Health-promoting interventions in prisons

An evidence review

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Research. Evidence. Action.

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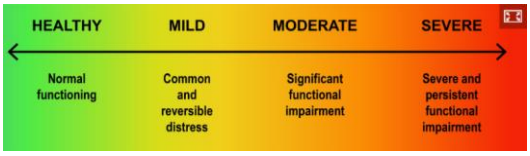
Abbreviations

Abbreviation	Explanation
AIDS	acquired immunodeficiency syndrome
AMSTAR	A MeaSurement Tool to Assess systematic Reviews
AMSTAR 2	A MeaSurement Tool to Assess systematic Reviews, Version 2
BDI	Beck Depression Inventory
BMI	body mass index
CASP	Critical Appraisal Skills Programme
CENTRAL	Cochrane Central Register of Controlled Trials
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CI	confidence interval
df	degrees of freedom
FEV1	forced expiratory volume in 1 second
FTND	Fagerstrom Test for Nicotine Dependence
GRADE	Grading of Recommendations, Assessment, Development and Evaluations
HADS-A	Hospital Anxiety and Depression Scale – anxiety subscale
HADS-D	Hospital Anxiety and Depression Scale – depression subscale
HIV	human immunodeficiency virus
HRB	Health Research Board
JBI	Joanna Briggs Institute
MD	mean difference
MeSH	Medical Subject Headings
NHANES	National Health and Nutrition Examination Survey
OR	odds ratio
PICO	population, intervention, comparison, and outcome
PRESS	Peer Review of Electronic Search Strategies
PRIOR	Preferred Reporting Items for Overviews of Reviews
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
PRISMA-S	Preferred Reporting Items for Systematic reviews and Meta-Analyses literature search extension
RCT	randomised controlled trial
RR	relative risk or risk ratio
STAI	State-Trait Anxiety Inventory
UK	United Kingdom
USA	United States of America
VC	vital capacity
WHO	World Health Organization

Glossary of terms

Term	Explanation
bias	Bias is a systematic overestimation or underestimation of an association in research. There are many types of bias, such as selection, recall, observer, and interviewer bias. Bias is minimised through good study design and implementation.
blinding	Blinding is a method used in research in order to ensure that the people involved in a research study – participants, clinicians, and researchers – do not know which participants are assigned to each study group, or which participants experienced the exposure or outcome of interest. Blinding is used in order to ensure that knowledge of the type of exposure, treatment, or diagnosis does not affect a participant's response to the treatment, a healthcare provider's behaviour, or an interviewer's approach to data collection.
before-and-after study	A before-and-after study (also called a pre-post study) measures outcomes in a group of participants before introducing a product or other intervention and then again afterwards. Any changes in the outcomes may be attributed to the product or intervention being studied. However, this type of study does not have a control group and does not control for changes over time. This study design cannot rule out that something other than the product or intervention being studied may have caused a change in outcomes.
body mass index	Body mass index (BMI) is a value derived from the mass and height of a person. BMI is defined as the body mass divided by the square of the body height, and is expressed in units of kilograms per metre squared, resulting from mass in kilograms and height in metres. For adults aged 20 years and over, the following BMI values apply: Under 18.5 Underweight 18.5–24.9 Healthy weight 25.0–29.9 Overweight 30.0 and over Obese
Bruce protocol	The Bruce protocol is a standardised diagnostic stress test used in the evaluation of cardiac function and physical fitness, and was developed by American cardiologist Robert A. Bruce. According to the original Bruce protocol, the patient walks on an uphill treadmill in a graded exercise test with electrodes attached to the chest to monitor the heart.
case-control study	A case-control study is an analytic observational epidemiological study which examines volunteer participants (cases) with an outcome (disease) back to exposure (cause) and compares their exposures with self-selected controls who do not have the disease (but are otherwise similar) in order to determine the odds that the exposure may have caused the disease. The odds ratio is the measure of choice in a case-control study. A case-control study can be used in order to identify exposures that cause rare diseases. Case-control studies contribute low-quality evidence to causality or disease aetiology. The main drawbacks in case-control studies are their potential for recall bias and their inability to calculate incidence.
chi square statistic	A chi-square ($\chi 2$) statistic is a test of association between the columns and rows that measures how a model compares to actual observed data. The data used in calculating a chi-square statistic must be random, raw, mutually exclusive, drawn from independent variables, and drawn from a large-enough sample.
cohort study	A cohort study is a form of longitudinal (analytic observational) epidemiological study in which a group of participants, called a cohort, is followed over a given period of time, and data relating to predetermined exposures and outcomes are collected on two or more occasions over this period. The incidence (new cases) of the outcome(s) of interest is calculated in the exposed participants and compared with the incidence in the non-exposed participants. This comparison of incidence is known as relative risk. The data for the cohort can be collected either by following the participants into the future (prospective study) or by asking them about their past (retrospective study). However, retrospective cohort studies are limited by recall bias. One of the indicators of a high-quality cohort study is a loss to follow-up rate of less than 20%. Cohort studies contribute to causality or disease aetiology and provide, at best, moderate-quality evidence.

Term	Explanation
confidence interval	A confidence interval is the range of values (for example, proportions) in which the true value is likely to be found with a degree of certainty (by convention, a 95% degree); that is, the range of values will include the true value 95% of the time.
control	A control is used when conducting an experiment to test an element or intervention. The control is the element that remains unchanged or unaffected by other variables. A control is the point of comparison against which other test results are measured.
cross-sectional survey	A cross-sectional survey or prevalence survey is a descriptive epidemiological study in which the presence or absence of both the exposure and outcome is assessed at the same point in time. This study type is vulnerable to the problem of which came first: the exposure or the outcome (likened to 'the chicken or the egg'), as both exposure and outcome are collected at the same point in time. These types of studies are often used to assess the prevalence of acute or chronic conditions; to inform health planning and evaluation; or to formulate a theory. It can be difficult to control for factors that may be related to the exposure and outcome in cross-sectional surveys, so they cannot be used to determine causality. They are sometimes included in the hierarchy of evidence and are considered to provide very low-quality evidence.
I^2	The I^2 statistic is the approximate proportion of total variability in point estimates that can be attributed to heterogeneity. Its value depends on the precision of included studies as well as their sample sizes, such that as studies increase in sample size, the I^2 statistic tends towards 100%. It is commonly classified as follows: I^2=25% or below: low heterogeneity I^2=26–74%: moderate heterogeneity I^2=75% or above: substantial heterogeneity
incidence	Incidence is a term used to describe the number of new cases of disease or events that develop among a population during a specified time interval.
L-carnitine	L-carnitine is a naturally occurring amino acid that helps the body turn fat into energy.
mean difference	The mean difference or difference in means is a standard statistic that measures the absolute difference between the mean value in two groups in an epidemiological study. It estimates the amount by which the exposure or intervention changes the outcome on average compared with the control.
Mental Health Continuum	The Mental Health Continuum is a way to think about mental health. All of us experience changes in our mood, changes in our level of anxiety – from life stressors or from crises – and those changes can be considered on a spectrum or a continuum. On this continuum, we can move from healthier to more disrupted levels of functioning and back. At each level, there are resources to promote health and reduce disruption. 
Modified Tiffeneau-Pinelli index	The modified Tiffeneau-Pinelli index is a calculated ratio used in the diagnosis of obstructive and restrictive lung disease. It represents the proportion of a person's vital capacity that they are able to expire in the first second of normal expiration (known as expiratory volume in 1 second (FEV1)) compared with the full forced vital capacity (FVC), calculated as the FEV1/VC ratio.
Moral Reconation Therapy	Moral Reconation Therapy is a form of cognitive behavioural intervention for reducing the risk of criminal recidivism by targeting criminogenic needs; in particular, it aims to reduce criminal thinking and criminal associations.
non-randomised trial	A non-randomised trial is an analytic interventional study in which an intervention is allocated by the researchers. The researchers allocate the participants to the intervention group, the comparator intervention group, or the placebo group. This trial design does not control for confounding variables and will have allocation bias. The participants are followed up on over a predefined length of time in order to determine the incidence of the outcome(s) in the intervention group compared with the comparator or control group; the difference in the incidence rate is then calculated. The interventions may be preventative or therapeutic. Data on

Term	Explanation
	confounding variables will need to be collected in order to control for confounding through stratification or regression.
odds ratio	An odds ratio is a statistic that quantifies the strength of the association between two events, A and B. The odds ratio is defined as the ratio of the odds of A in the presence of B and the odds of A in the absence of B, or equivalently (due to symmetry), the ratio of the odds of B in the presence of A and the odds of B in the absence of A.
overlap	Overlap between systematic reviews occurs when a single primary study is included in more than one systematic review evaluating the same outcome. For example, Review A and Review B both synthesise evidence on the effectiveness of an aerobic-based exercise intervention for ameliorating distress related to mental health, and both include Primary Study C. It is important to understand the degree of overlap between reviews, because the existence of a large number of reviews on a topic may give an inaccurate impression of the size of the body of evidence if many of the reviews are not independent but are instead based on the same relatively small number of primary studies. It is possible to calculate the degree of overlap between reviews (known as the 'corrected covered area').
placebo	'Placebo' is the name given to a substance which has no pharmacological effect but is administered as a control in testing the efficacy of a pharmacologically active preparation. Common placebos include inert tablets (sugar pills) or inert injections (sterile water or saline), which are designed to look and feel like the active substance being tested but do not contain any active ingredients.
peak oxygen pulse	Peak oxygen pulse is measured by dividing the predicted $\dot{V}O_2$ max by the predicted maximum heart rate.
prevalence	Prevalence is a term used to describe the proportion of people in a population who have a disease or condition at a specific point in time or during a specific period.
pulse oximetry	Pulse oximetry is a test used to measure the oxygen level or saturation of the blood.
Q	Statistical significance of differences between moderator variables is tested with the Q statistical method developed by Hedges and Olkin in 1985. In this method Q is divided in two as Q between (Q_b) and Q within (Q_w) and analyses are performed on these two different Q measures. Q_w tests the homogeneity within the moderator variable used while Q_b tests the homogeneity between the groups
randomised controlled trial	A randomised controlled trial (RCT) is an analytic interventional epidemiological study in which subjects are randomly assigned to one of at least two groups. The first group is the experimental group, which receives the intervention of interest, and the other group is the comparison or control group, which receives an alternative treatment (current conventional therapy or a placebo). The two groups are then followed up on to see if there are any differences between them with respect to the outcome(s) of interest. The results of the trial compare the incidence of success in the intervention group with that in the control group in order to assess the effectiveness of the intervention. RCTs are the most stringent study design for evaluating the effect of an intervention on an outcome.
relative risk or risk ratio	The relative risk or risk ratio is the ratio of the probability of an outcome in an exposed (or intervention) group relative to the probability of the outcome in an unexposed (or control) group, and it compares the incidence of the outcome in the exposed group with the incidence of the outcome in the unexposed group.
standard deviation	The standard deviation is a summary measure of the difference of each observation from the mean within a normal distribution. It measures the amount of variation or dispersion within a set of normally distributed values. A low standard deviation indicates that the values tend to be close to the mean of the set of values, while a high standard deviation indicates that the values are spread out over a wider range. For a normal distribution, around 68.0% of scores are within 1 standard deviation of the mean, around 95.0% of scores are within 2 standard deviations of the mean, and around 99.7% of scores are within 3 standard deviations of the mean.
statistical heterogeneity	Statistical heterogeneity is a quantifiable property that is influenced by the spread and precision of the effect size estimates included in a meta-analysis. Baseline heterogeneity can lead to statistical heterogeneity (for example, if effects differ between included populations), but this is

Term	Explanation
	not always the case. It is possible for a meta-analysis to display high statistical heterogeneity even if the included studies themselves are virtually identical.
$\dot{V}O_2$ max	$\dot{V}O_2$ max is the maximum rate or volume of oxygen consumption attainable during physical exertion. The name is derived from three abbreviations: '$\dot{V}$' for volume, 'O_2' for oxygen, and 'max' for maximum. It is usually normalised per kilogram of body mass.

Executive summary

Purpose of this overview of reviews

The overall objective of this overview of systematic reviews was to assess the extent to which certain non-pharmacological interventions aimed at promoting health and well-being among prisoners should be considered for implementation in Irish adult prisons. The eight categories of interventions assessed are:

1. Sports- and exercise-based interventions
2. Horticultural interventions
3. Yoga-, meditation-, and mindfulness-based interventions
4. Art and creative interventions
5. Animal-based interventions
6. Peer-based interventions
7. Smoking cessation interventions, and
8. Healthy eating and nutrition interventions.

Research questions

The following three research questions formed the scope of this overview of reviews:

1. What is the effectiveness of health-promoting interventions in prison settings in the short and long term?
2. Which factors influence the success and/or successful implementation of health-promoting interventions in prison settings?
3. What are the barriers to, and facilitators of, successful health-promoting interventions in prison settings?

Methods

We followed the established and recommended approach for this overview of systematic reviews, including setting a population, intervention, comparison, and outcome (PICO) question and eligibility criteria.

The literature searches for this overview of reviews included searches of four clinical databases, four systematic review resources, and one resource for open access, grey, and preprint material. We carried out reference and citation chasing, and we also searched for and followed up on review protocols and summaries. Our initial searches retrieved 1,609 results, and reference, citation, and protocol chasing retrieved an additional 3,299 results.

Two screeners carried out screening of article titles and abstracts. The same two researchers also carried out full-text screening. In addition to the standard exclusion criteria used in the first stages of screening (exclude on study type, intervention, date, etc.), we used three exclusion criteria that denote higher-quality systematic reviews during full-text screening: inadequate research question considering population, intervention, and outcome; inadequate literature search considering information sources and reproducible search strategies; and inadequate quality assessment/risk of bias assessment.

Two reviewers used the Health Evidence™ Quality Assessment Tool – Review Articles checklist in order to assess the methodological quality of each full-text review.

Three researchers used an adapted version of the Joanna Briggs Institute's Data Extraction Form for Review for Systematic Reviews and Research Syntheses in order to extract data on the descriptive characteristics and findings of each included systematic review. We extracted and documented the following data from each included review in tabular format: citation details; objectives of the review; participants; setting; interventions and comparators; search information; primary study date range; number of primary studies; primary study design; quality assessment/risk of bias tool used; quality assessment/risk of bias assessment results; results by outcome(s); and systematic review authors' assessment using Grading of Recommendations, Assessment, Development and Evaluations (GRADE). One researcher validated each extraction. We then summarised the main findings, identifying the effectiveness of, success factors for, barriers to, and facilitators of health-promoting interventions.

We also applied a modified GRADE algorithm to the effectiveness outcomes of the included systematic reviews in order to assess the certainty of the evidence. We used a common-sense methodology in order to assess the overlap of primary studies included in the systematic reviews for each outcome that was reported on for each intervention category. We had intended to use the Pieper *et al.* method to account for overlap, but we changed our approach when we saw how easily we could identify the overlap and deal with it within the narrative text and tables so as not to overestimate the quantity of evidence.

Findings

We identified 18 papers from 4,980 records that were suitable for data extraction covering 8 health-promoting interventions. Sixteen of the 18 included systematic reviews provided information on the effectiveness or benefits of health-promoting programmes in prison settings. Six of the 18 included systematic reviews provided information on factors associated with successful health-promoting interventions and/or their successful implementation in prison settings. Seven of the 18 included systematic reviews provided information on barriers to, and facilitators of, successful health-promoting interventions in prison settings.

Evidence of effectiveness

Based on the reviews we evaluated, there is some evidence to support the implementation of six of the eight categories of health-promoting interventions of interest in adult prison settings. These are: sports- and exercise-based interventions; yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions; smoking cessation interventions; and healthy eating and nutrition interventions (see Summary Table 2). The evidence to support intervention outcomes is of high, moderate, low, and/or very low certainty (see Summary Table 1). There is evidence that three of the eight categories of health-promoting interventions are effective in improving physical well-being among adult prison populations (sports- and exercise-based interventions; smoking cessation interventions; and healthy eating and nutrition interventions). There is evidence that four of the eight categories of health-promoting interventions are effective in improving mental well-being among adult prison populations (sports- and exercise-based interventions; yoga-, meditation-, and mindfulness-based interventions; art interventions; peer-based interventions). However, sports- and exercise-based interventions demonstrated positive improvements (albeit of mixed certainty) across most of the physical and mental health outcome categories assessed. The certainty of the evidence ranged from very low to high, which makes it difficult to draw strong conclusions regarding these interventions' actual effectiveness based on the evidence we evaluated. There are more detailed summaries with evidence

statements at the end of each subsection covering the eight categories of interventions (see Sections 4.2.1–4.2.8).

Summary Table 1 Certainty of evidence grades

Grade	Definition
High	We are very confident that the true effect lies close to the estimate of the effect.
Moderate	We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.
Very low	We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of the effect.

We found no usable evidence on any physical and mental well-being outcomes for horticultural interventions or for animal-based interventions. Furthermore, there was no evidence relating to some physical outcomes for yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; and peer-based interventions. In addition, there was no evidence relating to mental well-being for healthy eating and nutrition interventions. Considering these gaps in the available evidence, the implementation of health-promoting interventions in adult prisons would benefit from rigorous parallel evaluation studies in order to augment, update, and/or strengthen the current evidence base on the effectiveness of such interventions.

Success factors

The findings on success factors regarding the effectiveness and implementation of the interventions of interest are limited. Overall, it appears that art and creative interventions; animal-based interventions; and yoga-, meditation-, and mindfulness-based interventions may be more successful in addressing low mood, anxiety, and depression among older prisoners and female prisoners. Yoga-, meditation-, and mindfulness-based interventions may also reduce anger and hostility among prisoners, demonstrating such interventions' effectiveness. The success factors for sports- and exercise-based interventions included adequate indoor and outdoor facilities. In addition, relative to other sports- and exercise-based interventions, a 30-minute group aerobic exercise (such as running) of moderate to high intensity 5 days per week produced the most effective results for physical and mental health effectiveness outcomes. The systematic review evidence on peer-based interventions demonstrated that health-promoting interventions can be effectively delivered by prison peers, and prisoners with low levels of education in particular can benefit from such interventions. For sensitive or personal topics, prisoners preferred talking to peer educators over prison or professional staff. The selection criteria for recruiting peer workers in prison were consistent in the literature, and indicated that peer workers should be mature, drug free, literate, and serving longer prison sentences, and should have good communication skills and no history of security breaches.

Barriers

We have summarised the barriers to the success of health-promoting interventions in prison settings by stakeholder group, beginning with prison and criminal justice system management, then frontline staff, followed by peer workers, and ending with prisoners themselves.

The systematic review evidence indicated that there are several barriers to the successful implementation of effective health-promoting interventions at the prison and criminal justice system level, including a lack of resources; a lack of coherent planning leading to the unavailability and inaccessibility of health-promoting programmes; inadequate indoor and outdoor physical facilities due to

prison architecture; low retention of peer workers due to unplanned prisoner movements; a lack of enforcement of smoking bans; and increased security risks. The barriers in relation to frontline prison and healthcare staff are a lack of or inadequate support for staff at the system level; staff burnout; a lack of understanding and empathy among staff members towards mental health issues; staff resistance to peer workers; increased safety concerns; and increased security risks. There were two key barriers in relation to peer workers: a lack of boundaries between peer workers and other prisoners, and peer workers' susceptibility to criticism and abuse from other prisoners. There were many barriers with regard to the prisoner population. Prisoners reported that a lack of agency and self-determination, poor physical health, and unresolved life issues that led to apathy, powerlessness, stress, and anxiety ultimately hindered their engagement in health-promoting interventions. In addition, health-promoting interventions were not well advertised in the prisons, which led to low rates of prisoner involvement. There were also concerns about confidentiality between peer workers and other prisoners. Language barriers and a desire to avoid showing weakness in front of other prisoners were additional factors that impeded prisoners' uptake of health-promoting interventions.

Facilitators

We have summarised the facilitators of successful health-promoting interventions in prison settings by stakeholder group, beginning with prison and criminal justice system management, then frontline staff, followed by peer workers, and ending with prisoners themselves.

The systematic review evidence identified three facilitators of the successful implementation of effective health-promoting interventions in prisons: managerial support and investment, management support for external agencies that provided the health-promoting interventions, and the value for money of interventions that maximised the use of existing resources (such as peer workers, gyms, educational facilities, and kitchens). Several facilitators were identified at the frontline prison and healthcare staff level: prison staff involvement and support, buy-in among prison staff due to increased familiarity with the interventions, regular communication between all stakeholders, peer workers acting as mediators between the prison population and prison staff, and respectful relationships between prisoners and prison staff. The systematic review evidence also identified the following four key facilitators of the successful implementation of peer worker programmes: peer workers had a sense of purpose in prison; their peer work enabled them to avoid a feeling of boredom; peer workers established a role for themselves as mediators between prisoners and prison staff; and the existence of a referral mechanism for peer workers to 'pass on' issues to appropriate staff and services. The evidence also identified several facilitators for prisoners, including positive interpersonal relationships between prisoners, peer workers, and prison staff; health-promoting interventions empowering prisoners to develop new skills, including coping strategies and communication skills, in order to support their own mental health and well-being in varying situations; and the fact that those prisoners who have engaged in art, music, animal therapy, and/or gardening interventions have reported a newly found hope for the future.

Conclusion

Based on the reviews we evaluated, there is some evidence to support the implementation of six of the eight health-promoting interventions of interest in adult prison settings. These include sports- and exercise-based interventions; yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions; smoking cessation interventions; and healthy eating and nutrition interventions. However, there are gaps in the evidence with respect to some outcomes for yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions; and healthy eating and nutrition interventions. In addition, we found no usable evidence with regard to the effectiveness of horticultural interventions or animal-based interventions for

improving physical or mental well-being. Considering these gaps in the available evidence, the implementation of health-promoting interventions in adult prisons would benefit from rigorous parallel evaluation studies in order to augment, update, and/or strengthen the current evidence base on the effectiveness of such interventions. On the other hand, there are more substantial findings with regard to barriers and facilitators compared with the effectiveness findings, which can be used to help develop successful health-promoting programmes in prisons.

It is generally accepted that evidence-based practice is one of three equally important components for developing health-promoting interventions. The other two components are expertise and experience with health-promoting interventions, and stakeholders' values and circumstances. In prison settings, the stakeholders include prisoners, healthcare and prison security staff, prison management, and policy-makers.

Summary Table 2 Indicative findings

Intervention category	Single interventions (certainty of evidence)				Combined interventions (certainty of evidence)			
	Physical health		Mental health		Physical health		Mental health	
Intervention	Strength and fitness	Body and blood composition	Wellness	Distress	Strength and fitness	Body and blood composition	Wellness	Distress
Sports- and exercise-based	Improvement (very low and moderate certainty)	Improvement (low and moderate certainty)	Improvement (moderate certainty)	Improvement (low and moderate certainty)	Improvement (low and moderate certainty)	Improvement (very low and moderate certainty)	No effect (very low and low certainty)	Improvement (low certainty)
Horticultural	No data	No data	No data	No data	No data	No data	No data	No data
Yoga, meditation, and mindfulness-based	No data	No data	Improvement (low and moderate certainty)	Improvement (very low, low, and moderate certainty)	No data	No data	No data	No data
Art and creative	No data	No data	No data	Music: No effect (moderate certainty) Art: Improvement (moderate certainty)	No data	No data	No data	No data
Animal-based	No data	No data	No data	No data	No data	No data	No data	No data
Peer-based*	No data	No data	No effect (very low certainty)	Improvement (very low certainty)	No data	No data	No data	No data
Smoking cessation†	No data	Improvement (very low and low certainty)	No data	No data	No data	Mixed effects (very low certainty)	No data	No data
Healthy eating and nutrition	Improvement (low certainty)	Improvement (low certainty)	No data	No data	No data	Improvement (very low certainty)	No data	No data

Other outcomes measured:
* Peer-based interventions demonstrated largely **positive effects** on **knowledge and empowerment** outcomes among adult prisoners, and the certainty of evidence for this outcome was graded as low; **peer workers were also found to be as effective as or more effective than professional staff** with respect to knowledge and empowerment.
† Single smoking cessation interventions demonstrated largely **positive effects on smoking abstinence** (or negative effects on smoking relapse) among adult prisoners and ex-prisoners, and the certainty of evidence for this outcome was graded as moderate and low; these interventions also demonstrated **negative effects** on environmental cigarette smoking factors (increased **assaults on prisoners and staff**), and the certainty of evidence for this outcome was graded as low. Combined smoking cessation interventions demonstrated **mixed effects on smoking abstinence** among adult prisoners and ex-prisoners, and the certainty of evidence for this outcome was graded as low and high; these interventions also demonstrated **mixed effects** on environmental cigarette smoking factors (**passive smoking for prisoners and staff**), and the certainty of evidence for this outcome was graded as low and very low.

1 Introduction

The higher prevalence and risk of both physical and mental health issues among incarcerated people compared with the general population is well documented. For example, a 2022 report from the World Health Organization (WHO), which provides an overview of the performance of prison health systems in the WHO European Region based on data obtained via a 2020 survey collected from 36 countries, found that mental-health-related conditions were the most prevalent conditions among people in prison, affecting approximately one-third (32.8%) of the prison population. The data also showed that prisoners were at an increased risk of suicide and self-harm while incarcerated, with a suicide rate of 103.0 per 100,000 people in prison compared with a suicide rate of 39.5 per 100,000 people in the community [1]. This is supported by earlier reports indicating that the risk of suicide among people in European prisons was seven times higher than that of the general population [2]. Incarcerated people also tend to have a higher prevalence of infections compared with the general population, including infection with human immunodeficiency virus (HIV), the hepatitis B virus, the hepatitis C virus, other sexually transmitted infections, and tuberculosis [1,3], and they are also at an increased risk of all-cause mortality following release from prison, particularly in the early post-release period [4–6].

The determinants of mental and physical health outcomes among prisoners are complex and far-reaching. Incarcerated people are more likely to come from impoverished backgrounds, which are characterised by limited educational and vocational opportunities and a lack of social protections. These structural factors have been consistently linked to poor physical and mental well-being [7]. The incarceration period itself has also been shown to increase individuals' risk of developing physical and mental health issues [8]. Evidence has indicated that prisoners tend to have higher rates of exposure to communicable diseases [9] and are at an increased risk for experiencing trauma while incarcerated (e.g. due to violence and acute stress) [10], which puts them at risk for developing mental health issues, such as post-incarceration syndrome (a syndrome comparable to post-traumatic stress disorder) [11], or exacerbating existing mental health issues [12–14]. Ultimately, and as recently noted by Tesler *et al.*, "Maintaining the health of people living in prison is not only a matter of equal rights and humanitarian justice, but is of paramount importance to public health; maintaining their health is also a legal requirement, not a luxury" [15 p2].

1.1 Health-promoting interventions for prisoners

According to the WHO, the incarceration period offers a unique opportunity to tackle health and social disparities and to implement targeted physical and mental health-promoting strategies [16]. Since 2020, there has been an increased focus on examining the evidence for the WHO's Healthy Prisons Agenda from a settings perspective. This involves treating prisons as the settings in which a holistic approach to health promotion can be adopted by introducing and maintaining policies and practices that prioritise health promotion. Similar approaches have been taken in other settings, such as schools, hospitals, and organisations, wherein health promotion among the inhabitants of the setting is prioritised. However, thus far, there is an absence of evidence that the WHO's Healthy Prisons Agenda is being implemented in prisons on a consistent basis or that it is effective in improving outcomes for prisoners. According to Woodall:

> Unlike evaluative efforts in other health promoting settings, such as schools, there is little evidence to suggest that the health promoting prison model would or does 'work' or indeed pays dividends for health and well-being. It is a priority that continued efforts must be made to ensure that the relevance of settings-based health promotion within prisons is demonstrated in order for its future sustainability. The development and future of the health promoting prison is unclear. [17 p619]

Woodall [18] also points to the lack of robust evidence from rigorous evaluations with which to evaluate the effectiveness of the WHO's Healthy Prisons Agenda, and to a reliance on untested claims that in some prisons, the WHO's Healthy Prisons Agenda is having positive effects. In addition, Woodall highlights the challenges of evaluating health-promoting interventions, particularly those challenges that are specific to more complex settings such as prisons, which can be highly contextual:

> There is little robust evidence that suggests that the health-promoting prison concept improves health or addresses other outcomes. Although the accumulation of strategy documents and policy drivers in relation to the health-promoting prison has shown some promise in shifting perspectives on prison health away from a medical model toward a more holistic, social perspective of health, there has been minimal investment in evaluating the outcomes of the approach. These problems perhaps stem from the difficulties and challenges in evaluating health promotion interventions per se and the complications in evaluating setting-based strategies that are inherently holistic and ecological. However, unlike evaluative efforts in other health-promoting settings, such as schools, there is little evidence to suggest that the health-promoting prison model works or indeed pays dividends for health and well-being. This may be exacerbated by a reluctance of funding agencies to support a health promotion research agenda in prisons. [18 p859]

Despite the dearth of evidence available on health-promoting prisons from a settings perspective, there exists a growing evidence base from primary studies and systematic review research on the effectiveness of various individual non-pharmacological health-promoting interventions delivered in prisons. At the request of the Health and Wellbeing Unit in the Department of Health in Ireland, the Health Research Board (HRB) Evidence Centre undertook this overview of reviews in order to examine the evidence for the use of non-pharmacological interventions that promote the health and well-being of incarcerated individuals.

1.2 Purpose of this overview of systematic reviews

The overall objective of this overview of systematic reviews is to assess the extent to which certain non-pharmacological interventions aimed at promoting health and well-being among prisoners should be considered for implementation in Irish prisons. The findings of this overview will be used by the Health and Wellbeing Unit in the Department of Health, in collaboration with the Department of Justice and the Irish Prison Service, to inform the following:

- The health and well-being plan aimed at improving prisoner welfare in Ireland, and
- The World Health Organization (WHO) Healthy Prisons Agenda.

According to Ismail and de Viggiani, "The [WHO] introduced the Healthy Prisons Agenda in 1995 as a system-wide strategy for protecting and improving the health of prisoners … The Healthy Prisons Agenda advocates the 'whole-prison approach', a philosophy that prioritises the health of prisoners and that of the prison staff members and promotes an environment conducive for health to thrive" [19 p92].

An overview of the evidence base on successful interventions to promote health and well-being among prisoners will inform ongoing deliberations related to the next steps for advancing the WHO's Healthy Prisons Agenda in the Irish context.

1.3 Overview of review questions

Three research questions form the scope of this overview of reviews. These are as follows:

1. What is the effectiveness of health-promoting interventions in prison settings in the short- and long-term*?
2. Which factors influence the success of, and/or successful implementation of, health-promoting interventions in prison settings?
3. What are the barriers to and facilitators of successful health-promoting interventions in prison settings?

   * Long last effects were not strictly defined a priori but were interpreted to be after release from prison and more than 1 year after completion of the intervention for incarcerated participants.

For the purposes of this overview of reviews, we agreed eight categories of interventions that aim to promote physical and/or mental health and well-being with the Health and Wellbeing Unit in the Department of Health. These were chosen based on interventions of interest described by the Unit prior to the commencement of this overview, and on information retrieved during our preliminary scoping search of the relevant literature [20]. The eight categories of health-promoting interventions are:

1. Sports- and exercise-based interventions
2. Horticultural interventions
3. Yoga-, meditation-, and mindfulness-based interventions
4. Art and creative interventions
5. Animal-based interventions
6. Peer-based interventions
7. Smoking cessation interventions, and
8. Healthy eating and nutrition interventions.

Table 1 provides a more in-depth description of each intervention category. The DOH rationale for choosing the eight interventions was these were primary prevention interventions that would benefit all prisoners and were not yet formally introduced across the Irish Prison Service.

Table 1 Description of intervention categories of interest

Intervention category	Description
Sports- and exercise-based interventions	Coalter developed a typology to distinguish between the different types of interventions that incorporate sport and physical activity [21]. Depending on the prominence of sport within a given intervention, Coalter identified interventions as either 'sports-only', 'sports-plus', or 'plus sport' interventions [20,21]: • Sports-only: These types of interventions include "traditional forms of sport provision, which would, for example, include independent exercise in the prison gym, with an implicit assumption or explicit affirmation that the exercise has inherent developmental properties" [22 p52]; an example would be exercise training such as aerobic exercise (e.g. running) [23]. • Sports-plus: In these types of interventions, "sports are adapted and/or augmented with parallel programmes to overtly maximise development objectives" [22 p52]; one example is the United Kingdom's prison-based 'sports academies', in which coaching of football or rugby was used in order to engage young incarcerated men in education and training [22]. • Plus sport: In these types of interventions, "sport's popularity is used to attract participants to programmes of education and training, where the systematic development of sport is rarely an aim" [22 p52]. These include interventions in which the sport or exercise component is augmented with non-sport intervention components, such as skills classes [22]. Systematic reviews of any type of sports- or exercise-based intervention delivered in a prison setting, including combined/multi-component interventions involving a sports and/or exercise component, were eligible for inclusion in this overview of reviews.
Horticultural interventions	Horticultural interventions, including horticultural therapy and gardening interventions/programmes, can be defined as "a process, either active or passive, of purposefully using plants and gardens in therapeutic and rehabilitative activities designed to positively affect a set of defined health outcomes for individuals (e.g. improved mood, improved self-esteem, enhanced social interaction)" [24 p3]. Horticultural interventions encompass a broad range of activities, including both indoor and outdoor gardening (e.g. potting up plants), passive engagement with nature (e.g. viewing a garden through an open window), gathering natural elements, taking care of plants, and cooking with fresh herbs and vegetables [24,25]. Systematic reviews of any type of horticultural intervention delivered in a prison setting, including combined/multi-component interventions involving a horticultural component, were eligible for inclusion in this overview of reviews.
Yoga-, meditation-, and mindfulness-based interventions	Yoga, meditation, and mindfulness, while distinct categories of interventions delivered in order to enhance physical health and well-being, can intersect and are occasionally referred to collectively as adjunctive therapies [20,26]. Each intervention type are presented here: • Yoga aims "to reconstruct the balance between body and mind by using physical, psychological, and spiritual practices" [27 p2]. Yoga-based interventions tend to involve conscious, deep, and slow breathing while performing different body movements, and promote body awareness by encouraging participants to shift their focus to the body in still positions and to their feelings in the moment. Some forms of yoga conclude with meditation [27]. A particular type of yoga-based intervention called 'Krimyoga', which is based on a branch of yoga known as hatha yoga, is "a form of physical yoga that includes elements of relaxation specifically developed for use in correctional settings" [27]. • Meditation-based interventions involve a variety of practices, such as contemplation, open monitoring, and mantra repetition, that are intended to promote the development of more adaptive cognitive and affective functioning with the aim of enhancing positive traits, behaviours, and well-being [28,29].

Intervention category	Description
	• Mindfulness-based interventions involve "conscious maintenance of an open and non-judgemental awareness of the present moment" [28 p559]. Some examples of mindfulness-based interventions include: – Mindfulness-based stress reduction, which uses the formal practice of mindfulness meditation, such as body scan meditation, breathing meditation, and gentle yoga movement – Mindfulness-based cognitive therapy, which uses elements of cognitive behavioural therapy and mindfulness-based stress reduction in order to develop the ability to disengage from dysfunctional thoughts and promote positive behaviour change while practising mindfulness – Acceptance and commitment therapy, which seeks to promote psychological flexibility and is characterised by the capacity to confront challenging experiences openly and consciously while engaging in meaningful and valued activities, and – Dialectical behaviour therapy, which uses both acceptance strategies (i.e. mindfulness and distress tolerance) and change strategies (i.e. emotion regulation and interpersonal effectiveness) in order to achieve a balance of acceptance and change [30]. Systematic reviews of any type of yoga-, meditation-, and/or mindfulness-based intervention delivered in a prison setting, including combined/multi-component interventions involving a yoga, meditation, and/or mindfulness component, were eligible for inclusion in this overview of reviews.
Art and creative interventions	Various types of intervention can fall under the umbrella of art and creative interventions, including music-based and visual-arts-based interventions [20]. Some examples of art and creative interventions include: • An intervention known as Good Vibrations, which is a "prison-based Gamelan inspired music workshop involving education on musical pieces, learning how to improvise, composing an original piece of music, learning about Javanese culture and art, and a final performance" [31 p1023], and • An intervention known as Art Expression, which is a prison-based art programme consisting of six workshops, each of which features a planned art expression activity led by social workers and marriage and family therapists [31]. Systematic reviews of any type of art and creative intervention delivered in a prison setting, including combined/multi-component interventions involving an art and creative component, were eligible for inclusion in this overview of reviews.
Animal-based interventions	The American Veterinary Medical Association describes 'animal-based interventions' as a "broad term that is now commonly used to describe the utilization of various species of animals in diverse manners beneficial to humans" [32]. Examples of animal-based interventions include the following: • Animal-assisted therapy: This is a goal-directed intervention where the animal, which is required to meet specific predefined criteria, plays a central role in the treatment process. Delivered or overseen by qualified healthcare or human service providers, the goal of animal-assisted therapy is to enhance human physical, social, emotional, or cognitive function. It is adaptable to various contexts and can be conducted in groups or individually [32]. These activities tend to be highly standardised and organised in relation to the type and duration of activities, often with individualised goals for participants [32,33]. • Animal-assisted education: This is a structured intervention with specific academic or educational objectives, which is delivered or overseen by educational and related service professionals [32]. • Animal-assisted activities: These are activities that offer opportunities for motivation, education, or recreation with the goal of improving the recipient's quality of life. Delivered by specially trained professionals, paraprofessionals, or volunteers in association with animals that meet specific criteria, animal-assisted activities can be conducted in a variety of settings. These activities are generally poorly standardised in terms of the type and duration of activities [32,33].

Intervention category	Description
	Systematic reviews of any type of animal-based intervention delivered in a prison setting, including combined/multi-component interventions involving an animal component, were eligible for inclusion in this overview of reviews.
Peer-based interventions	Peer-based interventions involve "the provision of education, support or counselling between individuals who are of equal social status or who share similar characteristics or who have common experiences" [34 p6]. Peer-based interventions are often complex interventions that encompass several inter-related components in relation to the preparation, training, and supervision of peer workers, as well as in relation to managing the subsequent role of peer workers post-intervention and their interactions with peer intervention recipients [34]. A variety of different peer-based interventions have been developed and implemented across a range of settings, including in prison settings. Some examples include the following [34]: • Peer support: Peer support interventions pertain to the support exchanged between individuals who are of equal social status, or who share similar characteristics or experiences. Peer support can manifest itself through informational interactions between individuals or be delivered as a structured intervention, where peer support workers strive to promote health and enhance resilience against various stressors among support recipients. • Peer education: Peer education interventions involve the teaching and communication of health-related information and values, as well as health-promoting behaviours, between individuals who are of equal social status or who share similar characteristics or experiences. • Peer advisors: In prison settings, peer advisors typically offer housing information and guidance to fellow prisoners, particularly new prisoners and prisoners preparing for resettlement. • Peer mentoring: Peer mentoring involves the development of a relationship between two individuals, whereby the mentee is provided with opportunities to learn from the mentor, model positive behaviour, and acquire experience, knowledge, or skills. • Listener schemes: Listener schemes are typically aimed at the experience of distress, whereby volunteers provide confidential emotional support. Volunteers are selected, trained, and supported by the Samaritans or other community-based organisations to apply the principles of confidential, sympathetic listening in order to alleviate distress and reduce the incidence of self-harm and suicide among prisoners. • Prison hospice volunteers: These volunteers offer companionship, practical aid, and social support to prisoners in the final stage of terminal illness. They engage in various activities, such as writing letters, reading, and accompanying patients to religious services and other areas of the prison. Occasionally, they maintain a bedside presence for those nearing the end of life [34]:. Systematic reviews of any type of peer-based intervention delivered in a prison setting, including combined/multi-component interventions involving a peer intervention component, were eligible for inclusion in this overview of reviews.
Smoking cessation interventions	Smoking cessation interventions in prison settings typically fall into one of two categories: smoking bans, and smoking cessation programmes or smoking behaviour interventions [35]: • Smoking bans can be implemented in prison settings as either of the following types of bans: – Partial smoking bans, which are "designed to restrict smoking to particular places within a prison, usually, but not always, the cells, designated smoking areas or outside areas. These restrictions attempt to alleviate the civil rights issues around banning tobacco use in an environment where individuals are unable to leave the premises in order to smoke" [36 p291], and

Intervention category	Description
	– Complete smoking bans, which involve the prohibition of smoking anywhere in the institution [37]. • Smoking cessation programmes/smoking behaviour interventions delivered in prison settings commonly involve cognitive behavioural strategies to promote self-monitoring and coping skills, motivational strategies (e.g. motivational interviewing in order to explore and resolve ambivalence about changing one's smoking behaviour), educational strategies, and social strategies to address the social influences that perpetuate smoking behaviour [35,38]. Systematic reviews of any type of smoking cessation intervention delivered in a prison setting, including combined/multi-component interventions involving a smoking cessation component, were eligible for inclusion in this overview of reviews.
Healthy eating and nutrition interventions	Healthy eating and nutrition interventions in prisons aim to promote health and well-being by enhancing recipients' nutrition-related knowledge and behaviour and improving their diet quality [39]. Common types of healthy eating and nutrition interventions include education-based nutritional interventions and dietary supplementation [40,41]. Systematic reviews of any type of healthy eating and/or nutrition intervention delivered in a prison setting, including combined/multi-component interventions involving a healthy eating and/or nutrition component, were eligible for inclusion in this overview of reviews

2 Methods

2.1 Review design

This evidence review uses the overview of reviews (or umbrella review) design to examine the evidence base for non-pharmacological interventions that promote the health and well-being of prisoners living in a prison setting.

An overview of reviews synthesises findings from multiple systematic reviews, enabling reviewers to examine the evidence available with regard to the effectiveness of interventions and to identify whether the evidence base is consistent or contradictory. We chose an overview of reviews because our scoping searches indicated that the literature is already populated with a number of systematic reviews that are relevant to our review questions. The available reviews vary in design and conduct and comprise both Cochrane and non-Cochrane reviews. Therefore, it would be inappropriate to undertake an original systematic review while ignoring the existing evidence base from other systematic reviews. According to Aromataris *et al.,* "if current, multiple, good-quality, systematic reviews exist about a given topic or question, any reviewer should reconsider the need to conduct yet another review addressing the same issue. Rather, these [existing reviews] may be the basis to conduct an umbrella review and summarise or synthesise the findings of systematic reviews already available" [42 p365].

Undertaking an overview of reviews requires a systematic and transparent plan that follows a set of methods consistent with the approach adopted in a systematic review. According to McKenzie and Brennan, "Overviews involve the systematic retrieval and identification, assessment of bias, and integration of results from multiple systematic reviews. They have the potential to confer many benefits and opportunities. Notably, overviews capitalise on previous research synthesis efforts bringing efficiencies that may lessen research waste" [43 p185].

2.1.1 Overviews of reviews as an evidence-based product for policy-makers

Overviews of reviews have become feasible mainly due to the increasing volume of systematic reviews that are published on a regular basis in many subject areas. It is estimated that anywhere between 11 and 80 systematic reviews are produced daily. Indeed, according to Aromataris *et al.*, "The number of systematic reviews published to accommodate the demands of evidence-informed decision-making has increased markedly over the past two decades. One estimate [in 2015] suggests that 11 systematic reviews are published every day" [44 p133]. Hunt *et al.* estimated that around 22 new systematic reviews were published every day in 2018 [45] and, most recently, Hoffmann *et al.* reported a 20-fold increase in the number of systematic reviews published between 2000 and 2019, with up to 80 new systematic reviews being published per day in 2019 [46].

According to Gates *et al.*, "Around the turn of the century overviews of reviews, which compile data from multiple systematic reviews, emerged to deal with the growing volume of published systematic reviews. By taking advantage of existing syntheses, overviews of reviews can create efficiencies and answer broader research questions" [47 p2].

Systematic reviews are a recognised evidence-based product and are often used by policy-makers in their deliberations and decision-making. As systematic reviews are the exclusive unit of analysis in overviews of reviews, this means that overviews of reviews can contribute to evidence-based policy-making. According to Aromataris *et al.*, "With the ever-increasing number of systematic reviews published daily, umbrella reviews have a clear role in evidence-based healthcare and evidence-informed decision-making" [44 p139].

2.1.2 Definition of an overview of reviews

There have been numerous attempts to define the parameters of an overview of reviews. However, a recent consensus has emerged that agrees on the key elements. The definition of an overview of reviews, as cited in Gates *et al.* [47] and developed by the Cochrane Collaboration [48], comprises five key elements. Namely, an overview of reviews:

1. Contains a clearly formulated objective designed to answer a specific research question, typically about a healthcare intervention
2. Aims to search for and include only systematic reviews (with or without meta-analyses)
3. Uses explicit and reproducible methods in order to identify multiple systematic reviews that meet the overview of reviews' inclusion criteria, and to assess the quality/risk of bias of these systematic reviews
4. Sets out to collect, analyse, and present the following data from the included systematic reviews: descriptive characteristics of the systematic reviews and their included primary studies; the risk of bias of primary studies; quantitative outcome data; and the certainty of the evidence for predefined, clinically important outcomes, and
5. Discusses findings as they relate to the purpose, objective(s), and specific research question(s) of the overview of reviews, including a summary of the main results, the overall completeness and applicability of the evidence, the quality of the evidence, potential biases in the overview process, and agreements and/or disagreements with other reviews.

2.1.3 Purpose of undertaking an overview of reviews

The primary purpose of undertaking an overview of reviews is to provide an overall summary of the existing evidence on a given topic as reported in systematic reviews. This does not mean that such an output is meant to be an uncritical regurgitation of what is reported by the authors of the included systematic reviews; rather, the advantages of undertaking an overview of reviews include the opportunity for an in-depth examination of the review-based evidence in order to identify and resolve inconsistencies and contradictions across reviews of similar interventions and outcomes. In addition, reviewers can assess the nature and extent of the clinical and statistical heterogeneity across the review-based literature and discuss the implications for how such heterogeneity might affect our understanding of what is being studied and how it is studied. The following elaboration by Aromataris *et al.* encapsulates these and other prominent points:

> The principal reason for the conduct of an umbrella review is to summarize the evidence from multiple research syntheses …. Umbrella reviews are conducted to provide an overall examination of the body of information that is available for a given topic, and to compare and contrast the results of published systematic reviews. The wide picture obtainable from the conduct of an umbrella review is ideal to highlight whether the evidence base around a topic is consistent or contradictory, and to explore the reasons for the findings. Furthermore, an umbrella review allows ready assessment of whether review authors addressing similar review questions independently observe similar results and arrive at generally similar conclusions. [44 p133]

Additionally, McKenzie and Brennan state that the purposes of overviews of reviews include "mapping the available evidence, examining the effects of different interventions for the same condition or population, examining the effects of the same intervention for different conditions or populations (also

referred to as multiple-indication reviews) or examining reasons for discordance of findings and conclusions across reviews" [43 p185].

2.1.4 Overall methodological approach to undertaking this work

Our approach to undertaking this overview of reviews was based on a summary of overview methods guidance published by Gates *et al.* [47].

Each step taken in designing and conducting an overview of reviews requires careful consideration by the reviewers, and decisions taken should be primarily based on evidence, given that such decisions will ultimately affect the credibility of the findings. According to McKenzie and Brennan, "The choice of methods used in overviews may affect the trustworthiness of the findings, coverage of the evidence, and usability and usefulness of the overview, amongst other outcomes. Decisions as to which methods to use are best informed by methods research, along with theoretical considerations" [43 p186].

An important methodological factor to consider prior to undertaking an overview of reviews is review overlap; that is, what action to take when systematic reviews on the same topic include one or more identical primary studies [49]. In order to address the issue of overlap in this overview of reviews, we included the most recent update of each living review, and we intended to calculate the corrected covered area as a measure of overlap. The latter approach is recommended by Pieper *et al.*, who contend that "all producers of overviews should analyse the overlaps and report their analysis. Reporting should be done even if the amount of overlap is small and unlikely to have an impact on the conclusion. Otherwise, consumers will not know whether there is no meaningful overlap or if the authors simply did not [take] account of it. Consequently, overlaps should be reported by default" [50 p375].

2.1.5 Inclusion of non-Cochrane systematic reviews

Reports in the literature suggest that there are differences in the quality, coverage, and, ultimately, trustworthiness of systematic reviews undertaken following the Cochrane guidelines and systematic reviews undertaken outside the Cochrane guidelines. Gates *et al.* suggest that when undertaking an overview of reviews, reviewers must decide a priori if they will exclusively include Cochrane systematic reviews or both Cochrane and non-Cochrane systematic reviews. According to Gates *et al.*:

> The decision about whether to only include Cochrane systematic reviews or to also include non-Cochrane systematic reviews can be a balance between ensuring quality and coverage of all-important interventions. Though some non-Cochrane reviews can be of poorer methodological quality and have less detailed reporting, Cochrane reviews alone may not cover all relevant interventions or be adequately up to date. If authors choose to include both Cochrane and non-Cochrane systematic reviews, it is likely that they will need to deal with primary study overlap. However, this may occur even if only Cochrane systematic reviews are included. [47 p15]

We have used the decision tool developed by Pollock *et al.* to inform our decisions on the types of reviews to include in our overview of reviews [51]. This decision tool contains four questions to assist in our decision-making:

1. Do the Cochrane systematic reviews likely examine all relevant intervention comparisons and available data?
2. Do the Cochrane systematic reviews overlap?
3. Do the non-Cochrane systematic reviews overlap?
4. Are the researchers prepared and able to avoid double-counting outcome data from overlapping systematic reviews by ensuring that each primary study's outcome data are extracted from overlapping systematic reviews only once?

Pollock et al. provide guidance to help researchers answer each question, as well as empirical evidence regarding the advantages, disadvantages, and potential trade-offs of the different inclusion decisions.

We have included both Cochrane and non-Cochrane reviews in this overview of reviews in order to better capture the research on a broad range of health outcomes and conditions, as required by the review questions.

2.2 Protocol and reporting guidelines

We prepared a full protocol for this overview of reviews and registered it in advance on PROSPERO (registration number: CRD42023473432) [52]. This overview is reported in accordance with the Preferred Reporting Items for Overviews of Reviews (PRIOR) guidelines; see Appendix 1 for the PRIOR checklist [53].

2.3 Eligibility criteria

Our eligibility criteria are presented in Table 2. The population of interest was adult prisoners serving custodial sentences. Given the well-documented increased risk of mental-health-related and substance-related issues among incarcerated individuals [54], we did not exclude systematic reviews that specifically focused on (or included primary studies of) prisoners with mental health or substance use diagnoses, developmental or sensory issues, or any other social or health-related sample characteristics reported by the systematic review authors.

The interventions of interest to us were non-pharmacological interventions aimed at promoting the health and well-being of prisoners. For the purposes of this overview of reviews, we identified a core group of eight categories of interventions that were the exclusive focus of our overview, and these are outlined in Table 2. We agreed these eight categories of interventions during discussion with the relevant stakeholders prior to commencing the overview. No limits were established in relation to intervention duration, frequency, mode of delivery (e.g. peers, healthcare professionals, prison staff), intensity, dose, or follow-up duration. In addition, no limits were placed on the complexity of interventions; systematic reviews that reported on the delivery of combined or complex interventions were included, provided that one or more components of the intervention being evaluated were eligible for inclusion in this overview of reviews. We also did not impose restrictions on review eligibility in relation to intervention comparators; systematic reviews could include any context-specific comparator, comparison with standard or usual care, a no-treatment comparator, or no comparator (e.g. pre-post studies).

We were exclusively interested in outcomes relating to the physical, social, and/or mental/psychological emotional/ well-being of prisoners. We were not interested in outcomes relating to the reduction of recidivism, alcohol, or drug use, or relating to acute mental health diagnostics or treatment. We did not predefine more specific outcomes or outcome measures of interest because we anticipated that the

systematic review literature in this area would yield outcomes and outcome measures related to the physical, social, and/or mental/emotional well-being of prisoners that were highly heterogeneous. Therefore, the most sensible approach was to extract and map the more specific outcomes after we had identified the final set of included systematic reviews based on the eligibility criteria outlined in Table 2.

In relation to setting, only systematic reviews that included primary studies set in adult prisons were eligible for inclusion in this overview of reviews; systematic reviews of studies conducted in community settings (e.g. parole settings), hospital settings (e.g. emergency care settings), forensic settings (e.g. correctional psychiatric hospitals), and young offender institutions (e.g. juvenile detention centres) were excluded. Systematic reviews that focused on multiple settings (e.g. a systematic review that evaluated the effectiveness of an intervention of interest in adult prisons, forensic hospitals, and young offender institutions) were included, although only information pertaining to primary studies conducted in adult prisons was extracted. Notably, while systematic reviews of primary studies set in young offender institutions were considered to be outside of the scope of this review, systematic reviews that included primary studies involving young (i.e. adolescent) offenders were considered eligible for inclusion as long as the setting was described as, or implied to be, an adult prison and not a young offender institution.

In relation to study design, systematic reviews of randomised controlled trials (RCTs), non-randomised trials, controlled before-and-after studies, cohort studies, cross-sectional studies, and interrupted time series studies were all eligible for inclusion, as were mixed-methods, combined, or integrative systematic reviews that included eligible quantitative primary studies. In addition, mixed-methods reviews including both quantitative and qualitative data were eligible for inclusion, as were overviews of reviews and/or realist reviews.

The date limits chosen were from January 2012 to September 2023, based on guidance from the Joanna Briggs Institute (JBI) for overviews of reviews, which indicates that searching for reviews conducted over the 10 years prior to the overview will capture primary research conducted 30 or more years prior that has been included in the reviews identified [55]. The language limitations were a necessity, as none of our researchers speak another language fluently.

Table 2 Eligibility criteria for this overview of reviews, principally for Question 1

Domain	Inclusion criteria	Exclusion criteria
Population	Adults serving a custodial sentence	Persons not serving a custodial sentence Adolescents/young offenders serving custodial sentences in youth incarceration settings Ex-prisoners who received a relevant intervention post-release
Intervention	Sports- and exercise-based interventions Horticultural interventions Yoga-, meditation-, and mindfulness-based interventions Art and creative interventions Animal-based interventions Peer-based interventions Smoking cessation interventions Healthy eating and nutrition interventions Multi-component (i.e. combined/complex) interventions that include one of the intervention types listed above as an intervention component	Pharmacological interventions, psychotherapy interventions, psychoeducational interventions, and other interventions not classified as one of the eight categories of interventions identified for inclusion
Comparator	Any context-specific comparator Standard or usual care No treatment comparator No comparator (e.g. pre-post studies)	Not applicable
Outcome	Physical well-being Social well-being Mental/emotional well-being Psychological well-being	Recidivism-related outcomes Substance-use-related outcomes Outcomes related to the diagnosis of mental health disorders which necessitates formal treatment Outcomes related to a reduction in the symptomatology of diagnosed mental health disorders Economic well-being outcomes Cost-effectiveness outcomes
Context	Adult prisons Institutions where adults are serving a custodial sentence	Community settings (i.e. community homes, primary care, outpatient clinics, or care homes/nursing homes) Hospital settings (acute hospital or emergency care, general medicine, or geriatric care settings) Forensic settings that treat mental illness Youth incarceration settings

Domain	Inclusion criteria	Exclusion criteria
Study design	Peer-reviewed systematic reviews (with or without meta-analyses) reporting on any type of primary study design, including RCTs, non-randomised trials, controlled before-and-after studies, cohort studies, cross-sectional studies, case studies, and interrupted time series studies Peer-reviewed mixed-methods, combined, or integrative systematic reviews (with or without meta-analyses) reporting on any type of primary quantitative or qualitative study design Peer-reviewed mixed-methods reviews including both quantitative and qualitative data	Systematic reviews based on searches of only one bibliographic database Systematic reviews that do not report at least one grey literature search and/or supplementary search Systematic reviews without a quality/risk of bias assessment of all their included studies, or reviews that used an inappropriate tool for assessment (e.g. tools such as the Critical Appraisal Skills Programme (CASP) checklists that are study design checklists, not quality assessment tools) Overviews of reviews and/or realist reviews Conference proceedings Abstracts Papers published in the letter-to-editor format Systematic review protocols Grey literature Scoping reviews Mapping reviews Primary studies
Date	Systematic reviews published between January 2012 and September 2023	Systematic reviews published before January 2012
Language	English	Non-English languages

2.4 Search methods for the identification of reviews

2.4.1 Identifying research evidence

The planned structure of the literature search for this overview of reviews included a comprehensive search of bibliographic databases in order to identify as many of the relevant published syntheses on the review topic as possible. Following the selection of a set of papers that met our inclusion criteria, we undertook reference, citation, and protocol chasing in order to attempt to identify any further relevant research. The references from a previous review by the Scottish Government were also screened [20]. The literature search strategies were developed by an information specialist (LF) and were peer reviewed by a second information specialist (AF).

The type of evidence required in order to carry out an overview of reviews is limited to systematic reviews only [55]. Therefore, the type of evidence sources to be used for the information search focused on sources likely to contain systematic reviews and meta-analyses, as well as standard clinical evidence resources. The range of sources was as wide as possible given the time frame of the overview, and included systematic review databases/registries, clinical databases, and systematic review summary resources.

Aromataris *et al.* suggest that a broad search is appropriate for an overview of reviews [55]. This was the approach used for our search. The aim of our search strategy was to maximise sensitivity (capturing as much relevant material as possible, at the cost of including irrelevant material) over specificity (all material captured is relevant, at the cost of excluding some relevant material). A multiple-stage screening process was used in order to filter out the irrelevant material (title/abstract and full-text screening) in preference to using a more tightly focused search process that might inadvertently exclude relevant papers.

2.4.2 Literature search concepts

The search strategy for this review was designed primarily to answer research Question 1: What is the effectiveness of health-promoting interventions in prison settings in the short- and long-term?

'Health-promoting interventions' is a very broad concept, and initial scoping searches demonstrated that this broad concept was unlikely to retrieve a sufficient number of systematic reviews with which to answer the research question. Following consultation with the Department of Health and analysis of the Scottish Government's recent rapid review on the subject of health and well-being interventions in prisons [20], we designed search strategies to describe the eight categories of interventions already identified in the research literature:

1. Sports- and exercise-based interventions
2. Horticultural interventions
3. Yoga-, meditation-, and mindfulness-based interventions
4. Art and creative interventions
5. Animal-based interventions
6. Peer-based interventions
7. Smoking cessation interventions, and
8. Healthy eating and nutrition interventions.

The two basic concepts around which the search was constructed were 'prisoners' and a named intervention of interest (e.g. sports- and exercise-based interventions, or yoga-, meditation-, and mindfulness-based interventions). A search strategy was developed for each of the eight intervention categories.

The population of interest in this case was adults serving a custodial sentence. The intervention of interest was a list of eight known broad intervention categories or any unknown intervention that fulfilled the inclusion criteria, and the comparator was any alternative intervention. Outcomes were not included as a search concept, as the outcomes were not strictly defined in the population, intervention, comparison, and outcome (PICO) parameters, and, more importantly for the search process, outcomes may not necessarily be included in the database-indexed fields of an article and so may not be 'findable'. The *Cochrane Handbook for Systematic Reviews of Interventions* notes that it may not be helpful to include all aspects of a research question in a search strategy and recommends basing the search on population (or condition), intervention, and study design [56].

The two main concepts for our search were combined in order to capture reviews referring to any interventions used to promote health among prisoners in a prison setting (Figure 1). A further broad concept was included in the search: the concept of evidence syntheses, including systematic reviews, syntheses of empirical research, and meta-analyses.

Search limits in the form of date and publication type were also included. The term 'review' encompasses many types of reviews [57], and not all of these types of reviews would have contributed meaningful data to the analysis for this overview of reviews. Therefore, only reviews that satisfied the Health Evidence™ Quality Assessment Tool – Review Articles [58] checklist were included in the final analysis.

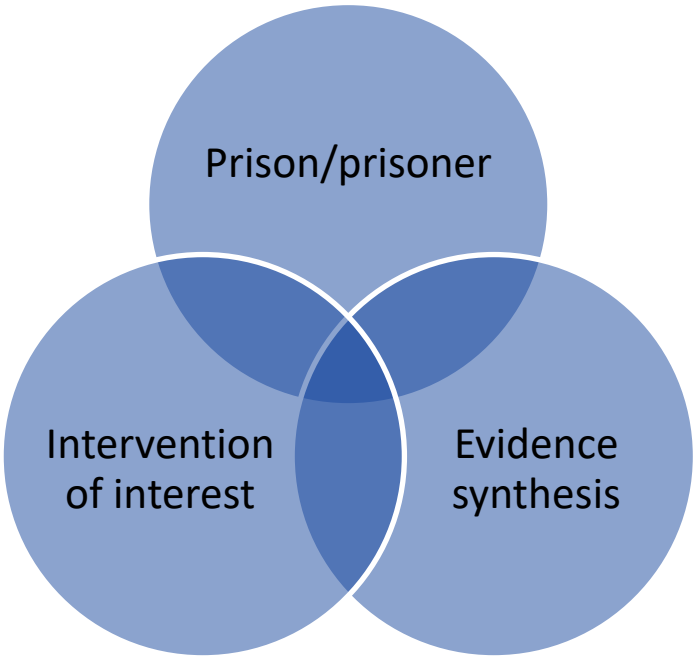


Figure 1 Graphic representation of the search concepts

2.4.3 Information sources

A range of information sources was used, including clinical databases and systematic review resources. The literature searches for this review included searches of four bibliographic databases (EBSCO MEDLINE, EBSCO Cumulative Index to Nursing and Allied Health Literature (CINAHL), EBSCO SocINDEX, and Ovid APA PsycInfo) and four systematic review resources (the Cochrane Library, Epistemonikos, and McMaster University's Social Systems Evidence and Health Systems Evidence databases). We carried out a search of PROSPERO, the international prospective register of systematic reviews, as part of the supplemental searches in order to identify missing reviews or relevant protocols for reviews that may inform our findings. A complete list of the resources searched is set out in Appendix 2.

2.4.4 Search terminology

The initial search strategy was developed in EBSCO MEDLINE. For both the 'prisoner' and 'intervention' search concepts, related relevant terms and thesaurus/controlled vocabulary terms were sourced using the National Library of Medicine's Medical Subject Headings (MeSH) Browser [59], known relevant articles, and the Scottish Government's report on prison-based health and well-being interventions [20]. Search terms included controlled vocabulary (MeSH terms) and 'free terms' or keywords. Boolean operators, adjacencies, and wildcards were used in order to focus the search terms. After testing the search terms using EBSCO MEDLINE searches, we combined the two sets of search terms (encompassing the 'prisoner' and 'intervention' search concepts). We added a systematic review filter to the search, as well as a date range from 2012 to September 2023, as per the JBI guidance on date limits for overviews of reviews. The full search strategy used is described in Appendix 3.

Regarding publication date cut-offs, the JBI guidance for overviews of reviews suggests that a cut-off date of research published in the 10 years prior to the overview will be likely to capture primary research published within approximately the previous 30 years [55]. In line with this guidance, we selected a date range of 2012–2023 for published research and implemented this in our literature search.

We translated the search strategy for use in the other databases (such as EBSCO CINAHL) and resources. Complex Boolean searching was not possible for some evidence sources used, and so we used abbreviated searches for those sources instead.

We combined the search concepts using Boolean operators in those databases where this facility is available (for example, EBSCO MEDLINE and EBSCO CINAHL). The broad structure of the search was as follows: (all terms for prisoners or prisons) AND (all terms for a named intervention) AND (systematic review filter) AND (date limit).

For information resources not providing Boolean search options, we combined the terms in the search facility provided or used appropriate free text terms. In some cases, we carried out abbreviated searches where more structured searches were not possible.

Some terminology that was included in the search may appear to be redundant, as it may seem to duplicate other terms used or may return no results. The inclusion was deliberate, however, and was designed to show that such terms were included and returned no results, rather than these terms being omitted with no knowledge gained as to whether they would be useful or not [60]. These terms may also play a role in future iterations of this or related work.

The search strategy was informally peer reviewed by a second information specialist (AF) using the headings of the Peer Review of Electronic Search Strategies (PRESS) checklist, which is outlined in the PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Explanation and Elaboration document [61].

2.4.5 Search limiters

The eligibility criteria for this review included a specification that papers in languages other than English would not be examined. However, we did not use a language limit within the search strategy. The databases that we used primarily index English-language research, and the addition of a language filter was not considered necessary, as the expected low number of non-English-language papers would be more accurately filtered out during the screening process.

No limits were included for subject ages, although the population of interest was limited to adults. The age of participants was established more precisely at the data extraction and synthesis stage rather than through the search process.

2.4.6 Supplemental searching

2.4.6.1 Protocol/reference/citation searching

There is evidence that reference searching would likely be useful; a previously published Cochrane review examined the use of reference searching for systematic reviews and found positive results, although these were derived from weak study designs [62]. Reference and citation searching of studies that were retrieved during initial searches has been incorporated into the search plans of previous HRB reviews, with variable but generally positive results. The process is not without drawbacks – it is time-consuming; it may result in a bubble effect where the same authors reference and cite each other; and there are differences in the 'retrievability' of citations between journal articles (which use digital object identifier numbers in cross-references) and reports (where citations are not so easily identified) – but it can be useful, especially in the retrieval of newly published articles, including those not indexed in databases (e.g. reports, grey literature) or articles indexed in databases other than the ones used in our search strategy.

Supplemental searching was carried out in January 2024 by the information specialist (LF). We used citationchaser, an R package and Shiny app for forward and backward citation chasing in academic searching, in order to extract the article citations and references from all included reviews [63]. Relevant papers were identified during the screening process and were tracked in order to find the related systematic reviews where these had been published. In addition, we identified 13 scoping reviews in the database searches and supplemental searches. We also used citationchaser in order to forward and backward citation chase within the scoping reviews. We used a brief search in PROSPERO in order to identify other protocols that may have been relevant to our overview of reviews.

The results of these searches were deduplicated, and preliminary screening was carried out by the information specialist (LF) using the inclusion/exclusion criteria outlined in Table 2. The prescreened results were then examined by the researchers (MK and LM).

2.4.6.2 Search dates

We carried out our initial database searches in September 2023. We carried out our supplemental searches, comprising protocol follow-up and reference and citation searching of reviews selected from the screening process, in January 2024.

2.4.6.3 Search data management

We exported our search results to EPPI-Reviewer Web for deduplication and screening. Screening was carried out in several steps [64]. We carried out data extraction using Microsoft Word, as described in Section 2.6.

2.5 Screening

2.5.1 Screening stage 1: Title and abstract screening

All database search results were imported into EPPI-Reviewer Web for title and abstract screening by two members of the review team (MK and LM) using the eligibility criteria outlined in Table 2. The reasons for exclusion included search dates, study type, population, intervention, and duplication. Citations and abstracts were retained if not enough information was available for the review team to decide on inclusion or exclusion.

For the purposes of this review, EPPI-Reviewer Web's priority screening was set to the 'Multiple: auto complete (code level)' reconciliation mode. Using this option, EPPI-Reviewer Web marked the coding as complete if there was agreement between the two reviewers. Differences of opinion between reviewers were reconciled through discussion and consensus between the two reviewers or via consultation with a third team member (LF). This process continued until all abstracts had been screened.

2.5.2 Screening stage 2: Full-text screening

Following title and abstract screening, relevant articles were retrieved for full-text screening. Each full-text paper was independently reviewed by two reviewers (MK and LM) using the eligibility criteria outlined in Table 2. At this stage, we implemented minimum criteria related to certain aspects of the methodological quality and completeness of reporting of the systematic reviews, which are also outlined in Table 2. Specifically, reviews were excluded if they had an inadequate or absent description of:

- The population, setting/context, and intervention(s) of interest
- The literature search, or
- The quality/risk of bias assessment process undertaken by the review authors.

We had previously implemented these minimum criteria in three of the HRB's recent overviews of reviews [65–67] in order to try to ensure a certain methodological standard among the systematic reviews brought forward to the data extraction stage.

The concept of what constitutes an adequate literature search is not fixed, and given the variety of resources appropriate for different topics, deciding what can be considered an adequate or comprehensive search is not an exact science [68]. In this case, an adequate search was understood to include, at a minimum, the following steps:

1. The use of at least two databases, an attempt to describe the search (varying from including a few keywords to providing a complete list of all search strategies used),
2. The use of at least one grey literature or supplemental search method. The supplemental search methods could include the use of trial registries, hand-searching of journals, reference and citation chasing, and making contact with subject matter experts, authors, etc. As searches of the Cochrane Library include searches of both Cochrane systematic reviews and the Cochrane Central Register of Controlled Trials (CENTRAL) (which derives records from, among other resources, ClinicalTrials.gov and the World Health Organization's International Clinical Trials Registry Platform), the use of the Cochrane Library in our searches is technically permissible as both a supplemental search and a database search source.

It must be stressed that these two factors were used as parameters to establish minimum standards for searches to include systematic reviews in this overview of reviews. These two factors should not be taken to indicate a comprehensive search, which should have included and reported the elements described in

the extended version of the Preferred Reporting Items for Systematic reviews and Meta-Analyses literature search extension (PRISMA-S) reporting guide for reporting literature searches [69].

The quality/risk of bias assessment exclusion criterion was that a quality/risk of bias assessment must be completed using a standard tool and that the result of the quality assessment for each primary study must have been reported for each domain in the selected tool. Reviews that used study design checklists were excluded. Reviews that did not provide a quality assessment for each included primary study were also excluded.

At all stages of our overview, records that were published in a language other than English (e.g. but that appeared in our search results due to their use of English-language abstracts or keywords) were retained in order to recognise that the English-language literature is not the total extent of the research on this topic. A list of the excluded papers and their reasons for exclusion at the full-text screening stage are provided in Appendix 4.

2.5.3 Screening stage 3: Screening during data extraction

All papers meeting the eligibility criteria outlined in Table 2 were forwarded to the data extraction stage of the review process. Each full-text paper was independently extracted by a reviewer and the extraction corroborated by another reviewer (MK, JL and LM) using the eligibility criteria outlined in Table 2. During extraction, some additional papers were removed because, after closer inspection, it was decided that they did not fit the criteria of this overview (young offenders or their institutions included in analysis); this left 18 systematic review papers for inclusion. A list of the excluded papers and their reasons for exclusion are provided in Appendix 4; reasons for exclusion included incorrect study design (including scoping reviews), excluded on topic or intervention, and exclusion on inadequate quality/risk of bias assessment.

2.5.4 Screening stage 4: Supplemental search results

As noted in Section 2.4.6 on supplemental searching, the results of supplemental searches (reference and citation chasing and protocol follow-up) were initially screened by the information specialist (LF). Initial screening was done by title and abstract. The results of this screening were then compared with the database search results. We excluded any results arising from supplemental screening which had also arisen in the database search results and which had been screened previously. A final set of potential results was screened on title and abstract by two researchers (MK and LM). The full text of all papers marked for inclusion was retrieved, screened, and extracted as described in Sections 3.1 and 3.2.

2.6 Data extraction

We used an amended version of the JBI data extraction form [70] (see Appendix 5) for systematic reviews and research syntheses in order to extract data from each included systematic review. One overview author undertook the data extraction for each review (MK, LM, or JL) and a second author validated it for accuracy and comprehensiveness (MK or LM). We extracted and documented the following data from each included review in tabular format: citation details, objectives of the review, participants, setting, interventions, comparators, search information, study date range, number of primary studies, study design, quality assessment/risk of bias tool used, results of quality assessment/risk of bias assessment (including publication bias), analysis methods, outcomes assessed, and results by outcome. Our amendments to the tool included additional notes (in order to ensure that all reviewers undertaking extraction made decisions using the same parameters), as well as additional items for extraction in order to capture data required for quality assessment (see Section 2.7).

Data were extracted at the level of the included systematic reviews only, not at the level of the primary studies included therein.

2.7 Quality assessment

We used the Health Evidence™ Quality Assessment Tool – Review Articles checklist in order to assess the methodological quality of systematic reviews [71]. This tool includes 10 items which, when rated and summed, provide an overall quality score that classifies reviews as methodologically weak (1–4 out of 10), moderate (5–7 out of 10), or strong (8–10 out of 10). This enables reviewers to build quality rating into a broader discussion within the overall evidence claims in an overview of reviews. We chose to use this tool because it is suitable for assessing the quality of both quantitative and qualitative reviews, and/or the quantitative and qualitative components of mixed-methods reviews, thereby avoiding the need to switch between multiple instruments when considering reviews with different designs and types of data.

We implemented minimum criteria for each item in order to ensure that the reviewers adhered to a common standard when assessing the quality of the included systematic reviews. Two reviewers independently applied the tool to each included systematic review, and discrepancies in scores were resolved through discussion. The full Health Evidence™ Quality Assessment Tool – Review Articles checklist, including our minimum criteria for each item, is available in Appendix 6.

2.8 Synthesis of results and rating the evidence of effectiveness outcomes

2.8.1 Collecting and presenting data on the characteristics of included reviews

As described in Section 2.6, we used the JBI data extraction form for systematic reviews and research syntheses [70] (see Appendix 5) in order to extract review characteristics and data from each included systematic review.

We documented descriptive data on the review characteristics in tabular form. For each included systematic review, we present the extracted data in two formats: a high-level summary that takes account of the quality of the evidence, which is presented in the main report; and a detailed, structured summary that is presented in the appendices to the main report (see Sections 3.2.1–3.2.8 and Appendix 7). The main report also presents information on the overlap of primary papers evaluating the same intervention for the same outcomes across one or more included systematic reviews (see Sections 3.2.1–3.2.8).

2.8.2 Collecting, analysing, and presenting outcome data

The a priori outcomes specified in the protocol for this overview of reviews were intentionally wide-ranging in order to ensure that evidence was captured from the interventions of interest on any outcomes related to the physical, social, and mental/emotional well-being of prisoners (Table 2). We extracted all outcomes considered relevant to these aspects of well-being from each systematic review, noting whether outcomes were identified as primary or secondary outcomes of interest by the systematic review authors in the detailed structured summaries of the included systematic reviews (i.e. the data extraction forms; see Appendix 7 and Appendix 8). In the Findings section of this report (Section 3.2 and Appendix 8), we describe the findings for the intervention outcomes that were considered the most relevant to the physical, social, and mental/emotional well-being of prisoners (i.e. physical or mental well-being) (see Sections 3.2.1–3.2.8 and Appendix 8); findings for the remaining outcomes can be found in the detailed structured summaries of the included systematic reviews (see Appendix 7).

We reviewed all outcomes related to physical, social, and mental/emotional well-being of prisoners, and categorised them into two overarching physical well-being outcomes and two overarching mental well-being outcomes for sports- and exercise-based interventions; yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions, healthy eating and nutrition interventions. Peer-based interventions have one additional mental health outcome titled ‘knowledge

and empowerment' as it was essential to present this effect of peer-based education. There are internationally agreed outcomes for smoking cessation, and we used these for the smoking cessation intervention. We extracted, analysed, and reported separately on the well-being outcomes of single interventions (e.g. sports- and exercise-based interventions alone) and on the well-being outcomes of combined or multi-component interventions (e.g. sports- and exercise-based interventions that incorporate an educational component) in Sections 3.2.1–3.2.8 of this report. The outcomes assessed by intervention are presented in Figures 2–4.

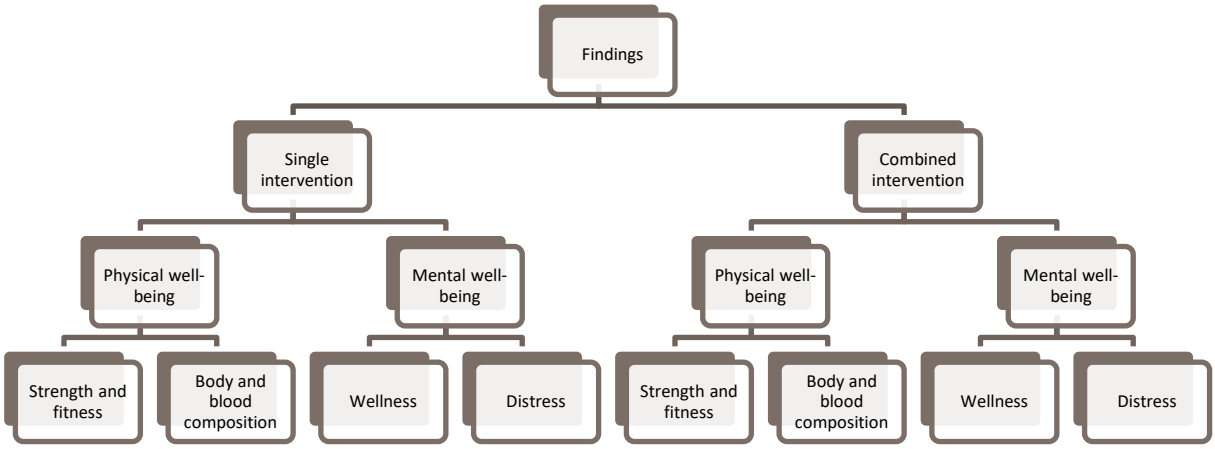


Figure 2 Outcomes for sports- and exercise-based interventions; yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; Healthy eating and nutrition interventions

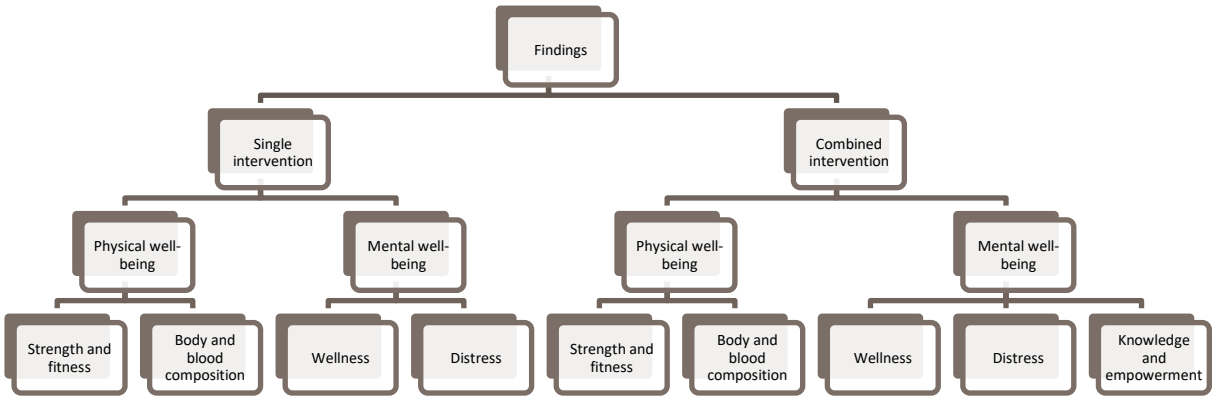


Figure 3 Outcomes for peer-based interventions

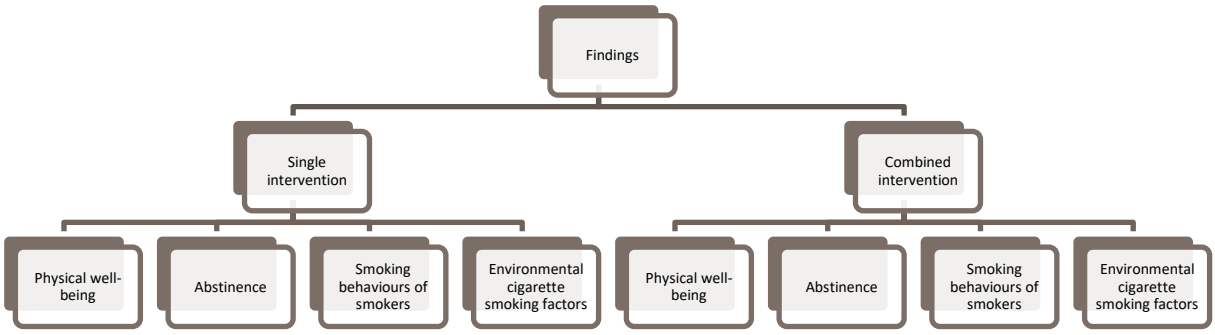


Figure 4 Outcomes schema for smoking cessation interventions

Rather than using a narrative synthesis approach in order to analyse the data, we chose to report the results for well-being outcomes in each intervention category in an aggregate format as presented by the authors of the included systematic reviews, taking into account any discordant findings, highlighting overlaps between reviews, and assigning a certainty of evidence rating. This decision was taken due to considerable variation in the nature of both the interventions being delivered and the conceptualisation and measurement of outcomes across the included systematic reviews within the intervention categories.

2.8.3 Collecting and analysing success factors

As described in Section 2.6, we used the JBI data extraction form for systematic reviews and research syntheses [70] (see Appendix 5) in order to extract factors influencing the success of, and/or successful implementation of, health-promoting interventions in prison settings. The specific factors for successful health-promoting interventions in prison settings were obtained from regression and other statistical models examining factors that influence outcomes, or they were ascertained from qualitative and observational studies based on qualitative analysis. The factors influencing the success identified in the full text papers were coded and grouped.

2.8.4 Collecting and analysing barriers and facilitators

As described in Section 2.6, we used the JBI data extraction form for systematic reviews and research syntheses [70] (see Appendix 5) in order to extract barriers to and facilitators of successful health-promoting interventions in prison settings. The barriers and facilitators identified in the full text papers were coded and assigned to a stakeholder group. Then they were analysed by stakeholder group: i.e. prison and criminal justice system management; frontline security and healthcare staff; peer workers; and prisoners.

2.8.5 Overlapping reviews

Overlap occurs between systematic reviews when a single primary study is included in more than one systematic review evaluating the same outcome. For example, Review A and Review B both synthesise evidence on the effectiveness of an aerobic-based exercise intervention for ameliorating distress related to mental health, and both include Primary Study C. It is important to understand the degree of overlap between reviews, because the existence of a large number of reviews on a topic may give an inaccurate impression of the size or consensus of the body of evidence if many of the reviews are based on the same relatively small number of primary studies.

Pieper *et al.* developed a methodology to assess the overlap of primary studies between systematic reviews of the same interventions [50], which they termed the 'corrected covered area'. We originally intended to use this measure for each effectiveness outcome in order to assess the overlap of the same primary studies across more than one systematic review. Pieper *et al.* grade the percentage of overlap as low (0–5%), moderate (6–10%), high (11–15%), and very high (16% and over) so that reviewers can categorise the degree of overlap [50]. We intended to use this method, but changed our approach when we saw how easily we could identify the overlap and deal with it within the text and tables so as not to overestimate the quantity of evidence and render overlap easier to understand for the reader.

We identified a small number of systematic reviews for each intervention category and a small number of outcomes, which meant that the degree of overlap of primary studies was easily identified when we were preparing our summary analysis in table and text formats. Therefore, in order to address the issue of overlapping primary studies between systematic reviews in this overview of reviews, we identified systematic reviews that included the same primary studies which evaluated the same outcomes in our outcome tables and summary analysis, and have presented their findings together but mentioned each primary study only once in the text and reported that it had been covered by more than one systematic review. Where there were inadequate or discrepant data on a single primary study included across multiple systematic reviews, we reported the more detailed data from the better-quality review. Where there were inadequate or discrepant data on a single primary study included in a single systematic review, we excluded the primary study findings from our summary text-based analysis.

2.8.6 Assessing the certainty of the evidence of outcome data

2.8.6.1 The Grading of Recommendations, Assessment, Development and Evaluations approach

The *Cochrane Handbook for Systematic Reviews of Interventions* recommends using the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach for assessing the certainty (or quality) of a body of evidence [72]. While the Health Evidence™ Quality Assessment Tool – Review Articles checklist that is described in Section 2.7 assesses the methodological quality of individual systematic reviews, the GRADE approach is used in order to rate the certainty of the body of evidence for each outcome across all reviews that report on that particular outcome. In order to illustrate the distinction, a systematic review can be of high methodological quality (e.g. it could use a comprehensive search, rigorous data extraction, and appropriate synthesis techniques) but identify only low- or very low-certainty evidence for the outcome(s) of interest (e.g. due to a lack of RCTs, primary studies having small sample sizes, or the presence of a high or uncertain risk of bias in primary studies).

Applying the GRADE approach is often referred to in the literature as assessing the quality of the evidence; however, in order to clarify the distinction between assessing the methodological quality of the systematic reviews themselves (using the Health Evidence™ Quality Assessment Tool – Review Articles checklist) and assessing the quality of the evidence for the outcome(s) of interest from each systematic review, we will henceforth refer to the GRADE approach as an assessment of the certainty of the evidence for each type of outcome within each intervention category.

Under the GRADE approach, the body of evidence for each outcome receives one of four grades (high, moderate, low, or very low), reflecting the level of confidence we may have that the true effect of the intervention (e.g. a sports- and exercise-based intervention) on the outcome of interest (e.g. physical well-being) is similar to (or substantially different from) the estimate of the effect presented in the systematic review(s), and that the findings of future studies and systematic reviews will be the same or similar.

The definitions of the four certainty of evidence grades are outlined in Table 3. Notably, we only assessed the certainty of the evidence for results pertaining to Questions 1 of this overview of reviews (i.e. the effectiveness questions). We did not apply the GRADE algorithm to Questions 2 or 3 covering success factors and the barriers to, and facilitators of, the success of interventions and/or the successful implementation of interventions, as these factors mediate the success of an intervention but are not themselves effectiveness outcomes.

Table 3 Certainty of evidence grades

Grade	Definition
High	We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate	We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.
Very low	We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of the effect.

Source: Schünemann *et al.*, 2013 [72]

2.8.6.2 Challenges of applying GRADE to overviews of reviews

The GRADE approach has been traditionally applied to rating the quality or certainty of evidence in single systematic reviews, primarily reviews that include a meta-analysis. However, there is a lack of consensus on how best to apply a GRADE assessment when undertaking an overview of reviews. The following extract from Gates *et al.* elaborates these difficulties [47]:

> It may not be possible or appropriate to simply extract existing GRADE appraisals from the included systematic reviews. The reviews might not include GRADE appraisals for the outcomes or populations of interest or be missing details on each of the GRADE considerations. Different systematic reviews with the same studies that have made different decisions about handling data (analysis) and appraising study quality may come to different GRADE conclusions, especially related to the study limitations, consistency, and precision domains. Different [assessors] across systematic reviews could come to different conclusions, due to the subjectivity of the GRADE approach. If re-doing the GRADE for each systematic review, authors are likely to encounter difficulty due to an absence of guidance on how to apply GRADE in the context of an overview, incomplete reporting at the level of the systematic review, and a lack of familiarity with the contributing primary studies. [47 p16]

These difficulties notwithstanding, we believe that it is important to assess the certainty of the evidence in this overview of reviews, given that the intended purpose of this overview is to inform the best approach by which to implement the WHO Healthy Prisons Agenda in the Irish context. The GRADE is the framework recommended by the *Cochrane Handbook for Systematic Reviews of Interventions* for facilitating the transparent rating of evidence quality. However, following a 2016 study attempting to apply GRADE in an overview of reviews, Pollock *et al.* concluded that "Within our overview, reviewers found that current GRADE guidance was insufficient to make reliable and consistent judgements" [73 p106].

In an effort to overcome some of the challenges to applying GRADE in an overview of reviews, Pollock *et al.* developed a modified algorithm to grade the quality of evidence in their overview [73]. Our approach to applying GRADE to the outcomes relevant to this overview of reviews was based on Pollock *et al.*'s algorithm. If any of the included systematic reviews had applied the original GRADE assessment in order to rate the certainty of the evidence within individual systematic reviews, we refrained from using those

assessments; this is because we wanted to avoid re-reporting potentially conflicting uses of the original instrument by different review teams. Additionally, the original instrument is comparatively more subjective than the more objective modified algorithm, and we wanted to avoid mixing the GRADE assessments of the systematic review authors and the HRB authors.

2.8.6.3 Pollock *et al.*'s modified GRADE algorithm

Pollock *et al.*'s algorithm for applying GRADE to an overview of reviews is based on four criteria. We added an additional criterion (criterion 1 in the list below: study design), as Pollock *et al.*'s algorithm was developed for systematic reviews of RCTs, whereas our overview of reviews includes systematic reviews of many different types of primary study designs, including randomised, quasi-randomised, and non-randomised trials, as well as cohort studies, quasi-experiments, mixed-methods studies, and qualitative research. The criteria are as follows:

1. The design of the included studies
2. The number of participants included in the analysis, considering imprecision based on sample size and confidence intervals around outcomes of interest
3. The risk of bias within the studies contributing participants to the analysis with respect to randomisation and blinding (outcome ascertainment)
4. The statistical inconsistency or heterogeneity within the analysis, as determined by the I^2 statistic or the *Q* statistic, and
5. The methodological quality of the review [73].

According to the guidance on this algorithm provided in Pollock *et al.* [73], each review starts with a ranking of high certainty and can receive one or two downgrades for methodological concerns on any one of the GRADE criteria. One downgrade is applied to each outcome of interest for the inclusion of non-randomised trials in the systematic review; a sample size of between 100 and 199 participants; high risk of bias in either randomisation or lack of blinding for >75% of study participants or a moderate methodological quality score; and high heterogeneity (I^2 >75%). Two downgrades to outcomes that include observational studies, a sample size of <100 participants, and both a high risk of bias in randomisation and lack of blinding for >75% of study participants or a low methodological quality score.

We applied a number of additional modifications to Pollock *et al.*'s GRADE algorithm, all of which were considered necessary due to the types of systematic reviews and primary studies included in this overview of reviews. These modifications are as follows, and are further elaborated on in Table 4:

- The GRADE algorithm developed by Pollock *et al.* uses only pooled analyses in order to evaluate the certainty of the evidence on certain criteria (i.e. imprecision due to sample sizes, and risk of bias for randomisation and outcome ascertainment). However, the majority of the systematic reviews included in our overview of reviews did not conduct a meta-analysis due to variation in primary study designs, outcomes, and outcome measures; rather, the findings of the included primary studies were more often reported via a narrative synthesis or descriptive summary approach. Therefore, we assessed the imprecision due to sample size and risk of bias criteria for each outcome for any approach to analysis or summary of results taken by the systematic review authors (i.e. pooled analysis, narrative synthesis, or descriptive summary).
- Our GRADE assessment used the 18 systematic review authors' quality/risk of bias assessment ratings (high, moderate, or low) for the primary studies contributing to each outcome, rather than the individual measure of risk of bias for randomisation and outcome ascertainment per outcome judged. This decision was taken due to the number of risk of bias and quality assessment tools used by

systematic review authors that did not assess risk of bias for randomisation and/or outcome ascertainment due to the inclusion of observational study designs in many of our included systematic reviews.

- The GRADE algorithm developed by Pollock *et al.* uses the responses of systematic review authors to questions 1–4 of the AMSTAR 2 (A MeaSurement Tool to Assess systematic Reviews Version 2) quality assessment tool (criterion 5 in the numbered list above). However, we utilised the Health Evidence™ Quality Assessment Tool – Review Articles checklist in order to assess the methodological quality of the included systematic reviews. Therefore, we applied downgrades to the certainty of the evidence for each outcome based on whether the contributing systematic reviews were assessed to be of strong (high), moderate, or weak (low) methodological quality according to their total scores on the Health Evidence™ Quality Assessment Tool – Review Articles checklist.

We are confident that our modifications do not materially change the principles outlined by Pollock *et al.* [73]. A full elaboration of how we applied the GRADE algorithm is provided in Table 4.

When completing the GRADE assessment, we considered primary study design, sample size for each outcome, quality assessment of primary studies, heterogeneity within the analysis for each outcome, and the methodological quality of the systematic review in order to judge the overall certainty of the evidence; therefore, our judgements have considered the main factors that limit the quality or certainty of the evidence.

Table 4 Formula for applying a GRADE level of evidence assessment in overviews of reviews and number of downgrades determined using the algorithm

Area assessed	Primary study design(s)	Imprecision (based on sample size)	Quality/risk of bias assessment of primary studies	Heterogeneity
Method of assessment	Randomised study designs	Adequate number of participants included in the pooled analysis, narrative synthesis, or descriptive overview.	The risk of bias/quality assessment rating of the primary studies included in the pooled analysis, narrative synthesis, or descriptive overview, as assessed by the systematic review authors. Total score on the Health Evidence™ Quality Assessment Tool – Review Articles checklist	Statistical heterogeneity or inconsistency, assessed by the I^2 statistic or *Q* statistic.
No downgrade (no serious limitations)	Only randomised study designs included	≥200	Primary studies contributing to the outcome were judged to be of low risk of bias/high (strong) methodological quality. Strong-quality rating (score of 8 or higher out of 10)	I^2 ≤75%
Downgrade one level (serious limitations)	Inclusion of non-randomised study designs	100–199	Primary studies contributing to the outcome were judged high risk of bias in either randomisation or lack of blinding for >75% of study participants or a moderate methodological quality score. Moderate-quality rating (score of 5–7 out of 10)	I^2 >75%
Downgrade two levels (very serious limitations)	Inclusion of observational or before-and-after study designs, or inclusion of studies with inadequate description of the study designs	1–99	Primary studies contributing to the outcome were judged both a high risk of bias in randomisation and lack of blinding for >75% of study participants or a low (weak) methodological quality score. Weak quality rating (score of 4 or lower out of 10)	Not applicable
Notes	No notes	Reviews that did not report a sample size were downgraded by two levels.	If more than one primary study contributed to a given outcome, and one or more primary studies received a certain risk of bias/methodological quality rating (e.g. low risk of bias/high methodological quality) and one or more other primary studies received a different risk of bias/methodological quality rating (e.g. high risk of bias/low methodological quality), we used the inferior risk of bias/methodological quality rating for GRADE (e.g. low rather than high methodological quality). If risk of bias/methodological quality ratings for individual primary studies contributing to a given outcome were not reported, we assumed a high risk of bias/low methodological quality rating and downgraded the review by two levels.	Not applicable if no meta-analysis was conducted; where more than one I^2 value was reported, we used the highest value; if sensitivity analysis was conducted, we used the I^2 value from the subgroup analysis over the main analysis.

Source: Adapted from Pollock *et al.*, 2016 [73]

2.8.7 Interpreting outcome data and drawing conclusions

Gates *et al.* [47] describe a number of challenges in synthesising findings from multiple systematic reviews, including heterogeneity of outcome measures, procedural variation at the level of individual systematic reviews, multiple comparisons, discordant results, and contrasting conclusions across different systematic reviews.

To address these challenges, we used the six-item framework proposed by Lunny *et al.* [74] in order to synthesise our interpretations and conclusions. Therefore, we:

1. Elaborate our interpretation and conclusions
2. Summarise the results from the included systematic reviews
3. Assess and report on heterogeneity
4. Assess and report on the risk of bias of the reviews
5. Assess and report on the overlap of primary studies included in more than one systematic review, and
6. Assess and report on discordant results, interpretations, and conclusions among the included reviews.

2.9 Differences between our protocol and review

Our review protocol did not outline our approach to extracting data from systematic reviews that included intervention studies delivered to more than one population (e.g. prisoners, parolees, and people in substance abuse treatment settings) or delivered in more than one setting (e.g. prisons, forensic settings, and psychiatric hospitals). In these cases, we proceeded to extract information about primary studies delivered to the population of interest in the setting of interest for the purposes of our overview of reviews. At the beginning of the extraction form for each included systematic review (see Appendix 7), we state whether the extraction pertains to the entire review or just some of the included primary studies. We did this in order to maximise the data available for analysis in response to Question 1.

Our search protocol did not include search terms that would capture systematic reviews of primary studies set in young offender institutions or equivalent (e.g. juvenile detention centres). We therefore excluded systematic reviews that focused on interventions delivered in youth incarceration settings. In systematic reviews that focused on both adult prisons and young offender institutions or on adult prisons and other settings, we only extracted information about primary studies set in adult prisons in order to answer Question 1.

In our protocol, we identified the Health Evidence™ Quality Assessment Tool – Review Articles checklist as our chosen tool for assessing the methodological quality of the included systematic reviews. We used this tool because it can be used for both quantitative and qualitative studies. Prior to the quality assessment phase of this overview, we established a minimum standard for each of the 10 items, and only reviews that met the minimum criteria on a given item were to receive a 'Yes' rating on that item. This was done in order to ensure that we followed a standardised approach to quality assessment and to minimise the likelihood of disagreements regarding quality ratings among the members of the review team. A blank version of our quality assessment form, along with our minimum criteria for each item, is available in Appendix 6.

We had intended to use the Pieper *et al.* corrected covered area method in order to assess overlap of primary studies across multiple included reviews [50], but we changed our approach when we saw how easily we could identify the overlap and deal with it within the text and tables so as not to overestimate the quantity of evidence. We identified systematic reviews that included the same primary studies which

evaluated the same outcomes in our outcome tables and summary analysis, and we have presented their findings together but mentioned each primary study only once in the text and reported that it had been covered by more than one systematic review. Where there were inadequate or discrepant data on a single primary study included across multiple systematic reviews, we reported the more detailed data from the better-quality review. Where there were inadequate or discrepant data on a single primary study included in a single systematic review, we excluded the primary study findings from our summary text-based analysis.

3 Findings

3.1 Introduction

Our database searches identified 1,609 records, of which 406 were duplicates, leaving 1,203 records for title and abstract screening (Figure 5). We excluded 1,107 records on title and abstract screening, leaving 96 records for full-text screening. Following full-text screening, we excluded 78 records, leaving 18 records for extraction (Figure 5). We did not find any additional records for inclusion from supplemental searches (which returned 3,299 records). In total, 18 systematic reviews were selected for data extraction.

The PRISMA flow chart in Figure 5 outlines the flow of information throughout the searching and screening process. Details of results from each individual part of the search process can be found in the search tables in Appendices 2 and 3, and all studies excluded at full text, along with their reason(s) for exclusion, are presented in Appendix 4.

We answer our three questions in sequence. Sections 3.3 summarises what is known about the effectiveness of the eight interventions (Question 1) while Section 3.2 describes factors influencing success of health-promoting interventions among prisoners (Question 2), and Section 3.3 presents the barriers to and facilitators of health-promoting interventions in prisons (Question 3).

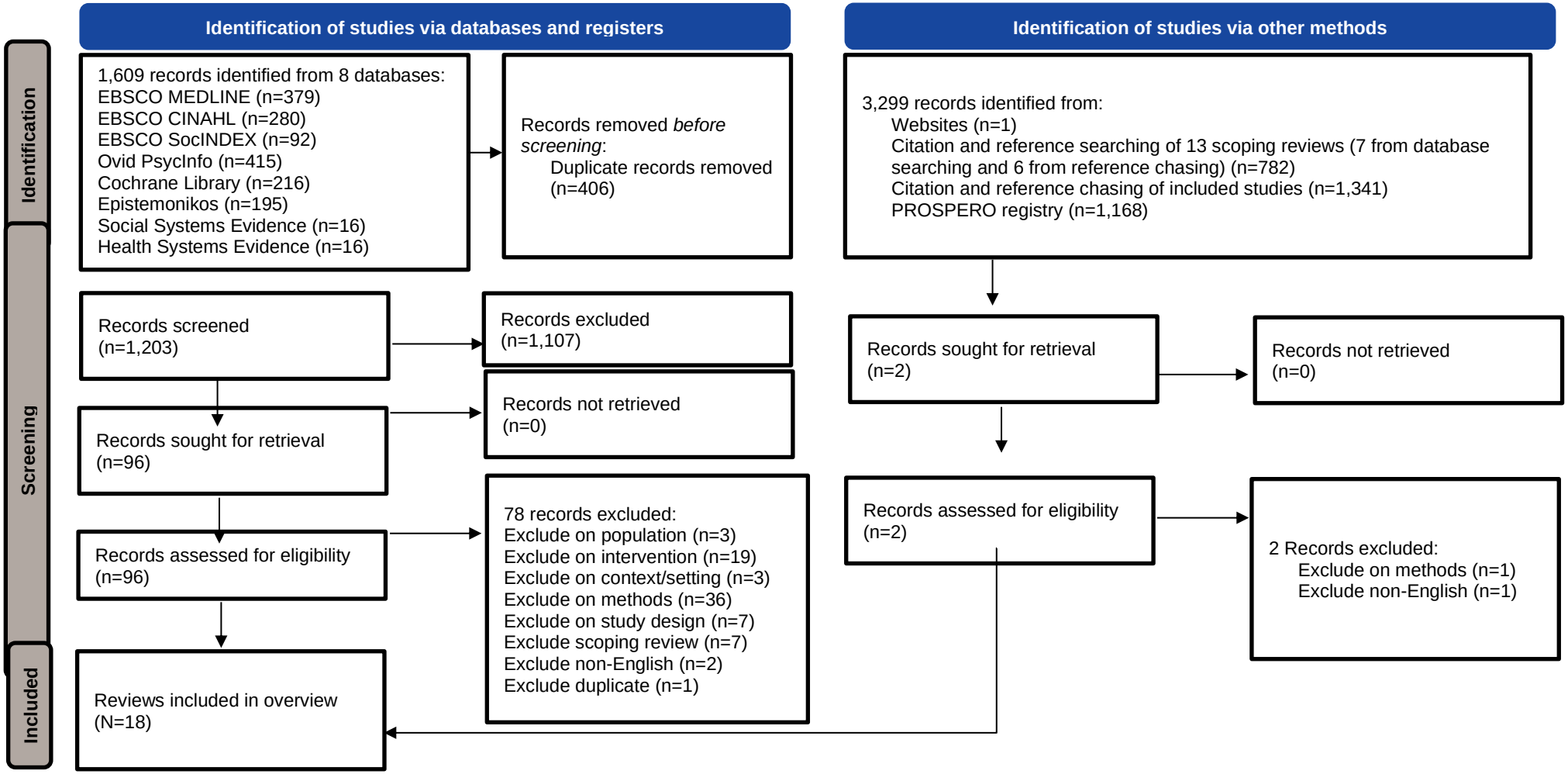


Figure 5 PRISMA 2020 flow diagram to identify systematic reviews for overview of reviews identified which include searches of databases, registers, and other sources

Source: Page *et al.*, 2021 [75]

3.2 Questions 1: Effectiveness of health-promoting interventions in prison settings in the short- and long-term

We present the findings of the 18 included systematic reviews by each of the eight health-promoting intervention categories selected with the Department of Health in response to Questions 1, 2, and 5. The eight health-promoting intervention categories of interest to this overview of reviews are:

1. Sports- and exercise-based interventions
2. Horticultural interventions
3. Yoga-, meditation-, and mindfulness-based interventions
4. Art and creative interventions
5. Animal-based interventions
6. Peer-based interventions
7. Smoking cessation interventions, and
8. Healthy eating and nutrition interventions.

These interventions examine non-pharmacological health-promoting interventions that enhance the health and well-being of adults living in a prison setting; some of the combined smoking cessation interventions also comprised pharmaceutical interventions, and we included these as they were combined with behavioural interventions. The findings of the eight intervention categories are categorised according to whether the intervention was a single intervention or a combined intervention. The intervention findings are then presented by outcome (Figures 2–4). Five of the eight intervention categories measured outcomes for physical well-being, while five measured outcomes for mental well-being. The three physical well-being outcomes measured are:

1. Physical well-being, expressed as physical strength and fitness
2. Physical well-being, expressed as body and blood composition, and
3. Physical well-being, measured as mortality, morbidity, and access to healthcare services (for smoking cessation interventions only).

In addition, the three mental well-being outcomes measured are:

1. Mental, psychological, and emotional well-being, expressed as wellness
2. Mental, psychological, and emotional well-being, expressed as mental and emotional distress, and
3. Mental, psychological, and emotional well-being, expressed as knowledge and empowerment (for peer-based interventions only).

Finally, there was one other outcome for smoking cessation interventions, namely environmental cigarette smoking factors, including effects on non-smokers. Peer-based interventions did not measure physical well-being outcomes and smoking cessation interventions did not measure mental well-being outcomes. Two intervention categories either did not measure effectiveness outcomes or did not report usable effectiveness outcome data, and these were horticultural and animal-based interventions.

We allocated the outcome measures to the most appropriate outcome by intervention category so as to facilitate our reporting of the findings (Appendix 8).

In the findings section(s) for each intervention category (presented as single and/or combined interventions), we describe the health-promoting interventions delivered as per the original systematic review authors' definitions. We present the number of full-text systematic reviews identified and the number that we included and excluded. We also present the systematic review characteristics (Appendix 9) and the results of the quality assessment (Appendix 10). Finally, we present the outcomes of the interventions together with their certainty of evidence (Appendix 11).

3.2.1 Sports- and exercise-based interventions

3.2.1.1 Introduction

3.2.1.1.1 Definition of intervention

The six included systematic reviews that evaluated sports- and exercise-based interventions are presented in this section.

Canada *et al.* evaluated a combined intervention tailored for prison settings, known as BE-ACTIV, which was examined in one primary study [31]. It comprised a 10-week behavioural therapy programme involving weekly individual therapy sessions, collaboration between therapists and activity staff in prisons, a plan for increasing 'pleasant' activities and events, assessment of increased activity level, and removal of barriers that may be interfering with activity levels.

Martinez-Merino *et al.* described the experience of prison-based sport and physical activity interventions in 29 primary studies [76], but did not provide any further description of the type or nature of the sport and physical activity interventions.

Mohan *et al.* evaluated the effects of supervised structured physical activity interventions [77]. The interventions comprised physical activity combined with education interventions in four primary studies. Two primary studies evaluated interventions that combined physical activity and educational sessions, the third primary study evaluated the effect of supervised physical activity combined with health education classes on the health of prisoners with chronic illness or risk factors for a chronic illness, and the fourth primary study evaluated the effect of a nutrition and fitness programme on the health and well-being of female prisoners. Two of the primary studies used a prisoner or prisoners to lead part or all of the intervention.

Perry *et al.* evaluated a combined health education and exercise programme intervention using one prison-based primary study [78].

Sanchez-Lastra *et al.* assessed prison-based exercise training programmes using 11 primary studies. Interventions were based on aerobic exercise (four primary studies); interventions evaluating combined forms of exercise, including aerobic exercises plus resistance training or anaerobic exercises plus resistance training (five primary studies); a yoga programme (one primary study); and a mixed sports activities intervention (one primary study) [23]. The yoga-based programme in Sanchez-Lastra *et al.*'s systematic review is included under the category of sports and exercise-based interventions while yoga-based interventions are a separate category of interest for the purposes of this overview of reviews, we decided to adhere to Sanchez-Lastra *et al.*'s classification of this kind of intervention as an exercise training programme, as defined in their systematic review.

Woods *et al.* examined sports-based interventions using 12 primary studies (reported in 9 papers and one of the 9 papers covers 4 of the 12 primary studies) [22]. The interventions consisted of either sport only, or sport as part of a broader multi-component intervention that used additional educational or counselling components. Six of the primary studies detailed sports-only interventions. The seventh primary study included sport alongside goal setting and weekly nutritional seminars. The eighth primary study focused on an intervention which included sport alongside cognitive behavioural therapy techniques and psychotherapy. The ninth study detailed an intervention based on outdoor adventure activities alongside social, creative, and reflective activities. Two of the 'sports-only' studies that evaluated a yoga-based intervention were included in Woods *et al.*'s systematic review under the category of sports and exercise-based interventions; while yoga-based interventions are a separate category of interest for the purposes of this overview of reviews, we decided to adhere to Woods *et al.*'s

classification of this kind of intervention as an exercise training programme, as defined in their systematic review.

3.2.1.1.2 Inclusion and exclusion at full text

We identified 21 reviews that covered sports- and exercise-based interventions for consideration at the full-text screening stage. We included 6 of these systematic reviews [22,23,31,76–78] and excluded the other 15 reviews [79–93]. The reasons for exclusion were intervention (three reviews), setting (one review), study design or type of review (four reviews), review methodology (five reviews), and language (two reviews). Three of the included reviews covered more than one intervention category: Canada *et al.* covered art and creative interventions as well as sports- and exercise-based interventions [31]; Mohan *et al.* covered smoking cessation interventions and healthy eating and nutrition interventions as well as sports- and exercise-based interventions [77]; and Perry *et al.* covered yoga-, meditation-, and mindfulness-based interventions, art and creative interventions, and animal-based interventions as well as sports- and exercise-based interventions [78].

3.2.1.1.3 Review characteristics

Four of the included systematic reviews examined interventions that were implemented in adult prisons [23,31,77,78] and two examined interventions that were implemented in adult prisons and young offender institutions [22,76] (Appendix 9). The primary studies based in young offender institutions were excluded from analysis [22,76]. Three of the included reviews covered more than one intervention category [31,77,78]. The age range of participants was 17–81 years across the six systematic reviews (Appendix 9). Both male and female participants were included in three systematic reviews, while males only were included in two reviews and females only were included in one review. The countries included across the six systematic reviews were Australia (four reviews), Canada (three reviews), France (one review), Italy (two reviews), Mexico (one review), New Zealand (one review), Poland (one review), Spain (two reviews), the United Kingdom (UK) (one review), and the United States of America (USA) (four reviews). The years of publication for the primary studies included in the six systematic reviews were 1974–2015, and the years of publication for the systematic reviews were 2017–2023. The primary study designs varied but included RCTs, non-randomised trials, before-and-after studies, cross-sectional surveys, case studies, other unspecified quantitative studies, mixed-methods studies, and qualitative studies [22,23,31,76–78].

3.2.1.1.4 Quality assessment

Of the six included systematic reviews, one was judged to be of strong quality [31] and five were judged to be of moderate quality [22,23,76–78] with respect to design and implementation (Appendix 10). None of the five moderate-quality reviews presented a reproducible search strategy in their paper or discussed the quality of the primary studies in their analysis [22,23,76–78]. Two of the moderate-quality reviews did not complete an appropriate analysis [23,76]. In addition, Perry *et al.* did not present a focused research question [78]. The conclusions of the five moderate-quality reviews are not supported by their methods and results.

3.2.1.2 Single interventions

Three of the systematic reviews contributed data to the effectiveness outcomes [22,23,77], two contributed data to benefits outcomes [31,76], and one did not include any primary studies that reported on sports- and exercise-based interventions [78].

3.2.1.2.1 Physical well-being, expressed as physical strength and fitness

Mohan *et al.* included four primary studies in their review that evaluated a single structured physical activity intervention delivered to adult prisoners in order to improve their physical well-being (Table 5) [77]. Three of the four primary studies were RCTs, and one study was a non-randomised trial. The 4 primary studies reported on a total of 14 outcome measures which we categorised as physical strength and fitness outcomes. Seven of the 14 outcome measures tested in the 4 primary studies reported no significant differences between the intervention and the control group. These seven outcome measures were cardiorespiratory fitness, maximum heart rate, resting blood pressure, abdominal strength, lower and upper body strength, endurance, and flexibility [77].

The first of the four primary studies included in Mohan *et al.*'s review that examined changes in the physical well-being of prisoners reported significant improvement in the levels of oxygen saturation and significant improvement in upper body strength in both of the intervention groups compared with the control group (Table 5) [77]. A lack of reporting of how the two parameters were measured and of outcome-related statistics limit interpretation of the reported results. The second of the four primary studies was a non-randomised trial and reported a significant improvement in muscular endurance in the intervention group compared with the control group. Statistical findings were not reported, which limits interpretation of the results. The third of the four primary studies evaluated a sports- and exercise-based intervention and is reported in more detail by Sanchez-Lastra *et al.*, who also included this primary study in their review [23]. The fourth primary study in Mohan *et al.*'s review examined changes in the physical well-being of prisoners and reported significant improvement in all physical fitness variables except for abdominal strength and endurance in the intervention group compared with the control group [77].

Further information on the four primary studies from Mohan *et al.*'s review that examined the effect of a single sports- and exercise-based intervention on the physical strength and fitness of adult prisoners is included in Table 5.

Table 5 Findings from Mohan et al. on single sports- and exercise-based interventions measuring physical well-being, expressed as physical strength and fitness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Cardiorespiratory fitness	Method unspecified, but assumed to have been measured using machinery	Perez-Moreno (2007) RCT Mohan *et al.* (2018) [77]	No significant difference between the intervention group (n=14 male prisoners who engaged in an exercise programme) and the control group (n=13 male prisoners who followed their usual sedentary lifestyle). No statistics were provided.	Intervention lasted for 4 months
Resting heart rate	Method unspecified, but assumed to have been measured using machinery	Amtmann (2001) Non-randomised trial Mohan *et al.* (2018) [77]	The review authors present contradictory results on this outcome: Significant differences between the intervention and control groups for body composition, resting heart rate, and muscular endurance. No significant differences between the 2 groups for body weight, flexibility, resting heart rate and resting blood pressure. No numbers or statistical measures were provided.	Intervention lasted for 14 weeks
Maximum heart rate	Method unspecified, but assumed to have been measured using machinery	Gettman (1976) RCT Mohan *et al.* (2018) [77]	No significant difference between any of the intervention groups (titled 5-d, 3-d, and 1-d) and the control group. No numbers or statistical measures were provided.	Intervention lasted for 20 weeks
Resting blood pressure	Method unspecified, but assumed to have been measured using machinery	Amtmann (2001) Non-randomised trial Mohan *et al.* (2018) [77]	No significant difference between the intervention group and the control group. No numbers or statistical measures were provided.	Intervention lasted for 14 weeks
Physical fitness variable: resting blood pressure	Method unspecified, but assumed to have been measured using machinery	Gettman (1976) RCT Mohan *et al.* (2018) [77] Overlap with Sanchez-Lastra *et al.* (2019) [23]	No significant difference between any of the intervention groups (titled 5-d, 3-d, and 1-d) and the control group. No statistics were provided.	Intervention lasted for 20 weeks
Oxygen saturation	Method unspecified, but assumed to have been measured using machinery	Battaglia (2013) RCT Mohan *et al.* (2018) [77]	Significant improvement in both intervention groups (1. the cardiovascular and resistance training group, n=25 male prisoners who engaged in cardiovascular plus resistance training and aerobic exercises alternating with resistance	Intervention lasted for 9 months

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			strength training; and 2. the high-intensity strength training group, n=25 male prisoners who engaged in high-intensity strength training with anaerobic exercise alternating with maximal strength exercises and active recovery) compared with the control group (n=25 male prisoners who performed habitual activities). No statistical measures were provided.	
Abdominal strength	Method unspecified, but assumed to have been measured using machinery	Battaglia (2013) RCT Mohan *et al.* (2018) [77]	No significant difference between either of the intervention groups and the control group. No numbers or statistical measures were provided.	Intervention lasted for 9 months
Upper body strength	Method unspecified, but assumed to have been measured using machinery	Battaglia (2013) RCT Mohan *et al.* (2018) [77]	Significant improvement in both intervention groups compared with the control group. No numbers or statistical measures were provided.	Intervention lasted for 9 months
Lower and upper body strength endurance	Method unspecified, but assumed to have been measured using machinery	Perez-Moreno (2007) RCT Mohan *et al.* (2018) [77]	No significant difference between the intervention group and the control group. No numbers or statistical measures were provided.	Intervention lasted for 4 months
Muscular endurance	Method unspecified, but assumed to have been measured using machinery	Amtmann (2001) Non-randomised trial Mohan *et al.* (2018) [77]	Significant improvement in the intervention group compared with the control group. No numbers or statistical measures were provided.	Intervention lasted for 14 weeks
Endurance	Method unspecified, but assumed to have been measured using machinery	Battaglia (2013) RCT Mohan *et al.* (2018) [77]	No significant difference between the cardiovascular and resistance training intervention group and the control group. Significant improvement in the high-intensity strength training intervention group compared with the control group. No numbers or statistical measures were provided.	Intervention lasted for 9 months
Flexibility	Method unspecified, but assumed to have been	Amtmann (2001) Non-randomised trial	No significant difference between the intervention group and the control group. No numbers or statistical measures were provided.	Intervention lasted for 14 weeks

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
	measured using machinery	Mohan *et al.* (2018) [77]		
All other physical fitness variables (e.g. resting heart rate, $\dot{V}O_2$ max) *Note:* The full list of physical fitness variables was not provided.	Method unspecified, but assumed to have been measured using machinery	Gettman (1976) RCT Mohan *et al.* (2018) [77] Overlap with Sanchez-Lastra *et al.* (2019) [23]	Significant differences between all three intervention groups (titled 5-d, 3-d, and 1-d) and the control group in all physical fitness variables except maximum heart rate]and resting blood pressure. No numbers or statistical measures were provided.	Intervention lasted for 20 weeks
All other physical fitness variables (not further specified) *Note:* The full list of physical fitness variables was not provided.	Method unspecified, but assumed to have been measured using machinery	Battaglia (2013) RCT Mohan *et al.* (2018) [77]	Significant improvement in the cardiovascular and resistance training group compared with the control group on all physical fitness variables except abdominal strength and endurance. No numbers or statistical measures were provided.	Intervention lasted for 9 months

Sanchez-Lastra *et al.* included two primary studies in their review that evaluated the effect of single sports- and exercise-based interventions on outcomes we categorised as physical strength and fitness outcomes (Table 6) [23]. One primary study evaluated the effect of aerobic exercise interventions on a number of variables related to cardiovascular health among adult prisoners; the variables reported were $\dot{V}O_2$ max, peak oxygen pulse, pulse oximetry, ventilation expiratory maximum, resting heart rate, and resting systolic and diastolic blood pressure. Mohan *et al.* also reported on some of the same findings of this primary study [77]. Both the Sanchez-Lastra *et al.* and Mohan *et al.* reviews reported that, overall, cardiovascular fitness improved significantly on all variables measured in the three intervention groups compared with the control group [23] [77].

The second primary study evaluated the effect of aerobic exercise interventions on cardiovascular-related variables, $\dot{V}O_2$ max, and maximum stress time based on treadmill use. Maximum stress time was not described further in the review (Table 6) [23]. The number of injuries and dropouts among participating prisoners were also measured. $\dot{V}O_2$ max and maximum stress time measures were significantly higher among participants in three of the six higher-frequency and longer-duration intervention groups compared with the two control groups. In addition, Sanchez-Lastra *et al.* reported that the percentage of participants who dropped out was significantly lower in at least one of the higher-frequency and longer-duration intervention groups compared with at least one of the control groups. Regarding the assessment of injuries, Sanchez-Lastra *et al.* reported a significantly greater percentage of injuries among participants in at least one of the intervention groups compared with at least one of the control groups, and a significantly greater percentage of dropouts due to injuries among participants in at least one of the intervention groups compared with at least one of the control groups [23].

Further information on the two primary studies from Sanchez-Lastra *et al.*'s review that examined the effect of a single sports- and exercise-based intervention on the physical strength and fitness of adult prisoners is included in Table 6 [23].

Table 6 Findings from Sanchez-Lastra et al. on single sports- and exercise-based interventions measuring physical well-being, expressed as physical strength and fitness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
• $\dot{V}O_2$ max (measured by treadmill step test • Peak oxygen pulse • Pulse oximetry • Ventilation expiratory maximum (using spirometer) • Time in Bruce test • Resting heart rate • Resting systolic and diastolic blood pressure	Objective measures	Gettman (1976) RCT Sanchez-Lastra *et al.* (2019) [23] Overlap with Mohan *et al.* (2018) [77]	Overall, cardiovascular fitness improved following the aerobic exercise interventions. The outcome measures listed in the left-hand column were significantly greater (p<0.05) among participants in all three intervention groups (three groups with increasing frequency of training; n=24 participants in group 1, n=26 participants in group 2, and n=30 participants in group 3) compared with the control group (n=20 prisoners who maintained their normal activity levels and habits). For example, resting heart rate was significantly lower (p<0.05) among participants in all three intervention groups compared with those in the control group. The exercise programme also led to improvements in systolic and diastolic blood pressure (no numbers or statistical measures were provided). Numbers and statistical measures were not provided for any outcome measures.	Intervention lasted for 20 weeks
• $\dot{V}O_2$ max (treadmill, Astrand protocol) • Maximum stress time (treadmill, Bruce protocol)	Objective measures	Pollock (1977) RCT Sanchez-Lastra *et al.* (2019) [23]	There were six intervention groups that increased in frequency and duration (comprising n=20, n=25, n=24, n=15, n=25, and n=18 participants, and two control groups (comprising n=18 and n=13 participants). Overall, cardiovascular fitness improved following the aerobic exercise interventions. $\dot{V}O_2$ max and maximum stress time were significantly higher (p<0.05) among participants in three of the	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
• Number of injuries • Number of dropouts			higher-frequency and longer-duration intervention groups compared with the two control groups. The percentage of participants who left the programme was significantly lower (p<0.05) in at least one of the higher-frequency and longer-duration intervention groups compared with at least one of the control groups. There was a significantly greater percentage of injuries (p<0.05) among participants in at least one of the intervention groups compared with at least one of the control groups. There was a significantly greater percentage of dropouts due to injuries (p<0.05) among participants in at least one of the intervention groups compared with at least one of the control groups. Numbers were not provided for the outcome measures.	

3.2.1.2.2 Physical well-being, expressed as body and blood composition

Mohan *et al.* included three primary studies in their review that evaluated the effect of single sports- and exercise-based interventions on seven outcomes that we categorised as body and blood composition outcome measures (Table 7) [77]. The first of the three primary studies (a non-randomised trial that compared a single intervention group that participated in an exercise programme with a control group) compared changes in body composition and body weight in both groups. Mohan *et al.* reported that significant improvements were observed in body composition in the intervention group compared with the control group; however, no statistical results were reported to help with this interpretation. Mohan *et al.* also reported that there was no significant difference in body weight between the intervention group and the control group [77].

The second of the three primary studies included in Mohan *et al.*'s review, an RCT, compared changes in waist girth, total skinfold fat, and the percentage of body fat in two or more intervention groups with one control group (Table 7) [77]. Sanchez-Lastra *et al.* also included this study in their review but collapsed the three outcomes into one finding [23]. Mohan *et al.* reported significant differences in waist girth in favour of the two intervention groups that received the intervention for 3 and 5 days per week compared with the control group [77]. No significant difference in waist girth was reported between the intervention group that received the intervention for 1 day per week compared with the control group. Results for the measurement of total skinfold fat show a significant difference in favour of the intervention group that engaged in endurance-oriented exercise for 5 days per week when compared with the control group. There was no significant difference in total skinfold fat between the intervention group that received the intervention for 1 day per week when compared with the control group. A significant difference in the

percentage of body fat favouring the intervention group that received the intervention for 5 days per week was reported compared with the control group. There was no significant difference in the percentage of body fat between the intervention group receiving the intervention for 1 day per week when compared with the control group. The results from this trial reported in Mohan *et al.*'s review suggest that more frequent participation in the intervention is associated with improvements in the body composition of adult prisoners [77].

The last of the three primary studies in Mohan *et al.*'s review, an RCT, evaluated various health-related outcomes between a cardiovascular and resistance training intervention group and a high-intensity strength training intervention group with a control group [77]. Mohan *et al.* reported significant improvements in high-density lipoprotein in the cardiovascular and resistance training intervention group compared with the control group (Table 7) [77]. No significant difference in high-density lipoprotein measures were reported between the high-intensity strength training intervention group and the control group. Results reported from the same RCT found no significant difference between either of the intervention groups and the control group for all other health-related outcomes assessed [77].

Overall, there was a lack of reporting on sample sizes and outcome-related statistics to help with the interpretation of the results from the three primary studies included in Mohan *et al.*'s review. Information on other findings from the three primary studies are included in Table 7 [77].

Table 7 Findings from Mohan et al. on single sports- and exercise-based interventions measuring physical well-being, expressed as body and blood composition

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Body composition	Method unspecified, but assumed to have been measured using machinery	Amtmann (2001) Non-randomised trial Mohan *et al.* (2018) [77]	Significant improvement in the intervention group (n=62 older prisoners who participated in an exercise programme in order to improve their physical fitness) compared with the control group (n=32 prisoners who did not participate in the exercise programme). Statistical measures were not provided for the outcome measures.	Intervention lasted for 14 weeks
Body weight	Method unspecified, but assumed to have been measured using machinery	Amtmann (2001) Non-randomised trial Mohan *et al.* (2018) [77]	No significant difference between the intervention group and the control group. Numbers and statistical measures were not provided for the outcome measures.	Intervention lasted for 14 weeks
Waist girth	Method unspecified, but assumed to have been measured using machinery	Gettman (1976) RCT Mohan *et al.* (2018) [77]	Significant difference between both the 3- and 5-day-per-week intervention groups and the control group. No significant difference between the 1-day-per-week intervention group and the control group. Numbers and statistical measures were not provided for the outcome measures.	Intervention lasted for 20 weeks

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Total skinfold fat	Method unspecified, but assumed to have been measured using machinery	Gettman (1976) RCT Mohan *et al.* (2018) [77]	Significant difference between the 5-day-per-week intervention group (n=30 male prisoners who engaged in endurance-oriented exercise for 5 days per week) and the control group (n=20 male prisoners who engaged in non-endurance recreational activity for 2 days per week). No significant difference between the 1-day-per-week intervention group (n=24 male prisoners who engaged in endurance-oriented exercise for 1 day per week) and the control group. Statistical measures were not provided for the outcome measures. *Note:* Results related to this outcome were not reported for the 3-day-per-week intervention group.	Intervention lasted for 20 weeks
Percentage body fat	Method unspecified, but assumed to have been measured using machinery	Gettman (1976) RCT Mohan *et al.* (2018) [77]	Significant difference between the 5-day-per-week intervention group and the control group. No statistics were provided. No significant difference between the 1-day-per-week intervention group and the control group. Numbers and statistical measures were not provided for the outcome measures. *Note:* Results related to this outcome were not reported for the 3-day-per-week intervention group.	Intervention lasted for 20 weeks
High-density lipoprotein	Method unspecified, but assumed to have been measured using blood samples	Battaglia (2013) RCT Mohan *et al.* (2018) [77]	Significant improvement in the cardiovascular and resistance training intervention group compared with the control group. No significant difference between the high-intensity strength training intervention group and the control group. Numbers and statistical measures were not provided for the outcome measures.	Intervention lasted for 9 months
All other health status variables *Note:* The list of health status variables was not provided.	Method unspecified, but assumed to have been measured using machinery	Battaglia (2013) RCT Mohan *et al.* (2018) [77]	No significant difference between either of the intervention groups and the control group. Numbers and statistical measures were not provided for the outcome measures.	Intervention lasted for 9 months

Sanchez-Lastra *et al.* included two primary studies in their review that evaluated the effects of a single sports- and exercise-based intervention on measures we categorised as body and blood composition outcomes (Table 8) [23]. The first of the two primary studies was also reported on in Mohan *et al.*'s review; we report Mohan *et al.*'s coverage of the study for three separate outcome measures, as Mohan *et al.* reported on those separately, whereas Sanchez-Lastra *et al.* collapsed the three outcomes into one finding [23,77]. That RCT evaluated the additional outcome of changes in levels of L-carnitine between the three aerobic exercise intervention groups (with increasing frequency of training) and the control group, and the findings suggest that the aerobic exercise programmes with the three intervention groups were reported to improve the blood serum levels of L-carnitine, but it is unclear whether this is a within-group or between-group effect [23].

The second of the two primary studies in Sanchez-Lastra *et al.*'s review measured changes in both free and total L-carnitine in the intervention group, which received an aerobic dancing intervention, and the control group (Table 8) [23]. Sanchez-Lastra *et al.* reported a significantly greater amount of both free and total L-carnitine in the intervention group compared with the control group [23].

Further information on the two primary studies included in Sanchez-Lastra *et al.*'s review that evaluated the effects of a single sports- and exercise-based intervention on measures we categorised as body and blood composition outcomes is included in Table 8 [23].

Table 8 Findings from Sanchez-Lastra et al. on single sports- and exercise-based interventions measuring physical well-being, expressed as body and blood composition

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
• Total skinfold fat • Body fat percentage • Waist girth • Body weight	Objective measures	Gettman (1976) RCT Sanchez-Lastra *et al.* (2019) [23]	Overall, anthropometric parameters improved following aerobic exercise: Except for body weight, the outcome measures listed in the left-hand column were significantly lower (p<0.05) among participants in the intervention group with the highest frequency of exercise (out of three intervention groups with increasing frequency of training; n=24 participants in group 1, n=26 participants in group 2, and n=30 participants in group 3) compared with the control group (n=20 prisoners who maintained their normal activity levels and habits). *Note:* Results regarding body weight were not reported. Numbers and statistical measures were not provided for the outcome measures.	Intervention lasted for 20 weeks
L-carnitine	Objective measure	Gettman (1976) RCT Sanchez-Lastra *et al.* (2019) [23]	The aerobic exercise programmes (out of three intervention groups with increasing frequency of training; n=24 participants in group 1, n=26 participants in group 2, and n=30 participants in group 3) were found to improve the blood serum levels of L-carnitine. *Note:* There is limited information provided in the review in relation to this outcome. It appears to be a within-group effect (i.e. from baseline to follow-up in the intervention group). Numbers and statistical measures were not provided for the outcome measures.	Intervention lasted for 20 weeks
• Free L-carnitine • Total L-carnitine	Objective measure	Acevedo-Pabon (2015) RCT Sanchez-Lastra *et al.* (2019) [23]	There was a significantly greater amount of both free and total L-carnitine (p<0.05) post-intervention in the intervention group (n=22 prisoners who participated in an aerobic dancing intervention) compared with the control group (n=22 prisoners who maintained their normal activity levels). Numbers and statistical measures were not provided for the outcome measures.	Intervention lasted for 12 weeks

3.2.1.2.3 Mental, psychological, and emotional well-being, expressed as wellness

Sanchez-Lastra *et al.* included one RCT in their review that assessed the effect of a single sports- and exercise-based yoga intervention on two mental and emotional well-being outcomes that we coded as wellness [23]. Sanchez-Lastra *et al.* report that the intervention group had significantly greater positive affect and executive function compared with the control group (Table 9). In addition, Sanchez-Lastra *et al.* report significant increases in measures of positive affect in the intervention group when comparing baseline to follow-up [23].

Table 9 Findings from Sanchez-Lastra et al. on single sports- and exercise-based interventions measuring mental, psychological, and emotional well-being, expressed as wellness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
• Positive affect Executive function, particularly attentional capacity and behavioural response inhibitors	Positive affect: The Positive and Negative Affect Schedule Executive function, particularly attentional capacity and behavioural response inhibitors: The GO/NO-GO stimulus task	Bilderbeck (2013) RCT Sanchez-Lastra *et al.* (2019) [23]	The intervention was a hatha yoga programme (total sample size: n=93 male and n=7 female prisoners, including intervention plus control group; n=45 in the intervention group and n=55 in the control group), and those in the control group maintained their normal activity levels. Significant (within-group) increase (p<0.05) in positive affect in the intervention group after the yoga intervention. The intervention group had significantly (p<0.05) greater positive affect and executive function compared with the control group after the yoga intervention.	Intervention lasted for 10 weeks

3.2.1.2.4 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

In the review by Sanchez-Lastra *et al.*, one of two included RCTs that assessed the effect of a single sports- and exercise-based intervention on mental and emotional distress outcomes compared changes in mental and emotional distress among two groups of adult prisoners receiving an aerobic exercise intervention and two control groups engaging in routine activity (Table 10) [23]. Sanchez-Lastra *et al.* reported that participating prisoners in both intervention groups showed significant improvements in their mental health compared with those in the control groups. In addition, participating prisoners in both intervention groups showed improved mental health scores from baseline to post-intervention [23].

The second RCT included in Sanchez-Lastra *et al.*'s review that assessed mental and emotional distress outcomes evaluated a yoga-type intervention delivered in an adult prison setting in order to improve mental distress (Table 10) [23]. Woods *et al.* also included this RCT in their review [22]. Both Sanchez-Lastra *et al.* and Woods *et al.* reported statistically significantly lower perceived levels of stress and psychological anguish among the intervention group compared with the control group [22,23]. Both systematic reviews also reported significant within-group decreases in perceived stress levels and psychological anguish in the intervention group, and significant decreases in perceived stress in the control group [22,23].

Further information on the two primary studies included in Sanchez-Lastra *et al.*'s review that evaluated the effect of a single sports- and exercise-based intervention on mental and emotional distress outcomes is included in Table 10 [23].

Table 10 Findings from Sanchez-Lastra et al. on single sports- and exercise-based interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Mental health (precise outcome measure unspecified)	General Health Questionnaire-28	Ghanbarzadeh (2012) RCT Sanchez-Lastra *et al.* (2019) [23]	Overall, mental health outcomes improved following the aerobic exercise interventions. The two intervention groups (n=15 participants in each group) showed significant (within-group) improvements in mental health from pre- to post-intervention (p<0.05). When compared with the control groups (two groups that continued to engage in normal activity; n=15 participants in each group), prisoners in both intervention groups showed significant improvements in mental health (p<0.05).	Intervention lasted for 12 weeks
• Perceived stress • Psychological anguish • Impulsiveness	Perceived stress: The Stress Perception Scale Psychological anguish: The Brief Symptom Inventory Impulsiveness: The Barrat Impulsiveness Scale: not reported	Bilderbeck (2013) RCT Sanchez-Lastra *et al.* (2019) [23] Overlap with Woods *et al.* [22]	The intervention was a hatha yoga programme (total sample size: n=93 male and n=7 female prisoners; n=45 in the intervention group and n=55 in the control group), and those in the control group maintained their normal activity levels). Significant (within-group) decreases (p<0.05) in perceived stress and psychological anguish in the intervention group after the yoga intervention (significant within-group decrease in perceived stress in the control group as well). The intervention group had significantly (p<0.05) lower perceived stress and psychological anguish compared with the control group, both before and after the yoga intervention.	Intervention lasted for 10 weeks

Woods *et al.* included six primary studies in their review that evaluated the effects of single sports- and exercise-based interventions on mental, psychological, and emotional outcomes which we categorised as mental and emotional distress outcomes (Table 11) [22]. Three of the six primary studies assessed the impact of a sports- and exercise-based intervention on depression among adult prisoners but used different instruments to measure changes. One study, an RCT that used the Symptom Checklist-90 revised instrument reported significant decreases in depression favouring the two groups receiving the intervention in comparison to the control group. One of the other two primary studies that measured changes in depression among adult prisoners used the Beck Depression Inventory-II in order to measure change and was based on a pre-post study design. This primary study reported significant within-group decreases in depression scores among adult prisoners from baseline to post-intervention. The remaining primary study on depression included in the review by Woods *et al.* measured changes in depression among adult prisoners using an earlier version of the Beck Depression Inventory and was a pre-post study based on a non-randomised control group design. This primary study reported significantly lower scores on depression among the intervention group compared with the control group and significant decreases in depression scores in the intervention group from baseline to post-intervention [22].

Two of the six primary studies in Woods *et al.*'s review evaluated the effects of single sports- and exercise-based interventions on outcomes that we categorised as mental and emotional distress, and assessed the effect of interventions on psychological distress among adult prisoners (Table 11) [22]. One of the two primary studies, an RCT, reported significant within-group decreases in scores on the Symptom Checklist-90 revised instrument. The other primary study, which was an RCT as well, was also reported on in Sanchez-Lastra *et al.*'s review, and we have already reported on that study's findings in Table 10 above so these findings will not be repeated here [23].

Two of the six primary studies in Woods *et al.*'s review that evaluated the effects of single sports- and exercise-based interventions on outcomes that we categorised as mental and emotional distress assessed the effect of interventions on anxiety among adult prisoners (Table 11) [22]. One of these two primary studies, an RCT, used the Symptom Checklist-90 revised instrument to measure changes in both anxiety and phobic anxiety. This study reported that there were significant within-group decreases in both anxiety and phobic anxiety among adult prisoners receiving the intervention. The other primary study that measured changes in anxiety was a pre-post study design and reported a non-significant decrease in anxiety scores among the intervention group [22].

Three of the six primary studies in Woods *et al.*'s review that evaluated the effects of single sports- and exercise-based interventions on outcomes which we categorised as mental and emotional distress assessed the effect of interventions on levels of stress among adult prisoners (Table 11) [22]. One of these three primary studies, an RCT, reported a significant decrease in perceived stress in the intervention group compared with the control group. The same study also reported significant within-group decreases in perceived stress in both the intervention and control groups. The second of the three primary studies reported in Woods *et al.*'s review that measured changes in stress levels was a pre-post study. This study reported no lasting changes in stress-related scores from baseline to post-intervention among the intervention group. In the third of these three primary studies included in Woods *et al.*'s review that assessed changes in stress levels among adult prisoners receiving single sports- and exercise-based interventions, the majority of participants receiving the intervention and responding to a cross-sectional survey reported a positive effect on their stress levels following the intervention [22].

One primary study included in Woods *et al.*'s review, an RCT, assessed changes in interpersonal sensitivity among adult prisoners receiving a single sports- and exercise-based intervention [22]. This study reported a significant (within-group) decrease in interpersonal sensitivity for the intervention group (Table 11). Another primary study included in Woods *et al.*'s review, a cross-sectional survey, asked participants,

“Does the exercise help you in moments of depression, stress and anxiety?” The results reported show that 75% of participants receiving the sports- and exercise-based intervention responded that the intervention had a positive effect on their levels of stress, depression, and anxiety [22].

Further information on the five primary studies included in Woods *et al.*’s review that evaluated the effects of single sports- and exercise-based interventions on mental and emotional distress outcomes is included in Table 11 [22]. The sixth study which we mentioned above is already described in Table 10 so will not be include in Table 11.

Table 11 Findings from Woods et al. on single sports- and exercise-based interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Depression	Symptom Checklist-90 revised	Battaglia (2014) RCT Woods *et al.* (2017) [22]	Significant decreases for both intervention groups (cardio and resistance training and high-intensity strength training) in comparison with the usual care control group (p<0.05, difference: −0.75; and p<0.01, difference: −0.82, respectively) (total sample size: n=64 male prisoners). Significant increase in depression in the usual care group (p<0.05).	Intervention lasted for 9 months
Depression	Beck Depression Inventory-II	Harner (2010) Pre-post study Woods *et al.* (2017) [22]	Significant (within-group) decrease in Beck Depression Inventory-II scores (p<0.01) following an Iyengar yoga intervention (n=21 female prisoners).	Intervention lasted for 12 weeks
Depression	Beck Depression Inventory	Libbus (1994) Pre-post study, non-randomised control group Woods *et al.* (2017) [22]	Significant (within-group) decrease in mean Beck Depression Inventory scores following an aerobic exercise intervention (decrease of 18.76 points p=0.0001). Sample size was not reported. Significantly lower scores in the aerobic exercise intervention group compared with the usual care control group (p=0.0001) (total sample size: n=45 male prisoners, i.e. intervention plus control group).	Intervention lasted for 12 weeks
Overall psychological distress	Symptom Checklist-90 revised	Battaglia (2014) RCT Woods *et al.* (2017) [22]	Significant (within-group) decrease in scores on the Global Severity Index for the cardio and resistance training intervention group (p<0.01) (total sample size: n=64 male prisoners).	Intervention lasted for 9 months
Psychological distress	The Brief Symptom Inventory	Bilderbeck (2013) RCT Woods *et al.* (2017) [22] Overlap with Sanchez-Lastra *et al.* (2019) [23]	Significant (within-group) decrease in psychological distress (p<0.01) in the hatha yoga intervention group (total sample size: n=93 male and n=7 female prisoners, including intervention plus control group). Significant decrease in perceived stress in the hatha yoga intervention group compared with the usual care control group (p<0.05).	Intervention lasted for 10 weeks
Anxiety	Symptom Checklist-90 revised	Battaglia (2014) RCT Woods *et al.* (2017) [22]	Significant (within-group) decrease in anxiety for the high-intensity training intervention group (p<0.05) (total sample size: n=64 male prisoners).	Intervention lasted for 9 months

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Phobic anxiety	Symptom Checklist-90 revised	Battaglia (2014) RCT Woods *et al.* (2017) [22]	Significant (within-group) decrease in phobic anxiety for the high-intensity training intervention group (p<0.05) (total sample size: n=64 male prisoners).	Intervention lasted for 9 months
Anxiety	Beck Anxiety Inventory	Harner (2010) Pre-post study Woods *et al.* (2017) [22]	Anxiety scores decreased (p=0.06), but not significantly, following an Iyengar yoga intervention (n=21 female prisoners).	Intervention lasted for 12 weeks
Perceived stress	The Perceived Stress Scale	Bilderbeck (2013) RCT Woods *et al.* (2017) [22] Overlap with Sanchez-Lastra *et al.* (2019) [23]	Significant (within-group) decrease in perceived stress (p<0.001) in the hatha yoga intervention group (sample size not reported by intervention and control group). Significant (within-group) decrease in perceived stress (p<0.05) in the usual care control group. Significant decrease in perceived stress in the hatha yoga group compared with the usual care control group (p<0.05) (total sample size: n=93 male and n=7 female prisoners, including intervention plus control group).	Intervention lasted for 10 weeks
Perceived stress	The Perceived Stress Scale	Harner (2010) Pre-post study Woods *et al.* (2017) [22]	Stress scores initially dropped, but returned to baseline by the end of 12 weeks following an Iyengar yoga intervention (n=21 female prisoners).	Intervention lasted for 12 weeks
Stress, depression, and anxiety	Single question: "Does the exercise help you in moments of depression, stress and anxiety?"	Nelson (2006) Cross-sectional survey Woods *et al.* (2017) [22]	A majority (75%) of 105 male prisoners reported a positive effect of the moderate exercise intervention on stress, depression, and anxiety	Not reported
Interpersonal sensitivity	Symptom Checklist-90 revised	Battaglia (2014) RCT Woods *et al.* (2017) [22]	Significant (within-group) decrease in interpersonal sensitivity for the cardio and resistance training intervention group (p<0.01) (total sample size: n=64 male prisoners).	Intervention lasted for 9 months

3.2.1.3 Combined interventions

3.2.1.3.1 Physical well-being, expressed as physical strength and fitness

Sanchez-Lastra *et al.* included three primary RCTs in their review that evaluated the effectiveness of combined sports- and exercise-based interventions on improving physical well-being outcomes among adult prisoners which we categorised as physical strength and fitness outcomes [23].

The first of the three RCTs assessed changes in the cardiovascular measures of resting systolic and diastolic blood pressure, average heart rate, cardiorespiratory endurance, peripheral oxygen saturation, and peak blood flow level; this primary study was reported on by both Sanchez-Lastra *et al.* and Mohan *et al.* (Table 12) [23]. Both Sanchez-Lastra *et al.* and Mohan *et al.* reported that the intervention group had a significantly lower heart rate and could travel a significantly greater distance based on a 6 minute walking test when compared with the control group. It was also reported that the combined exercise programme led to improvements in participants' systolic and diastolic blood pressure. However, imbalances in the comparison of resting diastolic blood pressure at baseline meant that comparison was not appropriate post-intervention. Outcome results for peripheral oxygen saturation and improving peak blood flow were not reported.

The second of the three primary RCTs included in Sanchez-Lastra *et al.*'s review measured changes in the $\dot{V}O_2$ max, flexibility, abdominal strength, upper body and shoulder strength, balance, anaerobic power, speed, and agility of adult prisoners receiving a combined sports- and exercise-based intervention (Table 12) [23]. Sanchez-Lastra *et al.* reported significant increases from baseline to follow-up among the participants in one or both of the intervention groups in the physical strength and fitness outcomes measured. The same RCT also measured changes in systolic and diastolic blood pressure and the risk of coronary heart disease among prisoners receiving the combined sports- and exercise-based intervention. Sanchez-Lastra *et al.* reported significant decreases from baseline to follow-up among the participants in one or both of the intervention groups in the physical strength and fitness outcomes measured. The same RCT also compared changes in $\dot{V}O_2$ max, flexibility, abdominal strength, strength (upper body and shoulder), and strength (upper body) in prisoners receiving the combined intervention with those in the control group. Sanchez-Lastra *et al.* reported significantly greater scores on the outcomes measured for adult prisoners in one or both of the intervention groups compared with the control group. Sanchez-Lastra *et al.* also reported that loss of balance was significantly lower among participants in the two intervention groups compared with those in the control group [23].

In the third of the three primary RCTs included in Sanchez-Lastra *et al.*'s review evaluating the effect of a combined sports- and exercise-based intervention on physical strength and fitness measures among adult prisoners, changes were compared in prisoners who received the combined intervention with a control group on the following measures: peak heart rate, peak completed workload, heart rate decline post-exercise, dynamic strength of the upper body, and dynamic strength of the knee extensors (Table 12) [23]. Sanchez-Lastra *et al.* reported no significant differences in any of the physical strength and fitness measures between the intervention and the control group. Sanchez-Lastra *et al.* reported significant (within-group) increases among participants in the intervention group on all the physical strength and fitness measures, with the exception of the dynamic strength of the knee extensors results, which were not reported in the review [23].

Further information about the three primary RCTs included in Sanchez-Lastra *et al.*'s review that evaluated the effects of a combined sports- and exercise-based intervention on physical strength and fitness measures among adult prisoners is included in Table 12 [23].

Table 12 Findings from Sanchez-Lastra et al. on combined sports- and exercise-based interventions measuring physical well-being, expressed as physical strength and fitness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
• Resting systolic and diastolic blood pressure • Average heart rate • Cardiorespiratory endurance (6-minute walking test) • Peripheral oxygen saturation • Peak blood flow level	Objective measures	Cashin (2008a) RCT Sanchez-Lastra *et al.* (2019) [23] Overlap with Mohan *et al.* (2018) [77]	Overall, cardiovascular fitness improved following the combined exercise programmes. Post-intervention, the intervention group (n=10 prisoners who engaged in a programme of strength exercise, cardiorespiratory resistance, and flexibility training) had a significantly lower average heart rate (p<0.05) and could travel a significantly greater distance (6-minute walking test) (p<0.05) compared with the control group (n=10 prisoners who maintained their normal activity levels). The combined exercise programme also led to improvements in systolic and diastolic blood pressure (no statistics provided). The combined exercise programme was not effective in improving peak blood flow (no statistics provided). *Note:* Pre-intervention, the intervention group had significantly (p<0.05) lower resting diastolic blood pressure compared with the control group. In addition, results regarding peripheral oxygen saturation were not reported.	Intervention lasted for 12 weeks
Group 1: • $\dot{V}O_2$ max (treadmill step test) • Flexibility (sit and reach) • Abdominal strength (half sit-up test) • Strength: upper body and shoulder (push-up test)	Objective measures	Battaglia (2013) RCT Sanchez-Lastra *et al.* (2019) [23]	Overall, cardiovascular fitness improved following the combined exercise programmes. There were significant (within-group) (p<0.05) increases among the participants in one or both of the intervention groups (two groups incorporating either aerobic or anaerobic exercise; n=25 in each group) in the outcome measures listed in Group 1 in the left-hand column. There were significant (within-group) decreases among the participants in	Intervention lasted for 36 weeks

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
• Strength: upper body (arm curl test) • Balance (flamingo balance test) • Anaerobic power, speed, and agility (10 × 5 shuttle test) **Group 2** • Systolic and diastolic blood pressure • Risk of coronary heart disease • Pulse oximetry • Tiffeneau-Pinelli index • Forced expiratory volume **Group 3** • $\dot{V}O_2$ max • Flexibility • Abdominal strength • Strength: upper body and shoulder • Strength: upper body • Pulse oximetry			one or both of the intervention groups (the more successful intervention group varies across outcomes) in the outcome measures listed in Group 2 in the left-hand column. The outcome measures listed in Group 3 in the left-hand column were significantly greater (p<0.05) among participants in one or both of the intervention groups compared with those in the control group (n=25 prisoners who maintained their normal activity levels). Loss of balance was significantly lower (p<0.05) among participants in both of the intervention groups compared with those in the control group. The interventions did not result in significant changes on the Tiffeneau-Pinelli index related to expiratory volume (no statistics provided).	

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Group 1 • Peak heart rate (pulsometer) • Peak completed workload (cycle ergometer) • Heart rate decline post-exercise • Dynamic strength of the upper body (bench press) **Group 2** Dynamic strength of the knee extensors	Objective measures	Perez-Moreno (2007) RCT Sanchez-Lastra *et al.* (2019) [23]	Overall, cardiovascular fitness improved following the combined exercise programme. There were significant (within-group) increases (p<0.05) among participants in the intervention group (n=14 prisoners infected with both human immunodeficiency virus (HIV) and hepatitis C who were enrolled in a methadone maintenance programme) in the outcome measures listed in Group 1 in the left-hand column. Dynamic strength of the knee extensors results were not reported within the intervention group. There were no significant differences in any of the outcome measures between the intervention and the control group (n=13 prisoners who maintained their normal activity levels).	Intervention lasted for 4 months

Mohan *et al.*'s review included one primary RCT that evaluated the effect of a combined sports- and exercise-based intervention on the physical strength and fitness of adult prisoners (Table 13) [77]. This RCT was also reported on in Sanchez-Lastra *et al.*'s review [23].

Table 13 Findings from Mohan et al. on combined sports- and exercise-based interventions measuring physical well-being, expressed as physical strength and fitness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Resting heart rate	Method unspecified, but assumed to have been measured using machinery	Cashin (2008a) RCT Mohan *et al.* (2018) [77] Overlap with Sanchez-Lastra *et al.* (2019) [23]	There was a significant difference between the intervention group (n=20 male prisoners who attended cardiorespiratory endurance, strength, and flexibility training, as well as three health education classes on healthy eating and self-management) and the control group (n=20 male prisoners who continued with their usual exercise regimen). No numeric or statistical values were provided.	Intervention lasted for 12 weeks
Diastolic blood pressure	Method unspecified, but assumed to have been measured using machinery	Cashin (2008a) RCT Mohan *et al.* (2018) [77] Overlap with Sanchez-Lastra *et al.* (2019) [23]	A significant difference was observed between the two groups for diastolic blood pressure, with the control group seeing the greatest improvement after the intervention. No numeric or statistical values were provided.	Intervention lasted for 12 weeks
Endurance	Method unspecified, but assumed to have been measured using machinery	Cashin (2008a) RCT Mohan *et al.* (2018) [77] Overlap with Sanchez-Lastra *et al.* (2019) [23]	There was a significant difference between the intervention group and the control group. No statistical values were provided.	Intervention lasted for 12 weeks

3.2.1.3.2 Physical well-being, expressed as body and blood composition

Sanchez-Lastra *et al.*'s review included three primary RCTs that evaluated the effect of a combined sports- and exercise-based intervention delivered to adult prisoners in order to improve their physical well-being, expressed as body and blood composition [23].

First, we will summarise the results from the three primary RCTs that examined changes in the body composition of adult prisoners (Table 14) [23]. The first of the three RCTs examined the effect of a combined sports- and exercise-based intervention on the body composition of participants by measuring changes in weight, body mass index (BMI), and waist girth. Sanchez-Lastra *et al.* reported no significant changes either between or within groups; however, the reporting on this primary RCT is poor. The same trial measured changes in the blood glucose levels of participants and reported no within-group reduction in glucose levels in either the intervention or control group [23].

The second of the three primary RCTs in Sanchez-Lastra *et al.*'s review examined the effect of a combined sports- and exercise-based intervention on improving the body composition of adult prisoners by

measuring changes in body mass and muscle mass (Table 14) [23]. Sanchez-Lastra *et al.* reported no significant differences between the intervention and control groups on either measure. Sanchez-Lastra *et al.* do report significant within-group increases in the estimated body mass among adult prisoners in the intervention group. The same trial also measured the effect of a combined sports- and exercise-based intervention on changes in haemoglobin, platelet count, and CD4 lymphocyte count in participating adult prisoners and reported a significant within-group increase in CD4 lymphocyte count among those in the intervention group. However, no significant within-group changes were reported in the intervention group for the other blood composition measures. Sanchez-Lastra *et al.* also reported no significant differences between the intervention and control groups for any of the blood composition measures [23].

The third of the three primary RCTs in Sanchez-Lastra *et al.*'s review examined changes in the BMI of participating adult prisoners following a combined sports- and exercise-based intervention and reported significant within-group decreases in the two intervention groups and significant within-group increases in the control group (Table 14) [23]. This trial assessed the effect of the combined intervention on changes in total cholesterol, high-density lipoprotein (or 'good') cholesterol, low-density lipoprotein (or 'bad') cholesterol, and triglycerides among participating adult prisoners. Sanchez-Lastra *et al.* reported significant within-group increases in total cholesterol and high-density lipoprotein cholesterol among the participants in one or both intervention groups. Sanchez-Lastra *et al.* also reported that high-density lipoprotein cholesterol was significantly higher among the participants in the intervention groups compared with the control group, and that there were no significant changes to low-density lipoprotein cholesterol in the two intervention groups or the control group. Sanchez-Lastra *et al.* reported a significant within-group decrease in triglycerides among the participants in the intervention groups compared with those in the control group, and a significant within-group increase in triglycerides in the control group [23].

Further information on the three primary RCTs included in Sanchez-Lastra *et al.*'s review which assessed the effect of a combined sports- and exercise-based intervention on the physical well-being, expressed as body and blood composition, of adult prisoners is included in Table 14 [23].

Table 14 Findings from Sanchez-Lastra et al. on combined sports- and exercise-based interventions measuring physical well-being, expressed as body and blood composition

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
• Weight • BMI • Waist girth	Objective measures	Cashin (2008a) RCT Sanchez-Lastra *et al.* (2019) [23]	There were no significant changes in any of the anthropometric variables measured (n=10 participants in the intervention group). No numeric or statistical values were provided. *Note:* There is limited information provided in relation to the outcomes. It is unclear whether these changes are within-group or between-group effects (n=10 participants in the control group who maintained their normal activity levels).	Not reported
• Body mass • Muscle mass	Objective measures	Perez-Moreno (2007) RCT Sanchez-Lastra *et al.* (2019) [23]	There was a significant (within-group) increase in estimated body mass (p<0.05) among participants in the intervention group (n=14 prisoners infected with both HIV and hepatitis C who were enrolled in a methadone maintenance programme) (no within-group results regarding muscle mass were reported). One table in the review reports that there were no significant differences between the intervention and control (n=13 prisoners who maintained their normal activity levels) groups, which is assumed to include body mass and muscle mass (among other physical outcomes). No numeric or statistical values were provided.	Intervention lasted for 4 months
BMI	Objective measure	Battaglia (2013) RCT Sanchez-Lastra *et al.* (2019) [23]	There was a significant (within-group) (p<0.05) decrease in BMI among the participants in the two intervention groups incorporating either aerobic or anaerobic exercise (n=25 participants in each group). In addition, there was a significant within-group increase in BMI in the control group (n=25 prisoners who maintained their normal activity levels).	Intervention lasted for 36 weeks
Blood glucose level	Objective measure	Cashin (2008a RCT	The combined intervention was not effective for the reduction of blood glucose levels (n=10 participants in the intervention group and n=10 in the	Intervention lasted for 12 weeks

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
		Sanchez-Lastra *et al.* (2019) [23]	control group). No statistical values were provided. *Note:* There is limited information provided in the review in relation to the outcome. It is unclear whether this is a within-group or between-group effect; the control group maintained normal activity levels.	
• Haemoglobin • Platelet count • CD4 lymphocyte count	Objective measures	Perez-Moreno (2007) RCT Sanchez-Lastra *et al.* (2019) [23]	There was a significant (within-group) increase in CD4 lymphocyte count (p<0.05) among participants in the intervention group (n=14 prisoners infected with both HIV and hepatitis C who were enrolled in a methadone maintenance programme), whereas no significant changes were reported for haemoglobin, leukocyte, and platelet count. The tabular data reported that there were no significant differences between the intervention and control (n=13 prisoners who maintained their normal activity levels) groups, which is assumed to include all haematological outcomes (among other physical outcomes).	Intervention lasted for 4 months
• Total cholesterol • High-density lipoprotein cholesterol • Low-density lipoprotein cholesterol • Triglycerides	Objective measures	Battaglia (2013) RCT Sanchez-Lastra *et al.* (2019) [23]	There were significant (within-group) (p<0.05) increases in total cholesterol and high-density lipoprotein cholesterol among the participants in one or both of the intervention groups (incorporating either aerobic or anaerobic exercise; n=25 in each group). There was a significant within-group increase in triglycerides in the control group (n=25 prisoners who maintained their normal activity levels). There was a significant (within-group) (p<0.05) decrease in triglycerides among the participants in the aerobic exercise intervention group (n=25 participants) compared with the control group. High-density lipoprotein cholesterol was significantly higher (p<0.05) among the participants in the aerobic exercise intervention group (n=25 participants)	Intervention lasted for 36 weeks

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			compared with the control group. Results regarding between-group differences in the remaining outcomes were not reported. There were no significant changes to low-density lipoprotein cholesterol in the two intervention groups and the control group. No numeric or statistical values were provided, and it is unclear if this result represents a within-group or between-group difference.	

Mohan *et al.*'s review included one primary pre-post study that assessed the effect of a combined sports- and exercise-based intervention on four physical well-being outcome measures which we categorised as body and blood composition outcomes among adult prisoners (Table 15) [77]. Mohan *et al.* reported a significant within-group improvement in chest measurement in the intervention group at follow-up compared with baseline. When changes in body weight, BMI, and waist-to-hip ratio were assessed, Mohan *et al.* reported no significant within-group changes from baseline to follow-up for any of these three measures [77].

There is further information on the sample size and sample profile from the included primary study in Table 15 [77]. Mohan *et al*. did not report numeric or statistical values to help with interpreting the results.

Table 15 Findings from Mohan et al. on a combined sports- and exercise-based intervention measuring physical well-being, expressed as body and blood composition

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Chest measurement	Method unspecified, but assumed to have been measured using machinery	Elwood Martin (2013) Pre-post study Mohan *et al.* (2018) [77]	There was a significant (within-group) improvement in the intervention group (n=28 female prisoners who participated in a circuit class or followed personalised exercise plans and received nutritional education sessions) at follow-up compared with baseline. No numeric or statistical values were provided.	Intervention lasted for 6 weeks
Weight	Method unspecified, but assumed to have been measured using machinery	Elwood Martin (2013) Pre-post study Mohan *et al.* (2018) [77]	No significant (within-group) change was observed from baseline to follow-up. No numeric or statistical values were provided.	Intervention lasted for 6 weeks
BMI	Method unspecified, but assumed to have been measured using machinery	Elwood Martin (2013) Pre-post study Mohan *et al.* (2018) [77]	No significant (within-group) change was observed from baseline to follow-up. No numeric or statistical values were provided.	Intervention lasted for 6 weeks
Waist-to-hip ratio	Method unspecified, but assumed to have been measured using machinery	Elwood Martin (2013) Pre-post study Mohan *et al.* (2018) [77]	No significant (within-group) change was observed from baseline to follow-up. No numeric or statistical values were provided.	Intervention lasted for 6 weeks

3.2.1.3.3 Mental, psychological, and emotional well-being, expressed as wellness

Woods *et al.*'s review included one primary study (a cross-sectional survey) that evaluated the effect of a combined sports and exercised-based intervention with a nutritional component on the energy levels and sleep quality (used as proxies for mental wellness) of adult prisoners (Table 16) [22]. Woods *et al.* report that all participants receiving the combined intervention reported a positive effect on their energy levels, and 81% of participants reported a positive effect on their quality of sleep [22].

Table 16 Findings from Woods et al. on a combined sports- and exercise-based intervention measuring mental, psychological, and emotional well-being, expressed as wellness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Energy levels	Self-reported change in energy levels at the end of the programme	Elwood Martin (2013) Cross-sectional survey Woods *et al.* (2017) [22]	All participants (n=16 female prisoners) reported a positive impact of the intervention (comprising exercise circuit stations and aerobic routines plus a nutrition programme) on energy levels. Statistical measures were not provided for the outcome measure.	Intervention lasted for 6 weeks
Sleep quality	Self-reported change in sleep quality at the end of the programme	Elwood Martin (2013) Cross-sectional survey Woods *et al.* (2017) [22]	A considerable majority (81%) of 16 female participants reported a positive impact of the combined intervention (comprising exercise circuit stations and aerobic routines plus a nutrition programme) on sleep quality post-intervention. Numbers and statistical measures were not provided for the outcome measure.	Intervention lasted for 6 weeks

Sanchez-Lastra *et al.*'s review included three RCTs that evaluated the effects of combined sports- and exercise-based interventions on improving the mental wellness of adult prisoners (Table 17) [23]. One of the three trials measured changes in health-related quality of life, which we categorised as a wellness outcome. In relation to this trial, Sanchez-Lastra *et al.* reported significant within-group increases in health-related quality of life measures among participants in the intervention group. However, Sanchez-Lastra *et al.* reported no significant differences in health-related quality of life between the intervention and control groups [23].

Sanchez-Lastra *et al.*'s review included one RCT that evaluated the effect of a multisport programme on measures of improved mental wellness among adult prisoners (Table 17) [23]. The trial on the multisport programme assessed changes in self-esteem, leisure performance, attitude, and participation and satisfaction during free time, and we categorised these measures as wellness outcomes. Sanchez-Lastra *et al.* reported no significant differences within groups or between groups on any of these four measures [23]. No results were reported for the third primary RCT.

Further information on the primary trials included in Sanchez-Lastra *et al.*'s review reporting results on wellness-related outcomes among adult prisoners is reported in Table 17 [23].

Table 17 Findings from Sanchez-Lastra et al. on combined sports- and exercise-based interventions measuring mental, psychological, and emotional well-being, expressed as wellness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Health-related quality of life	Health-related quality of life questionnaire	Perez-Moreno (2007) RCT Sanchez-Lastra *et al.* (2019) [23]	There was a significant (within-group) increase in health-related quality of life (p<0.05) among participants in the intervention group (n=14 prisoners infected with both HIV and hepatitis C who were enrolled in a methadone maintenance programme). The data in tables in the review indicate that there were no significant differences between the intervention and control (n=13 prisoners who maintained their normal activity levels) groups, which is assumed to include the health-related quality of life outcome (among other physical outcomes).	Intervention lasted for 4 months
• Self-esteem • Leisure performance • Attitude • Participation and satisfaction during free time	Self-esteem inventory (unspecified) Leisure diagnostic battery (unspecified) Not reported for attitude Not reported for participation and satisfaction during free time	Munson (1988) RCT Sanchez-Lastra *et al.* (2019) [23]	The intervention was a multisport programme examining changes in self-esteem across time points for the three groups (physical activity group, leisure education group, and informal discussion group) (total sample size: n=39 male prisoners). The combined intervention comprised two intervention groups (n=13 and n=14) and the control group (n=12) talking about interesting topics. There were no significant differences (either within or between groups) on self-esteem, attitude, participation and satisfaction during free time, or leisure performance. *Note:* There is limited information provided in relation to this outcome in the review.	Intervention lasted for 10 weeks
Total positive symptoms Positive Symptom Distress Index	Symptom Checklist-90-Revised	Battaglia (2015) RCT	No results were reported.	Intervention lasted for 36 weeks

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
		Sanchez-Lastra *et al.* (2019) [23]		

3.2.1.3.4 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

Sanchez-Lastra *et al.*'s review included two primary RCTs evaluating combined sports- and exercise-based interventions delivered in order to improve the mental distress of adult prisoners (Table 18) [23]. The first of the two primary trials, which compared changes in psychological distress, reported incomplete data. The second of the two trials evaluating a combined sports- and exercise-based intervention that was included in Sanchez-Lastra *et al.*'s review reported that both intervention groups had significantly lower levels of depression post-intervention when compared with the control group. In addition, Sanchez-Lastra *et al.* reported a significant within-group improvement in one or both of the intervention groups in interpersonal sensitivity, depression, the Global Severity Index, anxiety, and phobic anxiety. Further information on the characteristics of the two primary trials reported on in Sanchez-Lastra *et al.*'s review is included in Table 18 [23].

Table 18 Findings from Sanchez-Lastra et al. on combined sports- and exercise-based interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Psychological distress	A modified Kessler-10 tool	Cashin (2008b) RCT Sanchez-Lastra *et al.* (2019) [23]	The combined exercise programme (n=10 prisoners who engaged in a programme of strength exercise, cardiorespiratory resistance, and flexibility training) did not have a significant effect on psychological distress. *Note:* There is limited information provided in relation to this outcome; it is unclear whether this is a within-group or between-group effect.	Not reported
Group 1 • Interpersonal sensitivity • Depression • Global Severity Index • Anxiety • Phobic anxiety **Group 2** • Somatisation • Obsessive-compulsive disorder • Hostility • Psychoticism • Paranoid ideation • Sleep disorders	Symptom Checklist-90-Revised	Battaglia (2015) RCT Sanchez-Lastra *et al.* (2019) [23]	In one or both of the combined exercise intervention groups (n=25 in each of the two groups), there was a significant (within-group) reduction (p<0.05) in the outcome measures listed in Group 1 in the left-hand column. Compared with the control group (n=25 prisoners who maintained their normal activity levels), both intervention groups had significantly lower (p<0.05) levels of depression post-intervention. There was a significant improvement in one or both of the intervention groups in interpersonal sensitivity, depression, the Global Severity Index, anxiety, and phobic anxiety at follow-up. *Note:* Results regarding the remaining outcome measures in Group 2 in the left-hand column were not reported.	Intervention lasted for 36 weeks

3.2.1.4 Overlap of primary studies

There were four instances of overlap of a primary study between two of the three systematic reviews measuring the effectiveness of sports- and exercise-based interventions:

1. The first instance of overlap of a primary study was between the reviews by Sanchez-Lastra *et al.* and Mohan *et al.* examining the effect of physical exercise (single intervention) on physical strength and fitness [23,77].
2. The second instance of overlap of a primary study was between the reviews by Sanchez-Lastra *et al.* and Mohan *et al.* examining the effect of physical activity (single intervention) on body composition [23,77].
3. The third instance of overlap of a primary study was between the reviews by Sanchez-Lastra *et al.* and Woods *et al.* examining the effect of physical aerobic exercise (single intervention) on mental distress [22,23].
4. The fourth instance of overlap of a primary study was between the reviews by Sanchez-Lastra *et al.* and Mohan *et al.* examining combined sports- and exercise-based interventions on physical strength and fitness [23,77].

We acknowledged the four instances of overlap when presenting the analyses in the text and reported the findings from each primary study once in the text for each outcome in order to avoid overestimating the quantity of evidence contributing to each outcome.

3.2.1.5 Benefits of sports- and exercise-based interventions

Canada *et al.* reported thematic findings from one primary study on sports- and exercise-based interventions, based on validated scales, for the following outcomes: depression, mood, participation in pleasant events, and global functioning (Table 19) [31]. The systematic review authors found decreased depression for all participants, decreased negative affect in two of the four participants, and increased participation in pleasant activities, and found that all participants remained stable, with global functioning increasing for each participant [31].

Martinez-Merino *et al.* described the reported benefits of sports- and exercise-based interventions [76], stating that the benefits include:

> An increase in social relations (12 studies), both among inmates themselves and between inmates and prison staff; improved mental health (six studies) and quality of life (two studies); reduced stress (three studies) and hopelessness (one study) and the perception of a somewhat lesser degree of anxiety and depression (one study); increased happiness (one study) and better mood (one study); an improved sensation of well-being (one study) and relaxation (one study) and the emergence of feelings of pleasure and amusement (three studies); coming to forget the fact that they are incarcerated (six studies), thereby giving constructive vent to frustration and anger (two studies); improved perception of self-image, self-esteem (five studies) and self-confidence (two studies); the sensation of improved health (four studies) and the belief that they have attained greater awareness of their own state of health (one study) and of their bodies (one study); perception of the fact that physical activities help them desist from crime (two studies) and drugs (four studies) and favour the construction of a new identity that might transform their lives (two studies); and the opportunity to undertake personal and interpersonal apprenticeship (one study). [76 p1161]

The benefits report a direction of effect (either positive or negative), but not the size of the effect compared with a named comparator. In addition, Martinez-Merino *et al.* implied that the effects were self-reported and not measured using independent validated measures. Martinez-Merino *et al.* also

described the participants' experience of sports- and exercise-based interventions, and we have used this analysis in order to answer Question 4.

Perry *et al.* did not report results regarding the effect of sports- and exercise-based interventions on anxiety and depression [78].

Table 19 Findings from Canada et al. on single sports- and exercise-based interventions measuring mental, psychological, and emotional well-being, expressed as wellness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Positive and negative affect	The Philadelphia Geriatric Center Positive and Negative Affect Rating Scale	Meeks (2008) Case study Canada *et al.* (2020) [31]	Positive affect did not increase, but in two cases, negative affect decreased. No statistics were reported.	Intervention lasted for 10 weeks; evaluations took place before and after the intervention
Pleasant events	The Pleasant Events Schedule – Nursing Home Version	Meeks (2008b) Case study Canada *et al.* (2020) [31]	Participants showed an increase in pleasant activities. No statistics were reported.	Intervention lasted for 10 weeks; evaluations took place before and after the intervention
Global functioning	The Dartmouth COOP Scales of Functioning	Meeks (2008b) Case study Canada *et al.* (2020) [31]	This remained stable, with global functioning increasing for each participant. No statistics were reported.	Intervention lasted for 10 weeks; evaluations took place before and after the intervention
Depression	The Geriatric Depression Inventory	Meeks (2008b) Case study Canada *et al.* (2020) [31]	Depression decreased for all participants able to be assessed. No statistics were reported.	Intervention lasted for 10 weeks; evaluations took place before and after the intervention

3.2.1.6 Summary: Sports- and exercise-based interventions

We included six systematic reviews that covered sports- and exercise-based interventions, of which one was judged to be of strong quality with respect to design and implementation and five were judged to be of moderate quality. Three of the six reviews reported on the effects of sports- and exercise-based interventions and three reviews reported on the benefits of such interventions.

We included two systematic reviews that evaluated the effect of a single sports- and exercise-based intervention on changes in physical strength and fitness among adult prisoners. The first of the two reviews reported that there was no significant difference for 7 of 14 outcome measures of cardiovascular fitness and physical strength and fitness between adult prisoners in the intervention group compared with those in the control group. However, the first of the two reviews reported that prisoners in the intervention group demonstrated significant improvement in levels of oxygen saturation, upper body strength, muscular endurance, and other unspecified physical fitness measures when compared with participants in the control group. In the second review, one primary study reported that the prisoners in

the three intervention groups had significantly improved fitness based on all measures of cardiovascular fitness compared with those in the control group.

We included two systematic reviews covering four primary studies that evaluated the effect of a single sports- and exercise-based intervention on changes in body and blood composition among adult prisoners. One of the four primary studies was included in both systematic reviews. With respect to body composition, the two reviews reported significantly improved anthropometric measures for some but not all variables following exercise-based interventions. These improvements were more likely when exercise-based interventions were completed 5 days per week. Regarding changes in blood composition, significant improvements in high-density lipoprotein and L-carnitine were reported in the intervention group compared with the control group in one comparison, whereas in another comparison, no significant differences in high-density lipoprotein and L-carnitine measures were reported between the intervention and control groups.

We included one systematic review that evaluated the effect of a single sports- and exercise-based intervention on changes in mental, psychological, and emotional wellness among adult prisoners, and it reported that the intervention group had significantly greater positive affect (or mood) and executive function compared with the control group. In addition, the systematic review found significant within-group increases in measures of positive affect among those in the intervention group.

We included two systematic reviews that evaluated the effect of a single sports- and exercise-based intervention on changes in mental and emotional distress among adult prisoners. The first review reported significant improvements in mental health favouring the two intervention groups compared with the control groups. In addition, participating prisoners in both intervention groups showed improved mental health scores from baseline to post-intervention. The second review reported significant improvements or reductions in depression, anxiety, and psychological stress in prisoners in the intervention group compared with those in the control group. This second review also reported significant improvements or reductions in depression, anxiety, and psychological stress among prisoners in the intervention group at follow-up when compared with baseline.

We included two systematic reviews that evaluated the effect of a combined sports- and exercise-based intervention on changes in physical strength and fitness among adult prisoners. The first review summarised the results from three primary RCTs and reported that in two of these trials, prisoners in the intervention group fared significantly better than those in the control group on the majority of the physical strength and fitness outcomes assessed. In addition, the first systematic review reported that adult prisoners in the intervention group reported significantly favourable within-group scores on some of the outcomes. However, this first review reported no significant differences in any of the physical strength and fitness measures between the intervention group and the control group in the third primary RCT. The second review that evaluated the effect of a combined sports- and exercise-based intervention on changes in physical strength and fitness among adult prisoners reported a significant difference favouring the intervention group compared with the control group on measures of resting heart rate, endurance levels, and diastolic blood pressure.

We included two systematic reviews that evaluated the effect of a combined sports- and exercise-based intervention on changes in the body and blood composition of adult prisoners. The first systematic review reported no significant difference between the intervention and control groups on comparisons of changes to body composition. There is some evidence in this review that body composition or anthropometric parameters improved in the intervention group at follow-up compared with baseline. The same review reported no significant difference between the intervention and control groups when changes in blood composition were measured. The same review reported evidence of within-group

increases of high-density lipoprotein (or 'good') cholesterol among prisoners in the intervention group, as well as a significant within-group decrease in triglycerides among the participants in the intervention group compared with those in the control group and a significant within-group increase in triglycerides among the participants in the control group. The second review evaluated the effect of combined sports- and exercise-based interventions on body and blood composition, and it reported a significant improvement in chest measurement in the intervention group from baseline to follow-up. The second review reported no significant within-group changes in body weight, BMI, and waist-to-hip ratio from baseline to follow-up.

We included one systematic review that evaluated the effect of a combined sports and exercise-based intervention on measures of improved wellness among adult prisoners. This systematic review reported significant within-group increases in health-related quality of life measures among participants in the intervention group. The same review reported no significant differences in health-related quality of life between the intervention and control groups. In addition, the review reported no significant differences within groups or between groups on four measures: self-esteem, leisure performance, attitude, and participation and satisfaction during free time.

We included one systematic review that evaluated the effect of a combined sports- and exercise-based intervention on measures to reduce mental, psychological, and emotional distress among adult prisoners, and it reported that participants in the combined exercise intervention groups had significantly lower levels of depression post-intervention when compared with those in the control group. In addition, the review reported a significant within-group improvement in one or both of the intervention groups in interpersonal sensitivity, depression, the Global Severity Index, anxiety, and phobic anxiety.

Based on the reviews evaluating single sports- and exercise-based interventions, we conclude that there is:

- Very low- and moderate-certainty evidence to suggest that single sports- and exercise-based interventions improve some physical strength and fitness outcomes in adult prisoners
- Low- and moderate-certainty evidence to suggest that single sports- and exercise-based interventions improve some body and blood composition outcomes in adult prisoners
- Moderate-certainty evidence to suggest that single sports- and exercise-based interventions can improve mental wellness in adult prisoners, but the evidence is based on one primary study, and
- Low- and moderate-certainty evidence to suggest that single sports- and exercise-based interventions can reduce symptoms of mental and emotional distress in adult prisoners.

Based on the reviews evaluating combined sports- and exercise-based interventions, we conclude that there is:

- Low- and moderate-certainty evidence to suggest that combined sports- and exercise-based interventions can improve some physical strength and fitness outcomes in adult prisoners
- Very low- and moderate-certainty evidence to suggest that combined sports- and exercise-based interventions can improve body and blood composition outcomes in adult prisoners
- Very low- and low-certainty evidence to suggest that combined sports- and exercise-based interventions do not improve or disimprove mental wellness outcomes in adult prisoners, and
- Low-certainty evidence to suggest that combined sports- and exercise-based interventions reduce symptoms of mental and emotional distress in adult prisoners.

3.2.2 Horticultural interventions

3.2.2.1 Introduction

3.2.2.1.1 Definition of intervention

Harrison described the horticultural intervention examined in her review as agricultural therapy delivered through prison-based agriculture programmes [94]. There was no further description of the type or nature of the agricultural therapy.

3.2.2.1.2 Inclusion and exclusion at full text

We identified two systematic reviews that covered horticultural interventions for consideration at the full-text screening stage; we included one review [94] and excluded the other review [95]. The reason for exclusion was study design, as the excluded review was a scoping review. Harrison's review covered more than one intervention category [94]: it also covered art and creative interventions and animal-based interventions.

3.2.2.1.3 Review characteristics

The systematic review we included examined interventions that were implemented in adult prisons and contained nine primary studies [94] (Appendix 9). Three of the primary studies were of interest to our overview of reviews, and one of these three studies covered a horticultural intervention. The age range of participants was not reported (Appendix 9). The primary study focusing on prisoners who participated in a horticultural intervention was conducted on a male-only sample. The countries included in Harrison's systematic review were Australia, Canada, Ireland, the UK, and the USA. The years of publication for the primary studies included in the systematic review were 2001–2019, and the year of publication for the systematic review was 2020. The studies were qualitative designs with various analytic approaches [94].

3.2.2.1.4 Quality assessment

The included systematic review was judged to be of strong quality with respect to design and implementation [94] (Appendix 10).

3.2.2.2 Outcome assessment

Harrison described the participants' experience of horticultural interventions, and we have used this analysis in order to answer Question 4 [94].

3.2.2.3 Summary: Horticultural interventions

There were no systematic reviews measuring the effectiveness of horticultural interventions in order to address improve the physical and mental well-being of the adult prison population. We have included one qualitative systematic review that reported on the participants' experience of horticultural interventions, and we report on these findings in response to Question 4.

3.2.3 Yoga-, meditation-, and mindfulness-based interventions

3.2.3.1 Introduction

3.2.3.1.1 Definition of intervention

The three included systematic reviews that evaluated yoga-, meditation-, and mindfulness-based interventions are presented in this section.

Han evaluated mindfulness-based interventions involving [30]:

- Acceptance and commitment therapy (three primary studies)
- Mindfulness-based cognitive therapy (one primary study)
- Mindfulness meditation (two primary studies)
- Dialectical behaviour therapy (one primary study)
- Combined mindfulness-based stress reduction and mindfulness-based cognitive therapy for relapse prevention (two primary studies)
- Mindfulness-based cognitive therapy combined with some elements of mindfulness-based stress reduction (one primary study), and
- Combined acceptance and commitment therapy, dialectical behaviour therapy, mindfulness-based stress reduction, and mindfulness-based cognitive therapy (one primary study).

Shonin *et al.* evaluated mindfulness-based interventions using two primary studies, while Perry *et al.* evaluated positive psychology or mindfulness-based interventions using four primary studies [78,96]. There was no further description of the type or nature of the mindfulness-based interventions.

Shonin *et al.* also evaluated meditation-based interventions across three primary studies using Vipassana meditation and two primary studies using other Buddhist or Buddhist-like meditation interventions [96]. Shonin *et al.* reported that one of the two primary studies using Buddhist-like interventions followed Tibetan, Zen, and other Buddhist and non-Buddhist meditation approaches, and the other primary study was not affiliated with any particular meditation tradition, but it was included as it significantly resembled Buddhist-based mindfulness meditation.

Perry *et al.* evaluated yoga-based interventions using five primary studies [78]. There was no further description of the type or nature of the yoga interventions.

3.2.3.1.2 Inclusion and exclusion at full text

We identified 25 reviews that covered yoga-, meditation-, and mindfulness-based interventions for consideration at the full-text screening stage. We included 3 systematic reviews [30,78,96] and excluded the other 22 reviews [26,28,97–116]. The reasons for exclusion were population (1 review), intervention (9 reviews), study design or type of review (2 reviews), and review methodology (10 reviews). Perry *et al.* covered more than one intervention category [78]: in addition to yoga-, meditation-, and mindfulness-based interventions, they also covered sports- and exercise-based interventions, art and creative interventions, and animal-based interventions [78].

3.2.3.1.3 Review characteristics

Two of the included systematic reviews examined interventions that were implemented in adult prisons [78,96] and one examined interventions that were implemented in adult prisons and young offender institutions [30] (Appendix 9). The primary studies based in young offender institutions were excluded from analysis [30,78,96]. Perry *et al.* covered more than one intervention category [78]. The age range of

participants was 26.5–42.2 years across two of the three included systematic reviews [30,78] (Appendix 10). Both male and female participants were included in all three systematic reviews. The countries included across the three systematic reviews were China (two reviews), Hungary (one review), India (one review), Norway (one review), Spain (two reviews), Sweden (one review), Taiwan (two reviews), the UK (one review), and the USA (three reviews). The years of publication for the primary studies included in the three systematic reviews were 1983–2021, and the years of publication for the systematic reviews were 2013–2023. The primary study designs were RCTs and non-randomised trials.

3.2.3.1.4 Quality assessment

The three included systematic reviews were judged to be of moderate quality with respect to design and implementation [30,78,96] (Appendix 10). Two reviews did not present a reproducible search strategy in their paper [78,96], while two reviews did not discuss the quality of the primary studies in their analysis [30,78]. In addition, Perry *et al.* did not present a focused research question and Han did not complete an appropriate analysis [30,78]. The conclusions of the three moderate-quality reviews are not supported by their methods and results.

3.2.3.2 Single interventions

3.2.3.2.1 Physical well-being, expressed as physical strength and fitness

There were no single yoga-, meditation-, and mindfulness-based interventions reported on under the outcome of physical well-being, expressed as physical strength and fitness.

3.2.3.2.2 Physical well-being, expressed as body and blood composition

There were no single yoga-, meditation-, and mindfulness-based interventions reported on under the outcome of physical well-being, expressed as body and blood composition.

3.2.3.2.3 Mental, psychological, and emotional well-being, expressed as wellness

3.2.3.2.3.1 Mindfulness-based interventions

Shonin *et al.* reported on three primary studies measuring outcomes that we categorised as components of wellness: self-esteem, optimism, emotional intelligence, and mindfulness [96]. One of the three primary studies included by Shonin *et al.* in their systematic review, an RCT, evaluated the effect of a mindfulness-based stress-reduction intervention on the levels of self-esteem among adult prisoners (Table 20). A total of 113 mindfulness-based stress-reduction courses (each with 12–20 participants) were delivered across 6 minimum- and medium-security correctional facilities in the USA and had a completion rate of 69%. Shonin *et al.* report that participants in the mindfulness-based stress-reduction intervention group demonstrated a significant increase (by 5%) in self-esteem. Shonin *et al.* also reported that women had greater improvements in self-esteem than men, and that the effects of the intervention were maintained at the 6–8-week follow-up [96].

Table 20 Findings from Shonin et al. on single mindfulness-based interventions measuring mental, psychological, and emotional well-being, expressed as wellness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Self-esteem	Rosenberg Self-Esteem Scale	Samuelson (2007) RCT Shonin *et al.* (2013) [96]	Participants in the intervention group (n=1,953 male and female prisoners) showed a significant (within-group) improvement in self-esteem (5% increase). No significant changes were reported for the control group (n=180 male and female prisoners). The effects of the intervention were maintained at the 6–8-week follow-up. No inferential statistics were provided.	Intervention lasted for 6-8 weeks; follow-up took place 6-8 weeks post-intervention

3.2.3.2.3.2 Meditation-based interventions

Two primary studies included in the review by Shonin *et al.*, measuring outcomes that we categorised as wellness outcomes, evaluated the effectiveness of a Vipassana meditation intervention on adult prisoners (Table 21) [96]. The first primary study reported on by Shonin *et al.* reported significant (within-group) improvements in psychosocial outcomes following the Vipassana meditation intervention. However, Shonin et al. do not report results on optimism specifically. The second primary study reported significant improvements in psychosocial outcomes among the group receiving the Vipassana meditation intervention. In addition, the same primary study reported a significant (9%) increase in mindfulness and a 2% increase in emotional intelligence among the intervention group [96].

Table 21 Findings from Shonin et al. on Vipassana meditation interventions measuring mental, psychological, and emotional well-being, expressed as wellness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Optimism	The Life Orientation Test	Bowen (2006) Non-randomised trial Shonin *et al.* (2013) [96]	Shonin *et al.* reported that prisoners in the 10-day Vipassana meditation intervention group (n=63 male and female prisoners at baseline, n=29 at the 3-month follow-up) showed significant [within-group] improvements in psychosocial outcomes. However, Shonin *et al.* do not report results on optimism specifically.	Intervention lasted for 10 days; follow-up took place 3 months later (post-release)
Mindfulness	The Cognitive and Affective Mindfulness Scale – Revised	Perelman (2012) Non-randomised trial Shonin *et al.* (2013) [96]	The intervention group (n=60 male prisoners) participated in a 10-day Vipassana meditation retreat in prison, compared with the control group (n=67 prisoners) who attended a 10-week programme called Houses of health that also integrated mindfulness principles. The intervention group showed significant improvements in mindfulness (9% increase). These improvements were partially maintained at the 1-year follow-up. No statistical results were provided.	Intervention lasted for 10 days; follow-up took place 1 year later
Emotional intelligence	The Trait Meta-Mood Scale	Perelman (2012) Non-randomised trial Shonin *et al.* (2013) [96]	The intervention group (n=60 male prisoners) participated in a 10-day Vipassana meditation retreat in prison, compared with the control group (n=67 prisoners) who attended a 10-week programme called Houses of health that also integrated mindfulness principles. Prisoners in the intervention group (see above; n=60 male prisoners) showed significant improvements in emotional intelligence (2% increase). These improvements were partially maintained at the 1-year follow-up. No statistical results were provided.	Intervention lasted for 10 days; follow-up took place 1 year later

3.2.3.2.4 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

3.2.3.2.4.1 Mindfulness-based interventions

Three included systematic reviews examined the effect of mindfulness-based interventions on mental and emotional distress.

Han included 11 primary studies that evaluated the effect of a mindfulness-based intervention delivered in adult prisons [30]. The 11 studies examined 4 different outcome measures that we categorised as components of mental and emotional distress: depressive symptoms, anxiety, stress, and overall psychological distress. We have summarised the results of the primary studies from Han for each of these four outcome measures (Table 22). Five of the 11 primary studies assessed the effect of a mindfulness-based intervention on depressive symptoms using meta-analysis. The results indicated that, overall, mindfulness-based interventions had a moderate effect on reducing depressive symptoms compared with control groups (standardised mean difference (MD)=0.48; 95% confidence interval (CI)=0.25-0.71) [30]. In addition, Han reported that mindfulness-based interventions had a moderate effect on depression when compared with passive control groups only (standardised MD=0.50; 95% CI: 0.27-0.73; 4 RCTs; N=297), but there was no significant between-group difference in depressive symptoms when mindfulness-based interventions were compared with other active interventions (standardised MD: −0.05; 95% CI: −1.29-1.19; 1 RCT. One of the primary studies, an RCT was also included in the systematic review by Perry *et al.*

Eight of the 11 primary studies included in the review by Han assessed the effect of a mindfulness-based intervention on reducing anxiety among adult prisoners using meta-analysis (Table 22) [30]. The results found that, overall, a mindfulness-based intervention had a small effect on reducing anxiety when compared with the control group (standardised MD=0.21; 95% CI: 0.04-0.38). There was moderate heterogeneity in the main meta-analysis, but this was addressed in a subgroup analysis separating active and passive controls. The effect on anxiety was significantly in favour of mindfulness-based interventions when compared with passive control groups, but no significant effect was reported when mindfulness-based interventions were compared with other active interventions [30]. One of the primary studies, an RCT was also included in the systematic review by Perry *et al.*

Three of the 11 primary studies included in the review by Han assessed the effect of a mindfulness-based intervention on stress among adult prisoners using meta-analysis (Table 22) [30]. The results demonstrate that mindfulness-based interventions had a large effect on reducing stress compared with passive control groups (standardised MD=4.60; 95% CI: 2.93-6.27).

Four of the 11 primary studies included in the review by Han assessed the effect of mindfulness-based interventions on overall psychological distress among adult prisoners using meta-analysis (Table 22) [30]. There was substantial heterogeneity in the main meta-analysis, but this was addressed in a subgroup analysis separating active and passive controls. The results demonstrate that, overall, mindfulness-based interventions had a moderate effect on reducing overall psychological distress compared with control groups (standardised MD=0.50; 95% CI: 0.01-0.99).

In summary, when mindfulness-based interventions were compared with passive controls, the mindfulness-based interventions were better at reducing mental and emotional distress among adult prisoners, but there were no significant differences when these were compared with active interventions. As elaborated by Han:

> This meta-analysis shows moderate effects of [mindfulness-based interventions] on depressive symptoms and overall psychological distress, large effects on stress, and small effects on anxiety and mindfulness in incarcerated samples. The overall risk of bias across studies was unclear. Most included studies compared [mindfulness-based interventions] to treatment as usual/waiting list controls; the few studies comparing them to other [active] interventions showed little difference between interventions. [30 p57]

Table 22 Findings from Han on single mindfulness-based interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Depressive symptoms	Zung Self-Rating Depression Scale (one primary study) Beck Depression Inventory (two primary studies) Beck Depression Inventory – Short Form (one primary study) Depression subscale of the Trauma Symptom Checklist (one primary study)	An *et al.* (2019) Bradley (2003) Eisenbeck (2016) Nidich (2016) Song (2020) RCTs Han (2022) [30] Overlap with Perry *et al.* [78]	Overall, mindfulness-based interventions had a moderate effect on reducing depressive symptoms compared with control groups (standardised MD=0.48; 95% CI: 0.25-0.71; 5 RCTs; N=307 participants; I^2=0%). Mindfulness-based interventions did not differ with respect to depression when compared with the active control groups or passive control groups (no effect of control group type) (p=0.39). Mindfulness-based interventions had a moderate effect on depression when compared with passive control groups only (standardised MD=0.50; 95% CI: 0.27-0.73; 4 RCTs; N=297), but there was no significant between-group difference in depressive symptoms when mindfulness-based interventions were compared with other active interventions (standardised MD: −0.05; 95% CI: −1.29-1.19; 1 RCT.	Not reported
Anxiety	Zung Self-Rating Anxiety Scale (one primary study) Arousal subscale of the Trauma Symptom Inventory (one primary study) Beck Anxiety Inventory (two primary studies)	An *et al.* (2019) Bradley (2003) Eisenbeck (2016) González-Menéndez (2014) Lanza (2014) Lyons (2019) Nidich (2016) Song (2020) RCTs	Overall, mindfulness-based interventions had a small effect on reducing anxiety compared with control groups (standardised MD=0.21; 95% CI: 0.04-0.38; 8 RCTs; N=537 participants; I^2=37%). There was a statistically significant difference according to control subgroup type (p<0.001); i.e. the effects of the mindfulness-based interventions differed when compared with the active control groups or passive control groups.	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
	Anxiety Sensitivity Index (two primary studies) Anxiety subscale of the Trauma Symptom Checklist (one primary study) State-Trait Anxiety Inventory (one primary study)	Han (2022) [30] Overlap with Perry *et al.* [78]	Mindfulness-based interventions had a moderate effect when compared with passive control groups (standardised MD=0.45; 95% CI: 0.23-0.67; 5 RCTs; N=328), but when mindfulness-based interventions were compared with active control groups only, there was no significant effect for mindfulness-based interventions on anxiety (standardised MD: −0.16; 95% CI: −0.44-0.11; 4 RCTs; N=209).	
Stress	The Perceived Stress Scale	An *et al.* (2019) Nidich (2016) Song (2020) RCTs Han (2022) [30]	Mindfulness-based interventions had a large effect on reducing stress compared with passive control groups (standardised MD=4.60; 95% CI: 2.93-6.27; 3 RCTs; N=266; I^2=0%).	Not reported
Overall psychological distress	Symptom Checklist-90 (one primary study) Posttraumatic Stress Disorder Symptom Checklist (one primary study) Trauma Symptom Checklist total (one primary study) Posttraumatic Stress Disorder Checklist-Civilian version (one primary study)	An *et al.* (2019) Lyons (2019) Nidich (2016) Nidich (2017) RCTs Han (2022) [30]	Overall, mindfulness-based interventions had a moderate effect on reducing overall psychological distress compared with control groups (standardised MD=0.50; 95% CI: 0.01-0.99; 4 RCTs; N=372; I^2=79%).	Not reported

Two of the eight primary studies included in Perry *et al.*'s systematic review examined the effect of positive psychology or a mindfulness-based intervention on reducing anxiety and depression levels among adult prisoners (Table 23) [78]. One of the two primary studies, an RCT was also included in the systematic review by Han, which we reported on earlier in this section, so we have not reported on this trial in our summary of Perry *et al.*'s review. Regarding the other RCT included in Perry *et al.*'s review, the review authors report that this trial found a statistically significant difference in favour of the intervention group for a reduction in both anxiety and depression [78]. Perry *et al.* did not report numbers or statistical measures to help with interpreting the reported results. Two other primary studies included by Perry *et al.* assessed the effect of the same intervention on anxiety and depression, but no results were reported.

Table 23 Findings from Perry et al. on single mindfulness-based interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Anxiety	Primary outcomes were symptoms of depression and anxiety measured by standard rating scales.	Yu (2021) An *et al.* (2019) (reported in Han (2022)) RCTs Perry *et al.* (2023) [78] Overlap with Han (2022) [30]	Reported a statistically significant difference. *Note:* No numbers or statistical measures were provided.	Not reported
Depression	Primary outcomes were symptoms of depression and anxiety measured by standard rating scales.	Yu (2021) An *et al.* (2019) RCTs Perry *et al.* (2023) [78] Overlap with Han (2022) [30]	Reported a statistically significant difference. *Note:* No numbers or statistical measures were provided.	Not reported
No results for anxiety or depression		Deng (2019) RCT Yang (2018) Cluster trial Perry *et al.* (2023) [78]	These primary studies do not appear to meet our eligibility criteria (as they did not use a valid scale).	Not reported

Shonin *et al.* (2013) included six primary studies that evaluated the effect of mindfulness and other Buddhist-derived interventions on outcomes that we categorised as mental and emotional distress outcomes (Table 24) [96]. One of the six primary studies, an RCT, evaluated the effect of a mindfulness-based intervention on depression and negative outcome expectancies, and another primary RCT evaluated the effect of a mindfulness-based intervention on mood disturbance and on anger and hostility among adult prisoners. Shonin *et al.* report that the trial measuring changes in depression and negative outcome expectancies reported significant within-group improvements (by 78%) in levels of depression and significant decreases (by 34%) in negative outcome expectancies for participants in the intervention group compared with those in the control group. Shonin *et al.* report that the other primary RCT, measuring changes in mood disturbance and in anger and hostility, reported significant (within-group) reductions (by 31%) in mood disturbance among participants in the intervention group and no significant changes for the control group. Shonin *et al.* also report that participants in the intervention group demonstrated a significant (within-group) reduction (by 8%) in anger and hostility with no significant changes reported for the control group [96].

Table 24 Findings from Shonin et al. on single mindfulness-based interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Depression	Beck Depression Inventory-II	Lee (2011) RCT Shonin *et al.* (2013) [96]	The intervention was a modified mindfulness-based relapse-prevention programme on various substance-use concomitants (N=10 male prisoners serving 1-year sentences for possession or supply of illicit substances). Prisoners in the intervention group showed significant within-group improvements in levels of depression. No statistical results were provided.	Intervention lasted for 10 weeks
Negative outcome expectancies	This concept was not defined, and the measure was unspecified.	Lee (2011) RCT Shonin *et al.* (2013) [96]	The intervention was a modified mindfulness-based relapse-prevention programme on various substance-use concomitants (N=10 male prisoners serving 1-year sentences for possession or supply of illicit substances). Participants in the intervention group experienced significant improvements (78% increase) in negative outcome expectancies compared with participants in the control group (34% decrease), who received treatment as usual (n=14 male prisoners who received a substance abuse educational programme). No inferential statistics were provided.	Intervention lasted for 10 weeks
Mood disturbance	Profile of Mood States	Samuelson (2007) RCT Shonin *et al.* (2013) [96]	The intervention was a mindfulness-based stress-reduction programme delivered to prisoners incarcerated for drug-related convictions (n=1,953 male and female prisoners). Prisoners in the intervention group showed a significant (within-group) improvement in mood disturbance (31% reduction). No significant changes were reported for the control group (n=180 male and female prisoners who received treatment as usual involving smoking cessation training, literacy education, and exercise). The effects of the intervention were maintained at the 6–8-week follow-up. No inferential statistics were provided.	Intervention lasted for 6-8 weeks; follow-up took place 6-8 weeks post-intervention
Anger and hostility	Cook–Medley Hostility Scale	Samuelson (2007) RCT Shonin *et al.* (2013) [96]	The intervention was a mindfulness-based stress-reduction programme delivered to prisoners incarcerated for drug-related convictions (n=1,953 male and female prisoners). Participants in the intervention	Intervention lasted for 6-8 weeks; follow-up took place 6-8

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			group showed a significant (within-group) improvement in anger and hostility (8% decrease). No significant changes were reported for the control group. The effects of the intervention were maintained at the 6–8-week follow-up. No inferential statistics were provided.	weeks post-intervention

3.2.3.2.4.2 Meditation-based interventions

Two of the six primary studies included in the review by Shonin *et al.* evaluated the effect of a Vipassana meditation intervention delivered in adult prison settings (Table 25) [96]. One of these two primary studies assessed the impact of the Vipassana meditation intervention on mood disturbance and, according to Shonin *et al.*, reported a statistically significant reduction (by 8%) in mood disturbance among the group receiving the intervention. Shonin *et al.* also reported that improvements were partially maintained at the 1-year follow-up. However, no statistics were reported, which limits our interpretation of the results. Based on the second primary study, Shonin *et al.* report that participants receiving a Vipassana meditation intervention reported significantly greater reductions in thought suppression compared with participants in the control group [96].

Table 25 Findings from Shonin et al. on Vipassana meditation interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Mood disturbance	The Profile of Mood States – Short Form	Perelman (2012) Non-randomised trial Shonin *et al.* (2013) [96]	The intervention group (n=60 male prisoners) participated in a 10-day Vipassana meditation retreat in prison, compared with the control group (n=67 prisoners), who attended a 10-week programme called Houses of health that also integrated mindfulness principles. The intervention group showed significant improvements in mood disturbance (8% reduction). These improvements were partially maintained at the 1-year follow-up. No inferential statistics were provided.	Intervention lasted for 10 days; follow-up took place 1 year later
Thought suppression	The White Bear Suppression Inventory	Bowen (2007) Non-randomised trial Shonin *et al.* (2013) [96]	Prisoners in the 10-day Vipassana meditation intervention showed significantly greater reductions in thought suppression compared with controls (n=81 male and female prisoners.	Not reported *Note:* Follow-up was conducted 3 months post-release in Bowen (2006)

Two of the six primary studies included in Shonin *et al.*'s systematic review reported on the effect of other Buddhist-derived interventions on outcomes categorised as mental and emotional distress among adult prisoners (Table 26) [96]. Shonin *et al.* report that the first of these two primary studies that assessed the impact of other Buddhist-derived interventions found that prisoners in the intervention group showed significant improvements in overall psychological distress. Shonin *et al.* also report that in the second of the two primary studies that evaluated other Buddhist-derived interventions, prisoners in the intervention group demonstrated significant improvements in sleeping difficulties [96]. No statistical results were provided to help with interpreting the reported results.

Table 26 Findings from Shonin et al. on single meditation-based interventions categorised as other Buddhist-derived interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Psychological distress	Symptom Checklist-90	Rhead (1983) Non-randomised trial Shonin *et al.* (2013) [96]	The intervention followed Tibetan, Zen, and other Buddhist and non-Buddhist meditation approaches, involving weekly group meditation classes with instruction on meditation, chanting, and experience-sharing (n=6 male prisoners). Relative to the control group (n=5 male prisoners who received treatment as usual in the form of weekly psychotherapy), prisoners in the intervention group showed significant improvements in overall psychological distress. No inferential statistics were provided.	Intervention lasted for 2 months
Sleeping difficulties	The Medical Symptom Checklist	Sumpter (2009) RCT Shonin *et al.* (2013) [96]	The intervention was a meditation programme that resembled Buddhist-based mindfulness meditation (n=17 female prisoners). Relative to the control group (n=16 female prisoners who continued with their usual routine consisting of exercise, free time, reading, and/or being outside), the prisoners in the intervention group showed significant improvements in sleeping difficulties. No inferential statistics were provided.	Intervention lasted for 7 weeks

3.2.3.2.4.3 Yoga-based interventions

Perry *et al.* included five primary studies in their review that evaluated the effect of yoga-based interventions on outcomes we categorised as measuring mental and emotional distress (Table 27) [78]. Two of the eight primary studies evaluated the effect of a yoga-based intervention on anxiety among adult prisoners and two studies examined the effect of a yoga-based intervention on depression. Perry *et al.* reported that one primary RCT evaluating anxiety found a statistically significant difference in favour of the intervention group for reducing anxiety, while the other primary RCT evaluating anxiety reported no effect on anxiety. Perry *et al.* report no significant difference between the intervention and control groups in the other two primary studies when comparing the effect of yoga-based interventions on changes in depression among adult prisoners [78]. Perry *et al.* did not report numbers or statistical measures to help with interpreting the results.

Table 27 Findings from Perry et al. on single yoga-based interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Anxiety	Measured using standard rating scales	Ambhore (2009) Danielly (2017) RCTs Perry *et al.* (2023) [78]	Statistically significant difference reported for one study and no significant difference reported for the other study. *Note:* No numbers or statistical measures were provided in the review.	Not reported
Depression	Measured using standard rating scales	Lundstrom (2021) Crossover trial Danielly (2017) RCT Perry *et al.* (2023) [78]	No significant difference. *Note:* No numbers or statistical measures were provided in the review.	Not reported
Anxiety or depression	Did not use a valid scale	Kerekes (2017) Bilderbeck (2013) RCTs Perry *et al.* (2023) [78]	These primary studies do not appear to meet our eligibility criteria (as they did not use a valid scale). Results cannot be reported.	Not applicable

3.2.3.3 Combined interventions

3.2.3.3.1 Physical well-being, expressed as physical strength and fitness

There were no combined yoga-, meditation-, and mindfulness-based interventions reported on under the outcome of physical well-being, expressed as physical strength and fitness.

3.2.3.3.2 Physical well-being, expressed as body and blood composition

There were no combined yoga-, meditation-, and mindfulness-based interventions reported on under the outcome of physical well-being, expressed as body and blood composition.

3.2.3.3.3 Mental, psychological, and emotional well-being, expressed as wellness

There were no combined yoga-, meditation-, and mindfulness-based interventions reported on under the outcome of mental, psychological, and emotional well-being, expressed as wellness.

3.2.3.3.4 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

There were no combined yoga-, meditation-, and mindfulness-based interventions reported on under the outcome of mental, psychological, and emotional well-being, expressed as mental and emotional distress.

3.2.3.4 Overlap of primary studies

There were two instances of overlap of a primary study across the two systematic reviews (Han (2022) and Perry *et al.* (2023)) measuring the effects of yoga-, meditation-, and mindfulness-based interventions on the outcomes of depression and anxiety. We acknowledged the two instances of overlap when presenting the analyses in the text and reported the findings from each primary study once in the text for each outcome in order to avoid overestimating the quantity of evidence contributing to each outcome.

3.2.3.5 Summary: Yoga-, meditation-, and mindfulness-based interventions

We included three systematic reviews covering yoga-, meditation-, and mindfulness-based interventions, and these were judged to be of moderate quality with respect to design and implementation.

We included one systematic review that assessed the effect of a single intervention on the mental wellness of adult prisoners, and it reported that participation in a mindfulness-based stress-reduction intervention may be associated with a significant increase in self-esteem among adult prisoners from baseline to follow-up. There is also evidence from the same review that participation in a Vipassana meditation intervention may be associated with within-group improvements in wellness among adult prisoners by improving their optimism, mindfulness, and emotional intelligence.

We included three systematic reviews that evaluated the effect of a single yoga-, meditation-, and mindfulness-based intervention on changes in mental and emotional distress among adult prisoners. The first systematic review evaluated the effect of a single mindfulness-based intervention on outcome measures of reductions in mental and emotional distress among adult prisoners, and it reported that when mindfulness-based interventions were compared with passive controls (e.g. treatment as usual or waiting lists), the mindfulness-based interventions were better at reducing mental and emotional distress among adult prisoners. However, this review reported that there were no differences in mental and emotional distress among adult prisoners who received a mindfulness-based intervention when compared with other active interventions.

The second systematic review reported a significant reduction in mood disturbance and a significant reduction in thought suppression favouring adult prisoners participating in a Vipassana meditation intervention compared with a control group. The review also reported a significant reduction in depression, mood disturbance, negative outcome expectancies, and anger and hostility in adult prisoners participating in a mindfulness-based intervention compared with a control group. In addition, the review reported that other Buddhist-derived interventions may be associated with significant improvements in overall psychological distress and significant improvements in sleeping difficulties among adult prisoners when compared with a control group.

The third systematic review reported that there are mixed results regarding the effect of a yoga-based intervention compared with a control group on reducing anxiety among adult prisoners. The review also reported that there were no significant changes in depression levels among adult prisoners between participants receiving a yoga-based intervention and the control group. In addition, this review reported that positive psychology or mindfulness-based interventions may be associated with a significant reduction in levels of anxiety and depression among adult prisoners when compared with a control group.

Based on the reviews evaluating single yoga-, meditation-, and mindfulness-based interventions, we conclude that there is:

- Moderate-certainty evidence to suggest that single mindfulness-based interventions may improve mental wellness in adult prisoners, but the evidence is based on one primary study
- Moderate-certainty evidence to suggest that single mindfulness-based interventions may reduce the symptoms of mental and emotional distress in adult prisoners
- Low-certainty evidence to suggest that single meditation-based interventions may improve mental wellness in adult prisoners
- Low-certainty evidence to suggest that single meditation-based interventions may reduce the symptoms of mental and emotional distress in adult prisoners
- Very low-certainty evidence to suggest that single yoga-based interventions may reduce the symptoms of mental and emotional distress in adult prisoners, and
- No evidence for physical well-being outcomes for single yoga-, meditation-, and mindfulness-based interventions and no evidence for mental well-being outcomes for combined interventions, which means that evidence is required in relation to these outcomes.

3.2.4 Art and creative interventions

3.2.4.1 Introduction

3.2.4.1.1 Definition of intervention

The four included systematic reviews that evaluated art and creative interventions are presented in this section.

Canada *et al.* evaluated a music-based combined intervention titled Good Vibrations – which comprised a Gamelan-inspired music workshop delivered over a 1-week period and involving education on musical pieces, learning how to improvise, composing an original piece of music, learning about Javanese culture and art, and a final performance – in one prison-based primary study [31]. Chen *et al.* assessed music therapy interventions involving improvisation, composition, singing, etc. in two primary studies [117]. The music therapy interventions were delivered through group therapy (one primary study) and individual and group therapy (one primary study). Harrison investigated the participants' experience of music therapy interventions in one primary study [94].

Canada *et al.* also evaluated an art-based intervention on art expression in one prison-based primary study [31]. The intervention comprised six art expression workshops delivered over 6 weeks, which involved a short exercise to promote sharing and a planned art expression activity.

Perry *et al.* examined art and creative interventions in three primary studies from four papers [78]. There was no further description of the type or nature of these interventions in the systematic review, but the titles of the primary studies indicated that two were music-based interventions and one was an art-based intervention.

3.2.4.1.2 Inclusion and exclusion at full text

We identified 12 reviews that covered art and creative interventions for consideration at the full-text screening stage. We included four systematic reviews [31,78,94,117] and excluded the other eight reviews [118–125]. The reasons for exclusion were setting (three reviews) and review methodology (five reviews). Three of the included reviews covered more than one intervention category: Canada *et al.* covered sports- and exercise-based interventions as well as art and creative interventions [31]; Harrison covered horticultural interventions and animal-based interventions as well as art and creative interventions [94]; and Perry *et al.* covered sports- and exercise-based interventions, yoga-, meditation-, and mindfulness-based interventions, and animal-based interventions as well as art and creative interventions [78].

3.2.4.1.3 Review characteristics

Three of the included systematic reviews examined interventions that were implemented in adult prisons [31,78,94] and one examined interventions that were implemented in adult prisons as well as other criminal justice institutions [117] (Appendix 9). The primary studies based in other criminal justice institutions were excluded from analysis [117]. Three of the included reviews covered more than one intervention category [31,78,94]. The age range of participants was 18–76 years across two of the included systematic reviews [31,78], and the mean age was 31.4–35.5 years across two of the reviews [78,117] (Appendix 9). Both male and female participants were included in three of the systematic reviews, while males only were included in the fourth review. The countries included across the four systematic reviews were Australia (one review), Canada (one review), China (two reviews), Ireland (one review), Norway (one review), the UK (two reviews), and the USA (three reviews). The years of publication for the primary studies included in the four systematic reviews were 2001–2019, and the years of

publication for the systematic reviews were 2016–2023. The primary study designs varied but included pilot and full RCTs, observational quantitative studies, and qualitative studies.

3.2.4.1.4 Quality assessment

Of the four included systematic reviews, two were judged to be of strong quality [31,94] and two were judged to be of moderate quality [78,117] with respect to design and implementation (Appendix 10). The two moderate-quality reviews did not present a reproducible search strategy in their paper and did not discuss the quality of the primary studies in their analysis [78,117]. In addition, Perry *et al.* did not present a focused research question, and Chen *et al.* did not outline their quality assessment methods clearly and did not complete an appropriate analysis [78,117]. The conclusions of the two moderate-quality reviews were not considered to be supported by their methods and results.

3.2.4.2 Single interventions

Two of the four included reviews did not report on the effectiveness of art and creative interventions [31,94]. The first of these two reviews reported on the benefits of art and creative interventions (see Section 3.2.4.4) [31]. The second review described the participants' experience of art and creative interventions, and we have used this analysis in order to answer Question 4 [94]. We described all of the art and creative interventions as single interventions, as they concentrated on either art or music therapy alone.

3.2.4.2.1 Physical well-being

There were no single art and creative interventions reported on under the outcomes related to physical well-being expressed as physical strength and fitness or body and blood composition.

3.2.4.2.2 Mental, psychological, and emotional well-being, expressed as wellness

There were no single art and creative interventions reported on under the outcome of mental, psychological, and emotional well-being, expressed as wellness.

3.2.4.2.3 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

Two of the four included reviews reported on the effect of art and creative interventions on anxiety and depression (Table 28) [78,117]. Both Chen *et al.* and Perry *et al.* examined the effect of music therapy on anxiety using the same two primary studies and reported that one primary study demonstrated a positive effect on prisoners' anxiety, while the second primary study reported no effect. Time to follow-up was not reported. Chen *et al.* completed a meta-analysis of the two primary studies and reported that music therapy was not statistically significantly associated with reduced anxiety in prisoners (Hedges g=0.46 [a measure of mean difference]; 95% CI: −0.49 to 1.42; p=0.34; N=132 participants), but there was substantial heterogeneity between the two primary studies (I^2=92%). It was reported, however, that prisoners who attended 20 or more sessions were statistically significantly more likely to experience reduced anxiety than those who attended fewer than 20 sessions (p<0.001). The number of sessions had a moderator effect. The certainty of the evidence was moderate.

Two of the four included reviews reported on the effect of a music intervention on depression in prisoners [78,117]. Both Chen *et al.* and Perry *et al.* examined the effect of music therapy on depression using the same two primary studies and reported that one primary study demonstrated a positive effect on prisoners' depression, while the second primary study reported no effect. Time to follow-up was not reported. Chen *et al.* completed a meta-analysis of the two primary studies and reported that the overall effect of music therapy interventions was not statistically significant (Hedges g=0.44; 95% CI: −0.40 to 1.27; p=0.31; N=132 participants), but substantial heterogeneity was found between the two studies

(I^2=89%). The positive effects on depression were larger for the primary study where participants attended 20 or more sessions than for the one where participants attended fewer than 20 sessions, and this moderator effect was statistically significant (p=0.002). The number of sessions had a moderator effect. The certainty of the evidence was moderate.

Perry *et al.* examined the effect of art therapy on depression based on one primary study published in two papers and reported a positive effect on reducing prisoners' level of depression. Time to follow-up and inferential statistics were not reported [78]. The certainty of the evidence was moderate.

Table 28 Findings of single art and creative interventions measuring mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Anxiety	The State-Trait Anxiety Inventory (STAI) The Hospital Anxiety and Depression Scale – anxiety subscale (HADS-A	Chen (2015/2016) (music imagery, improvisation, songwriting) (group) Gold (2014) (song singing, improvisation, composition, sound development using a computer) (group and individual) RCTs Chen *et al.* (2016) [117] These primary studies overlap with Perry *et al.*	The combined effect of music therapy interventions was not statistically significant (g=0.46; 95% CI: −0.49 to 1.42; p=0.34; N=132 participants), but there was a large amount of heterogeneity between the two studies (I^2=92%; Chi^2=11.88; p<0.001). The effect was larger (Hedges g =0.94; 95% CI: 0.63–1.24; p<0.001) in the high-dose study (where participants attended 20 or more sessions) than the low-dose study (where participants attended fewer than 20 sessions) (Hedges g: −0.04; 95% CI: −0.50 to 0.42; p=0.87), and this moderator effect was statistically significant (Q=11.88; df=1; p<0.001).	Not reported
Anxiety	Primary outcomes were symptoms of depression and anxiety measured by standard rating scales such as the Hamilton Anxiety Scale, the Beck Anxiety Inventory, or the Generalised Anxiety Disorder Questionnaire.	Chen (2015/2016) Gold (2014) RCTs Perry *et al.* (2023) [78] These primary studies overlap with Chen *et al*	There was a statistically significant difference for group music therapy. There was no significant difference for individual and group music therapy. *Note:* No inferential statistics were provided.	The intervention lengths ranged from 4 weeks to 15 weeks
Depression	The Beck Depression Inventory (BDI) (one primary study) The Hospital Anxiety and Depression Scale – depression subscale (HADS-D) (one primary study)	Chen (2015/2016) Gold (2014) RCTs Chen *et al.* (2016) [117]	The overall effect of music therapy interventions was not statistically significant (Hedges g=0.44; 95% CI: −0.40 to 1.27; p=0.31; N=132 participants), but substantial heterogeneity was found between the two studies (I^2=89%; Chi^2=9.16; p=0.002). The effects were larger Hedges (g=0.85; 95% CI: 0.54–1.15;	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			p<0.001) for the study where participants attended 20 or more sessions than for the one where participants attended fewer than 20 sessions (Hedges g: −0.01; 95% CI: −0.47 to 0.45; p=0.97), and this moderator effect was statistically significant (Q=9.16; df=1; p=0.002).	
Depression	Primary outcomes were symptoms of depression and anxiety measured by standard rating scales such as the Hamilton Anxiety Scale, the Beck Anxiety Inventory, or the Generalised Anxiety Disorder questionnaire.	Chen (2015/2016) Gussak (2006) Gussak (2009 Gold (2014) Perry *et al.* (2023) [78]	There was a positive statistically significant effect of art and creative interventions on reducing depression for one study There was no significant difference for all other studies *Note:* No inferential statistics were provided.	The intervention lengths ranged from 4 weeks to 15 weeks.

3.2.4.3 Overlap

There was overlap of two primary studies in both Chen *et al.* and Perry *et al.* examining the effect of music therapy on two outcome measures: anxiety and depression. We acknowledged the overlap when presenting the analyses in the text and reported the findings from each primary study once in the text for each outcome.

3.2.4.4 Benefits of art and creative interventions

Canada *et al.* reported thematic findings on the benefits of art expression interventions for trauma experiences from one primary study and identified five themes as a result of participation in the art expression sessions [31]:

1. Having a potential to dream
2. Feeling connected with other women by sharing
3. Mutual understanding (recognising that others have gone through similar experiences)
4. Releasing and expressing feelings using art, and
5. Unselfish concern (demonstrated through group collaboration and teamwork).

Canada *et al.* also reported thematic findings on the benefits following a music programme, indicating that participants identified better mediation and management of emotions, improved communication and social skills, a sense of achievement, motivation to try something new, and having something to do with their time [31]. Participants also noted that regardless of disability, the music programme delivered was accessible.

3.2.4.5 Summary: Art and creative interventions

We included four systematic reviews covering the effectiveness or benefits of art and creative interventions. Two were judged to be of strong quality and two were judged to be of moderate quality with respect to design and implementation. Two of our included systematic reviews examined the effect of music therapy on anxiety and depression using the same two primary studies. One primary study (included in two systematic reviews) demonstrated a positive effect on prisoners' anxiety and depression, while the second primary study (included in the same two systematic reviews) reported no effect on either of these two outcome measures. Time to follow-up was not reported in either primary study. One systematic review presented two meta-analyses of the two aforementioned primary studies – one for anxiety and one for depression – and reported that music therapy was not statistically significantly associated with reduced anxiety and depression. There was substantial heterogeneity between the two studies in both meta-analyses (I^2=89% and 92%). However, employing subgroup analysis, prisoners who attended 20 or more sessions were statistically significantly more likely to experience reduced anxiety or depression than those who attended fewer than 20 sessions (p<0.003). The number of sessions had a moderator effect. One of the included systematic reviews examined the effect of art therapy on depression based on one primary study published in two papers and reported a positive effect on reducing prisoners' level of depression.

Our summary findings indicate that:

- Single creative interventions (music) demonstrated no effect on mental and emotional distress (depression and anxiety) among adult prisoners, and the certainty of the evidence for this outcome was graded as moderate.
- Single art expression interventions demonstrated a positive effect on the mental and emotional distress (depression and anxiety) of adult prisoners, and the certainty of the evidence for this outcome was graded as moderate. The evidence is based on two reviews reporting on two of the same primary studies.
- There was no evidence for other physical and mental well-being outcomes for single or combined art and creative interventions, which means that evidence is required in relation to these outcomes.

3.2.5 Animal-based interventions

3.2.5.1 Introduction

3.2.5.1.1 Definition of intervention

The four included systematic reviews that evaluated animal-based interventions are presented in this section.

Duindam *et al.* evaluated dog training programmes in one primary study and animal-assisted interventions in two primary studies [126]. Harrison evaluated the participants' experience of an animal-based intervention in one primary study [94]. Perry *et al.* assessed an animal-assisted therapy intervention in one primary study [78]. Villafaina-Domínguez *et al.* investigated dog-based, animal-assisted interventions in 15 primary studies [127]; among the activities included in these programmes were dog walking, dog training, taking care of rescue dogs, and using dogs as emotional support during therapy.

3.2.5.1.2 Inclusion and exclusion at full text

We identified 10 reviews that covered animal-based interventions for consideration at the full-text screening stage. We included four systematic reviews [78,94,126,127] and excluded the other six reviews [128–133]. The reasons for exclusion were study design or type of review (two reviews) and review methodology (four reviews). Two of the included reviews covered more than one intervention category [78,94]: Harrison covered horticultural interventions and art and creative interventions as well as animal-based interventions [94], and Perry *et al.* covered sports- and exercise-based interventions, yoga-, meditation-, and mindfulness-based interventions, and art and creative interventions as well as animal-based interventions [78].

3.2.5.1.3 Review characteristics

Two of the included systematic reviews examined interventions that were implemented in adult prisons [78,94] and two examined interventions that were implemented in adult prisons and other criminal justice institutions [126,127] (Appendix 9). The primary studies based in other criminal justice institutions were excluded from analysis [126,127]. Two of the included reviews covered more than one intervention category [78,94]. The mean age range of participants was 15.7–39.1 years in the two systematic reviews reporting exact data on age (Appendix 9). Both male and female participants were included in three of the included systematic reviews, while females only were included in the fourth review. Two systematic reviews included primary studies based in the USA, and two reviews did not report where the included primary studies were completed. The years of publication for the primary studies included in the four systematic reviews were 2001–2020, and the years of publication for the systematic reviews were 2020 and 2023. The primary study designs varied but included RCTs, non-randomised trials, quantitative observational studies, other unspecified quantitative studies, and qualitative studies.

3.2.5.1.4 Quality assessment

Of the four included systematic reviews, one was judged to be of strong quality [94], two were judged to be of moderate quality [78,126], and one was judged to be of weak quality [127] with respect to design and implementation (Appendix 10). The three systematic reviews judged to be of moderate or weak quality did not present a reproducible search strategy in their paper [78,126,127]. Perry *et al.* did not present a focused research question [78]. Two of the three systematic reviews judged to be of moderate or weak quality did not employ an appropriate method of analysis [126,127]. The conclusions of the three moderate- or weak-quality systematic reviews are not supported by their methods and results.

3.2.5.2 Outcome assessment

Perry *et al.* reported no findings on animal-based interventions [78]. The analysis of animal-based interventions presented by Duindam *et al.* could not be used to report on our outcomes because their use of moderators was not appropriate [126]. Villafaina-Domínguez *et al.* did not report their findings on animal-based interventions in a clear and transparent manner, and therefore, we were unable to report on them [127]. Harrison described the participants' experience of animal-based interventions, and we have used this analysis in order to answer Question 4 [94].

3.2.5.3 Summary: Animal-based interventions

There were no systematic reviews that reported valid or usable findings on the effectiveness of animal-based interventions as health-promoting interventions in order to improve the physical and mental well-being of the adult prison population. We have included one qualitative systematic review that reported on the participants' experience of animal-based interventions, and we report these findings in response to Question 4."

3.2.6 Peer-based interventions

3.2.6.1 Introduction

3.2.6.1.1 Definition of intervention

The two included systematic reviews that evaluated peer-based interventions are presented in this section.

South *et al.* (2014) evaluated the effectiveness and participants' experience of peer-based interventions in 54 primary studies, while South *et al.* (2016) was a qualitative peer-reviewed article based on 33 of the same qualitative primary studies that were also included in South *et al.* (2014) [34,134]. The peer volunteers or workers were prisoners or ex-prisoners who had been trained to provide health information, advice, counselling, and/or listening services to other prisoners. The peer-based interventions that were evaluated across the 54 primary studies in South *et al.* (2014) and 33 of those 54 primary studies in South *et al.* (2016) are as follows:

- Peer education (19 primary studies in South *et al.* (2014) and 6 primary studies in South *et al.* (2016))
- Peer support (14 primary studies in South *et al.* (2014) and 9 primary studies in South *et al.* (2016))
- Listeners (six primary studies in South *et al.* (2014) and six primary studies in South *et al.* (2016))
- Peer mentoring (three primary studies in South *et al.* (2014) and two primary studies in South *et al.* (2016))
- Prison hospice volunteers (three primary studies in South *et al.* (2014) and two primary studies in South *et al.* (2016))
- Peer advisors (same two primary studies in South *et al.* (2014) and South *et al.* (2016))
- Health trainers (same two primary studies in South *et al.* (2014) and South *et al.* (2016))
- Peer counsellors (same two primary studies in South *et al.* (2014) and South *et al.* (2016))
- Peer outreach (workers) (same single primary study in South *et al.* (2014) and South *et al.* (2016))
- Peer observers (one primary study in South *et al.* (2014))
- Peer trainers (one primary study in South *et al.* (2014)), and
- Peer-led fathering advisors (one primary study in South *et al.* (2016), but this intervention was categorised differently in South *et al.* (2014)).

The descriptions of the specific types of interventions in the South *et al.* (2016) review vary slightly from the descriptions provided in South *et al.* (2014), even though the South et al. (2016) publication included 33 of the same primary studies that were included in the South et al. (2014) publication[34,134].

3.2.6.1.2 Inclusion and exclusion at full text

We identified 10 reviews that covered peer-based interventions for consideration at the full-text screening stage. We included two systematic reviews [34,134] and excluded the other eight reviews [135–142]. The reasons for exclusion were population (one review), intervention (one review), study design or type of review (two reviews), review methodology (three reviews), and duplicate review (one review).

3.2.6.1.3 Review characteristics

One of the included reviews (a qualitative systematic review including 33 primary studies) examined interventions that were implemented in adult prisons [134], and the other review (a mixed-methods

review including 57 primary studies) examined interventions that were implemented in adult prisons and young offender institutions [34] (Appendix 9). The three primary studies based in young offender institutions were excluded from the quantitative analysis (resulting in 54 primary studies for analysis of Question 1) [34]. The age range of participants was 17–59 years across the two systematic reviews, and both male and female participants were included (Appendix 9). The countries included across the two systematic reviews were Australia (two reviews), Canada (two reviews), Ireland (two reviews), Israel (one review), Moldova (two reviews), Mozambique (one review), Russia (one review), South Africa (one review), the UK (two reviews), and the USA (two reviews). The years of publication for the primary studies included in the two systematic reviews were 1991–2012, and the years of publication for the systematic reviews were 2014 and 2016. The primary study designs varied but included RCTs, before-and-after studies, quantitative studies (specific design not specified), qualitative studies, mixed-methods studies, three studies of unclear design, one review study, and one study design described as 'not applicable'.

3.2.6.1.4 Quality assessment

The two included systematic reviews were judged to be of moderate quality with respect to design and implementation [34,134] (Appendix 10). South *et al.* (2014 and 2016) did not present a reproducible search strategy in their reviews, did not describe the level of evidence, and did not discuss the quality of their primary studies in their analysis [34,134]. In addition, South *et al.* (2016) did not complete an appropriate analysis [134]. The conclusions of these two reviews are not supported by their methods and results.

3.2.6.2 Combined interventions

We considered all peer-based interventions to be combined interventions because these types of interventions inherently encompass several coexisting intervention components; primarily, the components of peer-to-peer interaction and health promotion are combined in the delivery of peer-based interventions in the area of health and well-being. The quantitative analysis is based on South *et al.* (2014) [34].

3.2.6.2.1 Physical well-being, expressed as physical strength and fitness

There were no combined peer-based interventions reported on under the outcome of physical well-being, expressed as physical strength and fitness.

3.2.6.2.2 Physical well-being, expressed as body and blood composition

There were no combined peer-based interventions reported on under the outcome of physical well-being, expressed as body and blood composition.

3.2.6.2.3 Mental, psychological, and emotional well-being, expressed as wellness

3.2.6.2.3.1 Prisoner outcome: Issues discussed with health trainers

South *et al.* (2014) presented the findings of one primary study involving peer health trainers that collated the issues prisoners discussed with health trainers. The main issues discussed were exercise, weight, healthy eating, smoking cessation, stress, dental health, sleep, sexual health, and cancer. The authors presented the issues discussed from most to least common (Figure 6) (Table 29) [34].

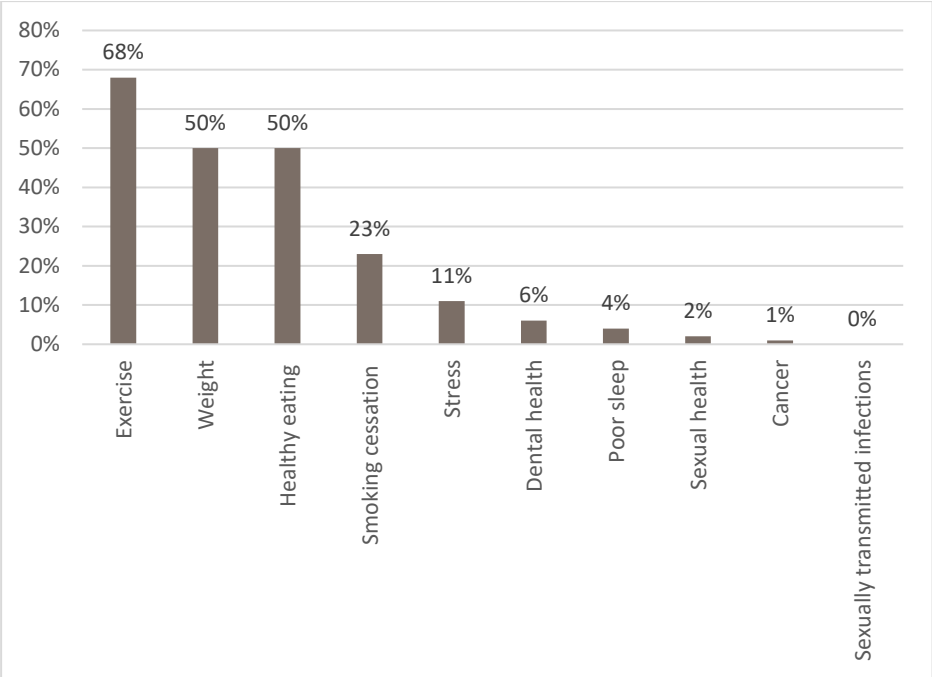


Figure 6 Issues prisoners discussed with health trainers or peer workers, by frequency

3.2.6.2.3.2 Prisoner outcome: Perceived benefit for prisoners using the service

South *et al.* (2014) presented the findings of one primary study that found that 44% of 28 users of the UK-based Listener scheme reported that they always felt better after confiding in a listener (peer worker) and 52% reported that they felt better at least sometimes (Table 29) [34]. This scheme aimed to address the experience of distress. Volunteers (who provide confidential emotional support) are selected, trained, and supported by the Samaritans to apply the principles of confidential, sympathetic listening in order to alleviate distress and reduce the incidence of self-harm and suicide among prisoners. In addition, 84% of participants in the Listener scheme from which data were collected said that they had always found the experience helpful [34]. The certainty of the evidence was very low.

3.2.6.2.3.3 Prisoner outcome: Self-esteem

South *et al.* (2014) identified four primary studies that measured prisoners' self-esteem using the Rosenberg Self-Esteem Scale (Table 29) [34]. The participants in the first primary study completed a peer training intervention known as the Alternatives to Violence Project; the review authors reported a small but statistically significant negative effect of the intervention on self-esteem (MD: −2.15; 95% CI: −4.20 to −0.10). The other three primary studies tested the effects of peer support interventions and reported no significant improvements in self-esteem from baseline to follow-up after the delivery of the interventions (standardised MD: 1.51; 95% CI: −0.84 to 3.86; 3 studies; N=83; p=0.21; I^2=81%). The exact time to follow-up was not reported. In addition, the sample sizes were small and there was substantial statistical heterogeneity in this result [34]. The certainty of the evidence was very low.

3.2.6.2.3.4 Prisoner outcome: Self-efficacy

South *et al.* (2014) reported that one primary study evaluating the effects of a peer education intervention found no significant differences in self-efficacy in the shorter (follow-up time not reported) or longer (3–6 months) term among prisoners in any of the three prisons involved in the study (Table 29) [34]. No statistics were provided. The certainty of the evidence was very low.

3.2.6.2.3.5 Prisoner outcome: Optimism

South *et al.* (2014) identified one primary study that tested the effects of a peer training intervention (the Alternatives to Violence Project) on optimism, as measured by the Life Orientation Test, and found no significant effect on optimism between baseline and follow-up after the intervention (time to follow-up not reported) (MD: 1.30; 95% CI: −0.83 to 3.34) (Table 29) [34]. The certainty of the evidence was very low.

3.2.6.2.3.6 Prisoner outcome: Perception of the prison environment

South *et al.* (2014) identified three primary studies evaluating peer support interventions in which perceptions of the prison environment were assessed using the Correctional Environment Status Inventory. The pooled results of the three primary studies demonstrated no statistically significant effect of peer support interventions across the five domains assessed (staff involvement, staff treatment, staff cohesion, orientation, and offender relationships) (Table 29) [34]. The certainty of the evidence was very low.

3.2.6.2.3.7 Prisoner outcome: Housing and employment

South *et al.* (2014) identified one primary study that evaluated the housing- and employment-related outcomes of a peer mentoring intervention at 12 months or more follow-up and reported that 82% of ex-prisoners who completed a peer mentoring intervention had secured treatment, transitional housing, or a permanent place to live (Table 29) [34]. It should be noted that the nature of the treatment secured and the type of accommodation involved were not described. In addition, 73% of ex-prisoners were employed, enrolled in an educational programme, or had completed the application process for disability benefits [34]. There was no comparison group for this finding. The certainty of the evidence was very low.

3.2.6.2.3.8 Prisoner outcome: Effects on listeners' self-esteem

South *et al.* (2014) reported that one primary study evaluating the effects of the UK-based Listener scheme found that 64% of 22 prisoners claimed that:

> By becoming a listener, friends and family had noticed a difference in their demeanour, finding them more relaxed, responsible, and optimistic, able to speak more and more able to listen. In total, 73% agreed that their new responsibilities would allow them to 'adjust better' on release and 55% agreed that the 'prison authorities' appreciated their work. In addition, 77% said that there was a difference in how immediate staff interacted with them (being trusted more, staff talking more to them, staff being grateful for the work they do) and 86% said that fellow prisoners behaved differently towards them. [p49 34]

The certainty of the evidence was very low.

Table 29 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as wellness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Mental well-being or wellness				
Issues discussed with health trainers	Self-report	Brooker (2007) Mixed-methods study South *et al.* (2014) [134]	The issues discussed with health trainers (from most to least common) were: - Exercise (68%) - Weight (50%) - Healthy eating (50%) - Smoking cessation (23%) - Stress (11%) - Dental health (6%) - Poor sleep (4%) - Sexual health (2%) - Cancer (1%), and - Sexually transmitted infections (0%).	Not reported
Perceived benefit for prisoners using the service (intervention recipients)	Self-report (measures unspecified)	Snow (2002) Quantitative study (specific design unspecified) South *et al.* (2014) [134]	Forty-four percent of 28 users of the Listener scheme (i.e. intervention recipients) reported that they always felt better after confiding in a listener, and 52% reported that they felt better at least sometimes. In addition, 84% said that they had always found the experience helpful.	Not reported
Self-esteem	The Rosenberg Self-Esteem Scale	Walrath (2011) Pre-post study South *et al.* (2014) [134]	The primary study tested the effects of a peer training intervention known as the Alternatives to Violence Project on self-esteem. The review reported a small but statistically significant negative effect of the intervention on self-esteem (MD: −2.15; 95% CI: −4.20 to −0.10; Sample size not reported).	Not reported
Self-esteem	The Rosenberg Self-Esteem Scale ntervention was "short term" (lasted for an unknown length of time); follow-up took place 3–6 months post-release ntervention was "short term" (lasted for an unknown length of time); follow-up took	Blanchette (1998) Delveaux (2000) Syed (2000) Mixed-methods studies South *et al.* (2014) [134]	There was no significant improvement in self-esteem (pre- versus post-intervention) (weighted MD: 1.51; 95% CI: −0.84 to 3.86; 3 studies; N=83; p=0.21; I^2=81%). *Note:* The sample sizes were small and there was substantial statistical heterogeneity in this result.	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
	place 3–6 months post-release			
Self-efficacy	Measure unspecified	Sifunda (2008) Pre-post study South *et al.* (2014) [134]	No significant differences were seen in prisoner self-efficacy in the shorter or longer term (3–6 months) among prisoners in any of the three prisons involved in the study (sample size not reported). No statistics were provided.	Intervention was "short term" (lasted for an unknown length of time); follow-up took place 3–6 months post-release
Optimism	The Life Orientation Test	Walrath (2011) Pre-post study South *et al.* (2014) [134]	The primary study tested the effects of a peer training intervention known as the Alternatives to Violence Project on optimism. The review reported no significant effect of the intervention on optimism (MD: 1.30; 95% CI: −0.83 to 3.34; sample size not reported).	Not reported
Perception of the prison environment	The Correctional Environment Status Inventory; domains assessed were: staff involvement, staff treatment, staff cohesion, orientation, and offender relationships	Blanchette (1998) Delveaux (2000) Syed (2000) Mixed-methods studies South *et al.* (2014) [134]	The review authors stated, "No statistically significant effect of the [peer-support intervention] was seen in the pooled results of the three studies across any of the 16 questions asked" [134 p45]. No statistical results were provided.	Not reported
Housing	Self-report	Goldstein (2009) Quantitative study (specific design unspecified) South *et al.* (2014) [134]	Eighteen out of 22 participants (82%) who had been released for at least 12 months had secured treatment, transitional housing, or a permanent place to live.	Follow-up took place at least 12 months post-release, but no other details were specified
Employment	Self-report	Goldstein (2009) Quantitative study (specific design unspecified) South *et al.* (2014) [134]	Sixteen out of 22 participants (73%) who had been released for at least 12 months were employed, enrolled in an educational programme, or had completed the application process for disability benefits.	At least 12 months, but otherwise unspecified
Precise outcome (beyond	Self-report (measures unspecified)	Richman (2004) Quantitative study (specific	Sixty-four percent of 22 prisoners claimed that "by becoming a listener, friends and family had	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
"effects on listeners" self-esteem) unspecified		design unspecified) South *et al.* (2014) [134]	noticed a difference in their demeanour, finding them more relaxed, responsible and optimistic, able to speak more and more able to listen. In total, 73% agreed that their new responsibilities would allow them to 'adjust better' on release and 55% agreed that the 'prison authorities' appreciated their work. In addition, 77% said that there was a difference in how immediate staff interacted with them (being trusted more, staff talking more to them, staff being grateful for the work they do) and 86% said that fellow prisoners behaved differently towards them"[p49 134].	

3.2.6.2.4 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

3.2.6.2.4.1 Prisoner outcome: Anger and frustration

South *et al.* (2014) reported on one primary study that tested the effects of the peer training intervention known as the Alternatives to Violence Project on anger and found that the intervention had no statistically significant effect on anger (MD: −4.01; 95% CI: −9.40 to 1.38) (Table 30) [34]. The systematic review authors also reported on one primary study that evaluated the effect of a peer education intervention on anger and frustration and found no difference either immediately post-intervention (MD=0.20; 95% CI: −1.42 to 1.82) or at longer follow-ups (length of time not reported) (MD=1.40; 95% CI: −0.03 to 2.83) [34]. The certainty of the evidence was very low.

3.2.6.2.4.2 Prisoner outcome: Number of confrontations between prisoners

South *et al.* (2014) presented one primary study that tested the effects of the peer training intervention known as the Alternatives to Violence Project on the number of confrontations between prisoners post-intervention (the point in time after the intervention was not reported), controlling for the number of confrontations between prisoners pre-intervention, and reported a statistically significant reduction in confrontations (MD=0.43; 95% CI: 0.32–0.58; $p<0.0005$; sample size not reported) (Table 30) [34]. It should be noted that South *et al.* (2014) did not describe how the primary study authors defined and measured confrontations. The certainty of the evidence was very low.

Table 30 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as mental and emotional distress

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Mental and emotional distress (e.g. depression, anxiety)				
Anger	The Anger Expression Scale	Walrath (2011) Pre-post study South *et al.* (2014) [134]	The primary study tested the effects of a peer training intervention known as the Alternatives to Violence Project on anger. The review reported no statistically significant effect of the intervention on anger (MD: −4.01; 95% CI: −9.40 to 1.38; Sample size not reported).	Not reported
Anger and frustration	Measure unspecified	Penn State Erie (2011) Mixed-methods study South *et al.* (2014) [134]	There was no effect of a peer education intervention on anger and frustration, either immediately post-intervention (MD=0.20; 95% CI: −1.42 to 1.82) or at longer follow-up durations (MD=1.40; 95% CI: −0.03 to 2.83) (length of time to follow-up not reported) (sample size not reported).	Not reported
Number of prisoner confrontations	Measure unspecified	Walrath (2011) Pre-post study South *et al.* (2014) [134]	The primary study tested the effects of a peer training intervention known as the Alternatives to Violence Project on the number of confrontations between prisoners post-intervention (the point in time after the intervention was not reported), controlling for the number of confrontations between prisoners pre-intervention. The review reported a statistically significant reduction in the number of confrontations (MD=0.43; 95% CI: 0.32–0.58; $p<0.0005$; Sample size not reported).	Not reported

3.2.6.2.5 Mental, psychological, and emotional well-being, expressed as knowledge and empowerment

3.2.6.2.3.1 Peer worker outcome: Health-related knowledge

South *et al.* (2014) identified one primary study that evaluated health trainers' or peer educators' knowledge of health issues and reported improvements in mean knowledge scores in all topic areas (exercise, smoking cessation, healthy eating/diet, sexual health, dental health, and immunisation). However, it was not possible for the review authors to ascertain whether these improvements were statistically significant due to the way data were presented in the primary paper (Table 31) [34]. In addition, the duration of follow-up post-peer-based health training was not reported. The certainty of the evidence was low.

3.2.6.2.3.2 Peer worker outcome: Health-related attitudes

South *et al.* (2014) reported that in the same primary study as described in the previous subsection on health-related knowledge, the primary study authors also evaluated health trainers' or peer educators' attitudes towards health issues, and found that more than one-half of the health trainers stated that their attitudes had changed in the areas of healthy eating/diet, sexual health, smoking cessation, and exercise following the delivery of the health trainer intervention (Table 31) [34]. In addition, 75% of health trainers stated that they would like to get a job as a health trainer on release from prison [34]. The certainty of the evidence was low.

3.2.6.2.3.3 Peer worker outcome: Health-related behaviours

South *et al.* (2014) reported that in the same primary study as described in the previous two subsections on health-related knowledge and attitudes, the primary study authors also evaluated health trainers' or peer educators' confidence in signposting, and reported that health trainers seemed most confident in signposting other prisoners to exercise and smoking cessation (including drug) services and least confident in signposting to immunisation, and dental services (Figure 7) (Table 31) [34]. The certainty of the evidence was low.

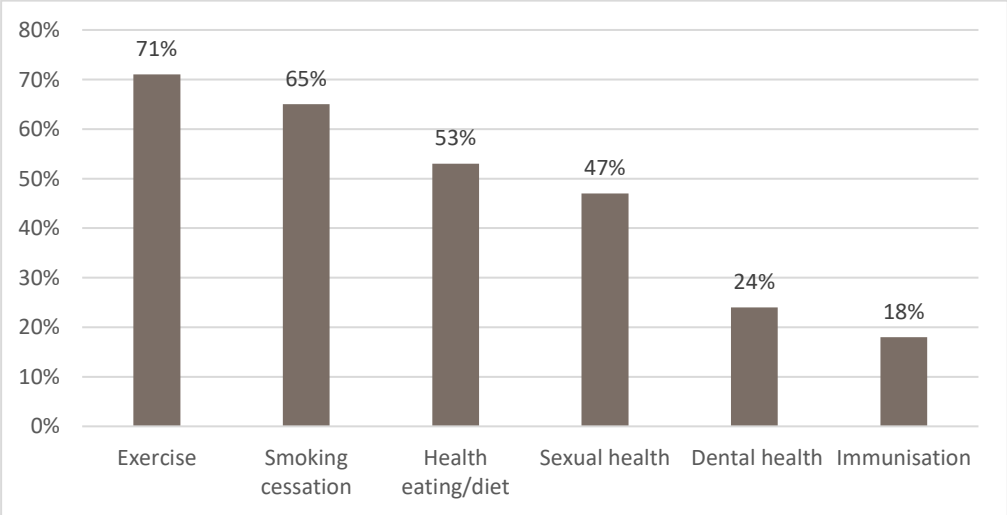


Figure 7 Proportion of peer workers who were confident in signposting prisoners to specific health promotion activities (n=17)

South *et al.* (2014) identified one primary study that evaluated the human immunodeficiency virus (HIV) behaviours of peer educators following their delivery of peer education to other prisoners with respect to HIV testing and status (Table 31) [34]. The study found that the proportion of peer educators who reported never having had a HIV test was lower than in a control group of prisoners (relative risk (RR):

0.31; 95% CI: 0.12–0.78; *p*=0.01; n=865). In addition, the same study reported that the proportion of peer educators who knew their HIV status was higher than in a control group of prisoners (RR=0.88; 95% CI: 0.79–0.99; *p*=0.04; n=865) [34]. The certainty of the evidence was low.

Table 31 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as knowledge and empowerment, for peer workers or health trainers

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Knowledge and empowerment				
Peer worker outcomes				
Health-related knowledge				
Health trainer knowledge of health issues	Self-report	Brooker (2007) Mixed-methods study South *et al.* (2014) [134]	The primary study showed "improvements in mean knowledge scores in all areas [exercise, smoking cessation, healthy eating/diet, sexual health, dental health, and immunisation] but it was not possible to ascertain whether or not these improvements were statistically significant as no measure of variance was given" [134 p51]. Table 4 in the systematic review indicates that the outcome pertains to health trainers themselves (rather than to recipients of the interventions).	Not reported
Health-related attitudes				
Health trainer attitudes towards health issues	Self-report	Brooker (2007) Mixed-methods study South *et al.* (2014) [134]	It was reported that more than 50% of health trainers stated that their attitudes had changed in the areas of healthy eating/diet, sexual health, smoking cessation, and exercise. It was also reported that 75% of health trainers stated that they would like to get a job as a health trainer on release from prison.	Not reported
Health-related behaviours				
Health trainer confidence in signposting intervention recipients to other services	Self-report	Brooker (2007) Mixed-methods study South *et al.* (2014) [134]	Health trainers seemed most confident in signposting other prisoners to exercise, smoking cessation, and drugs services and least confident in signposting to self-harm, immunisation, and dental services (n=17): - Exercise: 12/17 (71%) - Smoking cessation and drugs services: 11/17 (65%) - Healthy eating/diet: 9/17 (53%) - Sexual health: 8/17 (47%) - Dental health: 4/17 (24%), and - Immunisation: 3/17 (18%).	Not reported
Number of peer educators who reported never	Self-report	Ross (2006) Pre-post study South *et al.* (2014) [134]	There was a positive effect of being a peer educator on the likelihood of having had a HIV test compared with an unspecified	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
having had a HIV test			control group (RR=0.31; 95% CI: 0.12–0.78; *p*=0.01; n=865).	
Number of peer educators who reported that they knew their HIV status	Self-report	Ross (2006) Pre-post study South *et al.* (2014) [134]	There was a positive effect of being a peer educator on knowing their HIV status compared with an unspecified control group (RR=0.88; 95% CI: 0.79–0.99; *p*=0.04; n=865).	Not reported

1.2.6.2.3.2 Comparison of peer-led and professional-led outcomes: Peer-led and professional-led knowledge

South et al. (2014) identified one primary study that compared prisoners' knowledge of health issues related to HIV following peer education by either peer workers or professional staff and reported similar mean HIV knowledge scores for prisoners following this education: prisoners educated by the peer workers had a mean score of 8.1 and prisoners educated by the professional staff had a mean score of 8.3 (Table 32) [34].

1.2.6.2.3.3 Comparison of peer-led and professional-led outcomes: Peer-led and professional-led intention

South *et al.* (2014) identified one primary study that evaluated the effect of a peer education intervention on prisoners' intention with respect to condom use based on an interview (Table 32) [34]. The study compared the effects of an education intervention delivered by peer workers with an education intervention delivered by professional staff and reported no statistically significant positive differences in favour of education interventions delivered by peer workers compared with those delivered by professional staff with respect to intention to always use a condom (RR=1.00; 95% CI: 0.96–1.04; n=1,817) and intention to never use a condom (RR=0.99; 95% CI: 0.79–1.24; n=1,817) [34]. The study did not report the specific time to follow-up.

That same primary study evaluated interest or intention with respect to HIV or acquired immunodeficiency syndrome (AIDS) (Table 32) [34]. The study measured interest in taking a HIV test for the first time as well as interest in taking a HIV test at the time of the interview by type of educator. The primary study authors reported no statistically significant positive difference between the delivery of an education intervention by peer workers compared with the delivery of an education intervention by other professionals on interest in taking a HIV test for the first time (RR=1.00; 95% CI: 0.80–1.25; n=200) and on interest in taking a test now (RR=1.02; 95% CI: 0.82–1.27; n=200) [34].

1.2.6.2.3.4 Comparison of peer-led and professional-led outcomes: Peer-led and professional-led behaviour

South *et al.* (2014) identified one primary study that evaluated interest or intention with respect to condom use (Table 32) [34]. This study compared a peer education intervention (delivered via DVD) and professional-led intervention (using a standard practice HIV education intervention) and reported that the peer worker intervention had a slightly more favourable effect on condom use, but the effect was not statistically significant (RR=0.71; 95% CI: 0.50–1.02) [34].

Table 32 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as knowledge and empowerment, for peer workers compared with professional staff

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Knowledge and empowerment				
Comparison of peer-led and professional-led outcomes				
Peer-led and professional-led knowledge				
HIV-related knowledge	Self-report (measures unspecified)	Grinstead (1997) RCT South *et al.* (2014) [134]	Mean scores for HIV knowledge were 8.1 in the peer worker group and 8.3 in the professional-led group. However, it was not possible to ascertain whether or not there was a statistically significant difference between groups, as no measure of variance was provided (sample size not reported). The primary study authors "did not report a statistically significant difference between the groups using the chi-squared test" p59.	Not reported
Peer-led and professional-led intention				
Intention to always use a condom	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	There was no significant difference between the peer education intervention and the professional-led intervention (RR=1.00; 95% CI: 0.96–1.04; n=1,817).	Not reported
Intention to never use a condom	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	There was no significant difference between the peer education intervention and the professional-led intervention (RR=0.99; 95% CI: 0.79–1.24; n=1,817).	Not reported
Interest in taking a HIV test for the first time	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	There was no significant difference between the peer education intervention and the professional-led intervention (RR=1.00; 95% CI: 0.80–1.25; n=200).	Not reported
Interest in taking a HIV test now	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	There was no significant difference between the peer education intervention and the professional-led intervention (RR=1.02; 95% CI: 0.82–1.27; n=200).	Not reported
Peer-led and professional-led behaviour				
Condom use	Self-report (measure unspecified)	Martin (2008) RCT South *et al.* (2014) [134]	The primary study compared a peer education intervention (delivered via DVD) and a professional-led intervention (a standard practice HIV education intervention) and reported that peer education had a positive effect on condom use, but that the effect was not statistically significant (RR=0.71; 95% CI: 0.50–1.02; Sample size not reported).	Not reported

3.2.6.2.3.3 Prisoner outcome: Health-related knowledge of prisoners

South *et al.* (2014) identified six primary studies that measured HIV-related or HIV/AIDS-related knowledge and reported a statistically significant improvement in knowledge following a peer worker intervention (Table 33) [34]. The analyses were completed in four different groupings: one meta-analysis and three narrative analyses. One of the narrative analyses completed a subgroup analysis by level of education and reported that prisoners with less than full primary school education were significantly less likely than those with more schooling to respond correctly to all HIV/AIDS-related knowledge questions both before (43% compared with 69%, respectively; $p<0.00002$) and after (84% compared with 94%, respectively; $p<0.00001$) the peer education intervention. However, the less educated group showed a greater improvement in the proportion of correct answers for all questions compared with the more educated group (41% compared with 24%, respectively; $p<0.00001$) [34]. The certainty of the evidence was low.

Table 33 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as knowledge and empowerment, by prisoner knowledge

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Knowledge and empowerment				
Prisoner outcomes				
Health-related knowledge of prisoners				
Knowledge related to HIV (continuous scores)	Self-report (specific measures not reported)	Ross (2006) Pre-post study Grinstead (1997) RCT South *et al.* (2014) [134]	There was a statistically significant improvement in knowledge compared with no intervention (MD=0.46; 95% CI: 0.36–0.56; 2 studies; n=2,494; $p<0.05$; $I^2=94\%$). *Note:* There was substantial statistical heterogeneity in this result. Standard deviations were imputed for Grinstead (1997).	Not reported
Knowledge related to HIV/AIDS	Self-report, yes/no questions related to HIV/AIDS (43 questions in total)	Scott (2004) Zucker (2009) Taylor (1994) Vaz (1996) Pre-post studies South *et al.* (2014) [134]	The primary studies recorded the number or percentage of correct answers to a set of yes/no questions related to HIV/AIDS (different questions were asked in each study, with a total of 43 questions, only 3 of which were asked by more than one of the four primary studies). Statistically significant improvements favouring peer education were seen in the number of correct answers to 22 of the 43 questions asked. Negative effects of peer education were seen in the answers to 1 of the 43 questions asked. Responses to the remaining 20 questions showed no evidence of effect of the intervention. Risk ratios ranged from 0.43 (95% CI: 0.33–0.56; 1 study; n=949; question: "HIV can be	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			transmitted by bloody fights" (Taylor, 1994)) in favour of peer education, to 3.06 (95% CI: 1.91–4.91; 1 study; n=200; question: "All forms of hepatitis can be transmitted by sex" (Zucker, 2009)) against peer education.	
Knowledge related to HIV/AIDS	Knowledge scores, self-report (measures unclear)	Grinstead (1997) RCT Ross (2006) Taylor (1994) Sifunda (2008) Pre-post studies South *et al.* (2014) [134]	Positive results were seen in all four primary studies, indicating significant improvement in HIV-related knowledge scores in all four studies. However, data were imputed for two studies (standard deviations in Grinstead (1997) and numbers in groups in Sifunda (2008)), so these results should be interpreted with caution	Not reported
Knowledge related to HIV/AIDS	Self-report, yes/no questions related to HIV/AIDS	Vaz (1996) Pre-post study South *et al.* (2014) [134]	Prisoners with less than full primary school education were significantly less likely than those with more schooling to respond correctly to all HIV/AIDS-related knowledge questions both before (43% compared with 69%, respectively; $p<0.00002$) and after (84% compared with 94%, respectively; $p<0.00001$) the peer education intervention. However, the less educated group showed a greater improvement in the proportion of correct answers for all questions compared with the more educated group (41% compared with 24%, respectively; $p<0.00001$; Sample size not reported).	Not reported

3.2.6.2.3.4 Prisoner outcome: Health-related intention of prisoners

South *et al.* (2014) identified three primary studies that evaluated interest or intention with respect to HIV/AIDS testing (Table 34) [34]. None of these studies reported an exact time to follow-up. The first study measured the change in the proportion of prisoners interested in taking a HIV test for the first time and in taking a test at the time of the interview at baseline, and then again after a peer education intervention. The primary study authors reported a statistically significant positive increase in interest in taking a HIV test for the first time (RR=1.49; 95% CI: 1.12–1.97) and interest in taking a test now (RR=1.82; 95% CI: 1.33–2.49) after a peer education intervention. The second primary study reported no increase in intention to take a HIV test among prisoners attending peer worker education (RR=1.24; 95% CI: 0.75–2.05), and a decline in intention to take a HIV test among peer educators themselves (RR=0.62; 95% CI: 0.41–0.95). The third study examined the effects of the peer education programme on HIV intentions in two of the three included prisons both in the short term and 3–6 months after release. However, the intention under investigation is not clear in South *et al.*'s (2014) systematic review, and so we report no further information on this primary study [34]. The certainty of the evidence was low.

South *et al.* (2014) identified two primary studies that evaluated intention with respect to condom use following health education (Table 34) [34]. Neither of these studies reported an exact time to follow-up. The first primary study evaluated an education intervention delivered by peer workers at baseline and at follow-up after the intervention, and it reported a statistically significant positive increase in intention to always use a condom (RR=1.15; 95% CI: 1.08–1.22) and decrease in intention to never use a condom (RR=0.59; 95% CI: 0.48–0.72). The second primary study evaluated the effect of peer education on condom use intentions by ethnicity and found that all three ethnicities examined had increased intention to ever use a condom, but that white male prisoners were most likely to hold this intention and that increased intention to always use a condom was held by white men and African American men but not Latino men [34]. The certainty of the evidence was low.

Table 34 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as knowledge and empowerment, by prisoner intentions

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Knowledge and empowerment				
Health-related intention of prisoners				
Interest in taking a HIV test for the first time – peer receivers	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	The first primary study measured the change in the proportion of prisoners interested in taking a HIV test for the first time and in taking a test at the time of the interview at baseline, and then again after a peer education intervention. The primary study authors reported a statistically significant positive increase in interest in taking a HIV test for the first time (RR=1.49; 95% CI: 1.12–1.97) after a peer education intervention (sample size not reported).	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Interest in taking a HIV test now – peer receivers	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	The primary study authors reported a statistically significant positive increase in interest in taking a HIV test now (RR=1.82; 95% CI: 1.33–2.49) after a peer education intervention (sample size not reported).	Not reported
Intention to take a HIV test – peer receivers	Self-report	Ross (2006) Pre-post study South *et al.* (2014) [134]	There were no improvements in peer receivers' intention to take a HIV test (presumed within-group analyses) (RR=1.24; 95% CI: 0.75–2.05).	Not reported
Intention to take a HIV test – peer educators	Self-report	Ross (2006) Pre-post study South *et al.* (2014) [134]	There was a negative effect on peer educators' intentions to take a HIV test (presumed within-group analyses) (RR=0.62; 95% CI: 0.41–0.95).	Not reported
HIV intention (presumed intention to prevent HIV)	Self-report (measures unclear)	Sifunda (2008) Pre-post study South *et al.* (2014) [134]	There were positive effects of the peer education programme on HIV intentions in two of the three included prisons, both in the short term and 3–6 months after release: - HIV intention (presumed intention to prevent HIV) in the short term, prison 1: MD: −0.67 (95% CI: −0.99 to −0.35; n=38) - HIV intention (presumed intention to prevent HIV) in the short term, prison 2: MD: −0.05 (95% CI: −0.30 to 0.20; n=38) - HIV intention (presumed intention to prevent HIV) in the short term, prison 3: MD: −0.55 (95% CI: −0.85 to −0.25; n=38) - HIV intention (presumed intention to prevent HIV) in the longer term (3–6 months post-release), prison 1: MD: −0.18 (95% CI: −0.34 to −0.02; n=38) - HIV intention (presumed intention to prevent HIV) in the longer term (3–6 months post-release), prison 2: MD=0.10 (95% CI: −0.15 to 0.35; n=38), and - HIV intention (presumed intention to prevent HIV) in the longer term (3–6 months post-release), prison 3: MD: −0.73 (95% CI: −1.12 to −0.34; n=38).	Intervention was "short term" (lasted for an unknown length of time); follow-up took place 3–6 months post-release

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Condom use intention – peer receivers	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	There was a significant positive difference between the education intervention delivered by peer educators compared with the education intervention delivered by other professionals (RR=1.15; 95% CI: 1.08–1.22; Sample size not reported).	Not reported
Intention to never use a condom – peer receivers	Self-report	Grinstead (1997) RCT South *et al.* (2014) [134]	There was a significant positive difference between the education intervention delivered by peer educators compared with the education intervention delivered by other professionals (RR=0.59; 95% CI: 0.48–0.72; Sample size not reported).	Not reported
Intention to ever use a condom	Self-report	Goldstein (2009) RCT South *et al.* (2014) [134]	This RCT measured condom use intentions by ethnicity and showed that peer education had the greatest effect on white prisoners: - Intention to ever use a condom, Latino men (intervention compared with unspecified control): RR=1.25 (95% CI: 1.04–1.50; n=234) - Intention to ever use a condom, African American men (intervention compared with unspecified control): RR=1.07 (95% CI: 1.00–1.14; n=480), and - Intention to ever use a condom, white men (intervention compared with unspecified control): RR=1.28 (95% CI: 1.09–1.49; n=459).	Not reported
Intention to always use a condom	Self-report	Goldstein (2009) RCT South *et al.* (2014) [134]	This RCT measured condom use intentions by ethnicity and showed that peer education had the greatest effect on white prisoners: - Intention to always use a condom, Latino men (intervention compared with unspecified control): RR=1.12 (95% CI: 0.89–1.40; n=234) - Intention to always use a condom, African American men (intervention compared with unspecified control): RR=1.15 (95% CI: 1.02–1.31; n=480), and - Intention to always use a condom, white men (intervention compared with unspecified control): RR=1.61 (95% CI: 1.28–2.04; n=459).	Not reported

3.2.6.2.3.5 Prisoner outcome: Health-related and other attitudes/beliefs of prisoners

South *et al.* (2014) identified three primary studies that evaluated attitudes towards HIV (two studies) and towards an unspecified topic (one study) following a peer education intervention (Table 35) [34]. The first primary study demonstrated no change in HIV-related attitudes and the second study reported the development of two of three positive HIV-related attitudes following peer education [34]. The third primary study did not make the topic under investigation clear, so we have not reported its findings. The certainty of the evidence was low.

Table 35 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as knowledge and empowerment, by prisoner attitudes/beliefs

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Knowledge and empowerment				
Health-related and other attitudes/beliefs of prisoners				
HIV-related attitudes	Self-report (measure unclear)	Scott (2004) Pre-post study South *et al.* (2014) [134]	No changes in prisoners' HIV-related attitudes after peer education (presumed within-group analyses) (sample size not reported).	Not reported
HIV-related attitudes	Self-report	Taylor (1994) Pre-post study South *et al.* (2014) [134]	Improvements in the number of prisoners agreeing to all three of the following statements: - "HIV-positive inmates should be separated", RR=2.25 (95% CI: 1.94–3.33; Sample size not reported) - "I feel safe in the same wing as an inmate who is HIV positive", RR=0.74 (95% CI: 0.68–0.84; Sample size not reported), and - "I know enough to protect myself from catching HIV/AIDS", RR=0.54 (95% CI: 0.50–0.59; Sample size not reported).	Not reported
Prisoner attitudes (unspecified)	Self-report (measure unclear)	Sifunda (2008) Pre-post study South *et al.* (2014) [134]	No changes in prisoner attitudes after peer education (Sample size not reported for this outcome, but n=263 in the entire study). *Note:* Attitudes towards what are not made explicit; Table 5 in the South *et al.* systematic review states that this primary study is about HIV/AIDS and [hepatitis C virus] (and other infectious diseases).	Not reported

3.2.6.2.3.6 Prisoner outcome: Health-related behaviour of prisoners

South *et al.* (2014) identified two primary studies that evaluated HIV-related behaviours with respect to testing and status (Table 36) [34]. The first study reported that prisoners attending peer education were not significantly more likely to know their HIV status than a control group of prisoners. The second primary study reported that having a HIV test in prison was associated with having attended a peer-led HIV prevention programme (odds ratio (OR): 2.81; 95% CI: 1.09–7.24) [34]. The certainty of the evidence was low.

South *et al.* (2014) identified three primary studies that evaluated safer sex following peer education (Table 36) [34]. The first primary study estimated the proportion of prisoners having unprotected sex who had attended a peer education group compared with a control group and found a positive, albeit statistically not significant, effect of peer education on this behaviour compared with an unspecified control (RR=0.71; 95% CI: 0.50–1.02; p=0.06; n=200). The second and third primary studies assessed the proportion of prisoners not using a condom at first intercourse after release from prison who had attended a peer education group compared with a control group and reported a statistically significant reduction in favour of the intervention group (RR=0.73; 95% CI: 0.61–0.88; 2 studies; n=400; p<0.0009; I^2=24%) [34].

South *et al.* (2014) identified one primary study that evaluated engagement in peer education behaviour [34], but the intervention being measured was not clearly described. The certainty of the evidence was low.

South *et al.* (2014) identified one primary study that evaluated hepatitis B behaviour before and after peer education, and reported that there was a statistically significant positive effect on hepatitis B behaviour following the intervention (MD: −1.00; 95% CI: −1.76 to −0.24; n=25) (Table 36) [34]. The nature of the hepatitis B behaviour was not further described. The certainty of the evidence was low.

South *et al.* (2014) identified one primary study that evaluated attendance at infectious disease screening and vaccination clinics over the course of 6 months following a peer education intervention (Table 36) [34]. The study found an increase in the number of prisoners consenting to chlamydia, HIV, and hepatitis C screening. Conversely, the number of prisoners declining consent to hepatitis C screening also rose, from 13 to 115. In addition, hepatitis B vaccination uptake increased [34]. The certainty of the evidence was low.

South *et al.* (2014) identified one primary study that evaluated sexual communication in the short and long term as a result of a peer education intervention, and reported that there was no significant effect of peer education on sexual communication in either the short or long term (Table 36) [34]. The period ‘short term’ is not further defined, and ‘long term’ was indicated to be 3–6 months post-release. The certainty of the evidence was low.

Table 36 Combined peer-based interventions for mental, psychological, and emotional well-being, expressed as knowledge and empowerment, by prisoner behaviour

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Knowledge and empowerment				
Health-related behaviour				
Number of prison-based students (intervention recipients) who reported that they knew their HIV status	Self-report	Ross (2006) Pre-post study South *et al.* (2014) [134]	There was no significant effect of peer education on the number of peer education students who reported that they knew their HIV status compared with an unspecified control (RR=1.00; 95% CI: 0.70–1.42; *p*=1.00; n=200).	Not reported
Having a HIV test in prison	Self-report	Junker (2005) Study design unclear South *et al.* (2014) [134]	Having HIV tests in prison was associated with having attended a HIV prevention programme while in the study prison (OR=2.81; 95% CI: 1.09–7.24; Sample size not reported). Importantly, the rate of HIV testing was lower in the prison in which HIV testing was offered after a peer-led health education programme at intake (peer-led, voluntary: 46%; medical, voluntary: 86%; mandatory: 78%; *p*=0.05).	Not reported
Number of prisoners having unprotected sex	Self-report	Martin (2008) RCT South *et al.* (2014) [134]	There was a positive, albeit statistically not significant, effect of peer education on having unprotected sex compared with an unspecified control (RR=0.71; 95% CI: 0.50–1.02; *p*=0.06; n=200).	Not reported
Not using a condom at first intercourse after release from prison	Self-report (specific measures not reported)	Grinstead (1999) Zack (2004) RCTs South *et al.* (2014) [134]	There was a statistically significant reduction in not using a condom at first intercourse after release from prison among prisoners who had attended a peer education group compared with an unspecified control group; RR=0.73 (95% CI: 0.61–0.88; 2 studies; n=400; *p*<0.0009; I^2=24%).	Not reported
Engagement in peer education behaviour	Self-report (measure unspecified) (it is made clear that participants reported on a scale, however) *Note:* It is unclear what exactly is being measured	Bryan (2006) Single-group pre-post study South *et al.* (2014) [134]	South *et al.* (2014) states that "One study reported that older prisoners were more likely than younger prisoners to engage in peer education behaviour ($p < 0.05$)". However, Figure 9 of South *et al.* (2014) simply states peer education behaviour as the outcome, alongside the following inferential statistics: MD: −0.38 (95% CI: −0.54 to −0.22; n=196).	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			Note: It is unclear whether Figure 9 provides the effect estimate for the difference between older and younger prisoners in relation to engagement, or if this is the effect estimate for overall engagement. These results may not be usable.	
Hepatitis B behaviour	Hepatitis B behaviour subscale	Zucker (2008) Single-group pre-post study South *et al.* (2014) [134]	There was a statistically significant (within-group) effect on hepatitis B behaviour (the nature of the behaviour is unclear; however, the text states that it was a positive effect) (MD: −1.00; 95% CI: −1.76 to −0.24; n=25).	Not reported
Sexually transmitted disease screening	Self-report	Peek (2011) Study design unclear South *et al.* (2014) [134]	Following a peer education intervention, the number of prisoners aged under 25 years being screened for chlamydia rose from 13 to 83 in the 6-month period after beginning a peer education intervention (Sample size not reported). Additionally, the number being screened for hepatitis C increased from 9 to 46, and more participants were screened for HIV and underwent hepatitis B vaccination (the exact numbers for these were not reported). Conversely, the number declining hepatitis C screening rose from 13 to 115 (Sample size not reported).	Intervention lasted for 6 months
Sexual communication (short term)	Self-report (measure unspecified) (it is made clear that participants reported on a scale, however)	Sifunda (2008) Pre-post study South *et al.* (2014) [134]	There was no significant (within-group) effect of a peer education intervention on sexual communication in the short term (length of time unknown) in any of the three included prisons: - Prison 1: MD: −0.23 (95% CI: −0.68 to 0.22; n=38) - Prison 2: MD=0.07 (95% CI: −0.24 to 0.38; n=38), and - Prison 3: MD: −0.08 (95% CI: −0.35 to 0.19; n=38).	Intervention was "short term" (lasted for an unknown length of time)
Sexual communication (longer term)	Self-report (measure unspecified) (it is made clear that participants reported on a scale, however)	Sifunda (2008) Pre-post study South *et al.* (2014) [134]	There was no significant (within-group) effect of peer education on sexual communication in the longer term in one of the three included prisons: - Prison 1: MD: −0.08 (95% CI: −0.56 to 0.40; n=38). However, there was a significant and positive (within-group) effect of peer	Follow-up took place 3–6 months post-release

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			education on sexual communication in the longer term in two of the three included prisons: - Prison 2: MD: −0.24 (95% CI: −0.45 to −0.03; n=38), and - Prison 3: MD: −0.61 (95% CI: −1.03 to −0.19; n=38).	

3.2.6.3 Overlap of primary studies

The findings of the effectiveness of peer-based interventions were based on only one of the two included systematic reviews, and therefore there was no overlap of primary studies across systematic reviews.

3.2.6.4 Benefits of peer-based interventions

South *et al.* (2014 and 2016) described the experience of peer-based interventions, and we have used these analyses in order to answer Question 4 [34,134].

3.2.6.5 Summary: Peer-based interventions

We included two linked systematic reviews of moderate quality that focused on peer-based interventions. The first was published in 2014 and evaluated the effectiveness and experience of peer-based interventions in 54 primary studies, while the second, which was published in 2016, was a qualitative peer-reviewed article based on 33 of the same qualitative primary studies that were also included in the 2014 review. The findings presented here are based on the South *et al.* (2014) review. The peer-based interventions covered a number of different approaches, such as advice, counselling, education, and listening. We considered all peer-based interventions to be combined interventions because they comprised peer worker delivery of various specific health promotion topics.

One primary study in the systematic review evaluated a peer training intervention known as the Alternatives to Violence Project and reported a statistically significant reduction in the number of confrontations that occurred among prisoners, but no difference in anger levels following the intervention. The certainty of the evidence was very low.

The same systematic review also reported that a peer education intervention did not significantly improve prisoner self-esteem, self-efficacy, or optimism from baseline to follow-up. In addition, a peer education intervention was found to have no statistically significant effect on five domains of the prison environment (staff involvement, staff treatment, staff cohesion, orientation, and offender relationships). The certainty of the evidence was very low.

The systematic review also reported that peer workers' knowledge of health issues (exercise, healthy eating/diet, smoking cessation, sexual health, dental health, and immunisation) and attitudes towards health issues (healthy eating/diet, sexual health, smoking cessation, and exercise) improved following health training. The systematic review also reported that high proportions of peer workers seemed confident in signposting other prisoners to exercise and smoking cessation interventions. The systematic review authors identified one primary study that reported that peer workers had more positive HIV behaviours with respect to HIV testing and status. The certainty of the evidence was low.

When compared with professional staff, peer workers who delivered a peer education intervention were found to have similar mean scores on HIV knowledge post-intervention. The peer worker training resulted in a significantly higher incidence of intention to use a condom and intention take a HIV test by prisoners compared with professional staff training. The peer worker training resulted in a non-significantly higher incidence of prisoner condom use compared with professional staff training.

The systematic review authors identified six primary studies that measured HIV-related or HIV/AIDS-related knowledge and reported a statistically significant improvement in knowledge following a peer worker education or intervention. The systematic review authors found two primary studies that evaluated attitudes towards HIV following a peer education intervention. The first study demonstrated no change in HIV-related attitudes and the second study reported the development of two out of three positive HIV-related attitudes following peer education. The systematic review authors identified two primary studies that evaluated the effect of a peer education intervention on HIV-related behaviours with respect to testing and status. The first study reported that prisoners attending peer education were not more likely to know their HIV status than a control group of prisoners, while the second study reported that having a HIV test in prison was associated with having attended a peer-led HIV prevention programme. The systematic review authors identified three primary studies that reported that prisoners practised safer sex following participation in a peer education intervention. The systematic review authors identified one primary study that reported on attendance at infectious disease screening and vaccination clinics over the course of 6 months following a peer education intervention and found improvement in prisoners' ability to practise informed consent and an increase in the number of prisoners consenting to chlamydia, HIV, and hepatitis C screening as well as taking the hepatitis B vaccine. The certainty of the evidence was low.

Our summary findings indicate that:

- Peer-based interventions demonstrated no effect on the mental, psychological, and emotional well-being, expressed as wellness, of adult prisoners, and the certainty of the evidence for this outcome was graded as very low.
- Peer-based interventions demonstrated a positive effect on mental and emotional distress (measured as confrontation, which is a negative measure of the Alternatives to Violence Project) among adult prisoners and no effect on anger, and the certainty of the evidence for these outcomes was graded as very low. The evidence on confrontation is based on one primary study.
- Peer-based interventions demonstrated largely positive effects on knowledge and empowerment among adult prisoners, and the certainty of the evidence for this outcome was graded as low.
- Peer-based interventions demonstrated that peer workers were as effective as, or more effective than, professional staff with respect to mental, psychological, and emotional well-being, expressed as knowledge and empowerment.
- There was no evidence for physical well-being outcomes for peer-based interventions, which means that evidence is required in relation to these outcomes.

3.2.7 Smoking cessation interventions

3.2.7.1 Introduction

3.2.7.1.1 Definition of intervention

The five included systematic reviews that evaluated smoking cessation interventions are presented in this section.

de Andrade and Kinner evaluated complete prisoner smoking bans, which were described as prohibiting smoking within the facility and grounds for prisoners, across seven primary studies [35]. One of these smoking ban studies was a combined intervention also offering nicotine replacement therapy for purchase. de Andrade and Kinner also evaluated partial smoking bans across three primary studies (including indoor smoking bans in which smoking was limited to outdoor areas only), and two of the three remaining studies tested combined interventions involving pharmaceutical aids along with their partial smoking bans [35]. The pharmaceutical aids included nicotine replacement therapy, nortriptyline, and bupropion. de Andrade and Kinner also evaluated smoking cessation programmes in prisons that were not part of a full or partial smoking ban across eight primary studies [35]. de Andrade and Kinner evaluated a range of interventions (e.g. motivational interviewing, cognitive behavioural therapy, support groups, and a pilot tobacco control initiative). Six of the eight primary studies included combined interventions, some of which involved pharmaceutical aids, such as nicotine replacement therapy and nortriptyline.

Sourry *et al.* examined complete facility-wide smoking bans as well as other smoking cessation interventions in four primary studies [143]. All four primary studies were conducted on people who had previously been incarcerated in smoke-free prisons, and in two of the four studies, the researchers tested the effects of combined interventions. One of the two combined intervention studies evaluated incarceration in a smoke-free prison combined with pre-release six weeks of motivational interviewing and cognitive behavioural therapy sessions followed by two follow-up phone call sessions on the first day and at the end of the first week post-release, and the other study evaluated incarceration in a smoke-free prison combined with one face-to-face motivational interviewing session.

Frazer *et al.* examined the impact of smoking ban policies and smoke-free policies in prison: partial or complete bans in one primary study, a tobacco-free policy banning the sale and use of tobacco products in another primary study, and increased number of smoke-free zones in a third primary study [144]. Frazer *et al*. reported that nicotine replacement therapy may have been available in some prisons.

Lindson *et al.* assessed motivational interviewing, covering topics such as introductory information on the substance of tobacco, the prevalence of tobacco use, the effects of tobacco use on general health and dental health, psychosocial factors influencing tobacco use, healthy diet, and behavioural intervention for the prevention of tobacco use [145]. Only one of the 39 included primary studies in Lindson *et al.*'s systematic review was included in our analysis.

Mohan *et al.* examined combined smoking cessation interventions in two primary studies [77]. Both primary studies used nicotine replacement therapy along with behavioural therapy; one study delivered the intervention in a group setting, focusing on mood management training in order to prevent smoking relapse, and the other study delivered two brief face-to-face cognitive behavioural therapy sessions and had support systems in place in the form of a telephone counselling service and self-help materials.

3.2.7.1.2 Inclusion and exclusion at full text

We identified 13 reviews that covered smoking cessation interventions for consideration at the full-text screening stage. We included five of these reviews [35,77,143–145] and excluded the other eight reviews [146–153]. The reasons for exclusion were population (one review), study design or type of review (one review), and review methodology (six reviews). Mohan *et al.* covered more than one intervention category relevant to this overview of reviews [77]. Specifically, they covered sports- and exercise-based interventions and healthy eating and nutrition interventions as well as smoking cessation interventions [77].

3.2.7.1.3 Review characteristics

Two of the included systematic reviews examined interventions that were implemented in adult prisons [35,77] and three reviews examined interventions that were implemented in adult prisons alongside a mix of general population settings [143–145] (Appendix 9). The primary studies from general population settings were excluded from our findings [143–145]. Mohan *et al.* covered more than one intervention category [77]. The age of participants was reported in three of the five included systematic reviews, but different statistical measures of age were used across those three reviews, and the reported age in the three reviews indicated that most prisoners were younger adults (Appendix 9). Both male and female participants were included in four systematic reviews, while males only were included in one review. The countries included across the five systematic reviews were Australia (three reviews), Canada (one review), India (two reviews), Iran (one review), Switzerland (two reviews), Turkey (one review), the UK (one review), and the USA (four reviews). The years of publication for the primary studies included in the five systematic reviews were 1994–2021, and the years of publication for the systematic reviews were 2016–2022. The study designs varied but included RCTs, before-and-after studies, prospective cohort studies, cross-sectional surveys, and other unspecified observational studies.

3.2.7.1.4 Quality assessment

Of the five included systematic reviews, three were judged to be of strong quality [143–145] and two were judged to be of moderate quality [35,77] with respect to design and implementation (Appendix 10). Mohan *et al.* and de Andrade and Kinner, the two moderate-quality reviews, did not present a reproducible search strategy in their paper and did not discuss the quality of the primary studies included in their analysis [35,77]. The conclusions of the two moderate-quality reviews were not considered to be supported by their methods and results [35,77].

3.2.7.2 Single interventions

3.2.7.2.1 Physical well-being measured as mortality, morbidity, and access to healthcare services

3.2.7.2.1.1 Smoking ban

Frazer *et al.* reported on two primary studies that evaluated the impact on mortality of smoke-free policies or a smoking ban in prisons (Table 37) [144]. One primary study, using data on deaths in custody from 2001 to 2011, stratified by age and sex, reported that overall mortality and cause-specific mortality were reduced in prisons in states that had a smoking ban established for a period of 9 or more years when compared with prisons in states with no smoking policies:

- Overall deaths: RR=0.89; 95% CI: 0.85–0.94 (compared with prisons in states with no smoking bans)
- Cancer deaths: RR=0.81; 95% CI: 0.74–0.90 (compared with prisons in states with no smoking bans), and
- Pulmonary deaths: RR=0.66; 95% CI: 0.54–0.80 (compared with prisons in states with no smoking bans).

The second primary study reported statistically significant annual reductions in smoking-related mortality in prisons at two time points after the introduction of a state-wide prison smoking ban in New Jersey in 2005; these reductions were identified for all prisoners between 2005 and 2011, and particularly for those with a diagnosed mental illness:

- The annual mortality rate decreased by 13% after the smoking ban was introduced, from 232 per 100,000 population in 2005 to 203 per 100,000 population in 2011.
- The mortality rate for persons with special mental health needs decreased by 48% after the smoking ban was introduced, from an average of 676 per 100,000 population in 2005 to 353 per 100,000 population in 2011.

Frazer *et al.* acknowledged that the changes in mortality may be confounded by other factors in prisons, including improved healthy heart diets introduced between 2005 and 2007, which was during the period of the study [144]. In addition, we surmise that it is likely that individual smoking cessation interventions may have been provided alongside the smoking ban. The certainty of the evidence was low.

de Andrade and Kinner reported on one primary study that ascertained perceived improvement in health as a result of a complete smoking ban and found that 67.3% of prisoners reported perceived improvements in health in a 1-month pre-release interview [35]. de Andrade and Kinner included another primary study that estimated the number of staff sick days taken 1 year before and 1 year after a complete smoking ban, and reported no statistically significant difference in the number of staff sick days taken before and after the ban was introduced. The certainty of the evidence was very low.

3.2.7.2.1.2 Partial smoking ban and smoke-free areas

de Andrade and Kinner included one primary study that assessed perceived improvements in health following the introduction of an indoor smoking ban, which found that 45% of prisoners reported perceived improvements in overall health (Table 37) [35]. The certainty of the evidence was very low.

3.2.7.2.1.3 Single health behaviour smoking cessation interventions

There were no single health behaviour smoking cessation interventions reported on under the outcome of physical well-being, measured as mortality, morbidity, and access to healthcare services.

Table 37 Single smoking cessation interventions for the outcome of physical well-being , measured as mortality, morbidity, and access to healthcare services

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Single interventions for physical well-being , measured as mortality, morbidity, and access to healthcare services				
Single smoking ban interventions				
Smoking-related mortality	Observation (large dataset)	Binswanger (2014) Surveillance study Frazer *et al.* (2016) [144]	Mortality associated with smoking-related illness was reduced in prisons that had a smoking ban established for a period of 9 or more years when compared with prisons with no smoking policies (N=14,499 prisoners): - Overall deaths: RR=0.89; 95% CI: 0.85–0.94 (compared with prisons in states with no smoking bans) - Cancer deaths: RR=0.81; 95% CI: 0.74–0.90 (compared with prisons in states with no smoking bans), and - Pulmonary deaths: RR=0.66; 95% CI: 0.54–0.80 (compared with prisons in states with no smoking bans).	Data on deaths in custody from 2001 to 2011 stratified by age and sex
Smoking-related mortality	Observation (large dataset)	Dickert (2015) Surveillance study Frazer *et al.* (2016) [144]	There were statistically significant annual reductions in smoking-related mortality in prisons after the introduction of smoking bans in 2005; these reductions were identified for all prisoners between 2005 and 2011, and particularly for those with a diagnosed mental illness: - The annual mortality rate decreased by 13% after the smoking ban was introduced, from 232 per 100,000 population in 2005 to 203 per 100,000 population in 2011. - The mortality rate for persons with special mental health needs decreased by 48%, from an average of 676 per 100,000 population in 2005 to 353 per 100,000 population in 2006.	Census data from January to June 2005 until January to June 2011 were analysed
Perceived improvement in health	Self-report via pre-release interview	Thibodeau (2010) Pre-post study de Andrade and Kinner (2017) [35]	Following a complete smoking ban, 67.3% of prisoners reported perceived improvements in health in a 1-month pre-release interview.	Not reported
Number of staff sick days taken before and after complete smoking ban	Collection of administrative data	Leone (1994) Pre-post study de Andrade and Kinner (2017) [35]	There was no statistically significant difference in the number of staff sick days taken before and after a complete smoking ban was introduced.	From 1 year pre-ban to 1 year post-ban
Single partial smoking ban and smoke-free areas interventions				
Perceived improvements in overall health	Not specified, but presumed self-report	Lasnier (2011) Pre-post study de Andrade and Kinner (2017) [35]	Following the introduction of an indoor smoking ban, 45% of prisoners reported perceived improvements in overall health.	Not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Single health behaviour smoking cessation interventions				
No studies identified				

3.2.7.2.2 Abstinence from tobacco cigarette smoking and/or smoking cessation

3.2.7.2.2.1 Smoking ban

de Andrade and Kinner evaluated smoking cessation interventions that were described as a smoking ban in three primary studies [35]. The first study evaluated the effects of a complete smoking ban in a prison setting using the measure of 1 month of abstinence post-release, and it reported a significant reduction in the smoking rate (61% among the ex-prisoners, who had an average incarceration time of 2.3 years) (Table 38). de Andrade and Kinner also included a second primary study that evaluated the effects of a complete smoking ban in a prison setting using the measure of continuous abstinence, which reported a continuous abstinence rate of 13.7% among ex-prisoners at 1-month follow-up after release (prisoners had an average incarceration time of 2 months) and a continuous abstinence rate of 3.1% at 6-month follow-up after release [35]. de Andrade and Kinner included a third study that evaluated the effects of a complete smoking ban in a prison setting using the measure of point prevalence abstinence, which reported that 74% of ex-prisoners resumed smoking within 1 year of release. The certainty of the evidence was low.

3.2.7.2.2.2 Partial smoking ban and smoke-free areas

There were no single partial smoking ban and smoke-free areas interventions reported on under the outcome of abstinence from tobacco cigarette smoking and/or smoking cessation.

3.2.7.2.2.3 Single health behaviour smoking cessation interventions

The reviews by de Andrade and Kinner and by Lindson *et al.* both included the same primary study which reported that the quit rates following one or more motivational interviewing sessions on smoking cessation were statistically significantly higher at 6 months in the intervention group, at 16% (48 out of 300), than in the comparator group, at 2% (6 out of 30), giving a relative risk of 8.0 (95% CI: 3.5–18.4) (Table 38) [35,145]. The certainty of the evidence was low to moderate.

Table 38 Single smoking cessation interventions for the outcome of abstinence from tobacco cigarette smoking and/or smoking cessation

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Single interventions for abstinence from tobacco cigarette smoking and/or smoking cessation				
Single smoking ban interventions				
1 month of abstinence post-release	Self-report via post-release interview	Thibodeau (2010) Pre-post study de Andrade and Kinner (2017) [35]	Following incarceration in a prison with a complete smoking ban, the primary study reported significant reductions in smoking rates among ex-prisoners; the 1-month abstinence rate (unknown if this was continuous abstinence) among the ex-prisoners (whose average incarceration time was 2.3 years) post-release was 61% (n=49 male ex-prisoners).	Follow-up took place 1 month post-release
Continuous abstinence	Self-report via post-release interview	Lincoln (2009) Pre-post study de Andrade and Kinner (2017) [35]	Following incarceration in a prison with a complete smoking ban, the primary study reported a continuous abstinence rate of 13.7% at a 1-month post-release follow-up interview, and a continuous abstinence rate of 3.1% at a 6-month post-release follow-up interview (n=102 ex-prisoners with high comorbidity rates and an average incarceration time of 2 months).	Follow-up took place 1 month and 6 months post-release
Point prevalence abstinence at follow-up	Self-report via post-release survey	Howell (2015) Cross-sectional survey de Andrade and Kinner (2017) [35]	Following incarceration in a prison with a complete smoking ban, the primary study reported that 74% of ex-prisoners resumed smoking within 1 year of release (n=172 ex-prisoners released from prison in the previous 12 months but not in the previous 3 months).	Intervention duration not reported; follow-up took place between 3 months and 1 year post-release
Single partial smoking ban and smoke-free areas interventions				
No studies identified				
Single smoking cessation interventions				
Incidence of smoking cessation	Unclear. The review report stated that carbon monoxide was measured; however, it was unclear whether this was used to motivate participants, verify cessation rates, or both.	Naik (2014) RCT Lindson *et al.* (2019) [145] Same primary RCT is included in de Andrade and Kinner	The quit rates in the intervention group (n=300 male prisoners who received one or more motivational interviewing smoking cessation intervention sessions) were much higher than in the comparator group (n=300 male prisoners who did not receive the intervention) (48/300 (16%) and 6/300 (2%), respectively) (RR=8.00; 95% CI: 3.48–18.41).	Follow-up took place after 6 months
Quit smoking	Not specified, but presumed self-report	Naik (2014) RCT de Andrade and Kinner (2017) [35]	An immediate (within-group) post-intervention (motivational interviewing questionnaire) reported that 16% of 300 smokers at baseline had quit smoking.	Intervention duration seems to be minimum 4 weeks Follow-up appears to be

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
		Same primary RCT is included in Lindson *et al.*		immediately after intervention

3.2.7.2.3 Tobacco cigarette smoking behaviours, including relapse

3.2.7.2.3.1 Smoking ban

de Andrade and Kinner reported on one primary study that evaluated the effects of a complete smoking ban in a prison setting using a measure of nicotine dependence post-release, and found that there was a statistically significant reduction in mean scores on the Fagerstrom Test for Nicotine Dependence (FTND) at 1 month after release from prison (Table 39) [35].

Sourry *et al.* reported on two primary studies that evaluated smoking cessation interventions described as smoking bans [143]. One of the studies compared pre-prison smoking rates with post-release follow-up (no time point provided) and reported that 62% of participants smoked fewer cigarettes per day at follow-up.

The same primary study assessing smoking bans only measured time to smoking relapse and reported that 72% of ex-smokers relapsed on the day of their release from prison, 89% had relapsed by the end of the first week post-release, and 94% had relapsed to smoking at 2 months post-release.

The second primary study evaluated smoking relapse post-release and reported that 74% of ex-prisoners recommenced smoking within 1 day of release from prison, and 26% recommenced smoking between 2 and 21 days post-release.

The same primary study also measured smoking abstinence at a post-release follow-up (no time point provided) and reported that 42% of those in the intervention group were trying to quit smoking (Table 39). No inferential statistics were provided.

The certainty of the evidence for this outcome was low.

3.2.7.2.3.2 Partial smoking ban and smoke-free areas

de Andrade and Kinner included three primary studies that reported on single partial smoking ban interventions under the outcome of tobacco cigarette smoking behaviours, including relapse, but none presented a follow-up time point for the measure and we have therefore not reported narrative text on these studies as they are not comparable with other findings (Table 39). The certainty of the evidence was low.

3.2.7.2.3.3 Single health behaviour smoking cessation interventions

de Andrade and Kinner identified one primary study that evaluated a motivational interviewing intervention by measuring the number of cigarettes smoked per day as a proxy for change in smoking behaviour, the point prevalence of smoking at the 6-month follow-up (using expired carbon monoxide readings as a proxy for smoking behaviour in the last 12–24 hours), and the number of attempts to quit (Table 39) [35]. The primary study reported an immediate, statistically significant reduction in the number of cigarettes smoked per day in the intervention group between baseline and the 6-month follow-up (p<0.001). The same study reported no statistically significant difference in the number of cigarettes smoked per day in smokers as a result of motivational interviewing delivered to the intervention group compared with the control group at the 6-month follow-up (p=0.92). This study also measured the point

prevalence of smoking at 6 months using expired carbon monoxide readings, and reported that the quantity of expired carbon monoxide was statistically significantly lower for the motivational interviewing intervention group compared with the control group at the 6-month follow-up (p<0.001). Finally, the primary study reported a statistically significantly higher number of quit attempts among participants in the motivational interviewing intervention group (78.3%) compared with participants in the control group (30.7%) at the 6-month follow-up (p<0.001). The certainty of the evidence was low.

Table 39 Single smoking cessation interventions for the outcome of tobacco cigarette smoking behaviours, including relapse

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Single interventions for tobacco cigarette smoking behaviours, including relapse				
Single smoking ban interventions				
Nicotine dependence post-release	FTND mean scores, via post-release interview	Thibodeau (2010) Pre-post study de Andrade and Kinner (2017) [35]	Following a complete smoking ban, there was a significant (within-group) reduction in mean FTND scores (n=49 male prisoners).	Follow-up took place 1 month post-release
Daily number of cigarettes smoked	Self-report	Puljevic (2018) Cross-sectional survey Sourry *et al.* (2022) [143]	Following introduction of a smoke-free prison, compared with pre-prison smoking rates, 62% (n=114 male and female smokers released from a smoke-free prison) smoked fewer cigarettes per day at post-release follow-up.	Post-release follow-up (does not state exact time when data were collected)
Time to smoking relapse	Self-report	Puljevic (2018) Cross-sectional survey Sourry *et al.* (2022) [143]	Comparisons of post-release follow-up with pre-prison smoking rates (n=114 male and female smokers released from a smoke-free prison) found that: - 72% relapsed the day of release - 89% relapsed 1 week after release, and - 94% relapsed to smoking 2 months after release.	Follow-up took place at several time points post-release
Smoking relapse post-release	Self-report	Frank (2017) Prospective cohort study Sourry *et al.* (2022) [143]	Seventy-four percent (n=143 male and female smokers released from a smoke-free prison) were smoking within 1 day of release. Twenty-six percent recommenced smoking between 2 days and 21 days post-release.	Follow-up took place at several time points post-release
Smoking abstinence (quit attempts) at post-release follow-up	Self-report	Frank (2017) Prospective cohort study Sourry *et al.* (2022) [143]	Forty-two percent (n=60) of the intervention group (n=143 male and female smokers released from a smoke-free prison) were trying to quit smoking at post-release follow-up. No inferential statistics were provided.	Post-release follow-up (does not state exact time when data were collected)
Single partial smoking ban and smoke-free areas interventions				
Number of cigarettes smoked per day	Modified National Health and Nutrition Examination Survey (NHANES) tobacco questionnaire	Kauffman (2011) Pre-post study de Andrade and Kinner (2017) [35]	Results from the indoor smoking ban showed that the number of cigarettes smoked per day decreased significantly following the implementation of the smoking ban (p<0.001) (n=200 male prisoners) However, there was a significant increase in 'smokeless tobacco consumption' following	Intervention duration and follow-up not reported

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			implementation of the smoking ban (p<0.001).	
Number of cigarettes smoked per day	Not specified, but presumed self-report	Lasnier (2011) Pre-post study de Andrade and Kinner (2017) [35]	There was a significant (within-group) reduction in the average number of cigarettes smoked per day compared with pre-ban smoking levels (89% reported a reduction in the number of cigarettes smoked per day) (total sample size: n=113 male and female prisoners).	Intervention duration and follow-up not reported
Continued smoking despite ban	Not specified, but presumed self-report	Lasnier (2011) Pre-post study de Andrade and Kinner (2017) [35]	When prisoners still have access to tobacco (i.e. indoor bans), many will breach prison rules, with 93% of prisoners (total sample size: n=133 male and female prisoners across two correctional centres) continuing to smoke indoors following the ban (this is in contrast to results on the number of cigarettes smoked per day; see results reported for that outcome measure in the row above).	Intervention duration and follow-up not reported
Continued smoking despite ban	Modified NHANES tobacco questionnaire	Kauffman (2011) Pre-post study de Andrade and Kinner (2017) [35]	When prisoners still have access to tobacco (i.e. indoor bans), many will breach prison rules, with 51.2% of prisoners (total sample size: n=200) continuing to smoke indoors following the ban.	Intervention duration and follow-up not reported
Single smoking cessation interventions				
Number of cigarettes smoked per day as a proxy for change in smoking behaviour	Not specified, but presumed self-report	Naik (2014) RCT de Andrade and Kinner (2017) [35]	There was an immediate, significant (within-group) reduction in the motivational interviewing intervention group's daily smoking (p<0.001) (n=300 male prisoners in the intervention group). There was no significant difference in the motivational interviewing intervention group's daily smoking compared with the control group at the 6-month follow-up (p=0.92) (sample size not reported at follow-up). Note: Lindson et al. reported on the same primary study, and indicated that there were n=300 participants in each group (intervention and control) (see Table 38)	Intervention duration seems to be minimum 4 weeks Follow-up appears to be immediately after intervention 6 months
Expired carbon monoxide readings as a proxy for smoking behaviour in the last 12–24 hours	Carbon monoxide readings	Naik (2014) RCT de Andrade and Kinner (2017) [35]	There was an immediate, significant (within-group) reduction in the motivational interviewing intervention group's expired carbon monoxide readings (p<0.001) (n=300 male prisoners in the intervention group). Expired carbon monoxide readings were significantly lower for the motivational interviewing intervention group compared	Intervention duration seems to be minimum 4 weeks Follow-up appears to be immediately after intervention

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			with the control group at the 6-month follow-up (p<0.001) (Sample size not reported at follow-up).	6 months
Quit attempts	Not specified, but presumed self-report	Naik (2014) RCT de Andrade and Kinner (2017) [35]	There was an immediate (within-group), significant difference in the number of quit attempts among participants in the motivational interviewing intervention group pre-intervention (25.7%) compared with post-intervention (78.3%) (n=300 male prisoners in the intervention group). There was a significant difference in the number of quit attempts among participants in the motivational interviewing intervention group (78.3%) compared with participants in the control group (30.7%) (p<0.001).	Intervention duration seems to be minimum 4 weeks Follow-up appears to be immediately after intervention 6 months

3.2.7.2.4 Environmental cigarette smoking factors, including effects on non-smokers

3.2.7.2.4.1 Smoking ban

de Andrade and Kinner reported on one primary study that evaluated the effects of a complete smoking ban in a prison setting using the measures prisoner-on-prisoner assaults without injury and prisoner-on-staff assaults without injury, and found a significant increase in both measures (Table 40) [35]. de Andrade and Kinner also reported that a second primary study evaluated the effects of a complete smoking ban in a prison setting by measuring tobacco used as currency for gambling and found a significant drop in tobacco used as currency for gambling by prisoners after the ban was introduced, from 28.6% to 2.3% (p<0.001), and an increase in monetary wagers (no statistics were provided). The time to follow-up was not reported in this study. The certainty of the evidence was low.

de Andrade and Kinner reported the first primary study also counted the number of prisoners moved to segregation; however, the text and table in the systematic review report contradictory findings from this primary study and so are not further reported in narrative text [35].

3.2.7.2.4.2 Partial smoking ban and smoke-free areas

There were no single partial smoking ban and smoke-free areas interventions reported on under the outcome of environmental cigarette smoking factors, including effects on non-smokers.

3.2.7.2.4.3 Single health behaviour smoking cessation interventions

There were no single smoking cessation interventions reported on under the outcome of environmental cigarette smoking factors, including effects on non-smokers.

Table 40 Single smoking cessation interventions for the outcome of environmental cigarette smoking factors, including effects on non-smokers

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Single interventions for environmental cigarette smoking factors, including effects on non-smokers				
Single smoking ban interventions				
Prisoner-on-prisoner assaults without injury	Collection of administrative data	Leone (1994) Pre-post study de Andrade and Kinner (2017) [35]	A complete smoking ban was associated with an increase in the rate of prisoner-on-prisoner assaults without injury per year (1.31 to 3.73; p<0.001; Sample size not reported) from 1 year pre-ban to 1 year post-ban.	Follow-up from 1 year pre-ban to 1 year post-ban
Prisoner-on-staff assaults without injury	Collection of administrative data	Leone (1994) Pre-post study de Andrade and Kinner (2017) [35]	A complete smoking ban was associated with an increase in rate of prisoner-on-staff assaults without injury per year (0.08 to 0.64; p<0.05; Sample size not reported) from 1 year pre-ban to 1 year post-ban.	Follow-up from 1 year pre-ban to 1 year post-ban
Number of prisoners moved to segregation	Collection of administrative data	Leone (1994) Pre-post study de Andrade and Kinner (2017) [35]	There was a significant decrease in the number of prisoners moved for administrative segregation (334 to 309; p<0.005), but not in the number moved for disciplinary segregation (Sample size not reported). *Note:* Table 3 in de Andrade and Kinner's review describes this as an increase, but the figures provided suggest a decrease (334 to 309; p<0.005); therefore, we cannot use these data..	Follow-up from 1 year pre-ban to 1 year post-ban
Tobacco used as currency	Self-report, survey	Turner (2013) Pre-post study de Andrade and Kinner (2017) [35]	The results of a pre- and post-ban gambling survey found a significant drop in tobacco used as currency for gambling by prisoners post-ban, from 28.6% to 2.3% (p<0.001), and an increase in monetary wagers (pre-ban: n=254 male prisoners; post-ban: n=395 male prisoners).	Not reported
Single partial smoking ban and smoke-free areas interventions				
No studies identified				
Single smoking cessation interventions				
No studies identified				

3.2.7.3 Combined interventions

3.2.7.3.1 Physical well-being , measured as mortality, morbidity, and access to healthcare services

3.2.7.3.1.1 Smoking ban combined with smoking cessation interventions

There were no smoking ban combined with smoking cessation interventions reported on under the outcome of physical well-being, measured as mortality, morbidity, and access to healthcare services.

3.2.7.3.1.2 Partial smoking ban and smoke-free areas combined with smoking cessation interventions

The reviews by Frazer *et al.* and de Andrade and Kinner both included the same primary study that evaluated the effect of increased number of smoke-free zones in three prisons, one intervention prison and two control prisons (Table 41) [35,144]. Prisoners in the intervention prison reported receiving more medical help to quit smoking after the introduction of the smoking policy. Nicotine replacement therapy was available to purchase in this prison. For example, a statistically significantly higher proportion of prisoners in the intervention prison reported receiving medical help to quit smoking in 2011 (20%) compared with baseline in 2009 (4%; p=0.012). When compared with one control prison, statistically significantly more prisoners in the intervention prison felt that prison staff should do more to help prisoners' quit attempts (p=0.015). The certainty of the evidence was low.

3.2.7.3.1.3 Combined smoking cessation interventions

There were no combined smoking cessation interventions reported on under the outcome of physical well-being, measured as mortality, morbidity, and access to healthcare services"

Table 41 Combined smoking cessation interventions for the outcome of physical well-being measured as mortality, morbidity, and access to healthcare services

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Combined interventions for physical well-being, measured as mortality, morbidity, and access to healthcare services"				
Smoking ban combined with smoking cessation interventions				
No studies identified				
Partial smoking ban and smoke-free areas combined with smoking cessation interventions				
Receipt of medical help to quit smoking	Self-report	Etter (2012) Pre-post study Frazer *et al.* (2016) [144] Same primary study is included in de Andrade and Kinner	Prisoners in the intervention prison reported receiving more medical help to quit smoking after the introduction of the smoking policy; a statistically significantly higher proportion of prisoners in the intervention prison reported receiving medical help to quit smoking in 2011 (20%) compared with baseline in 2009 (4%; p=0.012). Nicotine replacement therapy was available for purchase in this prison. When compared with one control prison, statistically significantly more prisoners in the intervention prison felt that staff should do more to help prisoners' quit attempts (p=0.015).	13 months (2009–2011)
Medical attention	Self-report, via interviews	Etter (2012) Pre-post study de Andrade and Kinner (2017) [35] Same primary study is included in Frazer *et al.*	Prisoners and staff in Prison A (which had an extension in the number of smoke-free zones overtime combined with nicotine replacement therapy for purchase and self-help booklets) reported receiving increases medical attention from baseline to follow-up (p<0.005) (Prison A: pre-ban: n=70 male prisoners and n=51 staff; post-ban: n=60 male prisoners and n=48 staff).	13 months (2009–2011)
Prisoner perceptions of staff help to quit smoking	Self-report	Etter (2012) Pre-post study Frazer *et al.* (2016) [144] Same primary study is included in de Andrade and Kinner	When compared with Prison B (control prison: pre-ban: n=27 prisoners (19 smoked); post-ban: n=30 prisoners (17 smoked)), prisoners in Prison A (intervention prison: pre-ban: n=70 prisoners (52 smoked); post-ban: n=60 prisoners (43 smoked)) felt that staff should do more to help their quit attempts (p=0.015).	13 months (2009–2011)
Combined smoking cessation interventions				
No studies identified				

3.2.7.3.2 Abstinence from tobacco cigarette smoking and/or smoking cessation

3.2.7.3.2.1 Smoking ban combined with smoking cessation interventions

Sourry *et al.* evaluated smoking cessation interventions described as complete smoking bans, and in two of the relevant four primary studies, the researchers tested the effects of combined interventions (Table 42) [143]. The first primary study evaluated the effect of a smoke-free prison plus 6 weeks of motivational interviews and cognitive behavioural therapy sessions pre-release, and two follow-up phone sessions post-release on abstinence from smoking and found that 25.5% of participants in the intervention group were abstinent at 3 weeks post-release, compared with 7.2% of those in the control group (p<0.01). In addition, 11.5% of participants in the intervention group were abstinent at the 3-month post-release follow-up compared with 2.4% of those in the control group. No inferential statistics were provided. The findings of this primary study were validated with urine cotinine measures. This primary study was also included in de Andrade and Kinner's systematic review[35]. The second primary study included in Sourry *et al.*'s review assessed the effect of a smoke-free prison plus one motivational interview session on smoking abstinence at the 3-month post-release follow-up and found that there was no significant difference in continuous abstinence between the intervention group (8.6%) and the control group (7.4%). No inferential statistics were provided. The certainty of the evidence was low to high.

3.2.7.3.2.2 Partial smoking ban and smoke-free areas combined with smoking cessation interventions

There were no partial smoking ban and smoke-free areas combined with smoking cessation interventions reported on under the outcome of abstinence from tobacco cigarette smoking and/or smoking cessation.

3.2.7.3.2.3 Combined smoking cessation interventions

de Andrade and Kinner reported on two primary studies that evaluated continuous abstinence from smoking employing two different combined smoking cessation interventions (Table 42) [35]. The first primary study evaluated a tobacco control pilot programme combined with nicotine replacement therapy and reported 16.7% continuous abstinence at 6 months follow-up . The second primary study examined the effect of a combined smoking cessation intervention comprising two brief cognitive behavioural therapy sessions, nicotine replacement therapy, bupropion, and self-help resources, and reported continuous abstinence rates in the intervention group of 26% at the 5-month follow-up and 22% at the 6-month follow-up. No inferential statistics were provided. The findings of the second primary study were validated using expired carbon monoxide readings. The certainty of the evidence was low.

Mohan *et al.* reported on two relevant primary studies that evaluated continuous abstinence from smoking. The first primary study delivered the intervention in a group setting and focused on mood management training and nicotine replacement therapy in order to prevent smoking relapse [77]. The review authors reported that there was a statistically significantly greater increase in smoking abstinence for the intervention group at the 1-week target quit date compared with the control group. Almost one-half (46%) of participants in the intervention group relapsed after the 1-week target quit date, and there was a gradual decline in abstinence from week 5 until the 6-month follow-up time point. The other primary study delivered two face-to-face cognitive behavioural therapy sessions, active nortriptyline, and active nicotine patches, and had access to a telephone counselling service and support instruments, as well as nicotine patches. The findings showed no statistically significant differences between the intervention and control groups in continuous abstinence and point prevalence abstinence at 3, 6, and 12 months. The certainty of the evidence was low.

de Andrade and Kinner reported on three primary studies that evaluated point prevalence abstinence using expired carbon monoxide readings as a proxy for smoking behaviour in the previous 12–24 hours for three different combined smoking cessation interventions [35]. The first primary study assessed a pilot combined smoking cessation programme comprising nicotine replacement therapy, either group support

with a facilitator or one-on-one support by prison-based staff for 6 weeks, and a three-phase social marketing approach, and reported that the point prevalence abstinence rate at 4 weeks was 58–82% for the group intervention across three prisons and was 25% and 40% for the one-on-one intervention across two prisons. No inferential statistics were provided. The second primary study evaluated a combined intervention involving nicotine replacement therapy and 10 sessions of group counselling in order to help address mood management, and it reported that the point prevalence abstinence rates were 18.4% at the end of the intervention, 16.8% at the 3-month follow-up, 14.0% at the 6-month follow-up, and 11.6% at the 12-month follow-up. The difference between the intervention and control groups at the 6-month follow-up was statistically significant (14.0% compared with 2.8%; *p*=0.001). Mohan *et al.* also reported on the findings of this second primary study at 6 months [77]. The third primary study examined the effect of a combined intervention comprising two brief cognitive behavioural therapy sessions, nicotine replacement therapy, bupropion, and self-help resources, and reported that the point prevalence abstinence rates for the intervention group were 37% at the 5-month follow-up compared with 26% at the 6-month follow-up. No inferential statistics were provided. The certainty of the evidence was low.

Table 42 Combined smoking cessation interventions for the outcome of abstinence from tobacco cigarette smoking and/or smoking cessation

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Combined interventions for abstinence from tobacco cigarette smoking and/or smoking cessation				
Smoking ban combined with smoking cessation interventions				
7-day point prevalence abstinence	Urine cotinine measure	Clarke (2013) RCT Sourry *et al.* (2022) [143] The same primary study is included in de Andrade and Kinner	Following receipt of a combined intervention comprising six weeks of motivational interviews and cognitive behavioural therapy sessions pre-release, and two follow-up phone sessions post-release, 25.5% of participants in the intervention group (n=122 males and females released from a smoke-free prison) were abstinent at the 3-week follow-up compared with 7.2% of those in the control group (n=125 males and females released from a smoke-free prison who received six weekly sessions of educational videos in prison). At the 3-month post-release follow-up, 11.5% of participants in the intervention group were abstinent compared with 2.4% of those in the control group. No inferential statistics were provided.	Follow-up took place 3 weeks and 3 months post-release
Smoking abstinence at the 3-month post-release follow-up	Biochemically verified with expired air carbon monoxide concentration of <5 parts per million	Jin (2021) RCT Sourry *et al.* (2022) [143]	There was no significant difference in continuous abstinence between the intervention group (8.6%) (n=266 males and females released from a smoke-free prison who received one motivational interview session (combined intervention)) and the control group (7.4%) (n=291 males and	Follow-up took place 3 months post-release

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			females released from a smoke-free prison). No inferential statistics were provided.	
Continuous abstinence	Assumed self-report, and validated with urine cotinine measures	Clarke (2013) RCT de Andrade and Kinner (2017) [35] The same primary study is included in Sourry et al.	Following a pre-release combined intervention (n=122 male and female prisoners in the intervention group) involving 6 weekly sessions of motivational interviewing and cognitive behavioural therapy, as well as two brief telephone sessions post-release (in a prison with a complete smoking ban), 25.4% of participants in the intervention group had achieved continuous abstinence compared with 7.2% of those in the control group (n=125) at 3 weeks post-release (p<0.01) (>60% of the control group relapsed on the first day of release). At 3 months post-release, 11.5% of participants in the intervention group and 2.4% of those in the control group were continuously abstinent.	Follow-up took place 3 weeks and 3 months post-release
Partial smoking ban and smoke-free areas combined with smoking cessation interventions				
No studies identified				
Combined smoking cessation interventions				
Continuous abstinence	Self-report, survey	Awofeso (2001) Pre-post study de Andrade and Kinner (2017) [35]	There was no significant difference in the number of prisoners in the intervention group (which received a tobacco control pilot programme combined with nicotine replacement therapy) who exhibited continuous abstinence at 6 months (4 out of 24 male prisoners; 16.7%) compared with baseline.	Follow-up at 6 months
Continuous abstinence	Assumed self-report, and validated by expired carbon monoxide readings	Richmond (2006) Pre-post study de Andrade and Kinner (2017) [35]	Following a multi-component (combined) smoking cessation intervention involving two brief cognitive behavioural therapy sessions, nicotine replacement therapy, bupropion, and self-help resources, the continuous abstinence rate (within-group) was 26% at 5-month follow-up and 22% at 6-month follow-up (n=30 male prisoners at baseline; sample size not reported at follow-up). No inferential statistics were provided.	6 months follow-up time point
Continuous abstinence	Measure unspecified	Richmond (2012) RCT Mohan *et al.* (2018) [77]	There was no significant difference between the prisoners who received a combined intervention (n=206 male prisoners who received two face-to-face cognitive behavioural therapy sessions, active nortriptyline, and active nicotine patches, and had access to a telephone counselling	Follow-up took place at 3, 6, and 12 months

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			service and support instruments, and prisoners in the control group (n=219 male prisoners who received the same intervention as the intervention group with the exception of placebo nortriptyline). No inferential statistics were provided.	
Smoking: point prevalence abstinence	Measure unspecified	Richmond (2012) RCT Mohan *et al.* (2018) [77]	There was no statistically significant difference between the prisoners who received the combined intervention and prisoners in the control group. No inferential statistics were provided.	Follow-up took place at 3, 6, and 12 months
Smoking abstinence	Measure unspecified	Cropsey (2008) RCT Mohan *et al.* (2018) [77] The same primary study is included in de Andrade and Kinner	One week after the target quit date, there was a statistically significantly greater increase in smoking abstinence for the intervention group (n=250 female prisoners who received mood management training and nicotine replacement therapy in week 3 of the intervention in order to prevent smoking relapse) compared with the control group (n=289 female prisoners on a 6-month waiting list for the above smoking cessation intervention. The difference in relapse was observed until 6 months after completion of the intervention. For the intervention group, there was a gradual decline in abstinence from week 5 until the 6-month follow-up time point. Forty-six percent of participants in the intervention group relapsed after 1 week of abstinence. No inferential statistics were provided.	Intervention lasted for 10 weeks; follow-up took place after 6 months
Point prevalence abstinence validated using expired carbon monoxide readings as a proxy for smoking behaviour in the last 12–24 hours	Routinely collected data on smoking levels (assumed self-report), and validated by expired carbon monoxide readings	MacAskill (2008) Pre-post study de Andrade and Kinner (2017) [35]	The point prevalence abstinence rate after the group intervention (a pilot combined smoking cessation programme involving nicotine replacement therapy, either group support with a facilitator or one-on-one support by prison-based staff for 6 weeks, and a three-phase social marketing approach) ranged from 58% to 82% (n=159 male prisoners) across three prisons. No inferential statistics were provided. The point prevalence abstinence rate after a one-on-one intervention across two prisons was 25% and 40%. No inferential statistics were provided.	Follow-up at 4 weeks after intervention
Point prevalence abstinence validated using expired carbon	Assumed self-report, and validated by	Cropsey (2008) RCT	Following a combined intervention involving nicotine replacement therapy and 10 sessions of group counselling in order to help	Follow-up took place immediately

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
monoxide readings as a proxy for smoking behaviour in the last 12–24 hours	expired carbon monoxide readings	de Andrade and Kinner (2017) [35] The same primary study is included in Mohan *et al.*	address mood management (n=250 female prisoners in the intervention group, n=289 female prisoners in the control group), the point prevalence abstinence rates were 18.4% (end of treatment), 16.8% (3-month follow-up), 14.0% (6-month follow-up), and 11.6% (12-month follow-up). The difference between the intervention and control groups at the 6-month follow-up was statistically significant (14.0% compared with 2.8%; *p*=0.001).	post-intervention, and at 3, 6, and 12 months
Point prevalence abstinence validated using expired carbon monoxide readings as a proxy for smoking behaviour in the last 12–24 hours	Assumed self-report, and validated by expired carbon monoxide readings	Richmond (2006) Pre-post study de Andrade and Kinner (2017) [35]	Following a multi-component (combined) smoking cessation intervention (two brief cognitive behavioural therapy sessions, nicotine replacement therapy, bupropion, and self-help resources), the primary study reported that the point prevalence abstinence rates (within-group) for the intervention group were 37% at the 5-month follow-up compared with 26% at the 6-month follow-up (n=30 male prisoners at baseline; sample size not reported at follow-up). No inferential statistics were provided.	Follow-up took place at 5 and 6 months

3.2.7.3.3 Tobacco cigarette smoking behaviours, including relapse

3.2.7.3.3.1 Smoking ban combined with smoking cessation interventions

de Andrade and Kinner included one primary study that evaluated nicotine dependence among smokers and quitters in a prison with a complete smoking ban combined with nicotine replacement therapy (available for purchase only) and found that smokers had higher nicotine dependence scores than quitters at the 1-month follow-up (p<0.01) (Table 43) [35]. de Andrade and Kinner also reported that the same primary study evaluated the effects of a complete smoking ban combined with nicotine replacement therapy (available for purchase only) in one prison by measuring continued smoking, and found that 76% of participants were still smoking in the prison 1 month after the smoking ban was implemented [35]. No inferential statistics were provided. The certainty of the evidence was low.

Sourry *et al.* evaluated smoking cessation interventions described as smoking bans, and in two of the four included primary studies, the primary researchers tested the effects of different combined interventions [143]. The first primary study assessed the effect of a smoke-free prison plus one motivational interview session on the number of cigarettes smoked daily, and it reported that intervention participants smoked on average one fewer cigarette daily than participants in the control group 3 months after release (p<0.01). The first primary study also assessed the effect of a smoke-free prison plus one motivational interview session on smoking relapse post-release, and it reported that 66.9% of participants relapsed on the day of their release and that 90.2% relapsed within 3 months of release. This second study examined smoking relapse on the first day of release from a smoke-free prison and found that more than 60% of

participants in the control group who received weekly sessions over a six-week period of educational videos in prison relapsed to smoking. The certainty of the evidence was high.

3.2.7.3.3.2 Partial smoking ban and smoke-free areas combined with smoking cessation interventions

de Andrade and Kinner reported on one primary study that tested the effects of an indoor smoking ban in three prisons combined with additional smoking cessation interventions (nicotine replacement therapy for purchase in one prison and for free in two prisons; counselling in two prisons; and self-help booklets in all three prisons) on prisoner smoking behaviours, and reported no significant change in prisoner smoking behaviours from 2009 to 2011 (Table 43) [35]. de Andrade and Kinner did not describe the smoking behaviours under examination, but the same results were reported by Frazer *et al.* and described as active smoking rates in prisoners [144]. Frazer *et al.* reported on the same primary study and its evaluation of active smoking rates in prisoners and prison staff; no changes were observed in prisoners' active smoking rates over time (period not specified), and staff smoking rates increased at the 3-month follow-up in one of the two comparison prisons. In addition, no significant changes were detected in any of the prisoners in relation to quit attempts or relapse in the intervention prison compared with the two comparison prisons [144]. The certainty of the evidence was low.

de Andrade and Kinner included a second primary study that assessed the effect of an indoor smoking ban combined with an information session and a pharmacological intervention on the number of cigarettes smoked per day [35]. However, the results presented in the table and text of the systematic review were contradictory, and the exact follow-up time point was not reported so we have not discussed the results in the narrative.

3.2.7.3.3.3 Combined smoking cessation interventions

de Andrade and Kinner reported on one primary study that evaluated nicotine dependence and reported a statistically significant decrease from baseline to follow-up for the two intervention groups (the motivational interviewing intervention group and the combined motivational interviewing plus nicotine replacement therapy intervention group) at the 3-month follow-up (p=0.02) (Table 43) [35]. The certainty of the evidence was low.

de Andrade and Kinner also reported on three primary studies that evaluated three different combinations of smoking cessation interventions using the number of cigarettes smoked per day as a proxy for changes in smoking behaviour [35]. The first primary study evaluated motivational interviewing plus nicotine replacement therapy and reported a statistically significant reduction in the intervention group's daily smoking at the 3-month follow-up (p=0.02), and these findings were validated using expired carbon monoxide readings as a proxy for smoking behaviour in the 12–24 hours prior to the reading. The second primary study assessed a tobacco control pilot programme combined with nicotine replacement therapy and reported that 45% of participants reduced the number of cigarettes smoked per day at the 6-month follow-up; these findings were also validated using expired carbon monoxide readings. The third primary study examined a combined smoking cessation intervention comprising two brief cognitive behavioural therapy sessions, nicotine replacement therapy, bupropion, and self-help resources, and reported a statistically significant reduction in the number of cigarettes smoked per week at the 6-month follow-up. The certainty of the evidence was low.

Table 43 Combined smoking cessation interventions for the outcome of tobacco cigarette smoking behaviours, including relapse

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Combined interventions for tobacco cigarette smoking behaviours, including relapse				
Smoking ban combined with smoking cessation interventions				
Nicotine dependence	FTND scores, self-report	Cropsey (2005) Pre-post study de Andrade and Kinner (2017) [35]	Smokers (within-group and after the intervention) were more nicotine dependent in a prison with a complete smoking ban (combined with nicotine replacement therapy (optional), which was available for purchase only) (n=188 male prisoners classified as smokers or quitters; $p<0.01$).	Follow-up took place after 1 month
Continued smoking despite ban	Not specified, but presumed self-report	Cropsey (2005) Pre-post study de Andrade and Kinner (2017) [35]	In a prison with a complete smoking ban (combined with optional nicotine replacement therapy, which was available for purchase only), 76% of participants were still smoking in prison 1 month after the ban was implemented (n=188 male prisoners classified as smokers or quitters). No inferential statistics were provided.	Follow-up took place after 1 month
Daily number of cigarettes smoked (secondary outcome in the primary study)	Measure unspecified	Jin (2021) RCT Sourry *et al.* (2022) [143]	Intervention participants smoked on average one fewer cigarette daily than participants in the control group 3 months after release ($p<0.01$) (combined intervention).	Follow-up took place 3 months post-release
Smoking relapse post-release	Biochemically verified with expired air carbon monoxide concentration of <5 parts per million	Jin (2021) RCT Sourry *et al.* (2022) [143]	Following a combined intervention comprising a smoke-free prison plus one motivational interview session, 66.9% of participants relapsed on the day of their release and 90.2% relapsed within 3 months of release. *Note:* It was not clear if this result related specifically to the intervention group (n=266 males and females released from a smoke-free prison who received one motivational interview session), the control group (n=291 males and females released from a smoke-free prison), or both (combined intervention).	Follow-up took place the day of release and 3 months post-release (may only refer to abstinent clients on release)
Smoking relapse on first day of release	Urine cotinine measure	Clarke (2013) RCT Sourry *et al.* (2022) [143]	More than 60% of participants in the control group (n=125 males and females released from a smoke-free prison who also received six sessions on a weekly basis of educational videos in prison (combined intervention)) relapsed to smoking on the first day of their release.	Follow-up took place on the first day of release
Partial smoking ban and smoke-free areas combined with smoking cessation interventions				
Prisoner smoking behaviours	Not reported	Etter (2012) Pre-post study de Andrade and Kinner (2017) [35]	The intervention tested the effectiveness of an indoor smoking ban in three prisons combined with additional smoking cessation interventions (nicotine replacement therapy for purchase in one	Approximately 2 years (pre-ban: 2009; post-ban: 2011)

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			prison and for free in two prisons; counselling in two prisons; and self-help booklets in all three prisons) (pre-ban (2009): Prison A: n=70 male prisoners; Prison B: n=27 male prisoners; Prison C: n=116 "mainly male" prisoners; post-release (2011): Prison A: n=30 male prisoners; Prison B: n=30 male prisoners; Prison C: n=66 "mainly male" prisoners). The review reported "no significant change in prisoner smoking behaviours".	See follow-up calculated by Frazer
Active smoking rate (prisoners)	Self-report	Etter (2012) Pre-post study Frazer *et al.* (2016) [144] The same primary study is included in de Andrade and Kinner	No changes were observed in prisoners' active smoking rate: - Prison A (intervention prison): pre-ban: n=70 prisoners (52 smoked); post-ban: n=60 prisoners (43 smoked) - Prison B (control prison): pre-ban: n=27 prisoners (19 smoked); post-ban: n=30 prisoners (17 smoked), and - Prison C (control prison): pre-ban: n=116 prisoners (67 smoked); post-ban: n=66 prisoners (40 smoked). When the Etter (2012) primary study was included in a prison subgroup analysis, there was no evidence of change (RR=0.99 (95% CI: 0.84–1.16); 829 (active smoking) per 1,000 (no intervention) compared with 820 (696–961) per 1,000 (policy intervention to ban smoking) (n=130 prisoners; only before-and-after data from the intervention prison are included in this analysis, not the two control prisons)). In addition, there was "No significant change detected in any of the prisoners in smoking status, quit attempts or relapse" [p59 144].	Follow-up for this outcome at6–9 months for Prisons A (intervention prison) and C (control prison); 3 months for Prison B (control prison) Also reported a follow-up of 13 months later in 2010–11 (It is not clear from Frazer *et al.*'s review at which point follow-up data were collected; therefore, this finding is unlikely to be usable.)
Active smoking rate (staff)	Self-report	Etter (2012) Pre-post study Frazer *et al.* (2016) [144] The same primary study is included in Frazer *et al.*	Staff smoking rates increased in one control prison (assumed to refer to Prison B, as Prison C did not have a staff follow-up due to staff shortages) during the reporting period of the study (no inferential statistics were provided): - Prison A (intervention prison): pre-ban: n=51 staff; post-ban: n=48 staff - Prison B (control prison): pre-ban: n=27 staff; post-ban: n=24 staff, and - Prison C (control prison): pre-ban: n=126 staff; post-ban: n=0 staff.	Follow-up for this outcome at6–9 months for Prisons A (intervention prison) and C (control prison); 3 months for Prison B (control prison) Also reported a follow-up of 13 months later in 2010–11 (It is not clear from Frazer *et al.*'s review at

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
				which point follow-up data were collected; therefore, this finding is unlikely to be usable.)
Quit attempts and relapse	Presumed self-report	Etter (2012) Pre-post study Frazer *et al.* (2016) [144]	No significant changes were detected in any of the prisoners in relation to quit attempts or relapse in the intervention prison compared with the two control prisons (no inferential statistics were provided): - Prison A (intervention prison): pre-ban: n=70 prisoners (52 smoked); post-ban: n=60 prisoners (43 smoked) - Prison B (control prison): pre-ban: n=27 prisoners (19 smoked); post-ban: n=30 prisoners (17 smoked), and - Prison C (control prison): pre-ban: n=116 prisoners (67 smoked); post-ban: n=66 prisoners (40 smoked).	Follow-up for this outcome at6–9 months for prisons A (intervention prison) and C (control prison); 3 months for Prison B (control prison) Also reported a follow-up of 13 months later in 2010–11 (It is not clear from Frazer *et al.*'s review at which point follow-up data were collected; therefore, this finding is unlikely to be usable.)
Number of cigarettes smoked per day	Not specified, but presumed self-report	Turan (2016) Pre-post study de Andrade and Kinner (2017) [35]	Results from the indoor smoking ban combined with an information session and a pharmacological intervention (intervention options for those with a moderate/high FTND score and desire to quit were nicotine replacement therapy, bupropion, or varenicline; participants were required to pay for all options) showed that the average number of cigarettes smoked per day decreased significantly compared with prisoners' pre-admission consumption. *Note:* The supplementary table in de Andrade and Kinner's systematic review appears to contradict the findings presented in the text, implying that there had been an increase in the average number of cigarettes smoked per day since incarceration (from 20.2 to 22.3) (n=179 participants (106 prisoners and 70 staff; men and women); 59 prisoners and staff paid for tobacco cessation treatment).	Unclear which data collection point (of four possible time points: baseline, 1 month, 2 months, and 6 months) was used, and findings are confusing. Therefore, this finding is not usable.

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			Note: The primary study had a high attrition rate at the 1-month follow-up.	
Combined smoking cessation interventions				
Nicotine dependence	FTND scores	Jalali (2015) RCT de Andrade and Kinner (2017) [35]	FTND scores (within-group) decreased significantly for the two intervention groups (motivational interviewing intervention group (sample size not reported at follow-up) and combined motivational interviewing plus nicotine replacement therapy intervention group (sample size not reported at follow-up)) at the 3-month follow-up (p=0.02).	Follow-up took place after 3 months
Number of cigarettes smoked per day as a proxy for changes in smoking behaviour	Not specified, but presumed self-report	Jalali (2015) RCT de Andrade and Kinner (2017) [35]	There was a significant (within-group) decrease in the number of cigarettes smoked per day for the two intervention groups (motivational interviewing intervention group (sample size not reported at follow-up) and combined motivational interviewing plus nicotine replacement therapy intervention group (Sample size not reported at follow-up) (p=0.02)).	Follow-up took place after 3 months
Expired carbon monoxide readings as a proxy for smoking behaviour in the last 12–24 hours	Carbon monoxide readings	Jalali (2015) RCT de Andrade and Kinner (2017) [35]	There was a significant (within-group) reduction in carbon monoxide concentration readings (mean change) at follow-up immediately after the end of the 5 weeks of treatment (motivational interviewing group mean change: 7.80 ± 4.34; p=0.001 (n=71 male prisoners in intervention group 1); combined motivational interviewing plus nicotine replacement therapy group mean change: 10.87 ± 4.53; p=0.001 (n=71 male prisoners in intervention group 2)). Control group comparisons at the end of the 5 weeks of the interventions also showed significant reductions for both intervention groups relative to the control group (n=71 male prisoners in the control group) (no statistical results were provided). The effect of the combined intervention was significantly greater than that of the singular motivational interviewing intervention (p=0.001). There was a significant (within-group) reduction in carbon monoxide concentration readings (mean change) at the 3-month follow-up (motivational interviewing group mean change: 7.81 ± 4.80; p=0.001 (n=71 male prisoners in intervention group 1); combined motivational interviewing plus nicotine replacement therapy group mean change: 11.24 ± 3.82; p=0.001 (n=71 male prisoners in intervention group 2)). Control group comparisons at the 3-month follow-up also showed significant reductions for both intervention groups relative to the control group (n=73 male prisoners in control group) (no	Follow-up took place immediately following the 5-week interventions and again after 3 months

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
			inferential statistical results were provided). The effect of the combined intervention was significantly greater than that of the singular motivational interviewing intervention (p=0.001).	
Number of cigarettes smoked per day as a proxy for changes in smoking behaviour	Self-report, survey	Awofeso (2001) Pre-post study de Andrade and Kinner (2017) [35]	There was a significant reduction in the number of cigarettes smoked per day among those who had relapsed in the intervention group (tobacco control pilot programme combined with nicotine replacement therapy) at the 6-month follow-up (45% (9/20) of the 20 male and female prisoners showed a reduction in the number of cigarettes smoked per day).	Follow-up took place after 6 months
Number of cigarettes smoked per week as a proxy for changes in smoking behaviour	Not specified, but presumed self-report	Richmond (2006) Pre-post study de Andrade and Kinner (2017) [35]	There was a significant reduction in the number of cigarettes smoked per week following a multi-component (combined) smoking cessation intervention (two brief cognitive behavioural therapy sessions, nicotine replacement therapy, bupropion, and self-help resources) among prisoners who had relapsed at the 6-month follow-up (p<0.05) (n=30 male prisoners at baseline; sample size not reported at follow-up).	Follow-up took place after 6 months

3.2.7.3.4 Environmental cigarette smoking factors, including effects on non-smokers

3.2.7.3.4.1 Smoking ban combined with smoking cessation interventions

There were no smoking ban combined with smoking cessation interventions reported on under the outcome of environmental cigarette smoking factors, including effects on non-smokers.

3.2.7.3.4.2 Partial smoking ban and smoke-free areas combined with smoking cessation interventions

The reviews by Frazer *et al.* and de Andrade and Kinner both reported on the same primary study that evaluated perceived exposure to secondhand smoke or passive smoking in prisoners and staff following the introduction of an indoor smoking ban in three prisons, and both found no significant change in the duration of exposure to secondhand smoke across the three prisons between 2009 and 2011 (Table 44) [35,144]. However, prisoners and staff in one prison with an increase in the number of smoke-free zones over time, combined with nicotine replacement therapy for purchase and free self-help booklets, reported significantly decreased exposure to secondhand smoke. No inferential statistics were provided. The certainty of the evidence was low to very low.

3.2.7.3.4.3 Combined smoking cessation interventions

There were no combined smoking cessation interventions reported on under the outcome of environmental cigarette smoking factors, including effects on non-smokers.

Table 44 Combined smoking cessation interventions for the outcome of environmental cigarette smoking factors, including effects on non-smokers

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Combined interventions for environmental cigarette smoking factors, including effects on non-smokers				
Smoking ban combined with smoking cessation interventions				
No studies identified				
Partial smoking ban and smoke-free areas combined with smoking cessation interventions				
Passive smoking rate	Self-report	Etter (2012) Pre-post study Frazer *et al.* (2016) [144] The same primary study is included in de Andrade and Kinner	Prison A (intervention prison: pre-ban: n=70 prisoners and n=51 staff; post-ban: n=60 prisoners and n=48 staff): - Both prisoners and staff reported less exposure to secondhand smoke in 2011 than in 2009: 31% of prisoners were exposed to secondhand smoke at indoor workplaces in 2009 compared with 8% in 2011 (p=0.001), and 43% were exposed to secondhand smoke in common rooms in 2009 compared with 8% in 2011 (p<0.001); but there was no reduction reported in outdoor workplaces. Prison B (control prison: pre-ban: n=27 prisoners and n=27 staff; post-ban: n=30 prisoners and n=24 staff): - No changes were observed. Prison C (control prison: pre-ban: n=116 prisoners and n=126 staff; post-ban: n=66 prisoners and n=0 staff): - No changes were observed. All prisons: - Staff reported reductions in secondhand smoke exposure. Prison A: - There was a significant decrease in median duration of smoke exposure from 25 minutes per day (2009) to 2 minutes per day (2011) (p<0.001). - There was no significant difference when compared with Prison B. - Prisoner environmental tobacco smoke exposure was significantly reduced at follow-up in Prison A in the cafeteria, common rooms, break rooms, and indoor workplaces, but not in outdoor workplaces.	Follow-up for this outcome at6–9 months for Prisons A (intervention prison) and C (control prison); 3 months for Prison B (control prison) Also reported a follow-up of 13 months later in 2010–11 (It is not clear from Frazer *et al.*'s review at which point follow-up data were collected; therefore, this finding is unlikely to be usable.)
Perceived exposure to secondhand smoke – prisoners and staff	Self-report, via interviews	Etter (2012) Pre-post study de Andrade and Kinner (2017) [35]	There was no significant change in the duration of exposure to secondhand smoke across the three prisons. No inferential statistics were provided. Prisoners and staff in Prison A (which had an extension in the number of smoke-free zones	Approximately 2 years (pre-ban: 2009; post-ban: 2011)

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
		The same primary study is included in Frazer *et al.*	overtime combined with nicotine replacement therapy for purchase and self-help booklets) reported significantly decreased exposure to secondhand smoke (Prison A: pre-ban: n=70 male prisoners and n=51 staff; post-ban: n=60 male prisoners and n=48 staff). Prisoners in Prison C (which limited smoking locations combined with counselling, free nicotine replacement therapy, and self-help booklets) reported "increased [secondhand smoke] exposure in medical service" (Prison C: pre-ban: n=116 "mainly male" prisoners and n=126 staff; post-ban: n=66 "mainly male" prisoners and n=0 staff).	
Combined smoking cessation interventions				
No studies identified				

3.2.7.4 Overlap of primary studies

There were six instances of overlap of a primary study between two of the five systematic reviews measuring the effectiveness of smoking cessation interventions:

1. The first instance of overlap of a primary study was between de Andrade and Kinner [35] and Lindson *et al.* [145] examining the effect of motivational interviewing session(s) (single intervention) on smoking cessation (abstinence).
2. The second instance of overlap of a primary study was between Frazer *et al.* [144] and de Andrade and Kinner [35] examining the effect of an increased number of smoke-free zones and leaflets (combined partial ban) on medical help to quit smoking after the introduction of the smoking policy (combined partial ban) in one of three prisons. Nicotine replacement therapy was available to purchase in this prison.
3. The third instance of overlap of a primary study was between Sourry *et al.* [143] and de Andrade and Kinner [35] examining the effect of a smoke-free prison plus six weekly motivational interviews and cognitive behavioural therapy sessions pre-release, and two follow-up phone sessions post-release on abstinence from smoking.
4. The fourth instance of overlap of a primary study was between Mohan *et al.* [77] and de Andrade and Kinner [35] examining the effect of a combined intervention involving nicotine replacement therapy and 10 sessions of group counselling in order to help address mood management and reported point prevalence abstinence rates.
5. The fifth instance of overlap of a primary study was between Frazer *et al.* [144] and de Andrade and Kinner [35] on the effects of an indoor smoking ban in three prisons, combined with additional smoking cessation interventions (nicotine replacement therapy for purchase in one prison and for free in two prisons; counselling in two prisons; and self-help booklets in all three prisons) on prisoner smoking behaviours.
6. The sixth instance of overlap of a primary study was between Frazer *et al.* [144] and de Andrade and Kinner [35] on the perceived exposure to secondhand smoke or passive smoking in prisoners and staff following the introduction of an indoor smoking ban in three prisons.

We acknowledged the six instances of overlap when presenting the analyses in the text and reported the findings from each primary study once in the text for each outcome in order to avoid overestimating the quantity of evidence contributing to each outcome.

3.2.7.5 Summary: Smoking cessation interventions

We included five systematic reviews on smoking cessation interventions. Three were judged to be of strong quality and two were judged to be of moderate quality with respect to design and implementation. The smoking cessation interventions comprised complete smoking bans, partial smoking bans, smoke-free areas, and behaviour-based smoking cessation interventions. These interventions were delivered as single, standalone interventions or as combined interventions.

Using data on deaths in custody from 2001 or 2005 to 2011, two primary studies included in one systematic review reported that overall mortality was reduced in prisons that had a smoking ban (single intervention) established for a period of 6 years or longer, when compared with prisons with no smoking policies. However, the review authors acknowledged that smoking bans were not the only factor contributing to the reduction in mortality. The certainty of the evidence was low.

One systematic review reported on one primary study which found that 67.3% of prisoners in a prison with a complete smoking ban reported perceived improvements in health in a 1-month pre-release interview, while 45.0% of prisoners in a prison with a partial smoking ban reported perceived improvements in overall health. The certainty of the evidence was very low.

One systematic review reported on one primary study that evaluated the effects of a complete smoking ban (single intervention) in a prison setting, measuring prisoner-on-prisoner assaults without injury and prisoner-on-staff assaults without injury; the study found a significant increase in both measures. The certainty of the evidence was low.

One systematic review evaluated the effect of a complete smoking ban (single intervention) on time to smoking relapse following release from prison in two primary studies. One primary study reported that 72% of ex-smokers relapsed to smoking on the day of their release from prison, 89% had relapsed by the end of the first week post-release, and 94% had relapsed by 2 months post-release, while the second primary study reported that 74% of ex-prisoners recommenced smoking within 1 day of release from prison, and 26% recommenced smoking between 2 and 21 days post-release. The certainty of the evidence was low.

One systematic review evaluated a single smoking cessation intervention described as a complete smoking ban in three primary studies at differing time points and reported varied post-release abstinence rates of 61.0% among the ex-prisoners at 1 month post-release in the first study, 13.7% among ex-prisoners at 1 month post-release and 3.1% at 6 months post-release in the second study, and 26% at 1 year post-release in the third study. The certainty of the evidence was low.

Two systematic reviews included the same primary study that reported that the quit rates following one or more motivational interviewing sessions (single intervention) in prison were statistically significantly higher at 6 months in the intervention group, at 16%, than in the comparator group, at 2%, giving a relative risk of 8.0 (95% CI: 3.5–18.4). The certainty of the evidence was low and moderate.

Two systematic reviews evaluated smoking cessation interventions described as complete smoking bans combined with smoking cessation interventions. There were two primary studies of interest in the two reviews. The first study, covered in both reviews, evaluated the effect of a smoke-free prison plus six weekly motivational interviews and cognitive behavioural therapy sessions pre-release, and two follow-up phone sessions post-release on abstinence from smoking and found that 25.5% of participants in the intervention group were abstinent at 3 weeks post-release, compared with 7.2% of those in the control group (p<0.01). In addition, 11.5% of participants in the intervention group were abstinent at the 3-month post-release follow-up compared with 2.4% of those in the control group. The second primary study assessed the effect of a smoke-free prison plus one motivational interview session on smoking abstinence at the 3-month post-release follow-up and found no significant difference in continuous abstinence between the intervention group (8.6%) and the control group (7.4%). The certainty of the evidence was low and high.

Two systematic reviews reported on the same primary study that evaluated the effect of an increased in the number of smoke-free zones (partial ban) combined with self-help booklets in three prisons. Nicotine replacement therapy was also available to purchase in the intervention prison. The primary study found that a statistically significantly higher proportion of prisoners in the intervention group reported receiving medical help to quit smoking in 2011 (20%) compared with baseline in 2009 (4%; p=0.012). The certainty of the evidence was low. When compared with one control prison, prisoners in the intervention prison were more likely to think that prison staff should do more to help prisoners' quit attempts (p=0.015). The certainty of the evidence was low.

One systematic review evaluated continuous abstinence in two primary studies that employed two different combined smoking cessation interventions. The first primary study evaluated a tobacco control pilot programme combined with nicotine replacement therapy and found 16.7% continuous abstinence at 6 months follow-up. The second primary study examined the effect of a combined smoking cessation intervention comprising two brief cognitive behavioural therapy sessions, nicotine replacement therapy, bupropion, and self-help resources, and reported continuous abstinence rates in the intervention group of 26% at the 5-month follow-up and 22% at the 6-month follow-up. The certainty of the evidence was low.

One systematic review included one primary study that evaluated the effect of a smoke-free prison plus one motivational interview session on smoking relapse post-release, and it reported that 66.9% of participants relapsed on the day of their release and that 90.2% relapsed within 3 months of release. The certainty of the evidence was high.

One systematic review reported on two primary studies that evaluated continuous abstinence from smoking. The first primary study delivered the intervention in a group setting and focused on mood management training and nicotine replacement therapy in order to prevent smoking relapse, and it reported that there was a statistically significantly greater increase in smoking abstinence for the intervention group at the 1-week target quit date compared with the control group. Almost one-half (46%) of participants in the intervention group relapsed after the 1-week target quit date, and there was a gradual decline in abstinence from week 5 until the 6-month follow-up time point. The other primary study delivered two face-to-face cognitive behavioural therapy sessions, active nortriptyline, and active nicotine patches, and had access to a telephone counselling service and support instruments and found no statistically significant differences between the intervention and control groups for continuous abstinence and point prevalence abstinence at 3, 6, and 12 months. The certainty of the evidence was low.

Two systematic reviews reported on the same primary study that evaluated perceived exposure to secondhand smoke or passive smoking in prisoners and staff following the introduction of an indoor smoking ban in three prisons, and both found no significant change in the duration of exposure to secondhand smoke across the three prisons between 2009 and 2011. However, prisoners and staff in one prison with an increase in the number of smoke-free zones over time, combined with nicotine replacement therapy for purchase and free self-help booklets, reported a statistically significant decrease in exposure to secondhand smoke. The certainty of the evidence was low to very low.

Our summary findings indicate that:

- Single smoking cessation interventions demonstrated positive effects on the physical well-being (mortality and health perception) of adult prisoners, and the certainty of the evidence for this outcome was graded as low to very low.
- Single smoking cessation interventions demonstrated largely positive effects on smoking abstinence (or negative effects on smoking relapse rates) among adult prisoners and ex-prisoners, and the certainty of the evidence for this outcome was graded as moderate and low.
- Single smoking cessation interventions demonstrated negative effects on environmental cigarette smoking factors (assaults on prisoners and staff), and the certainty of the evidence for this outcome was graded as low. The evidence for this outcome is based on a single primary study.
- Combined smoking cessation interventions demonstrated mixed effects on the physical well-being (access to smoking cessation interventions) of adult prisoners, and the certainty of the evidence for this outcome was graded as very low. The evidence for this outcome is based on a single primary study.
- Combined smoking cessation interventions demonstrated mixed effects on smoking abstinence for adult prisoners and ex-prisoners, and the certainty of the evidence for this outcome was graded as low and high.
- Combined smoking cessation interventions demonstrated mixed effects on environmental cigarette smoking factors (secondhand smoke exposure among prisoners and staff), and the certainty of the evidence for this outcome was graded as low and very low. The evidence for this outcome is based on a single primary study.
- There was no evidence for mental well-being outcomes for smoking cessation interventions, which means that evidence is required in relation to these outcomes.

3.2.8 Healthy eating and nutrition interventions

3.2.8.1 Introduction

3.2.8.1.1 Definition of intervention

The nutrition interventions examined by Mohan *et al.* in their systematic review were evaluated in two primary studies of interventions in which the diets of prisoners were modified, and in a third primary study that examined the effect of education and behavioural workshops on the nutrition practices of prisoners [77].

3.2.8.1.2 Inclusion and exclusion at full text

We identified nine reviews that covered healthy eating and nutrition interventions for consideration at the full-text screening stage. We included one systematic review [77] and excluded the other eight reviews [154–161]. The reasons for exclusion were intervention (two reviews), study design or type of review (two scoping reviews), and review methodology (four reviews). Mohan *et al.*'s review covered more than one intervention category [77]: it covered sports- and exercise-based interventions and smoking cessation interventions as well as healthy eating and nutrition interventions [77].

3.2.8.1.3 Review characteristics

The included systematic review examined interventions that were implemented in adult prisons [77]. Mohan *et al.* covered more than one intervention category [77] (Appendix 9). The age of the participants in this systematic review was measured using different measures and indicates that they were young and middle-aged male and female adults (Appendix 9). The countries included in the systematic review were Belgium, Spain, and the USA. The years of publication for the primary studies were 2009–2013, and the year of publication for the systematic review was 2018. The primary study designs varied and included cohort studies and a case-control study.

3.2.8.1.4 Quality assessment

The included systematic review was judged to be of moderate quality with respect to design and implementation [77] (Appendix 10). Mohan *et al.* did not present a reproducible search strategy in their paper and did not discuss the quality of the primary studies in their analysis, and the review conclusions are not supported by their methods and results [77].

3.2.8.2 Single interventions

3.2.8.2.1 Physical well-being, expressed as physical strength and fitness

Mohan *et al.* reported on two primary studies that introduced a healthier diet in the intervention prisons and measured blood pressure and other unspecified clinical parameters in order to determine physical well-being, expressed as physical strength and fitness (Table 45) [77]. Both primary studies reported statistically significant positive effects on the diastolic blood pressure of intervention participants. However, no effect sizes were provided. Mohan *et al.* reported that other clinical findings were not statistically significant. The certainty of the evidence was low.

Table 45 Findings on single healthy eating and nutrition interventions measuring physical well-being, expressed as physical strength and fitness

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Diastolic blood pressure	Method unspecified, but assumed to have been measured using machinery	Gil-Delgado (2011) Cohort study Mohan *et al.* (2018) [77]	There were significant (within-group) improvements in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year
Diastolic blood pressure	Method unspecified, but assumed to have been measured using machinery	Sioen (2009) Cohort study Mohan *et al.* (2018) [77]	There was a significant (within-group) improvement in the intervention group (n=70 male prisoners, all smokers, who were given a standard diet for 6 weeks and then supplied with a diet enriched with polyunsaturated fatty acids for 12 weeks) compared with baseline. No statistics were provided.	Intervention lasted for 12 weeks
All other clinical variables	Method unspecified, but assumed to have been measured using machinery	Gil-Delgado (2011) Cohort study Mohan *et al.* (2018) [77]	There were no significant differences compared with baseline for all clinical variables except triglycerides, blood glucose, and glycated haemoglobin. No statistics were provided. *Note:* The list of clinical variables was not provided.	Intervention lasted for 1 year
All other clinical variables	Method unspecified, but assumed to have been measured using machinery	Sioen (2009) Cohort study Mohan *et al.* (2018) [77]	There were no significant differences compared with baseline for all other clinical variables except diastolic blood pressure. No statistics were provided. *Note:* The list of clinical variables was not provided.	Intervention lasted for 12 weeks

3.2.8.2.2 Physical well-being, expressed as body and blood composition

Mohan *et al.* reported on one primary study that transformed prisoners' diets and a second primary study that provided prisoners with a diet enriched with polyunsaturated fatty acids [77] (Mohan *et al.* 2018). Mohan *et al.* reported measures of body and blood composition through blood glucose, glycated haemoglobin, triglyceride levels, incidence of metabolic syndrome, and high-density lipoprotein cholesterol levels in order to determine physical well-being, expressed as body and blood composition (Table 46) [77]. The certainty of the evidence was low.

Mohan *et al.* reported that the primary study that transformed prisoners' diets observed significant positive effects on their body composition and a reduced incidence of metabolic syndrome in the intervention participants, and the second primary study (which provided a diet enriched with polyunsaturated fatty acids) observed significant positive effects on high-density lipoprotein cholesterol levels in prisoners who smoked [77]. However, no effect sizes were provided for any of the outcomes. Mohan *et al.* reported that other anthropometric or blood composition findings were not statistically significant. The certainty of the evidence was low.

Table 46 Findings on single healthy eating and nutrition interventions measuring physical well-being, expressed as body and blood composition

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Body composition variables	Method unspecified, but assumed to have been measured using machinery	Gil-Delgado (2011) Cohort study Mohan *et al.* (2018) [77]	There were significant (within-group) improvements in the intervention group (n=139 prisoners who had changes to their diet made by a nutritionist) compared with baseline for unspecified body composition variables. No statistics were provided.	Intervention lasted for 1 year
Triglycerides	Method unspecified, but assumed to have been measured using machinery	Gil-Delgado (2011) Cohort study Mohan *et al.* (2018) [77]	There was no significant (within-group) change in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year
Blood glucose	Method unspecified, but assumed to have been measured using machinery	Gil-Delgado (2011) Cohort study Mohan *et al.* (2018) [77]	There was no significant (within-group) change in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year
Glycated haemoglobin	Method unspecified, but assumed to have been measured using machinery	Gil-Delgado (2011) Cohort study Mohan *et al.* (2018) [77]	There was no significant (within-group) change in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year
High-density lipoprotein cholesterol	Method unspecified, but assumed to have been measured using machinery	Sioen (2009) Cohort study Mohan *et al.* (2018) [77]	There was a significant (within-group) improvement in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 12 weeks
Metabolic syndrome	Method unspecified, but assumed to have been measured using machinery	Gil-Delgado (2011) Cohort study Mohan *et al.* (2018) [77]	There was a significant reduction in the number of participants with metabolic syndrome according to International Diabetes Federation criteria.	Intervention lasted for 1 year
All other anthropometric variables	Method unspecified, but assumed to have been measured using machinery	Sioen (2009) Cohort study Mohan *et al.* (2018) [77]	There were no significant differences compared with baseline for all other unspecified anthropometric variables. No statistics were provided.	Intervention lasted for 12 weeks

3.2.8.2.3 Mental, psychological, and emotional well-being, expressed as wellness

There were no single healthy eating and nutrition interventions reported on under the outcome of mental, psychological, and emotional well-being, expressed as wellness.

3.2.8.2.4 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

There were no single healthy eating and nutrition interventions reported on under the outcome of mental, psychological, and emotional well-being, expressed as mental and emotional distress.

3.2.8.3 Combined interventions

3.2.8.3.1 Physical well-being, expressed as physical strength and fitness

There were no combined healthy eating and nutrition interventions reported on under the outcome of physical well-being, expressed as physical strength and fitness.

3.2.8.3.2 Physical well-being, expressed as body and blood composition

Mohan *et al.* reported on one primary study that assessed the effect of education, behavioural, and gardening workshops on the nutrition practices of prisoners and found that the intervention had a statistically significant positive effect on prisoners' nutrition practices (Table 47) [77]. However, no effect sizes were provided. The certainty of the evidence was very low.

Table 47 Findings on healthy eating and nutrition interventions combined with other interventions measuring physical well-being, expressed as body and blood composition (proxy nutrition practices)

Systematic review's primary outcome measures	Method employed in order to assess measure	First author (year) of primary studies, study design(s), and first author (year) of systematic review	Results	Intervention duration and/or time to follow-up
Nutritional practices	Measure unspecified	Curd (2013) Case-control study Mohan *et al.* (2018) [77]	There was a significant improvement between the intervention group (n=19 male prisoners who attended three nutrition workshops and participated in a vegetable garden project) and the control group (n=37 male prisoners who did not participate in the workshops) with respect to nutrition practices. No information was provided in relation to what was measured. No statistics were provided.	Intervention lasted for 6 months

3.2.8.3.3 Mental, psychological, and emotional well-being, expressed as wellness

There were no combined healthy eating and nutrition interventions reported on under the outcome of mental, psychological, and emotional well-being, expressed as wellness.

3.2.8.3.4 Mental, psychological, and emotional well-being, expressed as mental and emotional distress

There were no combined healthy eating and nutrition interventions reported on under the outcome of mental, psychological, and emotional well-being, expressed as mental and emotional distress.

3.2.8.4 Overlap

The findings on the effectiveness of healthy eating and nutrition interventions were based on one systematic review, and therefore there was no overlap of primary studies across systematic reviews.

3.2.8.5 Summary: Healthy eating and nutrition interventions

We included one moderate-quality systematic review on healthy eating and nutrition interventions, which comprised two primary studies that evaluated interventions in which the diets of prisoners were modified, as well as a third primary study that evaluated the effect of education and behavioural workshops on the nutrition practices of prisoners. The two primary studies that modified prisoners' diets reported statistically significant positive effects on the diastolic blood pressure of intervention participants. One primary study (which transformed prisoners' diets) observed significant positive effects on their body composition and a reduced incidence of metabolic syndrome in the intervention participants, and the second primary study (which provided a diet enriched with polyunsaturated fatty acids) observed significant improvements in high-density lipoprotein cholesterol levels in prisoners who smoked. One primary study assessed the effect of education, behavioural, and gardening workshops on the nutrition practices of prisoners and found that the intervention had a statistically significant positive effect on prisoners' nutrition practices. The certainty of the evidence was low to very low.

Our summary findings indicate that:

- Single healthy eating and nutrition interventions demonstrated positive effects on physical well-being, expressed as physical strength and fitness (diastolic blood pressure) among adult prisoners, and the certainty of the evidence for this outcome was graded as low.
- Single healthy eating and nutrition interventions demonstrated positive effects on physical well-being, expressed as body and blood composition (incidence of metabolic syndrome and levels of high-density lipoprotein) among adult prisoners, and the certainty of the evidence for this outcome was graded as low.
- Combined healthy eating and nutrition interventions demonstrated positive effects on the nutrition practices of adult prisoners, and the certainty of the evidence for this outcome was graded as very low. The evidence for this outcome is based on a single primary study.
- There was no evidence for mental well-being outcomes for healthy eating and nutrition interventions, which means that evidence is required in relation to these outcomes.

3.3 Question 2: Factors influencing the success of, and/or successful implementation of, health-promoting interventions in prison settings

3.3.1 Introduction

Six of the 18 included systematic reviews provided information on factors associated with successful health-promoting interventions and their implementation in prison settings [23,34,96,117,126,134]. These six systematic reviews evaluated five different categories of interventions and were judged to be of moderate quality with respect to review design and conduct (Appendix 10). Chen *et al.* evaluated art and creative interventions in two primary studies conducted in adult prison settings in their systematic review [117], while Duindam *et al.* reviewed animal-based interventions in eight primary studies completed in adult prison settings [126]. Both Chen *et al.* and Duindam *et al.* also included primary studies based in other criminal justice settings. The third review, Shonin *et al.*, evaluated yoga-, meditation-, and mindfulness-based interventions in adult prison settings and included seven primary studies in their systematic review [96]. The fourth review, South *et al.* (2014), studied peer-based interventions in adult prison and young offender settings and included 57 primary studies, of which 3 were based in young offender settings [34]. The fifth systematic review, South *et al.* (2016), explored the experience of peer-based interventions in adult prison settings using 33 primary studies [134]. Finally, Sanchez-Lastra *et al.* evaluated sports- and exercise-based interventions using 11 primary studies based in adult prisons in their systematic review [23]. All six of these systematic reviews identified factors associated with the effectiveness of the intervention being evaluated [23,34,96,117,126,134]. The specific factors for successful health-promoting interventions in prison settings were obtained from regression and other statistical models examining factors that influence outcomes, or they were ascertained from qualitative and observational studies based on qualitative analysis. There were no success factors associated with health-promoting interventions documented for horticultural interventions, smoking cessation interventions, or healthy eating and nutrition interventions.

3.3.2 Specific factors for successful health-promoting interventions in prison settings

Chen *et al.* evaluated art and creative interventions in two primary studies conducted in adult prison settings and found that “music therapy …. showed larger effects on anxiety and depression in the studies with 20 or more sessions than those with less than 20 sessions” [117 p 222]. Chen *et al.* also noted that “the positive effects on anxiety and depression were in line with previous findings” [117 p 222].

Duindam *et al.* investigated animal-based interventions in eight primary studies completed in adult prison settings and reported that older participants derived more social, emotional, and criminal justice benefits from the interventions [126]. The individual contribution of social and emotional functioning to outcomes could not be ascertained from the data, text and tables presented in the systematic review.

Sanchez-Lastra *et al.* evaluated sports- and exercise-based interventions using 11 primary studies based in adult prisons in their systematic review [23]. Sanchez-Lastra *et al.* reported that the secondary objective of their systematic review was to identify the kinds of physical education training programmes that could be successfully implemented in adult prison settings and noted that the exercise modalities that can be performed in prisons are limited due to the lack of resources and sport facilities. Sanchez-Lastra *et al.* identified a number of factors to consider when designing physical education programmes for use in prisons. The first consideration is that exercises should be able to be performed without the need for expensive or specific material resources. The second consideration is that particular attention should be given to the fact that inmates might prefer to exercise outdoors. Aerobic exercises like walking or running are important options to be considered, as other exercise modalities found in Sanchez-Lastra *et al.*’s

review (muscular strengthening and anaerobic exercise) are usually performed indoors. The review authors reported that the frequency and intensity of the proposed exercise interventions analysed in their review varied considerably. For an effective exercise programme, the findings of one included primary study observed that exercising at least twice per week was related to a higher quality of life for prisoners. On the basis of the reviewed studies, exercise should be performed at moderate to high intensity. A feasible goal would be "running consecutively for 30 minutes at a moderate pace, as … has been observed in other penitentiary systems" [23]. Sanchez-Lastra *et al.* note that it is advisable to perform exercise activities in groups because it seems to be an effective strategy for changing inmate behaviour for the better.

Shonin *et al.* evaluated yoga-, meditation-, and mindfulness-based interventions in adult prison settings and included seven primary studies; their review found significant increases in mood as well as self-esteem and optimism for participants in one primary study, and the increase was higher in women compared with men [96]. A downward trend was seen for anger and hostility, but this finding was not tested for statistical significance.

South *et al.* (2014) studied peer-based interventions in adult prison and young offender settings across 57 primary studies, of which 3 were based in young offender settings [34]. South *et al.* (2014) reported that prisoners with less than full primary school education were significantly less likely than those with more schooling to respond correctly to all human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS)-related knowledge questions both before and after the peer education intervention. However, the less educated group showed a greater improvement in the proportion of correct answers for all questions compared with the more educated group.

One primary study in the South *et al.* (2014) systematic review measured intention to use condoms by ethnicity and showed that peer education had a more significant effect on white male prisoners compared with Latino and African American male prisoners. The same primary study reported no significant difference between peer-led (peer education) and professional-led groups for intention to use a condom, reporting that both types of educators were equally effective. When intention to use a condom was broken down by ethnicity, no significant differences were seen between groups taught by peers and groups taught by professionals except for African American men's intention to always use a condom, which was statistically significantly greater in the peer-led group than in the professional-led group. The same primary study reported that older prisoners were statistically significantly more likely than younger prisoners to engage in peer education behaviour. The study used both HIV-negative and HIV-positive peer educators (also prisoners). In the short term, no statistically significant differences were found between the group taught by HIV-negative educators and the group taught by HIV-positive educators except for the knowledge variable in one prison. In the longer term (3–6-month follow-up), the group taught by HIV-negative peer educators had higher average scores than both the HIV-positive peer educator group and the control group for attitudes towards both condom use and sexual communication. This primary study reported a strong preference among inmates for being taught by a HIV-positive peer educator rather than by a professional HIV/AIDS educator. This was most marked in the group that had received education from a peer (68% preferred to be taught by an inmate with HIV and 11% preferred to be taught by a professional HIV/AIDS educator).

In their systematic review, South *et al.* (2016) explored the experience of peer-based interventions in adult prison settings using 33 primary studies and found that the selection criteria for recruiting peer workers in prison were consistent in the literature; these included [134]:

- Security factors (i.e. excluding prisoners perceived to be at risk of security breaches, such as distribution of contraband) (five primary studies)
- Providing a voluntary drug test (one primary study)
- Having knowledge of the prison system and knowledge and skills required to be a prison officer (one primary study)
- Basic literacy skills (one primary study)
- The period of time the prisoner was likely to be staying in the prison (three primary studies)
- Interpersonal skills and commitment (four primary studies), and
- A level of maturity (two primary studies).

South *et al.* (2016) identified the motivations that encouraged prisoners to take on a health educator role, and these included an altruistic desire to support others (three primary studies) and perceived personal benefits, such as an increased opportunity for parole (three primary studies) [134].

3.3.3 Summary of specific factors for successful health-promoting interventions

Overall, it appears that art and creative interventions, animal-based interventions, and yoga-, meditation-, and mindfulness-based interventions may be more successful in addressing low mood, anxiety, and depression among older prisoners and female prisoners. Yoga-, meditation-, and mindfulness-based interventions may also reduce anger and hostility among prisoners.

The success factors for sports- and exercise-based programmes included adequate indoor and outdoor facilities and a 30-minute group aerobic exercise (such as running) of moderate to high intensity at least twice per week. One point worth noting is that the evidence indicates that exercising 5 days per week produces the best results for the effectiveness outcomes.

The systematic reviews on peer-based interventions demonstrated that health-promoting interventions can be effectively delivered by prison peers, and prisoners with low levels of education can benefit from such interventions. For sensitive or personal topics, prisoners preferred peer educators over prison or professional staff.

The selection criteria for recruiting peer workers in prison were consistent in the literature (peer workers should be mature, drug free, literate, have good communication skills, be serving longer sentences, and have no history of security breaches), and the two motivations that encouraged prisoners to take on a health educator role were for altruistic purposes or for personal gain (such as an increased opportunity for parole).

3.4 Question 3: Barriers to and facilitators of successful health-promoting interventions in prison settings

3.4.1 Introduction

Barriers are any conditions that make implementation of health promotion programmes difficult while facilitators are any conditions that make implementation of health promotion programmes easier. Seven of the 18 included systematic reviews provided information on barriers to, and facilitators of, the success and/or successful implementation of health-promoting interventions in prison settings [23,31,34,35,76,94,134]. Two were judged to be of strong quality [31,94] and five were judged to be of moderate quality [23,34,35,76,134] with respect to design and conduct (Appendix 10).

Three of the systematic reviews documented barriers to, and/or facilitators of, sports- and exercise-based interventions [23,31,76]. Two systematic reviews documented those related to art and creative interventions [31,94], and two other systematic reviews documented barriers and/or facilitators related to peer-based interventions [34,134]. One review each documented barriers to, and/or facilitators of, horticultural interventions [94] animal-based interventions [94], and smoking cessation interventions [35]. There were no barriers and facilitators documented in the 18 included systematic reviews for yoga-, meditation-, and mindfulness-based interventions or healthy eating and nutrition interventions.

Five of the included systematic reviews were completed in adult prisons [23,31,35,94,134] and two were completed in mixed prison settings (adult and young offender institutions) [34,76] (Appendix 9).

3.4.2 Barriers

All seven systematic reviews identified barriers to the successful implementation of health-promoting interventions in prison settings [23,31,34,35,76,94,134].

Canada *et al.* evaluated sports- and exercise-based interventions (using one primary study) and art and creative interventions (using two primary studies) in adult prison settings in their systematic review [31]. They reported that the "resources for activities (e.g. art supplies), time for activities, and privacy for therapy sessions were limited and created barriers for participants" [31 p1024]. Participants noted that the art and creative intervention titled Good Vibrations "provided them with something meaningful to do with their time", although they critiqued the intervention's length, "as they thought it should be longer and offered more frequently" [31 p1026].

de Andrade and Kinner reviewed smoking cessation interventions (using 19 primary studies) in adult prison settings and acknowledged that 2 primary studies reported that there was poor enforcement of smoking bans by prison staff [35].

Harrison examined art and creative interventions (using one primary study), animal-based interventions (using one primary study), horticultural interventions (using one primary study), and a number of other interventions that were not on our list of interventions of interest (using six primary studies) in adult prison settings in her review [94]. It was not feasible to separate the qualitative findings by intervention, and so we report Harrison's findings for all included interventions. Harrison reported that "five of the [primary] studies highlighted barriers, both physical and attitudinal, to accessing [mental health] support and interventions whilst in prison [94 p1-15]" and goes on to report that participants described the mental health staff support available to them as "overworked, rejecting and abandoning" [94 p1-15]. Harrison reports that this theme reflects the "barriers, both physical and attitudinal, to accessing [mental health] support and interventions whilst in prison, including challenges presented by the immediate environment, perceived attitudes towards [mental health] and resources" [94 p1-14]. Participants in the primary studies reported that the level of staff support received and perceived staff attitudes towards

mental health difficulties impacted on their experience of and motivation to engage in interventions. Some participants felt that the discouraging attitudes of staff affected their [mental health], and therefore created additional barriers to engaging in [mental health] support [94]. Another important factor highlighted by Harrison was the impact that feeling a lack of personal control (i.e. powerlessness in prison) had on individuals' ability to access and engage in the interventions. According to Harrison, this left prisoners unable to understand their own mental health. Problem-solving was not possible within a prison setting, and limited freedoms restricted prisoners' ability to make active change, further impacting on their mental health and well-being. One of the included primary studies reported that prisoners' ability "to focus on the [mental health] support that was offered was influenced by additional, potentially unresolved, concerns in their lives" [94 p1-17]. One of the included primary studies also reported "how the lack of available care for [prisoners'] physical health led to additional anxieties and worries, contributing to poor [mental health]" [94 p1-17]. Participants in this primary study highlighted that the increase in stress and anxiety within the prison environment added to mental health difficulties that the individuals had experienced before entering prison. Harrison reported that themes relating to the need for hope for the future, which positively impacts on mental health, were consistently experienced across all primary studies included in the review. This hope, however, was balanced with limited available resources in prison (staffing, time, etc.), which was a barrier to participants feeling a sense of control over their own well-being and ability to engage in the interventions. Harrison notes that, while staff perspectives were not included in the review, staff burnout should be considered, as a lack of resources, staffing, and environment pressures negatively impact on prisoners' opportunity to create hope and purpose.

Martinez-Merino *et al.* reviewed sports- and exercise-based interventions in 29 primary studies in adult prisons and 4 primary studies in young offender institutions [76]. It was not feasible to separate the qualitative findings by setting, and so we report the findings for both settings. Martinez-Merino *et al.* reported that:

> The obstacles women prison inmates encounter when it comes to engaging in [sports and physical activities include the following: an overlap between visiting times, work periods and parole, and the gym schedule; strict security measures imposed when it comes to gaining access to [sports and physical activity] facilities, resulting even in access denial or standing in long queues in order to use sporting material; long waiting lists for certain activities, which denotes a lack of qualified personnel; prison architecture unconducive to and the lack of open space for the practice of [sports and physical activities]; lack of variety for the practice of [sports and physical activities]; and low involvement rates due to lack of motivation or ill-humour. [76 p1161]

Sanchez-Lastra *et al.* evaluated sports- and exercise-based interventions using 11 primary studies based in adult prisons in their systematic review. The review authors stated that "some correctional institutions have opted for eliminating altogether the availability of exercise equipment, to make jail 'less comfortable' for inmates" [23 p 1207].

South *et al.* (2014) reviewed peer-based interventions in adult prison and young offender settings using 57 primary studies, of which 3 were based in young offender settings [34]. The qualitative findings could not be separated by study setting, and so we present all findings together. One primary study reported that the peer worker role could be challenging and onerous for peer workers, and that the burden of care of supporting many prisoners could be problematic. There was some qualitative evidence from four primary studies of negative health effects:

> [Negative health effects were] related to the emotional burden of listening to other prisoners' problems and issues. Discussions relating to suicidal intentions and other distressing topics could be particularly burdensome for peer deliverers to manage. There were also reports [in two primary studies] of peer deliverers experiencing 'burnout' and mental exhaustion as a result of the demands placed on their time by other prisoners. [34 p38]

The systematic review by South *et al.* (2016) explored the experience of peer-based interventions in adult prison settings using 33 primary studies, and found that attrition and the difficulty in retaining peer workers due to sudden movements of prisoners between institutions was identified as a cross-cutting theme in eight primary studies [134]. Lack of organisational support, measured by a lack of funding and staff resources in prisons, negatively impacted on staff support for peer-based interventions in two primary studies. Boundary issues (in terms of prisoner relationships) were highlighted as a challenge; for example, one primary study of 'listeners' reported prisoner dependency on certain peer workers, and another study reported peer workers having concerns over maintaining appropriate boundaries for their role. South *et al.* (2016) identified many reasons why prisoners did not utilise peer interventions, including a lack of awareness within the prisoner population (four primary studies); no personal need (two primary studies); concerns about confidentiality (three primary studies); preference to discuss issues with professional staff, cellmates, or family members (two primary studies); language barriers (two primary studies); and concerns about not demonstrating weakness to other prisoners (two primary studies) [134]. Staff-specific challenges to the operation of peer-based schemes in prisons included a lack of awareness and understanding of peer interventions among staff (four primary studies). Staff resistance was also reported as a significant barrier to the integration of peer-based interventions in prisons (seven primary studies), which one primary study described as being underpinned by security concerns. Some studies reported that staff resistance to peer-based interventions receded as recognition of the value of these schemes grew (three primary studies). Peer workers were found to be more susceptible to criticism and abuse from other prisoners due to their alignment with prison or healthcare staff; that is, when some prisoners (peer workers) are placed in positions of relative power and trust, this may negatively affect their place in the prison population (one primary study). Enhanced freedom and access to other prisoners led to higher security risks and thereby influenced how peer-based interventions were delivered (three primary studies). Peer workers were either perceived or reported to abuse their position of trust in 11 primary studies, and distribution of contraband (such as tobacco or mobile telephones) was a primary concern.

Table 48 presents the barriers identified in the seven included systematic reviews by stakeholder group: i.e. prison and criminal justice system management; frontline security and healthcare staff; peer workers; and prisoners. The research indicates that interventions are required at each stake-holder level, and interventions to address barriers may be more effective if addressed simultaneously.

Table 48 Barriers identified in the seven included systematic reviews, by stakeholder group

Stakeholder group	Barriers
Prison and criminal justice system management	• Inadequate resources in prisons, including staff and time (lack of resources) • Poor scheduling, low frequency of interventions, and limited health promotion intervention options (lack of available and accessible health promotion interventions) • Prison architecture being unconducive to interventions and the lack of indoor and outdoor space for the practice of interventions (inadequate physical facilities) • Attrition/retention of peer workers due to sudden movements of prisoners between institutions and unplanned release (lack of sustainability) • Poor enforcement of smoking bans by prison staff (lack of enforcement), and • Environmental pressure, including increased security risks.
Frontline prison and healthcare staff	• Mental health staff feeling overworked, rejected, and abandoned (lack of or inadequate support for staff at system level) • Prison staff feeling burnt out (staff burnout) • Level of staff support received and perceived staff attitudes towards mental health difficulties impacting on prisoners' experience of and motivation to engage in interventions (lack of empathy and understanding) • Staff resistance to peer workers • Peer workers abusing their position of trust (increased safety concerns), and • Peer workers distributing contraband (increased security risks).
Peer workers	• Lack of boundaries (distance or boundaries), and • Peer workers being susceptible to criticism and abuse from other prisoners (safety).
Prisoners	• Lack of personal control (i.e. powerlessness in prison) affecting individuals' ability to access and engage in the interventions (agency) • Unresolved concerns in prisoners' lives leading to higher levels of stress and anxiety (mental well-being) • Lack of available care for prisoners' physical health leading to additional anxieties and worries (physical well-being) • Low involvement rates (apathy) • Lack of awareness of peer support (lack of information) • Concerns about confidentiality with respect to peer workers (confidentiality) • Preference to discuss issues with individuals other than peer workers (preference for professionals) • Language barriers (communication), and • Concerns about not demonstrating weakness to other prisoners (feeling unsafe).

3.4.3 Facilitators

Five of our included systematic reviews identified facilitators of the successful implementation of health-promoting interventions in prison settings [31,34,76,94,134].

Canada *et al.* evaluated sports- and exercise-based interventions (using one primary study) and art and creative interventions (using two primary studies) in adult prison settings in their systematic review [31].

Although not thoroughly discussed, Canada *et al.* do report that "BE-ACTIV is a low-cost programme and includes resources that are already available in prison settings" [31 p 1024]. The review authors noted that in one primary study on art and creative interventions, "the women in this project experienced trauma before prison and during their incarceration and [the authors] conclude that an art expression workshop can support women with trauma exposure at low cost to the prison" [31 p 1025] and that the art and creative intervention titled Good Vibrations "provided them with something meaningful to do with their time" [31 p 1026].

Harrison examined art and creative interventions (using one primary study), animal-based interventions (using one primary study), horticultural interventions (using one primary study), and a number of other interventions that were not on our list of interventions of interest (using six primary studies) in adult prison settings in her review [94]. It was not feasible to separate the qualitative findings by intervention, and so we report Harrison's findings for all included interventions. Harrison reported that "the third theme identified encapsulated concepts relating to the value of being able to develop coping strategies, communication and organisation skills, emotional awareness and expression, and stress management" [94 p1-17]. Harrison found that "the interventions offered to prisoners were found to support development of strategies and skills to manage [mental health] difficulties (eight studies). Individuals talked about having a space to reflect (one study), a space for escape and relaxation (one study) and support for self-expression all leading to reduced stress (two studies)" [94 p1-17]. In two primary studies, Harrison reported that:

> Individuals discussed novel methods introduced for [mental health] support and well-being, feeling encouraged to use literature and reading in a 'literature-based intervention', to systematically work through problems (two studies), with others being introduced to visual imagery for problem-solving and relaxation (one study). Music therapy was utilised to encourage emotional expression and management (one study), as well as through the opportunity to engage in animal therapy (one study). [94 p1-18]

Harrison went on to state that her review "highlights the importance of 'normalising' [mental health] difficulties within the prison environment, enabling open and non-judgemental conversations, [and] encouraging individuals to feel accepted in discussing their difficulties" [94 p1-28], and that "the value of peer support is recognised in supporting [mental health] and well-being, given the loneliness, isolation and vulnerability reported as part of being in prison" [94 p1-28]. Harrison notes that "an additional perspective highlighted here emphasises the need for accessibility and convenience when considering intervention content, thinking about skills to create hope and promote future planning for individuals to use within prison and upon release, encouraging autonomy and empowerment" [94 p1-28]. Furthermore, the review states that "from individual reports, given the surrounding environment of prison, the interventions have a responsibility to offer a 'sense of real life' and 'normality', allowing individuals to feel valued, humanised and accepted" [p1-28 94], and that "by enabling empowerment, choice and control, individuals could develop skills to support their own [mental health] and well-being in varying situations" [p1-29 94]. Harrison reported that themes relating to the need for hope for the future, which positively impacts on mental health, were consistently experienced across all included studies in the review. Those who engaged in the interventions reported a newly found hope for the future, which created a sense of normality.

Martinez-Merino *et al.* reviewed sports- and exercise-based interventions in 29 primary studies in adult prisons and 4 primary studies in young offender institutions [76]. It was not feasible to separate the qualitative findings by setting, and so we report the findings for both settings. Martinez-Merino *et al.* reported that their systematic review did not explicitly name any specific facilitators that may be associated with the success of sports- and exercise-based interventions in a prison setting. However, the

review authors did report on a number of benefits which reportedly accrued among the female participants, and which may be seen as proxies for facilitators of the uptake and success of sports- and exercise-based interventions in prisons among female inmates. According to Martinez-Merino *et al.*, these facilitators include "benefits that women inmates perceive as having derived from the practice of physical activities, such as an increase in social relations, both among inmates themselves and between inmates and prison staff; coming to forget the fact that they are incarcerated, giving constructive vent to frustration and anger; and the opportunity to undertake personal and interpersonal apprenticeship" [76 p1161].

South *et al.* (2014) reviewed peer-based interventions in adult prison and young offender settings using 57 primary studies, of which 3 were based in young offender settings [34]. The qualitative findings could not be separated by study setting, and so we present all findings together. Qualitative evidence from 3 of the 57 studies indicates that the demands placed on peer workers/counsellors by other prisoners gave individuals a sense of purpose in prison, and this was beneficial for combating boredom while serving their prison sentence.

South *et al.* (2016) identified that supervision of peer workers could be considered as either a barrier or a facilitator [134]. Supervision was provided within interventions by prison staff, either through one-to-one or group meetings (three primary studies) or by external agencies (three primary studies). The review authors note that there was little in-depth evaluation of support systems, but that most studies reported that prisoners valued support. South *et al.* (2016) explored organisational support as a theme and reported that broader managerial support within the prison was consistently emphasised as a facilitator in order to ensure that peer support schemes operate effectively (nine primary studies) [134]. Supportive relationships with external agencies, such as third-sector organisations, was reported as useful to the operation of peer support schemes in prison (three primary studies). Prison staff involvement and support was essential both in relation to identified members of staff having responsibility for the implementation of peer interventions (three primary studies) and to staff support at other levels within the prison (e.g. assisting the movement of prisoners around the institution) (two primary studies), and was identified as an important mechanism for embedding peer interventions within the prison. South *et al.* (2016) explored the theme of prisoner interpersonal relationships and recognised the need for a boundary between peer workers and recipients, as well as a number of studies reporting that peer workers knew when to 'pass on' issues to healthcare professionals or prison staff (five primary studies) [134]. The review authors identified that the staff-specific facilitators of the successful operation of peer support schemes were regular communication (two primary studies) and increased familiarity with the intervention over time (one primary study). South *et al.* (2016) reported that effective communication emerged as a facilitator because peer workers acted as mediators between the prison population and staff (four primary studies).

Table 49 presents the facilitators identified in five of the included systematic reviews by stakeholder group: prison and criminal justice system management; prison security and healthcare frontline staff; peer workers; and prisoners. The research indicates that interventions are required at each stake-holder level, and interventions to address facilitators may be more effective if addressed concurrently.

Table 49 Facilitators identified in five of the seven included systematic reviews, by stakeholder group

Stakeholder group	Facilitators
Prison and criminal justice system management	• Broader managerial support and investment within the prison (support and investment) • Supportive relationships with external agencies (support of external agencies), and • Low-cost programmes maximising the use of available resources (value for money and maximising the use of existing resources).
Prison and healthcare frontline staff	• Prison staff involvement and support (involvement and support) • Increased familiarity with the intervention over time (buy-in) • Regular communication between all stakeholders (communication) • Peer workers acting as mediators between the prison population and prison staff (mediation), and • Better relationships between inmates and prison staff (positive interpersonal relationships).
Peer workers	• Peer workers having a sense of purpose in prison (sense of purpose) • Peer work being beneficial for combating boredom in prison (sense of fulfilment) • Peer workers acting as mediators between prisoners and prison staff (established role) • Boundaries being established between peer workers and recipients (presence of 'ground rules'), and • Existence of a referral mechanism to 'pass on' issues to healthcare professionals or prison staff (mediation and referral system).
Prisoners	• Better relationships among inmates themselves and between inmates and prison staff (positive interpersonal relationships) • The possibility for individuals to develop skills (through empowerment, choice, and control) to support their own mental health and well-being in varying situations (agency and self-determination) • Ability to develop coping strategies, communication and organisation skills, emotional awareness and expression, and stress management through mental health promotion (e.g. through art, music, animal therapy, or gardening) (developing coping strategies; developing appropriate communication strategies) • Engagement in the interventions fostering a newly found hope for the future, creating a sense of normality (hope) • Recognising the value of peer workers in supporting mental health and well-being (presence of trained and discreet peer workers) • Peer workers acting as mediators between the prison population and staff (peer workers as mediators) • Meaningful mental and physical health promotion interventions (programme of interventions) • Giving constructive vent to frustration and anger (positive strategy to deal with negative emotions), and • Prisoners forgetting the fact that they are incarcerated (healthier environment).

3.4.4 Summary of barriers to, and facilitators of, successful health-promoting interventions in prison settings

We have summarised the barriers to, and facilitators of, health-promoting interventions in prison settings by stakeholder group, beginning with prison and criminal justice system management, then frontline staff, followed by peer workers, and ending with prisoners themselves.

The data from the included systematic reviews indicate that there are several barriers to the successful implementation of effective health-promoting interventions at the prison and criminal justice system level, including a lack of resources, a lack of coherent planning leading to the unavailability and inaccessibility of health-promoting programmes, inadequate indoor and outdoor physical facilities due to prison architecture, low retention of peer workers due to unplanned prisoner movements, a lack of enforcement of smoking bans, and increased security risks. On the other hand, the data from the systematic reviews also identify three facilitators of the successful implementation of effective health-promoting programmes; these were managerial support and investment, management support of external agencies that provided health-promoting interventions, and the value for money of interventions that maximised the use of existing resources (such as prisoners, gyms, educational facilities, and kitchens).

The data from the included systematic reviews reported a number of important barriers to the successful implementation of effective health-promoting interventions in relation to frontline prison and healthcare staff. These barriers are a lack of or inadequate support for staff at the system level; staff burnout; a lack of understanding of and empathy among staff members towards mental health issues; staff resistance to peer workers; increased safety concerns; and increased security risks. However, the data from the included systematic reviews also identified several facilitators of the successful implementation of effective health-promoting programmes at the frontline prison and healthcare staff level; these were prison staff involvement and support, buy-in among prison staff due to increased familiarity with the interventions, regular communication between all stakeholders, peer workers acting as mediators between the prison population and prison staff, and respectful relationships between prisoners and prison staff.

The data from the included systematic reviews reported two key barriers to the successful implementation of effective health-promoting interventions in relation to peer workers: a lack of boundaries between peer workers and other prisoners, and peer workers' susceptibility to criticism and abuse from other prisoners. Conversely, the data from the systematic reviews also identified four key facilitators of the successful implementation of effective health-promoting programmes, and these were the fact that peer workers had a sense of purpose in prison; that their peer work enabled them to avoid a feeling of boredom; peer workers' establishment of a role for themselves as mediators between prisoners and prison staff; and the existence of a referral mechanism to 'pass on' issues to appropriate staff and services.

The data from the included systematic reviews reported many barriers to the successful implementation of effective health-promoting interventions with regard to the prisoner population. Prisoners reported a lack of agency and self-determination, poor physical health, and unresolved life issues that led to apathy, powerlessness, stress, and anxiety, which ultimately prevented them from engaging in health-promoting interventions. In addition, health-promoting interventions were not well advertised in the prisons, which also led to low prisoner involvement rates. There were also concerns about confidentiality between peer workers and other prisoners. Language barriers and a desire to avoid showing weakness in front of other prisoners were additional factors that prevented greater uptake of health-promoting programmes. On the other hand, the data from the systematic reviews also identified numerous key facilitators of the

successful implementation of effective health-promoting interventions, including positive interpersonal relationships between prisoners, peer workers, and prison staff; health-promoting interventions empowering prisoners to develop new skills, including coping strategies and communication skills, in order to support their own mental health and well-being in varying situations; and the fact that those prisoners who have engaged in art, music, animal therapy, and/or gardening interventions have reported a newly found hope for the future. On the topic of peer workers, prisoners have indicated that they value peer workers and their role as mediators. Another important facilitator was the existence of a meaningful programme of mental and physical health-promoting interventions.

4 Discussion

4.1 Key findings

Based on the reviews we evaluated, there is evidence to support the effectiveness and benefits of six of the eight health-promoting interventions of interest with respect to the physical and/or mental well-being of adult prisoners [22,23,30,31,34,35,76–78,96,117,143,144,145]. These include sports- and exercise-based interventions; yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions; smoking cessation interventions; and healthy eating and nutrition interventions. The interventions were delivered alone as single interventions, or in combination with other interventions. However, there are gaps with respect to some outcomes for yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions; and healthy eating and nutrition interventions. In addition, we found no usable evidence on the effects of horticultural interventions or animal-based interventions on physical or mental well-being [78,94,126,127]. On the other hand, there are substantive findings with regard to barriers and facilitators, which can be used to inform the development of successful health-promoting programmes in prisons [23,31,34,35,76,94,134]. It should be noted, however, that the findings on success factors regarding implementation and effectiveness are limited [23,34,96,117,126,134].

4.2 Comparisons with other research

We did not identify any other overviews of reviews investigating the effectiveness of one or more of our interventions of interest delivered to adult prisoners, so we were unable to compare our findings with similar research. In addition, we did not find any other overviews of reviews identifying factors associated with positive health outcomes in adult prisoners or associated with the successful implementation of one or more of our interventions of interest.

We did identify one rapid evidence review of prison-based physical health and well-being interventions that was commissioned by the Scottish Government and undertaken to support a programme of research in Scottish prisons [20]. This rapid review, undertaken on behalf of the Scottish Government, is different from our overview of reviews in several ways. For example, we included only systematic reviews that met a number of quality criteria, whereas the Scottish rapid review included a mix of primary and secondary research and did not specify quality criteria that the included research should comply with. In addition, the Scottish Government review did not undertake a quality assessment of the included studies or apply the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach to their findings in order to assess the certainty of the evidence. These decisions by the Scottish Government were appropriate given that it completed a rapid review rather than a full systematic review or overview of reviews. As the Scottish Government acknowledged, “Given the time constraints for this project, a rapid evidence review was undertaken as opposed to a systematic review. As such, this is an indicative review of the evidence about prison-based physical health and wellbeing interventions and is not intended to be comprehensive” [20 p4]. Nonetheless, although our methods and the methods employed in the Scottish Government’s rapid review are different (with ours being more robust), the type of health-promoting interventions examined were similar and therefore, to some degree, comparable.

This Scottish Government’s rapid review focuses on six rather than eight physical health and well-being interventions, which were titled sports-based; horticultural; yoga, meditation, and mindfulness; art and creative; animal-based; and peer support [20]. It did not examine smoking cessation interventions or healthy eating and nutrition interventions. Summarising the evidence from the literature it reviewed on the effectiveness of physical health and well-being interventions in the prison setting, the Scottish Government’s review concludes that “There was strong evidence that yoga, meditation, and mindfulness

interventions are effective in improving the health and wellbeing outcomes of people who live in prison" [20 p37]. Although our methods are more rigorous and not directly comparable with those of the Scottish Government's review, our findings on the effectiveness of yoga-, meditation-, and mindfulness-based interventions are less certain than the conclusions of the Scottish Government's review. For example, we found moderate-certainty evidence that mindfulness-based interventions may improve mental wellness in adult prisoners and reduce the symptoms of mental and emotional distress, and low-certainty evidence that meditation-based interventions may improve mental wellness in adult prisoners and reduce the symptoms of mental and emotional distress.

The Scottish Government also reported that "There was promising evidence for the use of horticultural and art and creative interventions to improve health and wellbeing outcomes" [p37 20]. The Scottish Government acknowledged that the evidence was consistently positive but only included qualitative evaluations and quantitative evidence without control groups; thus, it did not evaluate the effectiveness of the interventions. Our findings for these interventions are less positive than those reported by the Scottish Government. For example, we found no evidence from systematic reviews with which to evaluate the effectiveness of horticultural interventions in an adult prison setting. From the reviews we did examine covering art and creative interventions, we found moderate-certainty evidence that creative interventions (music) demonstrated no effect on mental and emotional distress among adult prisoners, and that art expression interventions demonstrated a positive effect on mental and emotional distress. However, these findings for art and creative interventions are based on a small number of primary studies cited in the systematic reviews we examined.

According to the Scottish Government, "Mixed results were observed across the quantitative evidence for [sports- and exercise-based interventions and animal-based] interventions, while qualitative results reported positive changes in physical health and wellbeing" [p37 20]. Our findings for the effectiveness of sports- and exercise-based interventions are broadly in line with the findings of the Scottish Government. Overall, we found mixed results from the reviews we examined leading to overall findings of very low-, low-, and moderate-certainty evidence. For example, we found very low- and moderate-certainty evidence that single sports- and exercise-based interventions may improve the physical strength and fitness of adult prisoners, and low- and moderate-certainty evidence that single sports- and exercise-based interventions may improve body and blood composition. We found moderate-certainty evidence that single sports- and exercise-based interventions improve mental wellness outcomes among adult prisoners, and low- and moderate-certainty evidence that single sports- and exercise-based interventions can reduce symptoms of mental and emotional distress. From the reviews we screened, we found no reviews that reported valid or usable findings on the effectiveness of animal-based interventions in addressing the physical and mental well-being of adult prisoners.

The Scottish Government also examined the evidence for peer support interventions and reported that "there was inconclusive evidence for the effectiveness of peer support interventions" [20 p37]. Our findings on the effectiveness of peer-based interventions are more promising, although mixed. For example, we found that peer-based interventions demonstrated largely positive effects on improving the knowledge and empowerment of adult prisoners, although the certainty of the evidence for this outcome was graded as low. In addition, we found that adult prisoners acting as peer workers were as effective as, or more effective than, professional staff with respect to knowledge and empowerment. On the other hand, we found that peer-based interventions had no effect on mental wellness, with the certainty of the evidence graded as very low, and mixed effects on mental and emotional distress, with the certainty of the evidence graded as very low.

Of the different types of health-promoting interventions that we examined that demonstrated evidence for outcomes that we graded as low or moderate certainty, perhaps the most popular are sports- and

exercise-based interventions, and these may therefore be a good place to start in terms of formally introducing health-promoting activities. For example, it has recently been documented that Irish prisons are well equipped with the necessary infrastructure to facilitate the implementation of targeted sports- and exercise-based interventions. Crowe reported that "Across all prisons, [non-segregated] prisoners are provided with access to a gym and an exercise yard, with several prisons also housing football courts. As many prisoners are interested in health and fitness, these activities are very popular, in particular exercise classes held in the gym" [162 p30].

In addition, international consensus is emerging on the value of implementing sports- and exercise-based interventions aimed at promoting social, psychological, and physical well-being in prisons. Recently, more than 40 experts from 15 countries came together to develop an international consensus statement to advise on designing, delivering, and evaluating sports- and exercise-based interventions aimed at promoting social, psychological, and physical well-being in prisons [163]. The authors of that consensus statement set out a detailed account of why and how they undertook their work and what the outputs contain for the future of promoting sports- and exercise-based interventions in prisons in order to improve the health and well-being of prisoners. Murray *et al.* reported:

> We believe that a robust, evidence-based implementation of [sports- and exercise-based interventions] in prisons is required internationally to ensure that people in carceral settings have the opportunity to engage with theoretically informed, well-resourced, objective-led and sustainable sport and physical activity programmes. Equally, a robust evidence base should ensure that ethically and methodologically sound data collection mechanisms are used in the monitoring and evaluation of such programmes. This consensus statement is designed to provide guidance for the development, delivery and evaluation (process and outcome) of [sports- and exercise-based interventions] in prisons. [163 p9]

We identified one review of barriers and facilitators that we did not include in our overview of reviews, as it did not provide a full risk of bias assessment. The National Institute for Health and Care Excellence in the UK published a guideline titled *Physical health of people in prison* in 2016, and reported on identified barriers to, and facilitators of, health promotion [164]. The National Institute for Health and Care Excellence reported the identified barriers and facilitators under the following themes: environmental factors, psychosocial factors, resources, personal support factors, and economic factors. With respect to environmental factors, the Institute identified similar issues as we did, with the addition of sharing a cell and/or environment with a smoker, as well as unclean facilities within a prison setting. We identified the same psychological factors as the National Institute for Health and Care Excellence, and these were prisoner stress, boredom, and motivation; social stigma; and smoking as a social norm. The resource issues that the National Institute for Health and Care Excellence identified as barriers were more granular than ours, and it included a lack of healthy and varied food choices; poor quality of food; a lack of frequent access to washing facilities; a lack of access to self-care equipment; and prisoners limited financial resources. The personal support factors identified by the Institute were peer support; family/friend support; and lack of staff support and negative staff attitudes towards prisoners, and we also identified these three factors in our overview [164]. The National Institute for Health and Care Excellence did not identify any economic factors as barriers, whereas we identified investment and planning at the criminal justice system and prison management level as key facilitators.

Twyman *et al.* identified barriers to smoking cessation for six selected vulnerable groups, including prisoners, and reported the following barriers for prisoners: use of smoking to manage stress, the high prevalence and acceptability of smoking, smoking as a cultural norm, a lack of professional and other help with smoking cessation, and boredom [165]. We identified all the same factors as Twyman *et al.* did in our overview.

Francis-Graham *et al.* explored how blood-borne virus testing programmes work in prison settings in order to ensure informed consent and to increase test engagement and uptake where appropriate and consented to. They found that the proportion of new prisoners offered testing was influenced by the time at which the test was offered, which was frequently delayed due to delays in offering access or taking the sample to prisoner access [166]. The prisoners' decision to accept testing was influenced by concerns about confidentiality, fear of a positive diagnosis, a prisoner's personal interpretation of risk, discomfort with invasive procedures, trust in healthcare, and distrust in the opt-out offer of a test [166]. These are important barriers to the uptake and subsequent management of blood-borne viral and sexually transmitted infections, which are common in the prison population. We did not cover these preventative healthcare interventions in our overview, but we would suggest that they form part of a prison-based health promotion programme.

4.3 Research gaps

We found no systematic review evidence of effectiveness for two of our interventions of interest – namely, horticultural interventions and animal-based interventions – and high-quality primary and systematic review research is required in order to address this research gap. In addition, we found that some of our interventions of interest had no systematic reviews to inform some of our physical and mental well-being outcomes. For example, the systematic reviews on yoga-, meditation-, and mindfulness-based interventions, art and creative interventions, and peer-based interventions did not provide evidence for physical well-being outcomes, while the reviews on smoking cessation interventions and healthy eating and nutrition interventions did not provide evidence for mental well-being outcomes. These research gaps require addressing. Finally, some of the systematic review evidence for our interventions of interest was based on dated information, such as that for sports- and exercise-based interventions and peer-based interventions, and these reviews require more up to date research.

South *et al.* (2022) identified and collated systematic reviews with a focus on reducing risk behaviours in disadvantaged groups, including prisoners, and highlighted where evidence is lacking [93], which agrees to some extent with our findings. South *et al.* (2022) included 14 reviews with prisoners as a population of interest, with most of these targeting smoking cessation interventions alone or alongside interventions to address other risk behaviours (12 reviews) and peer health promotion interventions in prisons (1 review and 1 protocol). The review authors report that prisoners' risk behaviours may be particularly difficult to address, as prisoners have limited control over the food provided by the prison canteen and few opportunities for physical activity [93]. However, the context in each country may differ, and this finding could provide an opportunity for a country-specific criminal justice system, prison management, prison staff, and prisoners themselves to examine opportunities for prison-based healthy eating and physical exercise in collaboration with each other and with an emphasis on maximising the use of existing resources.

One of our peer reviewers (DW), who had long experience of introducing health promotion interventions in prison settings, suggested that the Irish prison services might establish feasibility studies when introducing the prevention interventions, and that these feasibility studies would have input from all stakeholders. The same peer reviewer also reported that "a significant factor in successfully delivering an intervention and trying to measure impact, was a lengthy collaborative effort up front between researchers, prisoners, prison staff, and prison management on the anticipated barriers and facilitators to a successful implementation of the intended programme of work."

4.4 Strengths and weaknesses

This is the first overview of reviews on health-promoting interventions in adult prisons, and it brings together the evidence to date on eight health-promoting interventions of interest. We chose an overview of reviews design to allow us to cover the full scope of relevant health-promoting interventions, which would not have been possible with a traditional systematic review in the available time frame. Methods for overviews of reviews are continually evolving, and we consulted best-practice guidance provided by the leading thinkers in this area in order to develop our approach, tailoring our methods where necessary [42,53]. A limitation of overviews of systematic reviews is that primary research published 2–3 years prior to the overview is unlikely to be included, as it would not yet have been published/available for inclusion in any systematic reviews.

While our overview was conducted in accordance with best-practice guidance for overviews of reviews, it is vulnerable to some of the disadvantages inherent to this form of evidence review [42,53]. Most significantly, the validity of the findings in any overview of reviews is contingent on the methodological quality of the included systematic reviews. While we took several steps to screen out low-quality work (see Section 2.3 on eligibility criteria and Section 2.5 on screening), weaknesses within the body of evidence as a whole cannot be overcome by the process of conducting an overview of reviews. There may be errors in the extraction of data from primary studies to systematic reviews that were difficult or not possible to detect without scrutinising and comparing the primary studies included in the systematic reviews against the reviews themselves. The nature of overviews of reviews means that the overview authors are one step further removed from the original research than systematic review authors, and so nuances of methodology or interpretation that are important to the original research may be obscured in the findings of an overview of reviews.

A strength of our overview of reviews is that the search strategy was robust and comprehensive (Appendices 2 and 3). We did not specify particular outcomes so as to capture as wide a range of outcomes as possible; thus, the search strategy was based around the concepts of 'the eight specific health-promoting interventions of interest', 'prisoners' and 'evidence synthesis'. Given the time frame in which this review was to be completed, we conducted individual searches for each of the eight specific health-promoting interventions of interest. Employing a very broad search strategy using only the general concept of 'health-promoting interventions' would have resulted in an unmanageable number of search results and extended our time frame for completing this review considerably. Less structured, general searches were used in many of the additional resources searched, and it was hoped that this would capture a wide range of results. The use of supplemental searching (reference, citation, and protocol follow-up) was also expected to capture as much relevant material as possible, thereby mitigating the risk of relevant research being missed.

A limitation of the literature search stage was the lack of non-English-language databases and resources included in the search. The use of a language limit (in the form of including English-language work only) was necessary at the extraction stage, as our review team members did not have the language skills necessary to interpret complex and technical papers written in other languages, and the resource allocation, time frame, and competing work commitments did not allow for the professional translation of papers. However, non-English-language reviews with English-language abstracts or keywords that appeared to be relevant to the topic of this overview were identified in order to ensure that this wider research was recorded and credited. We identified two records in non-English languages, but on review of the abstracts, both were excluded. These records were captured using English-language-based databases. There is some research to suggest that omitting research published in languages other than English may not change the direction of findings significantly [167]. The inclusion of English-only primary studies in the

reviews included in our overview may compound the language bias of only including English-language reviews. However, 5 of the 18 included systematic reviews stated that there were no language restrictions in their search [34,78,117,144,145], and therefore non-English-language papers were included in their analyses. The characteristics of the primary studies indicate that research came from most continents, including North America Asia, Oceania, and Europe (Appendix 9).

Our search did not encompass search terms to capture systematic reviews of primary studies set in young offender institutions or equivalent (e.g. juvenile detention centres). We therefore excluded systematic reviews that focused on interventions delivered in youth incarceration settings. In systematic reviews that focused on both adult prisons and young offender institutions or on adult prisons and other settings, we only extracted information on primary studies set in adult prisons for Questions 1 and 2. We were unable to separate the qualitative data from studies with mixed settings or different populations, so we included primary studies that evaluated both adult prisons and young offender institutions in the analysis for Question 4.

Our review protocol did not outline our approach to extracting data from systematic reviews that included primary studies of interventions delivered to more than one population (e.g. prisoners, parolees, and people in substance abuse treatment settings) or delivered in more than one setting (e.g. prisons, forensic settings, and psychiatric hospitals) (registration number: CRD42023473432) [52]. In these cases, we proceeded to extract information about primary studies delivered to the population of interest in the setting of interest for the purposes of our overview of reviews. At the beginning of the extraction form for each included systematic review (see Appendix 7), we state whether the extraction pertains to the entire review or just some of the included primary studies. We did this in order to maximise the data available for analysis in response to Questions 1, 2, and 5.

In our protocol, we identified the Health Evidence™ Quality Assessment Tool – Review Articles checklist as our chosen tool for assessing the methodological quality of the included systematic reviews [71]. We used this tool because it can be used for both quantitative and qualitative studies. Prior to the quality assessment phase of this overview, we established a minimum standard for each of the 10 items, and only reviews that met the minimum criteria on a given item were to receive a 'Yes' rating on that item. This was in order to ensure that we followed a standardised approach to quality assessment and to minimise the likelihood of disagreements regarding quality ratings among the members of the review team. However, when we informally compared the Health Evidence™ Quality Assessment Tool – Review Articles checklist to AMSTAR 2 (A MeaSurement Tool to Assess systematic Reviews, Version 2) [168], it did not have the same high level of rigour, and in our opinion, some of the studies that were deemed to be of moderate quality on the Health Evidence™ Quality Assessment Tool – Review Articles checklist would have been deemed low quality on AMSTAR 2.

The quality assessment revealed that the conclusions of 15 of the 18 included systematic reviews were not supported by the reviews' methods and results (see Appendix 10). When completing the GRADE assessment, we used a robust and objective method considering primary study design, sample size for each outcome, quality assessment of primary studies, heterogeneity within the systematic review analysis for each outcome, and the methodological quality of the systematic review in order to judge the certainty of the evidence. Therefore, our judgement of the certainty of the evidence for each outcome has considered the main factors that limit the quality of the evidence. The assessment of each outcome is presented in Appendix 11 so that readers can see the scoring of the certainty of the evidence, and, where downgrades were assigned, the reasons for downgrading decisions.

In many of the included systematic reviews, the quantitative outcome data presented were minimal, and essential numeric and statistical data were missing or not clearly presented. We have highlighted these

data deficiencies throughout the findings section, and we note that such deficiencies minimise the level of synthesis we could complete. In addition, the outcome measures for each outcome lacked standardisation and the means of measurement varied, while in some cases the means of measurement were not reported for the outcome measures. Finally, many of the included systematic reviews did not report the time to follow-up for the outcome measures, which questions the validity of some of our findings. We generally concentrated on summarising the data rather than completing a formal synthesis, and we have stated data deficiencies alongside the findings and/or in the associated tables in Section 3.2. Where there were inadequate or discrepant data from a primary study included in a single systematic review, we excluded the primary study from our summary text-based analysis.

When we wrote our protocol, we had intended to use the Pieper *et al.* corrected covered area method in order to assess the overlap of primary studies across multiple included reviews [50], but we changed our approach when we saw how easily we could identify the overlap for each intervention and outcome and deal with it within the text and tables so as not to overestimate the quantity of evidence. We identified systematic reviews that included the same primary studies which evaluated the same outcomes in our outcome tables and summary analysis, and we have presented their findings together but mentioned each primary study only once in the text and reported that it had been covered by more than one systematic review. Where there were inadequate or discrepant data on a single primary study included across multiple systematic reviews, we reported the more detailed data from the better-quality review.

We did not investigate health promotion topics such as suicide prevention and infection prevention (including prevention of blood-borne viruses, sexually transmitted infections, and tuberculosis), as we know that these topics are already being researched by the existing health services provided by the Irish Prison Services [162]. However, these topics need continued inclusion in any new health-promoting programmes in prisons. In addition, our research does not cover the effectiveness of health-promoting interventions for young offenders, but other research does exist in this area. There are also additional issues for women's health, such as the prevention of unwanted pregnancy and screening for breast and cervical cancer. Finally, we did not consider environmental health conditions relating to general hygiene such as food safety, personal hygiene, adequate cleaning of cells and common areas in prisons, ventilation, and adequate and effective laundry facilities. These basic structural interventions may be taken for granted as part of the general management of prisons, but where they are absent, prisoners and prison staff are at risk of infections of the skin, respiratory tract, and digestive tract.

5 Conclusions

Based on the reviews we evaluated, there is some evidence to support the implementation of six of the eight health-promoting interventions of interest in adult prison settings. These include sports- and exercise-based interventions; yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions; smoking cessation interventions; and healthy eating and nutrition interventions. However, there are gaps in the evidence with respect to some outcomes for yoga-, meditation-, and mindfulness-based interventions; art and creative interventions; peer-based interventions; and healthy eating and nutrition interventions. In addition, we found no usable evidence with regard to the effectiveness of horticultural interventions or animal-based interventions for improving physical or mental well-being. Considering these gaps in the available evidence, the implementation of health-promoting interventions in adult prisons would benefit from rigorous parallel evaluation studies in order to augment, update, and/or strengthen the current evidence base on the effectiveness of such interventions. On the other hand, there are more substantial findings with regard to barriers and facilitators compared with the effectiveness findings, which can be used to help develop successful health-promoting programmes in prisons. It should be noted, however, that the findings on success factors regarding implementation and effectiveness are limited. It is generally accepted that evidence-based practice is one of three equally important components for developing health-promoting programmes. The other two components are expertise and experience with health-promoting programmes, and stakeholders' values and circumstances. The stakeholders in prison settings include prisoners, healthcare and prison security staff, prison management, and policy-makers.

6 References

1 World Health Organization. Status report on prison health in the WHO European Region 2022. 2022. https://www.who.int/europe/publications/i/item/9789289058674 (accessed 5 Mar 2024).

2 Rabe K. Prison structure, inmate mortality and suicide risk in Europe. *Int J Law Psychiatry* 2012;**35**:222–30. https://doi.org/10.1016/j.ijlp.2012.02.012

3 Dolan K, Wirtz AL, Moazen B, *et al.* Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees. *Lancet Lond Engl* 2016;**388**:1089–102. https://doi.org/10.1016/S0140-6736(16)30466-4

4 Zlodre J, Fazel S. All-Cause and External Mortality in Released Prisoners: Systematic Review and Meta-Analysis. *Am J Public Health* 2012;**102**:e67–75. https://doi.org/10.2105%2FAJPH.2012.300764 (accessed 6 Mar 2024).

5 Jones M, Kearney GD, Xu X, *et al.* Mortality Rates and Cause of Death Among Former Prison Inmates in North Carolina. *N C Med J* 2017;**78**:223–9. https://doi.org/10.18043/ncm.78.4.223

6 McNeeley S, Clark VA, Duwe G. Risk factors for all-cause, natural, and unnatural deaths among individuals released from state prison. *J Crim Justice* 2023;**86**:102059. https://doi.org/10.1016/j.jcrimjus.2023.102059 (accessed 6 Mar 2024).

7 Massoglia M, Remster B. Linkages Between Incarceration and Health. *Public Health Rep* 2019;**134**:8S-14S. https://doi.org/10.1177%2F0033354919826563 (accessed 11 Mar 2024).

8 Wallace D, Wang X. Does in-prison physical and mental health impact recidivism? *SSM - Popul Health* 2020;**11**:100569. https://doi.org/10.1016%2Fj.ssmph.2020.100569 (accessed 6 Mar 2024).

9 European Centre for Disease Prevention and Control, European Monitoring Centre for Drugs and Drug Addiction, Beer N, *et al.* Systematic review on active case finding of communicable diseases in prison settings: prevention and control of communicable diseases in prison settings. European Centre for Disease Prevention and Control 2017. https://data.europa.eu/doi/10.2900/348536 (accessed 6 Mar 2024).

10 Gabrysch C, Fritsch R, Priebe S, *et al.* Mental disorders and mental health symptoms during imprisonment: A three-year follow-up study. *PLoS ONE* 2019;**14**:e0213711. https://doi.org/10.1371%2Fjournal.pone.0213711 (accessed 6 Mar 2024).

11 Liem M, Kunst M. Is there a recognizable post-incarceration syndrome among released 'lifers'? *Int J Law Psychiatry* 2013;**36**:333–7. https://doi.org/10.1016/j.ijlp.2013.04.012

12 Cotter L. Are the Needs of Adult Offenders with Mental Health Difficulties being met in Prisons and on Probation? *Ir Probat J* 2015;**12**:57–78. https://www.probation.ie/EN/PB/0/068C17157F5F892C8025802E00485264/$File/IPJ2015pages57to78.pdf

13 Edgemon TG, Clay-Warner J. Inmate Mental Health and the Pains of Imprisonment. *Soc Ment Health* 2019;**9**:33–50. https://doi.org/10.1177/2156869318785424 (accessed 11 Mar 2024).

14 Gonçalves LC, Endrass J, Rossegger A, *et al.* A longitudinal study of mental health symptoms in young prisoners: exploring the influence of personal factors and the correctional climate. *BMC Psychiatry* 2016;**16**:91. https://doi.org/10.1186/s12888-016-0803-z (accessed 11 Mar 2024).

15 Tesler R, Regev O, Birk R, *et al.* Health promotion programs in prison: attendance and role in promoting physical activity and subjective health status. *Front Public Health* 2023;**11**:1189728. https://doi.org/10.3389%2Ffpubh.2023.1189728 (accessed 11 Mar 2024).

16 World Health Organization. The WHO prison health framework a framework for assessment of prison health system performance. Copenhagen: WHO Regional Office for Europe 2021. https://www.who.int/europe/publications/i/item/9789289055482 (accessed 11 Mar 2024).

17 Woodall J. Acritical examination of the health promoting prison two decades on. *Crit Public Health* 2016;**26**:615–21. https://doi.org/10.1080/09581596.2016.1156649 (accessed 5 Mar 2024).

18 Woodall J. Why Has the Health-Promoting Prison Concept Failed to Translate to the United States? *Am J Health Promot* 2018;**32**:858–60. https://doi.org/10.1177/0890117116670426

19 Ismail N, de Viggiani N. Challenges for prison governors and staff in implementing the Healthy Prisons Agenda in English prisons. *Public Health* 2018;**162**:91–7. https://doi.org/10.1016/j.puhe.2018.06.002

20 Scottish Government. Prison-based Physical Health and Wellbeing Interventions: Evidence review and survey of provision in Scotland's prisons. 2022. https://www.gov.scot/publications/prison-based-physical-health-wellbeing-interventions-evidence-review-survey-provision-scotlands-prisons/ (accessed 8 Mar 2024).

21 Coalter F. *A Wider Social Role for Sport. Who's Keeping the Score?* Routledge 2007. https://doi.org/10.4324/9780203014615 (accessed 8 Mar 2024).

22 Woods D, Breslin G, Hassan D. A systematic review of the impact of sport-based interventions on the psychological well-being of people in prison. *Ment Health Phys Act* 2017;**12**:50–61. https://doi.org/10.1016/j.mhpa.2017.02.003 (accessed 24 Mar 2023).

23 Sanchez-Lastra MA, Álvarez V de D, Pérez CA. Effectiveness of Prison-Based Exercise Training Programs: A Systematic Review. *J Phys Act Health* 2019;**16**:1196–209. https://doi.org/10.1123/jpah.2019-0049 (accessed 24 Mar 2023).

24 Scott TL. Horticultural Therapy. In: Pachana NA, ed. *Encyclopedia of Geropsychology*. Singapore: Springer 2015. 1–5. doi:10.1007/978-981-287-080-3_268-1

25 Spano G, D'Este M, Giannico V, *et al.* Are Community Gardening and Horticultural Interventions Beneficial for Psychosocial Well-Being? A Meta-Analysis. *Int J Environ Res Public Health* 2020;**17**:3584. https://doi.org/10.3390%2Fijerph17103584 (accessed 8 Mar 2024).

26 Auty KM, Cope A, Liebling A. A Systematic Review and Meta-Analysis of Yoga and Mindfulness Meditation in Prison: Effects on Psychological Well-Being and Behavioural Functioning. *Int J Offender Ther Comp Criminol* 2017;**61**:689–710. https://doi.org/10.1177/0306624X15602514 (accessed 24 Mar 2023).

27 Sfendla A, Malmström P, Torstensson S, *et al.* Yoga Practice Reduces the Psychological Distress Levels of Prison Inmates. *Front Psychiatry* 2018;**9**:407. https://doi.org/10.3389%2Ffpsyt.2018.00407 (accessed 8 Mar 2024).

28 Bursky M, Kosuri M, Walsh Carson K, *et al.* The Utility of Meditation and Mindfulness-Based Interventions in the Time of COVID-19: A Theoretical Proposition and Systematic Review of the Relevant Prison, Quarantine and Lockdown Literature. *Psychol Rep* 2023;**126**:557–600. https://doi.org/10.1177%2F00332941211048734 (accessed 8 Mar 2024).

29 Koncz A, Demetrovics Z, Takacs ZK. Meditation interventions efficiently reduce cortisol levels of at-risk samples: a meta-analysis. *Health Psychol Rev* 2021;**15**:56–84. https://doi.org/10.1080/17437199.2020.1760727 (accessed 8 Mar 2024).

30 Han A. Effects of mindfulness-based interventions on psychological distress and mindfulness in incarcerated populations: A systematic review and meta-analysis. *Crim Behav Ment Health CBMH* 2022;**32**:48–59. https://doi.org/10.1002/cbm.2230

31 Canada KE, Barrenger SL, Robinson EL, *et al.* A systematic review of interventions for older adults living in jails and prisons. *Aging Ment Health* 2020;**24**:1019–27. https://doi.org/10.1080/13607863.2019.1584879 (accessed 24 Mar 2023).

32 American Veterinary Medical Association. Animal-assisted interventions: Definitions. 2024. https://www.avma.org/resources-tools/avma-policies/animal-assisted-interventions-definitions (accessed 8 Mar 2024).

33 Bert F, Gualano MR, Camussi E, *et al.* Animal assisted intervention: A systematic review of benefits and risks. *Eur J Integr Med* 2016;**8**:695–706. https://doi.org/10.1016%2Fj.eujim.2016.05.005 (accessed 8 Mar 2024).

34 South J, Bagnall A-M, Hulme C, *et al.* A systematic review of the effectiveness and cost-effectiveness of peer-based interventions to maintain and improve offender health in prison settings. *Health Serv Deliv Res* 2014;**2**:1–218. doi:10.3310/hsdr02350

35 de Andrade D, Kinner SA. Systematic review of health and behavioural outcomes of smoking cessation interventions in prisons. *Tob Control* 2017;**26**:495–501. https://doi.org/10.1136%2Ftobaccocontrol-2016-053297 (accessed 5 Sep 2023).

36 Butler T, Richmond R, Belcher J, *et al.* Should smoking be banned in prisons? *Tob Control* 2007;**16**:291–3. https://doi.org/10.1136%2Ftc.2007.021600 (accessed 8 Mar 2024).

37 Willemsen M, Gorts C, Van Soelen P, *et al.* Exposure to environmental tobacco smoke (ETS) and determinants of support for complete smoking bans in psychiatric settings. *Tob Control* 2004;**13**:180–5. doi:10.1136/tc.2003.004804

38 Naik S, Khanagar S, Kumar A, *et al.* Assessment of effectiveness of smoking cessation intervention among male prisoners in India: A randomized controlled trial. *J Int Soc Prev Community Dent* 2014;**4**:S110–5. doi:10.4103/2231-0762.146213

39 Kosendiak A, Stanikowski P, Domagała D, *et al.* Dietary Habits, Diet Quality, Nutrition Knowledge, and Associations with Physical Activity in Polish Prisoners: A Pilot Study. *Int J Environ Res Public Health* 2022;**19**:1422. https://doi.org/10.3390/ijerph19031422 (accessed 11 Mar 2024).

40 Vetrani C, Verde L, Ambretti A, *et al.* Nutritional interventions in prison settings: a scoping review. *Nutr Rev* 2024;:nuae011. doi:10.1093/nutrit/nuae011

41 Cortie CH, Byrne MK, Collier C, *et al.* The Effect of Dietary Supplementation on Aggressive Behaviour in Australian Adult Male Prisoners: A Feasibility and Pilot Study for a Randomised, Double Blind Placebo Controlled Trial. *Nutrients* 2020;**12**:2617. https://doi.org/10.3390%2Fnu12092617 (accessed 11 Mar 2024).

42 Aromataris E, Fernandez R, Godfrey C, *et al.* Chapter 9.1.1 Why an umbrella review? In: Aromataris E, Lockwood C, Porrit K, *et al.*, eds. *JBI Manual for Evidence Synthesis*. JBI 2024. https://doi.org/10.46658/JBIMES-24-01 (accessed 4 Mar 2024).

43 McKenzie JE, Brennan SE. Overviews of systematic reviews: great promise, greater challenge. *Syst Rev* 2017;**6**:185. doi:10.1186/s13643-017-0582-8

44 Aromataris E, Fernandez R, Godfrey CM, *et al.* Summarizing systematic reviews: methodological development, conduct and reporting of an umbrella review approach. *JBI Evid Implement* 2015;**13**:132. https://doi.org/10.1097/XEB.0000000000000055 (accessed 29 Aug 2023).

45 Hunt H, Pollock A, Campbell P, *et al.* An introduction to overviews of reviews: planning a relevant research question and objective for an overview. *Syst Rev* 2018;**7**:39. https://doi.org/10.1186/s13643-018-0695-8 (accessed 29 Aug 2023).

46 Hoffmann F, Allers K, Rombey T, *et al.* Nearly 80 systematic reviews were published each day: Observational study on trends in epidemiology and reporting over the years 2000-2019. *J Clin Epidemiol* 2021;**138**:1–11. https://doi.org/10.1016/j.jclinepi.2021.05.022

47 Gates M, Gates A, Guitard S, *et al.* Guidance for overviews of reviews continues to accumulate, but important challenges remain: a scoping review. *Syst Rev* 2020;**9**:254. https://doi.org/10.1186/s13643-020-01509-0 (accessed 29 Aug 2023).

48 Pollock M, Fernandes RM, Becker LA, *et al.* Chapter V: Overviews of reviews. In: *Cochrane Handbook for Systematic Reviews of Interventions*. London: Cochrane 2020.

49 Lunny C, Pieper D, Thabet P, *et al.* Managing overlap of primary study results across systematic reviews: practical considerations for authors of overviews of reviews. *BMC Med Res Methodol* 2021;**21**:140. doi:10.1186/s12874-021-01269-y

50 Pieper D, Antoine S-L, Mathes T, *et al.* Systematic review finds overlapping reviews were not mentioned in every other overview. *J Clin Epidemiol* 2014;**67**:368–75. doi:10.1016/j.jclinepi.2013.11.007

51 Pollock M, Fernandes RM, Newton AS, *et al.* A decision tool to help researchers make decisions about including systematic reviews in overviews of reviews of healthcare interventions. *Syst Rev* 2019;**8**:29. doi:10.1186/s13643-018-0768-8

52 Keane M, Murphy L, Farragher L, *et al.* Non-pharmacological interventions that promote the health and well-being of prisoners living in a prison setting. PROSPERO CRD42023473432. 2023. https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=473432 (accessed 15 Apr 2024).

53 Gates M, Gates A, Pieper D, *et al.* Reporting guideline for overviews of reviews of healthcare interventions: development of the PRIOR statement. *BMJ* 2022;**378**:e070849. https://doi.org/10.1136/bmj-2022-070849

54 Scottish Government. Chapter 2: Rapid Literature Review. 2022. http://www.gov.scot/publications/understanding-substance-use-wider-support-needs-scotlands-prison-population/pages/3/ (accessed 11 Mar 2024).

55 Aromataris E, Fernandez R, Godfrey CM, *et al.* Chapter 9.2.6 Search Strategy. In: Aromataris E, Lockwood C, Porrit K, *et al.*, eds. *JBI Manual for Evidence Synthesis*. JBI 2024. https://doi.org/10.46658/JBIMES-24-01 (accessed 7 Jun 2022).

56 Lefebvre C, Glanville J, Briscoe S. Chapter 4: Searching for and selecting studies. In: Higgins JPT, Thomas J, Chandler J, eds. *Cochrane Handbook for Systematic Reviews of Interventions version 6.2 (updated February 2021)*. Cochrane 2021. https://training.cochrane.org/handbook/current/chapter-04 (accessed 11 Jun 2022).

57 Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Inf Libr J* 2009;**26**:91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

58 Health Evidence. Health Evidence™ Quality Assessment Tool. Ontario: National Collaborating Centre for Methods and Tools. McMaster University https://www.healthevidence.org/our-appraisal-tools.aspx (accessed 19 Mar 2024).

59 U.S. National Library of Medicine. MeSH Browser. 2023. https://meshb.nlm.nih.gov/search (accessed 26 Aug 2023).

60 Schoones JW. Redundancy of terms is not an error but plays a positive role in composing search strategies. *J Med Libr Assoc* 2020;**108**:118–9. https://doi.org/10.5195/jmla.2020.780

61 McGowan J, Sampson M, Salzwedel DM, *et al.* PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement. *J Clin Epidemiol* 2016;**75**:40–6. doi:10.1016/j.jclinepi.2016.01.021

62 Horsley T, Dingwall O, Sampson M. Checking reference lists to find additional studies for systematic reviews. *Cochrane Database Syst Rev* Published Online First: 2011. https://doi.org/10.1002/14651858.MR000026.pub2 (accessed 29 Aug 2023).

63 Haddaway NR, Grainger MJ, Gray CT. citationchaser: an R package for forward and backward citations chasing in academic searching. Version 0.0.3. 2021. doi:10.5281/zenodo.4543513

64 London: UCL Social Research Institute. EPPI-Reviewer: advanced software for systematic reviews, maps and evidence synthesis. EPPI-Centre Software [program]. 2023.

65 Lambe K, Teahan A, Lee C, *et al.* The efficacy and safety of medicinal cannabis in adult populations: An evidence review. Dublin: Health Research Board 2024. https://www.hrb.ie/data-collections-evidence/hrb-evidence-centre/publications/publication/the-efficacy-and-safety-of-medicinal-cannabis-in-adult-populations-an-evidence-review/returnPage/1/

66 Long J, Lee C, Schwendicke F, *et al.* Management of non-cavitated caries and cavitated caries in primary, permanent, and mixed dentition. An evidence review. Dublin: Health Research Board 2022. https://www.hrb.ie/fileadmin/2._Plugin_related_files/Publications/2022_Publication_files/2022_Evidence_Centre/Management_of_non-cavitated_and_cavitated_caries_2022.pdf

67 Murphy L, Farragher L, Clements K, *et al.* Primary prevention of dental caries: An evidence review. Dublin: Health Research Board 2023. https://www.hrb.ie/data-collections-evidence/hrb-evidence-centre/publications/publication/primary-prevention-of-dental-caries-an-evidence-review/returnPage/1/

68 Cooper C, Booth A, Varley-Campbell J, *et al.* Defining the process to literature searching in systematic reviews: a literature review of guidance and supporting studies. *BMC Med Res Methodol* 2018;**18**:85. https://doi.org/10.1186/s12874-018-0545-3

69 Rethlefsen ML, Kirtley S, Waffenschmidt S, *et al.* PRISMA-S: an extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews. *Syst Rev* 2021;**10**:39. doi:10.1186/s13643-020-01542-z

70 Aromataris E, Fernandez R, Godfrey C, *et al.* Appendix 9.3 JBI Data Extraction Form for Review for Systematic Reviews and Research Syntheses. In: *JBI Manual for Evidence Synthesis*. Joanna Briggs Institute 2024. https://doi.org/10.46658/JBIMES-24-01 (accessed 4 Mar 2024).

71 National Collaborating Centre for Methods and Tools at McMaster University. Health Evidence™ Quality Assessment Tool. 2024. https://www.healthevidence.org/our-appraisal-tools.aspx (accessed 26 Mar 2024).

72 Schünemann H, Higgins J, Vist G, *et al.* Chapter 14: Completing 'Summary of findings' tables and grading the certainty of the evidence. In: Higgins J, Thomas J, Chandler J, *et al.*, eds. *Cochrane Handbook for Systematic Reviews of Interventions version 6.4 (updated August 2023)*. Cochrane 2023. https://training.cochrane.org/handbook/current/chapter-14 (accessed 29 Aug 2023).

73 Pollock A, Farmer SE, Brady MC, *et al.* An algorithm was developed to assign GRADE levels of evidence to comparisons within systematic reviews. *J Clin Epidemiol* 2016;**70**:106–10. doi:10.1016/j.jclinepi.2015.08.013

74 Lunny C, Brennan SE, McDonald S, *et al.* Toward a comprehensive evidence map of overview of systematic review methods: paper 1—purpose, eligibility, search and data extraction. *Syst Rev* 2017;**6**:231. https://doi.org/10.1186/s13643-017-0617-1 (accessed 29 Aug 2023).

75 Page MJ, McKenzie JE, Bossuyt PM, *et al.* The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;**372**:n71. doi:https://doi.org/10.1136/bmj.n71

76 Martinez-Merino N, Martín-González N, Usabiaga O, *et al.* Physical activity practiced by incarcerated women: A systematic review. *Health Care Women Int* 2017;**38**:1152–69. doi:10.1080/07399332.2017.1368515

77 Mohan ARM, Thomson P, Leslie SJ, *et al.* A Systematic Review of Interventions to Improve Health Factors or Behaviors of the Cardiovascular Health of Prisoners During Incarceration. *J Cardiovasc Nurs* 2018;**33**:72–81. doi:10.1097/JCN.0000000000000420

78 Perry AE, Marshall D, Moe-Byrne T, *et al.* Effects of interventions on depression and anxiety in older people with physical health problems in the criminal justice system: a systematic review. *Lancet Healthy Longev* 2023;**4**:e431–40. doi:10.1016/S2666-7568(23)00111-3

79 Murray J, Wickramasekera N, Elings M, *et al.* The impact of care farms on quality of life, depression and anxiety among different population groups: A systematic review. *Campbell Syst Rev* 2019;**15**:e1061. doi:10.1002/cl2.1061

80 Leigh-Hunt N, Perry A. A systematic review of interventions for anxiety, depression, and PTSD in adult offenders. *Int J Offender Ther Comp Criminol* 2015;**59**:701–25. https://doi.org/10.1177/0306624X13519

81 McCann LJ, Peden J, Phipps E, *et al.* Developing gender-specific evidence-based standards to improve the health and wellbeing of women in prison in England: a literature review and modified eDelphi survey. *Int J Prison Health* 2019;**16**:17–28. doi:10.1108/IJPH-02-2019-0010

82 Stephenson T, Leaman J, O'Moore É, *et al.* Time out of cell and time in purposeful activity and adverse mental health outcomes amongst people in prison: a literature review. *Int J Prison Health* 2021;**17**:54–68. doi:10.1108/IJPH-06-2020-0037

83 Flotron T, Büsser R, Gantschnig B, *et al.* Handlungsfähigkeit hinter Gittern ermöglichen : ältere Menschen im Gefängnis und mögliche Ansätze der Ergotherapie. *Ergoscience* 2015;**10**:21–9. https://digitalcollection.zhaw.ch/handle/11475/4807 (accessed 23 Feb 2024).

84 Rioux M-A, Laurier C, Gadais T, *et al.* De l'entraîneur à l'intervenant : réflexion sur l'apport des connaissances issues des sciences du sport aux interventions basées sur le sport auprès des jeunes contrevenants. *Rev Psychoéducation* 2017;**46**:313–36. doi:10.7202/1042253ar

85 Luchenski S, Maguire N, Aldridge RW, *et al.* What works in inclusion health: overview of effective interventions for marginalised and excluded populations. *The Lancet* 2018;**391**:266–80. https://doi.org/10.1016/S0140-6736(17)31959-1 (accessed 27 Mar 2023).

86 Mutz M, Müller J. Sport im Strafvollzug aus der Perspektive der Inhaftierten: Ein systematisches Review qualitativer Forschungsarbeiten. 2019. https://philpapers.org/rec/MUTSIS (accessed 19 Mar 2024).

87 Papa V, Tafuri D, Vaccarezza M. Could Physical Activity Have any Role in Cardiovascular Disease Prevention in Prisoners? A Systematic Review. *Int J Environ Res Public Health* 2021;**18**:2307. doi:10.3390/ijerph18052307

88 Stevens BA, Shaw R, Bewert P, *et al.* Systematic review of aged care interventions for older prisoners. *Australas J Ageing* 2018;**37**:34–42. doi:10.1111/ajag.12484

89 Wigham S, McGovern R, Kaner E, *et al.* A review of recent innovation in psychosocial interventions for reducing violence and aggression in adults using a horizon scanning approach. *Aggress Violent Behav* 2022;**62**:101685. doi:10.1016/j.avb.2021.101685

90 Maruca A. Self-Care Management for Correctional Populations: A Literature Review...28th Annual Scientific Session, June 2-6, 2017, Baltimore, Maryland: Nursing Research. *Nurs Res* 2016;**65**:E95–6. doi:10.1097/NNR.0000000000000152

91 Song MJ, Yu L, Enright RD. Trauma and healing in the underserved populations of homelessness and corrections: Forgiveness Therapy as an added component to intervention. *Clin Psychol Psychother* 2021;**28**:694–714. doi:10.1002/cpp.2531

92 South E, Rodgers M, Wright K, *et al.* A scoping review of systematic reviews on reducing lifestyle risk behaviours in disadvantaged groups. *Eur J Public Health* 2021;**31**:ckab165.383. doi:10.1093/eurpub/ckab165.383

93 South E, Rodgers M, Wright K, *et al.* Reducing lifestyle risk behaviours in disadvantaged groups in high-income countries: A scoping review of systematic reviews. *Prev Med* 2022;**154**:106916. doi:10.1016/j.ypmed.2021.106916

94 Harrison S. The 'sub-culture' created through austere measures: Understanding the cycle to break it. PhD. Lancaster University 2020. http://www.research.lancs.ac.uk/portal/en/publications/the-subculture-created-through-austere-measures(6acdcdc7-b146-4b81-a546-d978b24aa4d0).html (accessed 5 Mar 2024).

95 Moeller C, King N, Burr V, *et al.* Nature-based interventions in institutional and organisational settings: a scoping review. *Int J Environ Health Res* 2018;**28**:293–305. https://doi.org/10.1080/09603123.2018.1468425 (accessed 19 Sep 2023).

96 Shonin E, Gordon WV, Slade K, *et al.* Mindfulness and other Buddhist-derived interventions in correctional settings: A systematic review. *Aggress Violent Behav* 2013;**18**:365. https://www.academia.edu/2639064/Shonin_E_Van_Gordon_W_Slade_K_and_Griffiths_M_D_2013_Mindfulness_and_other_Buddhist_derived_interventions_in_correctional_settings_A_systematic_review (accessed 10 Sep 2023).

97 Armstrong E, Eggins E, Reid N, *et al.* Parenting interventions for incarcerated parents to improve parenting knowledge and skills, parent well-being, and quality of the parent–child relationship: A systematic review and meta-analysis. *J Exp Criminol* 2018;**14**:279–317. https://doi.org/10.1007/s11292-017-9290-6 (accessed 19 Mar 2024).

98 Bartlett A, Jhanji E, White S, *et al.* Interventions with women offenders: a systematic review and meta-analysis of mental health gain. *J Forensic Psychiatry Psychol* 2015;**26**:133–65. https://doi.org/10.1080/14789949.2014.981563 (accessed 19 Mar 2024).

99 Bright A-M, Higgins A, Grealish A. Women's experiences of prison-based mental healthcare: a systematic review of qualitative literature. *Int J Prison Health* 2022;**19**:181–98. https://doi.org/10.1108/IJPH-09-2021-0091 (accessed 19 Mar 2024).

100 Frank Terry L, Praetorius RT, Nordberg A. Environmental influences on services for and mental health of incarcerated populations: A review. *J Soc Work* 2018;**18**:46–65. https://doi.org/10.1177/1468017316651999 (accessed 19 Mar 2024).

101 Gagnon JC, Benedick AR, Mason-Williams L. Mental health interventions for youth who are incarcerated: A systematic review of literature. *Am J Orthopsychiatry* 2022;**92**:391–404. https://psycnet.apa.org/doi/10.1037/ort0000587

102 Perdacher E, Kavanagh D, Sheffield J. Well-being and mental health interventions for Indigenous people in prison: systematic review. *BJPsych Open* 2019;**5**:e95. doi:10.1192/bjo.2019.80

103 Wimberly AS, Xue J. A Systematic Review of Yoga Interventions in the Incarcerated Setting. *J Sociol* 2016;**43**:Article 6. https://scholarworks.wmich.edu/jssw/vol43/iss4/6?utm_source=scholarworks.wmich.edu%2Fjssw%2Fvol43%2Fiss4%2F6&utm_medium=PDF&utm_campaign=PDFCoverPages

104 Criss J, John A. Therapeutic Interventions for Mental Wellness in Correctional Facilities: A Systematic Review. *Int J Offender Ther Comp Criminol* 2023;:306624X231159884. https://doi.org/10.1177/0306624X2311598

105 Eadeh H-M, Breaux R, Nikolas MA. A Meta-Analytic Review of Emotion Regulation Focused Psychosocial Interventions for Adolescents. *Clin Child Fam Psychol Rev* 2021;**24**:684–706. https://doi.org/10.1007/s10567-021-00362-4 (accessed 19 Mar 2024).

106 Griffiths C, Hina F. Prisoner's insomnia prevalence, insomnia associated factors and interventions with sleep as an outcome: a review and narrative analysis. *Int J Prison Health* 2021;**18**:27–42. https://doi.org/10.1108/IJPH-01-2021-0014 (accessed 19 Mar 2024).

107 Kristofersson GK, Kaas MJ. Stress Management Techniques in the Prison Setting. *J Forensic Nurs* 2013;**9**:111. https://doi.org/10.1097/jfn.0b013e31827a5a89 (accessed 19 Mar 2024).

108 Luu K, Hall PA. Hatha Yoga and Executive Function: A Systematic Review. *J Altern Complement Med* 2016;**22**:125–33. doi:10.1089/acm.2014.0091

109 Per M, Spinelli C, Sadowski I, *et al.* Evaluating the Effectiveness of Mindfulness-Based Interventions in Incarcerated Populations: A Meta-Analysis. *Crim Justice Behav* 2020;**47**:310–30. doi:10.1177/0093854819891457

110 Ratnam KKY, Nordin A, Tok PSK, *et al.* Mental Health Interventions in Juvenile Detention Institutions: A Systematic Review of What Works. *Adolesc Psychiatry* 2021;**11**:203–24. doi:10.2174/2210676611666211116163220

111 Stewart W, Coppard C, Thompson A. Promoting resilience among older people in prisons: a systematic literature review. *Nurs Older People* Published Online First: 12 April 2023. doi:10.7748/nop.2023.e1436

112 Simpson S, Mercer S, Simpson R, *et al.* Mindfulness-Based Interventions for Young Offenders: a Scoping Review. *Mindfulness* 2018;**9**:1330–43. doi:10.1007/s12671-018-0892-5

113 Engstrom KV, van Ginneken EFJC. Ethical Prison Architecture: A Systematic Literature Review of Prison Design Features Related to Wellbeing. *Space Cult* 2022;**25**:479–503. https://doi.org/10.1177/12063312221104211 (accessed 19 Mar 2024).

114 Derlic D. A Systematic Review of Literature: Alternative Offender Rehabilitation—Prison Yoga, Mindfulness, and Meditation. *J Correct Health Care* 2020;**26**:361–75. https://doi.org/10.1177/1078345820953837 (accessed 10 Sep 2023).

115 Mallion JS, Wood JL, Mallion A. Systematic review of 'Good Lives' assumptions and interventions. *Aggress Violent Behav* 2020;**55**:101510. doi:10.1016/j.avb.2020.101510

116 Gagnon JC, Ruiz E, Mathur SR, *et al.* Interventions addressing incarcerated youth behavior: A review of literature. *Am J Orthopsychiatry* 2022;**92**:405–17. https://psycnet.apa.org/doi/10.1037/ort0000621

117 Chen XJ, Leith H, Aarø LE, *et al.* Music therapy for improving mental health problems of offenders in correctional settings: systematic review and meta-analysis. *J Exp Criminol* 2016;**12**:209–28. https://doi.org/10.1007/s11292-015-9250-y (accessed 18 Jul 2023).

118 Abbing A, Haeyen S, Nyapati S, *et al.* Effectiveness and mechanisms of the arts therapies in forensic care. A systematic review, narrative synthesis, and meta analysis. *Front Psychiatry* 2023;**14**. https://doi.org/10.3389/fpsyt.2023.1128252 (accessed 18 Jul 2023).

119 Abbing A, Ponstein A, van Hooren S, *et al.* The effectiveness of art therapy for anxiety in adults: A systematic review of randomised and non-randomised controlled trials. *PloS One* 2018;**13**:e0208716. https://doi.org/10.1371/journal.pone.0208716

120 Daykin N, de Viggiani N, Pilkington P, *et al.* Music making for health, well-being and behaviour change in youth justice settings: a systematic review. *Health Promot Int* 2013;**28**:197–210. https://doi.org/10.1093/heapro/das005

121 Cohen-Yatziv L, Regev D. The effectiveness and contribution of art therapy work with children in 2018 -what progress has been made so far? A systematic review. *Int J Art Ther* 2019;**24**:100–12. https://doi.org/10.1080/17454832.2019.1574845 (accessed 19 Mar 2024).

122 Coutinho BV, Hansen AL, Waage L, *et al.* Music Making Interventions with Adults in the Forensic Setting – A Systematic Review of the Literature – Part I: Group Interventions. *Music Med* 2015;**7**:40–53. https://doi.org/10.47513/mmd.v7i3.409 (accessed 19 Mar 2024).

123 Coutinho BV, Hansen AL, Waage L, *et al.* Music Making Interventions with Adults in the Forensic Setting – A Systematic Review of the Literature – Part II: Case Studies and Good vibrations. *Music Med* 2015;**7**:50–71. https://doi.org/10.47513/mmd.v7i4.435 (accessed 19 Mar 2024).

124 Maujean A, Pepping CA, Kendall E. A Systematic Review of Randomized Controlled Studies of Art Therapy. *Art Ther* 2014;**31**:37–44. doi:10.1080/07421656.2014.873696

125 Regev D, Cohen-Yatziv L. Effectiveness of Art Therapy With Adult Clients in 2018—What Progress Has Been Made? *Front Psychol* 2018;**9**. doi:10.3389/fpsyg.2018.01531

126 Duindam HM, Asscher JJ, Hoeve M, *et al.* Are We Barking Up the Right Tree? A Meta-Analysis on the Effectiveness of Prison-Based Dog Programs. *Crim Justice Behav* 2020;**47**:749–67. https://doi.org/10.1177/0093854820909875 (accessed 5 Mar 2024).

127 Villafaina-Domínguez B, Collado-Mateo D, Merellano-Navarro E, *et al.* Effects of Dog-Based Animal-Assisted Interventions in Prison Population: A Systematic Review. *Animals* 2020;**10**:2129. doi:10.3390/ani10112129

128 Cooke BJ, Farrington DP. The Effectiveness of Dog-Training Programs in Prison: A Systematic Review and Meta-Analysis of the Literature. *Prison J* 2016;**96**:854–76. https://doi.org/10.1177/0032885516671919 (accessed 24 Mar 2023).

129 Doney E. Animal-assisted interventions with dogs: A review of the current literature. Psy.D. Azusa Pacific University 2021. https://www.proquest.com/docview/2470049104

130 Mulcahy C, Mclaughlin D. Is the Tail Wagging the Dog? A Review of the Evidence for Prison Animal Programs. *Aust Psychol* 2013;**48**:370–8. doi:10.1111/ap.12021

131 Topbas ZS, Simsek N. Effect of Animal Assisted Interventions on Inmates: A Systematic Review/Hayvan Destekli Uygulamalarin Tutuklu Bireyler Uzerine Etkisi:Sistematik Bir Gozden Gecirme. *Psikiyatr Guncel YaklasimlarCurrent Approaches Psychiatry* 2022;**14**:12–21. https://go.gale.com/ps/i.do?p=AONE&sw=w&issn=13090658&v=2.1&it=r&id=GALE%7CA698592433&sid=googleScholar&linkaccess=abs (accessed 19 Mar 2024).

132 Bachi K. Equine-Facilitated Prison-Based Programs Within the Context of Prison-Based Animal Programs: State of the Science Review. *J Offender Rehabil* 2013;**52**:46–74. https://doi.org/10.1080/10509674.2012.734371 (accessed 7 Sep 2023).

133 Ciez T. Correctional Education as Therapeutic Change: Exploring the Use of Animal-Assisted Therapy Programs with Incarcerated Women. Ed.D. Northern Illinois University 2021. https://www.proquest.com/docview/2557474474

134 South J, Woodall J, Kinsella K, *et al.* A qualitative synthesis of the positive and negative impacts related to delivery of peer-based health interventions in prison settings. *BMC Health Serv Res* 2016;**16**:525. doi:10.1186/s12913-016-1753-3

135 Bagnall A-M, South J, Hulme C, *et al.* A systematic review of the effectiveness and cost-effectiveness of peer education and peer support in prisons. *BMC Public Health* 2015;**15**:290. https://doi.org/10.1186/s12889-015-1584-x

136 Di Lorito C, Völlm B, Dening T. The individual experience of ageing prisoners: systematic review and meta-synthesis through a Good Lives Model framework. *Int J Geriatr Psychiatry* 2018;**33**:252–62. https://doi.org/10.1002/gps.4762

137 Netto NR, Carter JM, Bonell C. A Systematic Review of Interventions That Adopt the “Good Lives” Approach to Offender Rehabilitation. *J Offender Rehabil* 2014;**53**:403–32. doi:10.1080/10509674.2014.931746

138 Richardson J, Zini V. Are prison-based therapeutic communities effective? Challenges and considerations. *Int J Prison Health* 2020;**17**:42–53. doi:10.1108/IJPH-07-2020-0048

139 Stewart W, Edmond N. Prisoner peer caregiving: a literature review. *Nurs Stand R Coll Nurs G B 1987* 2017;**31**:44–51. doi:10.7748/ns.2017.e10468

140 South J, Bagnall A-M, Woodall J. Developing a Typology for Peer Education and Peer Support Delivered by Prisoners. *J Correct Health Care* 2017;**23**:214–29. doi:10.1177/1078345817700602

141 Topping KJ. Peer Education and Peer Counselling for Health and Well-Being: A Review of Reviews. *Int J Environ Res Public Health* 2022;**19**:6064. doi:10.3390/ijerph19106064

142 Moyes HCA, Heath JJ, Dean LV. What can be done to improve outcomes for prisoners with a dual diagnosis? *Adv Dual Diagn* 2016;**9**:14–25. doi:10.1108/ADD-07-2015-0016

143 Sourry RJ, Hyslop F, Butler TG, *et al.* Impact of smoking bans and other smoking cessation interventions in prisons, mental health and substance use treatment settings: A systematic review of the evidence. *Drug Alcohol Rev* 2022;**41**:1528–42. doi:10.1111/dar.13524

144 Frazer K, McHugh J, Callinan JE, *et al.* Impact of institutional smoking bans on reducing harms and secondhand smoke exposure. *Cochrane Database Syst Rev* 2016;**2016**:CD011856. https://doi.org/10.1002/14651858.CD011856.pub2

145 Lindson N, Thompson TP, Ferrey A, *et al.* Motivational interviewing for smoking cessation. *Cochrane Database Syst Rev* 2019;**2019**:CD006936. https://doi.org/10.1002%2F14651858.CD006936.pub4 (accessed 5 Mar 2024).

146 Cabral DCP, Lima M de FG, Albuquerque NLS de, *et al.* Preventive measures against risk factors for cardiovascular diseases in the prison environment: an integrative review. *Rev Rene* 2023;**24**:e83186–e83186. https://doi.org/10.15253/2175-6783.20232483186 (accessed 19 Mar 2024).

147 Djachenko A, St John W, Mitchell C. Smoking cessation in male prisoners: a literature review. *Int J Prison Health* 2015;**11**:39–48. https://doi.org/10.1108/IJPH-10-2014-0035

148 Kennedy SM, Davis SP, Thorne SL. Smoke-Free Policies in U.S. Prisons and Jails: A Review of the Literature. *Nicotine Tob Res* 2015;**17**:629–35. https://doi.org/10.1093/ntr/ntu225 (accessed 19 Mar 2024).

149 Puljević C, Segan CJ. Systematic Review of Factors Influencing Smoking Following Release From Smoke-Free Prisons. *Nicotine Tob Res* 2019;**21**:1011–20. doi:10.1093/ntr/nty088

150 Spaulding AC, Eldridge GD, Chico CE, *et al.* Smoking in Correctional Settings Worldwide: Prevalence, Bans, and Interventions. *Epidemiol Rev* 2018;**40**:82–95. doi:10.1093/epirev/mxy005

151 Wilson A, Guillaumier A, George J, *et al.* A systematic narrative review of the effectiveness of behavioural smoking cessation interventions in selected disadvantaged groups (2010-2017). *Expert Rev Respir Med* 2017;**11**:617–30. doi:10.1080/17476348.2017.1340836

152 Gentry S, Forouhi NG, Notley C. Are Electronic Cigarettes an Effective Aid to Smoking Cessation or Reduction Among Vulnerable Groups? A Systematic Review of Quantitative and Qualitative Evidence. *Nicotine Tob Res* 2019;**21**:602–16. https://doi.org/10.1093/ntr/nty054 (accessed 19 Mar 2024).

153 Emerson A, Lipnicky A, Schuster B, *et al.* Physical health programs and interventions with women during incarceration: a scoping review. *Int J Prison Health* 2021;**18**:285–99. https://doi.org/10.1108/IJPH-06-2021-0055 (accessed 24 Mar 2023).

154 Herbert K, Plugge E, Foster C, *et al.* Prevalence of risk factors for non-communicable diseases in prison populations worldwide: a systematic review. *Lancet Lond Engl* 2012;**379**:1975–82. https://doi.org/10.1016/S0140-6736(12)60319-5

155 Qureshi FM, Kunaratnam N, Kolla NJ, *et al.* Nutritional supplementation in the treatment of violent and aggressive behavior: A systematic review. *Aggress Behav* 2021;**47**:296–309. doi:10.1002/ab.21953

156 Attebery J. Regenerating Soil, Soul, and Society: Garden-based Sustainability Pedagogy for Incarcerated Adult Learners. Ph.D. Prescott College 2017. https://books.google.ie/books?id=MV6kzQEACAAJ

157 Newman L, Baum F, Javanparast S, *et al.* Addressing social determinants of health inequities through settings: a rapid review. *Health Promot Int* 2015;**30 Suppl 2**:ii126-143. doi:10.1093/heapro/dav054

158 Santora L, Arild Espnes G, Lillefjell M. Health promotion and prison settings. *Int J Prison Health* 2014;**10**:27–37. doi:10.1108/IJPH-08-2013-0036

159 Smoyer AB. Food in correctional facilities: A scoping review. *Appetite* 2019;**141**:104312. doi:10.1016/j.appet.2019.06.004

160 Davison KM, D'Andreamatteo C, Smye VL. Medical nutrition therapy in Canadian federal correctional facilities. *BMC Health Serv Res* 2019;**19**:89. https://doi.org/10.1186/s12913-019-3926-3 (accessed 19 Mar 2024).

161 Guo W, Cronk R, Scherer E, *et al.* A systematic scoping review of environmental health conditions in penal institutions. *Int J Hyg Environ Health* 2019;**222**:790–803. https://doi.org/10.1016/j.ijheh.2019.05.001 (accessed 19 Mar 2024).

162 Crowe. Health Needs Assessment for the Irish Prison Service Final Report. Crowe 2022. https://www.gov.ie/pdf/?file=https://assets.gov.ie/256918/0a95d124-8d58-498f-994b-356e9e1fb161.pdf#page=null (accessed 15 Apr 2024).

163 Conor Murray, Brendan Coyle, Haydyn Morgan, *et al.* International consensus statement on the design, delivery and evaluation of sport-based interventions aimed at promoting social, psychological and physical well-being in prison. *BMJ Open* 2024;**14**:e075792. https://doi.org/10.1136/bmjopen-2023-075792

164 National Guideline Centre hosted by the Royal College of Physicians. Physical health of people in prison: assessment, diagnosis and management of physical health problems. London: National Institute for Health and Care Excellence 2016. https://www.ncbi.nlm.nih.gov/books/NBK395929/

165 Twyman L, Bonevski B, Paul C, *et al.* Perceived barriers to smoking cessation in selected vulnerable groups: A systematic review of the qualitative and quantitative literature. *BMJ Open* 2014;**4**:e006414. doi:10.1136/bmjopen-2014-006414

166 Francis-Graham S, Ekeke NA, Nelson CA, *et al.* Understanding how, why, for whom, and under what circumstances opt-out blood-borne virus testing programmes work to increase test engagement and uptake within prison: a rapid-realist review. *BMC Health Serv Res* 2019;**19**:152. doi:10.1186/s12913-019-3970-z

167 Nussbaumer-Streit B, Klerings I, Dobrescu AI, *et al.* Excluding non-English publications from evidence-syntheses did not change conclusions: a meta-epidemiological study. *J Clin Epidemiol* 2020;**118**:42–54. doi:10.1016/j.jclinepi.2019.10.011

168 Shea BJ, Reeves BC, Wells G, *et al.* AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ* 2017;**358**:j4008. doi:10.1136/bmj.j4008

7 Appendices

7.1 Appendix 1 PRIOR statement

Topic	Number	Item descriptor	Location reported
TITLE			
Title	1	Identify the report as an overview of reviews.	Cover page
ABSTRACT			
Abstract	2	Provide a comprehensive and accurate summary of the purpose, methods, and results of the overview of reviews.	Executive summary
INTRODUCTION			
Rationale	3	Describe the rationale for conducting the overview of reviews in the context of existing knowledge.	Section 1.2
Objectives	4	Provide an explicit statement of the objective(s) or question(s) addressed by the overview of reviews.	Section 1.3
METHODS			
Eligibility criteria	5a	Specify the inclusion and exclusion criteria for the overview of reviews. If supplemental primary studies were included, this should be stated, with a rationale.	Section 2.3
	5b	Specify the definition of 'systematic review' as used in the inclusion criteria for the overview of reviews.	Section 2.1.2
Information sources	6	Specify all databases, registers, websites, organizations, reference lists, and other sources searched or consulted to identify systematic reviews and supplemental primary studies (if included). Specify the date when each source was last searched or consulted.	Section 2.4 and Appendix 2
Search strategy	7	Present the full search strategies for all databases, registers, and websites, such that they could be reproduced. Describe any search filters and limits applied.	Section 2.4 and Appendix 3
Selection process	8a	Describe the methods used to decide whether a systematic review or supplemental primary study (if included) met the inclusion criteria of the overview of reviews.	Sections 2.3 and 2.5
	8b	Describe how overlap in the populations, interventions, comparators, and/or outcomes of systematic reviews was identified and managed during study selection.	Section 2.8.3
Data collection process	9a	Describe the methods used to collect data from reports.	Section 2.6 and Appendix 5
	9b	If applicable, describe the methods used to identify and manage primary study overlap at the level of the comparison and outcome during data collection. For each outcome, specify the method used to illustrate and/or quantify the degree of primary study overlap across systematic reviews.	Section 2.8.3
	9c	If applicable, specify the methods used to manage discrepant data across systematic reviews during data collection.	Taking the more detailed and better-quality review
Data items	10	List and define all variables and outcomes for which data were sought. Describe any assumptions made and/or measures taken to identify and clarify missing or unclear information.	Sections 2.3, 2.8.2, and 3.2
Risk of bias assessment	11a	Describe the methods used to *assess* risk of bias or methodological quality of the included systematic reviews.	Section 2.7 and Appendix 6

Topic	Number	Item descriptor	Location reported
	11b	Describe the methods used to *collect* data on (from the systematic reviews) and/or *assess* the risk of bias of the primary studies included in the systematic reviews. Provide a justification for instances where flawed, incomplete, or missing assessments are identified but not re-assessed.	Section 2.7 and Appendix 6 and Appendix 7
11c		Describe the methods used to *assess* the risk of bias of supplemental primary studies (if included).	Not applicable
Synthesis methods	12a	Describe the methods used to summarize or synthesize results and provide a rationale for the choice(s).	Section 2.8.1 and 2.8.2
	12b	Describe any methods used to explore possible causes of heterogeneity among results.	Section 2.7 and Appendix 6 Section 2.8.4 and Appendix 11
	12c	Describe any sensitivity analyses conducted to assess the robustness of the synthesized results.	Not applicable
Reporting bias assessment	13	Describe the methods used to *collect* data on (from the systematic reviews) and/or *assess* the risk of bias due to missing results in a summary or synthesis (arising from reporting biases at the levels of the systematic reviews, primary studies, and supplemental primary studies, if included).	Sections 2.6 and 2.7 and 2.8.4 Sections 3.2.1–3.2.8 Appendices 6, 7, 8, 9, 10 and 11
Certainty assessment	14	Describe the methods used to *collect* data on (from the systematic reviews) and/or *assess* certainty (or confidence) in the body of evidence for an outcome.	Section 2.8.4 and Appendix 11
RESULTS			
Systematic review and supplemental primary study selection	15a	Describe the results of the search and selection process, including the number of records screened, assessed for eligibility, and included in the overview of reviews, ideally with a flow diagram.	Section 3.1 and Figure 5
	15b	Provide a list of studies that might appear to meet the inclusion criteria, but were excluded, with the main reason for exclusion.	Sections 3.2.1–3.2.8 and Appendix 4

Source Gates *et al.* (2022)[53]

7.2 Appendix 2 List of the resources searched

7.2.1 Database search summary

Source	Date searched	Results
MEDLINE (EBSCO)	6 September 2023	379
CINAHL (EBSCO)	6-10 September 2023	280
SocIndex (EBSCO)	6-10 September 2023	92
APA PsycInfo (Ovid) 1806 to September Week 1 2023	11 September 2023	415
Cochrane Library (Wiley)	11-15 September 2023	216
Epistemonikos	6-11 September 2023	195
Social Systems Evidence	6-11 September 2023	16
Health Systems Evidence	6-11 September 2023	16
Total		1609
Total after deduplication		1203

7.2.2 Supplemental searches

7.2.2.1 Reference and citation searching of included studies

	Date	Results
Reference chasing in Citation Chaser	5 January 2024	1,298
Citation chasing in Citation Chaser	5 January 2024	800
Total		2098
Deduplicated		2085
TOTAL 2012-present		1341

7.2.2.2 PROSPERO International prospective register of systematic reviews

Source	Date	Results
PROSPERO International prospective register of systematic reviews	8 January 2024	1,168

7.2.2.3 Reference and citation searching of 13 identified scoping reviews

	Date	Results
Reference chasing in Citation Chaser	9 January 2024	779
Citation chasing in Citation Chaser	9 January 2024	344

Total	1124
Total 2012-present	787
Deduplicated	782

7.3 Appendix 3 Search strategy

7.3.1 MEDLINE (EBSCO)

	#	Query	Limiters/Expanders
	S29	S7 AND S12 AND S27	Limiters - Date of Publication: 20120101-20231231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S28	S7 AND S12 AND S27	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
Exercise/sports concept	S27	S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S26	SU Gymnastics OR Running OR Physical Conditioning OR Exercise	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S25	(MH "Exercise Therapy+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S24	(MH "Exercise+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S23	(MH "Physical Conditioning, Human+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S22	(MH "Running+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S21	(MH "Gymnastics")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S20	TI ("isometric exercise" OR "isometric exercises" OR "jogging" OR "physical" OR "physical activities" OR "physical activity" OR "physical endurance" OR "physical exercise" OR "physical exercises" OR "physical fitness" OR "sport" OR "sports for persons with disabilities") OR AB ("isometric exercise" OR "isometric exercises" OR "jogging" OR "physical" OR "physical activities" OR "physical activity" OR "physical endurance" OR "physical exercise" OR	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	#	Query	Limiters/Expanders
		"physical exercises" OR "physical fitness" OR "sport" OR "sports for persons with disabilities")	
	S19	TI ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises") OR AB ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S18	TI ("swimming" OR "tai ji" OR "team sports" OR "track and field" OR "volleyball" OR "walking" OR "weight lifting" OR "wrestling") OR AB ("swimming" OR "tai ji" OR "team sports" OR "track and field" OR "volleyball" OR "walking" OR "weight lifting" OR "wrestling")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S17	TI ("jogging OR "martial arts" OR "nordic walking" OR "running" OR "soccer") OR AB ("jogging" OR "martial arts" OR "nordic walking" OR "running" OR "soccer")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S16	TI ("basketball" OR "boxing" OR "football" OR "gymnastics") OR AB ("basketball" OR "boxing" OR "football" OR "gymnastics")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S15	TI ("athletic" OR "athletic performance" OR "athletics") OR AB ("athletic" OR "athletic performance" OR "athletics")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S14	TI ("aerobic exercise" OR "aerobic exercises") OR AB ("aerobic exercise" OR "aerobic exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S13	TI ("activity" or "activities" OR "acute exercise" OR "acute exercises") OR AB ("activity" or "activities" OR "acute exercise" OR "acute exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
Prisons and prisoners' concept	S12	S8 OR S9 OR S10 OR S11	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S11	TI ("convict*" OR "criminal justice" OR "correctional facility*" OR "custody" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand") OR AB ("convict*" OR "criminal justice" OR	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	#	Query	Limiters/Expanders
		"correctional facility*" OR "custody" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand")	
	S10	SU ("convict*" OR "criminal justice" OR "correctional facility*" OR "custody" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S9	(MH "Correctional Facilities") OR (MH "Jails")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S8	(MH "Prisoners") OR (MH "Prisons")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
Systematic review concept	S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S6	TI (systematic N5 review* or (cochrane N5 review*)) OR AB (systematic N5 review* or (cochrane N5 review*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S5	TI ("assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "systematic review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*"OR "meta-synthe*"OR "metaanaly*") OR AB ("assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "systematic review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*"OR "meta-synthe*"OR "metaanaly*")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S4	SU "assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	#	Query	Limiters/Expanders
		"systematic review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*"OR "meta-synthe*"OR "metaanaly*"	
	S3	(MH "Meta-Analysis as Topic") OR (MH "Network Meta-Analysis")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S2	(MH "Review Literature as Topic")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S1	(MH "Systematic Reviews as Topic")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

The following tables contain the individual search concepts added to the above systematic reviews and prison/prisoner concepts for the remaining interventions

#	Query	Limiters/Expanders
Horticulture concept		
S4	S1 OR S2 OR S3	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	(MH "Gardening") OR (MH "Horticultural Therapy")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	SU ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	TI ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture") OR AB ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Yoga/wellness concept		

S9	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S8	SU "Muscle Stretching Exercises" OR yoga OR meditation	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S7	TI (Mindful OR mindfulness) OR AB (Mindful OR mindfulness)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S6	TI "Transcendental Meditation" OR AB "Transcendental Meditation"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	TI ((asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga OR mindful OR mindfulness OR wellbeing OR well-being) N5 (intervention* OR program* OR session*)) OR AB ((asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga OR mindful OR mindfulness OR wellbeing OR well-being) N5 (intervention* OR program* OR session*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	TI yogic OR AB yogic	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	TI yoga*	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	(MH "Muscle Stretching Exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	(MH "Yoga") OR (MH "Meditation")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Animal-assisted concept		
S4	S1 OR S2 OR S3	Interface - EBSCOhost Research Databases

		Search Screen - Advanced Search Database - MEDLINE
S3	SU ("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S2	TI ("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*") OR AB ("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S1	(MH "Animal Assisted Therapy+")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE

#	Query	Limiters/Expanders
Arts therapy concept		
S4	S1 or S2 OR S3	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S3	SU ("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S2	TI ("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance") OR AB ("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S1	(MH "Art Therapy") OR (MH "Dance Therapy") OR (MH "Music Therapy")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE

#	Query	Limiters/Expanders
Peer support concept		
S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	
S6	TI (((Peer-based) N3 intervention*) OR ((Peer based) N3 intervention*) OR "peer intervention*" OR "peer education" OR "peer health" OR "peer group" OR "peer mentoring") OR AB (((Peer-based) N3 intervention*) OR ((Peer based) N3 intervention*) OR "peer intervention*" OR "peer education" OR "peer health" OR "peer group" OR "peer mentoring")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S5	SU (((Peer-based) N3 intervention*) OR ((Peer based) N3 intervention*) OR "peer intervention*" OR "peer education" OR "peer health" OR "peer group" OR "peer mentoring")	Interface - EBSCOhost Research Databases

		Search Screen - Advanced Search Database - MEDLINE
S4	(MH "Self-Help Groups") OR (MH "Friends")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S3	(MH "Therapeutic Community")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S2	(MH "Social Support") OR (MH "Community Support")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S1	(MH "Peer Group+")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE

#	Query	Limiters/Expanders
Healthy eating concept		
S8	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S7	SU food OR eating OR diet* OR fruits* OR vegetables* OR "nutritional status" OR "feeding behavior" OR "feeding behaviour"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S6	TI (cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*) OR AB (cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S5	(MH "Food+") OR (MH "Eating")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	(MH "Diet+") OR (MH "Fruit+") OR (MH "Vegetables")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	(MH "Nutritional Status")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	(MH "Feeding Behavior")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	(MH "Food Services") OR (MH "Menu Planning")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Smoking cessation concept		
S5	S1 OR S2 OR S3 OR S4	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S4	SU "Smoking Cessation" OR "Smoking Cessation Age" OR "Smoking Prevention" OR "Smoke-Free Policy" OR Tobacco Control"	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S3	(MH "Smoking Cessation") OR (MH "Smoking Cessation Agents")	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE
S2	(MH "Tobacco Control") OR (MH "Smoking Prevention") OR (MH "Smoke-Free Policy")	Interface - EBSCOhost Research Databases

		Search Screen - Advanced Search Database - MEDLINE
S1	TI ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco) OR AB ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco)	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE

7.3.2 CINAHL (EBSCO)

	#	Query	Limiters/Expanders
Application of date limit	**S28**	S7 AND S12 AND S26	Limiters - Published Date: 20120101-20231231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
Addition of three concepts	**S27**	S7 AND S12 AND S26	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
Exercise/sports concept	**S26**	S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S25	SU exercise OR "physical fitness" OR "cardiorespiratory fitness" OR "therapeutic fitness"	Limiters - Published Date: 20120101-20231231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S24	(MH "Cardiorespiratory Fitness")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S23	(MH "Physical Fitness") OR (MH "Athletic Training Programs")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	#	Query	Limiters/Expanders
	S22	(MH "Exercise+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S21	(MH "Therapeutic Exercise")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S20	TI ("isometric exercise" OR "isometric exercises" OR "jogging" OR "physical" OR "physical activities" OR "physical activity" OR "physical endurance" OR "physical exercise" OR "physical exercises" OR "physical fitness" OR "sport" OR "sports for persons with disabilities") OR AB ("isometric exercise" OR "isometric exercises" OR "jogging" OR "physical" OR "physical activities" OR "physical activity" OR "physical endurance" OR "physical exercise" OR "physical exercises" OR "physical fitness" OR "sport" OR "sports for persons with disabilities")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S19	TI ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises") OR AB ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S18	TI ("swimming" OR "tai ji" OR "team sports" OR "track and field" OR "volleyball" OR "walking" OR "weight lifting" OR "wrestling") OR AB ("swimming" OR "tai ji" OR "team sports" OR "track and field" OR "volleyball" OR "walking" OR "weight lifting" OR "wrestling")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S17	TI ("jogging OR "martial arts" OR "nordic walking" OR "running" OR "soccer") OR AB ("jogging" OR "martial arts" OR "nordic walking" OR "running" OR "soccer")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S16	TI ("basketball" OR "boxing" OR "football" OR "gymnastics") OR AB ("basketball" OR "boxing" OR "football" OR "gymnastics")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	#	Query	Limiters/Expanders
Prison/prisoner concept	**S15**	TI ("athletic" OR "athletic performance" OR "athletics") OR AB ("athletic" OR "athletic performance" OR "athletics")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S14	TI ("aerobic exercise" OR "aerobic exercises") OR AB ("aerobic exercise" OR "aerobic exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S13	TI ("activity" or "activities" OR "acute exercise" OR "acute exercises") OR AB ("activity" or "activities" OR "acute exercise" OR "acute exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S12	S8 OR S9 OR S10 OR S11	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S11	SU Prisoner* OR "correctional facilit*" OR prison* OR correctional	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S10	(MH "Correctional Facilities")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S9	(MH "Prisoners")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S8	TI ("convict*" OR "criminal justice" OR "correctional facility*" OR "custody" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand") OR AB ("convict*" OR "criminal justice" OR	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	#	Query	Limiters/Expanders
		"correctional facility*" OR "custody" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand")	
Systematic review concept	**S7**	S1 OR S2 OR S3 OR S4 OR S5 OR S6	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S6	SU "Systematic Review" OR "scoping review" OR "literature review" OR "meta-analysis" OR "meta analysis" OR "meta-synthesis" OR meta synthesis"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S5	systematic N3 review	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S4	(MH "Meta Analysis") OR (MH "Meta Synthesis")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S3	(MH "Systematic Review") OR (MH "Scoping Review") OR (MH "Literature Review")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S2	TI (systematic N5 review* or (cochrane N5 review*)) OR AB (systematic N5 review* or (cochrane N5 review*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S1	TI ("assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "systematic review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*"OR "meta-synthe*"OR "metaanaly*")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	#	Query	Limiters/Expanders
		OR AB ("assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "systematic review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*"OR "meta-synthe*"OR "metaanaly*")	

The following tables contain the individual search concepts added to the above systematic reviews and prison/prisoner concepts for the remaining interventions

#	Query	Limiters/Expanders
Horticulture concept		
S5	S1 OR S2 OR S3 OR S4	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	SU horticulture OR "garden therapy" OR "gardening therapy" OR gardening OR garden	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	SU horticulture OR "garden therapy" OR "gardening therapy" OR gardening	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	(MH "Horticulture")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	TI ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture") OR AB ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Yoga concept		
S10	S1 OR S2 OR S3 OR S4 OR S5 S6 OR S7 OR S8 OR S9	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S9	SU "Meditation" OR "Relaxation Techniques" OR Yoga OR mindfulness	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S8	(MH "Meditation") OR (MH "Relaxation Techniques")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S7	(MH "Yoga")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S6	(MH "Mindfulness+") OR (MH "Reflection") OR (MH "Thinking+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	TI ((Mindful OR mindfulness OR wellbeing OR well-being) N5 (program* or intervention* OR therap* OR session*)) OR AD ((Mindful OR mindfulness OR wellbeing OR well-being) N5 (program* or intervention* OR therap* OR session*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	TI "Transcendental Meditation" OR AB "Transcendental Meditation"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	TI (asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga) OR AB (asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S2	TI yogic OR AB yogic	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	TI yoga* OR AB yoga*	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Arts concept		
S6	S1 OR S2 OR S3 OR S4 OR S5	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	SU "art therap*" OR "arts therap*" OR "music therap*" OR "dance therap*"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	(MH "Music Therapy")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	(MH "Dance Therapy")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	(MH "Art Therapy")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S1	TI ("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance") OR AB ("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Animal-assisted concept		
S5	S1 OR S2 OR S3 OR S4	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	SU ("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	(MH "Animal Assisted Therapy (Iowa NIC)")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	(MH "Pet Therapy+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	TI ("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

"equine assisted psychotherapy*") OR AB ("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*")

#	Query	Limiters/Expanders
Peer concept		
S6	S1 OR S2 OR S3 OR S4 OR S5	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	SU (((Peer-based) N3 intervention*) OR ((Peer based) N3 intervention*) OR "peer intervention*" OR "peer education" OR "peer health" OR "peer group" OR "peer mentoring")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	(MH "Support, Social")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	(MH "Support Groups")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	(MH "Peer Counseling") OR (MH "Peer Pressure") OR (MH "Peer Group") OR (MH "Peer Assistance Programs")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	TI (((Peer-based) N3 intervention*) OR ((Peer based) N3 intervention*) OR "peer intervention*" OR "peer education" OR "peer health" OR "peer group" OR "peer mentoring") OR AB (((Peer-	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	based) N3 intervention*) OR ((Peer based) N3 intervention*) OR "peer intervention*" OR "peer education" OR "peer health" OR "peer group" OR "peer mentoring")	

#	Query	Limiters/Expanders
Healthy eating concept		
S9	S13OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S8	(MH "Food Services") OR (MH "Menu Planning") OR (MH "Restaurants")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S7	(MH "Vegetables+") OR (MH "Fruit+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S6	(MH "Nutrition") OR (MH "Diet+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	(MH "Eating Behavior+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	(MH "Eating")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S3	(MH "Food+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	SU food OR eating OR diet* OR fruits* OR vegetables* OR "nutritional status" OR "feeding behavior" OR "feeding behaviour"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	TI (cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*) OR AB (cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Smoking cessation concept		
S5	S1 OR S2 OR S3 OR S4 OR S5	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	(MH "Tobacco Use Cessation Products+") OR (MH "Tobacco Control")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	(MH "Smoking Cessation Programs") OR (MH "Smoking Cessation") OR (MH "Smoking+") OR (MH "Smoking Cessation Assistance (Iowa NIC)")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	SU "Smoking Cessation" OR "Smoking Cessation Age" OR "Smoking Prevention" OR "Smoke-Free Policy" OR Tobacco Control"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	TI ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

smoking" OR "tobacco control" OR tobacco) OR AB ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco)

7.3.3 SocINDEX (EBSCO)

	#	Query	Limiters/Expanders
	S20	S16 AND S17 AND S18	Limiters - Date of Publication: 20120101-20231231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S19	S16 AND S17 AND S18	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S18	S11 OR S12 OR S13 OR S14 OR S15	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S17	S5 OR S6 OR S7 OR S8 OR S9 OR S10	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S16	S1 OR S2 OR S3 OR S4	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
Exercise/sport concept	S15	SU ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises")) OR KW ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises"))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S14	TI (("activity" or "activities" OR "acute exercise" OR "acute exercises")) OR AB (("activity" or "activities" OR "acute exercise" OR "acute exercises"))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S13	TI (("aerobic exercise" OR "aerobic exercises") OR AB ("aerobic exercise" OR "aerobic exercises")) OR AB (("aerobic exercise" OR "aerobic exercises") OR AB ("aerobic exercise" OR "aerobic exercises"))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	S12	TI ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises") OR AB ("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S11	(DE "EXERCISE" OR DE "PHYSICAL fitness" OR DE "SPORTS") OR (DE "SPORT for all" OR DE "ATHLETICS" OR DE "SPORTS participation")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
Prison/prisoners concept	S10	SU "correctional facilit*" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand")	Limiters - Date of Publication: 20120101-20231231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S9	KW "correctional facilit*" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand")	Limiters - Date of Publication: 20120101-20231231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S8	TI (("correctional facilit*" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand"))) OR AB (("correctional facilit*" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand")))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S7	DE "PRISON population" OR DE "PRISON gangs" OR DE "PRISONERS"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

Systematic review concept	S6	DE "CRIMINALS" OR DE "ARSONISTS" OR DE "COMMERCIAL criminals" OR DE "CRIMINAL snipers" OR DE "CRIMINALS with mental illness" OR DE "CYBERCRIMINALS" OR DE "DEAF criminals" OR DE "DELINQUENT youths" OR DE "DRUG dealers" OR DE "FIRST-time offenders" OR DE "FUGITIVES from justice" OR DE "GANGS" OR DE "GANGSTERS" OR DE "GAY criminals" OR DE "IMPOSTORS & imposture" OR DE "JUVENILE offenders" OR DE "MALE offenders" OR DE "MINORITY criminals" OR DE "MURDERERS" OR DE "NONVIOLENT offenders" OR DE "OCCASIONAL criminals" OR DE "PAROLEES" OR DE "PIMPS" OR DE "RECIDIVISTS" OR DE "SEX offenders" OR DE "STALKERS" OR DE "TERRORISTS" OR DE "THIEVES" OR DE "UNDOCUMENTED immigrant criminals" OR DE "VIOLENT criminals" OR DE "WAR criminals" OR DE "WOMEN criminals"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S5	DE "IMPRISONMENT" OR DE "CORRECTIONAL institutions" OR DE "DETENTION facilities" OR DE "HALFWAY houses" OR DE "JAILS" OR DE "PENAL colonies" OR DE "PRISONS"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S4	TI ((("meta-analysis" OR "meta analysis" OR Network Meta-Analysis") OR ("meta-analysis" OR "meta analysis" OR Network Meta-Analysis") OR ("assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*"OR "meta-synthe*"OR "metaanaly*") OR ("systematic reviews" or "systematic review*"))) OR AB ((("meta-analysis" OR "meta analysis" OR Network Meta-Analysis") OR ("meta-analysis" OR "meta analysis" OR Network Meta-Analysis") OR ("assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*"OR "meta-synthe*"OR "metaanaly*") OR ("systematic reviews" or "systematic review*")))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S3	KW ("meta-analysis" OR "meta analysis" OR "network Meta-Analysis" OR "assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*" OR "meta-synthe*" OR "metaanaly*" OR "systematic reviews" or "systematic review")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
	S2	SU ("meta-analysis" OR "meta analysis" OR "network Meta-Analysis" OR "assessment review" OR "literature review" OR "overview of reviews" OR "review of reviews" OR "scoping review" OR "state-of-the-art review" OR "umbrella review" OR "meta-analy*" OR "metasynthe*" OR "meta-synthe*" OR "metaanaly*" OR "systematic reviews" or "systematic review")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	S1	DE "SYSTEMATIC reviews"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

The following tables contain the individual search concepts added to the above systematic reviews and prison/prisoner concepts for the remaining interventions

#	Query	Limiters/Expanders
Horticulture concept		
S4	S1 OR S2 OR S3	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	SU ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture") OR KW ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	TI ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture") OR AB ("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	SU "correctional facilit*" OR "detainee*" OR "detention" OR "felon*" OR "incarcerated offender*" OR "incarcerated population*" OR "inmate*" OR "gaol" OR "imprison*" OR "incarcerat*" OR "jail*" OR "offender*" OR "prisoner*" OR "reincarcerated" OR "repeat offender*" OR "penal" OR "penitentiary" OR "prison*" OR "probation" OR "remand")	Limiters - Date of Publication: 20120101-20231231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders

Yoga concept		
S4	S1 OR S2 OR S3	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	SU (yoga OR meditation OR mindful OR mindfulness OR "relaxation technique*" OR asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga OR wellbeing OR well-being) OR KW (yoga OR meditation OR mindful OR mindfulness OR "relaxation technique*" OR asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga OR wellbeing OR well-being)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	TI (yoga OR meditation OR mindful OR mindfulness OR "relaxation technique*" OR asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga OR wellbeing OR well-being) OR AB (yoga OR meditation OR mindful OR mindfulness OR "relaxation technique*" OR asana OR pranayama OR dhyana OR dharana or meditation* OR hatha OR ashtanga OR wellbeing OR well-being)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	((DE "MEDITATION" OR DE "TRANSCENDENTAL Meditation") AND (DE "AFFIRMATIONS (Self-help)" OR DE "CONSCIOUSNESS" OR DE "CONTEMPLATION" OR DE "MINDFULNESS")) OR (DE "TWELVE-step programs" OR DE "SELF-efficacy" OR DE "SELF-perception")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Arts concept		
S4	S1 OR S2 OR S3	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	SU (("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "creativ* therapy" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance")) OR KW (("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "creativ* therapy" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	"dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance"))	
S2	TI (("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "creativ* therapy" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance")) OR AB (("arts therap*” OR "arts psychotherap*" "art therap*" OR "art psychotherapy*" OR "creativ* therapy" OR "music* intervention*" OR "music therap*" OR "musictherap*" OR "drama therap*" OR "dramatherap*" OR "drama psychotherapy*" OR "dance therap*" OR "dancetherap*" OR "dance movement therap*" OR "movement psychotherapy*" OR "therap* movement" OR "therap* dance"))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	DE "ART therapy" OR DE "MUSIC therapy" OR DE "DANCE therapy"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

Animal-assisted concept		
S6	S1 OR S2 OR S3 OR S4 OR S5	
S5	TI (("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*")) OR AB (("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*"))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S4	SU (("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*")) OR KW (("animal assisted therap*" OR "animal-assisted therap*" OR "animal facilitated therap*" OR "animal facilitated therap*" OR "pet assisted therap*" OR "pet-assisted therap*" OR "pet facilitated therap*" OR "pet-facilitated therap*" OR "pet therap*" OR ("dog based" N3 intervention*) OR (dog-based N3 intervention*) OR "equine-assisted psychotherapy*" OR "equine assisted psychotherapy*"))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	DE "OCCUPATIONAL therapy"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	DE "PETS" OR DE "PETS & society" OR DE "HUMAN-animal relationships"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	(DE "PETS" OR DE "PETS & society") OR (DE "HUMAN-animal relationships")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Peer concept		
S6	S1 OR S2 OR S3 OR S4 OR S5	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	TI (“self-help group” OR “therapeutic communit*” OR "social support" OR "community support" OR "peer group*”) OR AB (“self-help group” OR “therapeutic communit*” OR "social support" OR "community support" OR "peer group*”)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S4	TI (((Peer or support or community or mentor*) N3 (intervention* OR education OR health OR group OR mentor* OR therapeutic communit*))) OR AB (((Peer or support or community or mentor*) N3 (intervention* OR education OR health OR group OR mentor* OR therapeutic communit*)))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	(DE "SOCIAL groups" OR DE "SOCIAL networks" OR DE "LEARNING communities") AND (DE "FRIENDSHIP" OR DE "FEMALE friendship" OR DE "MALE friendship")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	DE "SUPPORT groups" OR DE "SUPPORT groups for substance abusers" OR DE "SELF-efficacy" OR DE "SELF-help techniques"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	DE "PEER communication"	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Healthy eating concept		
S6	S1 OR S2 OR S3 OR S4 OR S5	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	SU ((cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*)) OR KW ((cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	TI ((cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*)) OR AB ((cafeteria* OR canteen* OR "food program*" OR "food intervention*" OR fruit* OR "health* n2 eating" OR menu* OR "menu planning" OR nutrition* OR vegetable*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

S3	SU (food OR eating OR diet* OR fruits* OR vegetables* OR "nutritional status" OR "feeding behavior" OR "feeding behaviour") OR KW (food OR eating OR diet* OR fruits* OR vegetables* OR "nutritional status" OR "feeding behavior" OR "feeding behaviour")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S2	TI (food OR eating OR diet* OR fruits* OR vegetables* OR "nutritional status" OR "feeding behavior" OR "feeding behaviour") OR AB (food OR eating OR diet* OR fruits* OR vegetables* OR "nutritional status" OR "feeding behavior" OR "feeding behaviour")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	(DE "FOOD habits") OR (DE "NUTRITION") OR (DE "FOOD & culture")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

#	Query	Limiters/Expanders
Smoking cessation concept		
S6	S1 OR S2 OR S3 OR S4 OR S5	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S5	SU ("Smoking Cessation" OR "Smoking Cessation Age" OR "Smoking Prevention" OR "Smoke-Free Policy" OR "Tobacco Control") OR KW ("Smoking Cessation" OR "Smoking Cessation Age" OR "Smoking Prevention" OR "Smoke-Free Policy" OR "Tobacco Control")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S4	TI ("Smoking Cessation" OR "Smoking Cessation Age" OR "Smoking Prevention" OR "Smoke-Free Policy" OR "Tobacco Control") OR AB ("Smoking Cessation" OR "Smoking Cessation Age" OR "Smoking Prevention" OR "Smoke-Free Policy" OR "Tobacco Control")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S3	SU ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco) OR KW ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

	smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco)	
S2	TI ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco) OR AB ("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR " anti-smoking campaign*" OR " anti smoking education " OR "anti-smoking education" OR cigaret*OR "giving up smoking" OR nicotine OR "quitting smoking" OR smok* OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase
S1	(DE "SMOKING" OR DE "TOBACCO use" OR DE "CIGARETTE smokers" OR DE "CIGARETTES" OR DE "SMOKING bans" OR DE "SMOKING laws") OR (DE "NICOTINE addiction")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase

7.3.4 PsycINFO (Ovid)

	#	Searches
Prisons/prisoner concept	1	incarcerated/or exp criminal offenders/
	2	correctional institutions/or exp prisons/or incarceration/
	3	incarcerated/or formerly incarcerated/or criminal rehabilitation/
	4	("convict*" or "criminal justice" or "correctional facility*" or "custody" or "detainee*" or "detention" or "felon*" or "incarcerated offender*" or "incarcerated population*" or "inmate*" or "gaol" or "imprison*" or "incarcerat*" or "jail*" or "offender*" or "prisoner*" or "reincarcerated" or "repeat offender*" or "penal" or "penitentiary" or "prison*" or "probation" or "remand").mp.
	5	1 or 2 or 3 or 4
Systematic review concept	6	"systematic review"/or "literature review"/or exp meta analysis/
	7	("assessment review" or "literature review" or "overview of reviews" or "review of reviews" or "scoping review" or "state-of-the-art review" or "systematic review" or "umbrella review" or "meta-analy*" or "metasynthe*OR meta-synthe*OR metaanaly*").mp.
	8	((systematic adj5 review*) or (cochrane adj5 review*)).mp.
	9	6 or 7 or 8
Exercise/sports concept	10	exp Exercise/or exp Aerobic Exercise/or exp "Sport and Exercise Measures"/
	11	exp Physical Fitness/or exp Physical Activity/
	12	("isometric exercise" or "isometric exercises" or "jogging" or "physical" or "physical activities" or "physical activity" or "physical endurance" or "physical exercise" or "physical exercises" or "physical fitness" or "sport" or "sports for persons with disabilities").mp.
	13	("cardiorespiratory fitness" or "exercise" or "exercise test" or "exercise therapy" or "exercise training" or "exercise trainings" or "exercises" or "swimming" or "tai ji" or "team sports" or "track and field" or "volleyball" or "walking" or "weight lifting" or "wrestling" or jogging or "martial arts" or "nordic walking" or running or soccer or basketball or boxing or football or gymnastics or athletic or "athletic performance" or athletics or "aerobic exercise" or "aerobic exercises" or activity or activities or "acute exercise" or "acute exercises").mp.
	14	10 or 11 or 12 or 13

15	5 and 9 and 14
16	limit 15 to yr="2012 -Current"

The following tables contain the individual search concepts added to the above systematic reviews and prison/prisoner concepts for the remaining interventions

	Horticulture
1	exp horticulture therapy/or exp botany/or exp "plants (botanical)"/or exp recreation therapy/
2	("garden therapy" or "gardening therapy" or "garden" or "gardening" or "horticulture therapy" or "horticultural therapy" or "therapeutic horticulture").mp.
3	1 or 2

	Yoga
1	exp yoga/or relaxation/
2	meditation/or centering/or holistic health/or martial arts/or mindfulness/or mindfulness-based interventions/or exp relaxation therapy/
3	(yoga or meditation or mindful or mindfulness or "relaxation technique*" or asana or pranayama or dhyana or dharana or meditation* or hatha or ashtanga or wellbeing or well-being).mp.
4	1 or 2 or 3

	Arts therapy
1	exp art therapy/or exp creative arts therapy/or exp recreation therapy/
2	dance therapy/or exp movement therapy/
3	exp music therapy/
4	1 or 2 or 3

	Animal-assisted therapy
1	exp animal assisted therapy/
2	("animal assisted therap*" or "animal-assisted therap*" or "animal facilitated therap*" or "animal facilitated therap*" or "pet assisted therap*" or "pet-assisted therap*" or "pet facilitated therap*" or "pet-facilitated therap*" or "pet therap*" or ("dog based" adj3 intervention*) or (dog-based adj3 intervention*) or (equine adj3 intervention*) or "equine-assisted psychotherapy*" or "equine assisted psychotherapy*").mp.
3	1 or 2

	Peer support
1	peers/or exp peer counseling/or exp peer pressure/or exp peer relations/
2	exp Therapeutic Community/
3	social support/or emotional support/or friendship/or social connectedness/
4	((Peer-based adj3 intervention*) or ("Peer based" adj3 intervention*) or "peer intervention*" or "peer education" or "peer health" or "peer group" or "peer mentoring").mp.
5	1 or 2 or 3 or 4

	Healthy eating
1	nutrition/or "beverages (nonalcoholic)"/or calories/or carbohydrates/or dietary supplements/or exp diets/or energy drink/or exp food/or mealtimes/or exp healthy eating/or exp meat consumption/or exp nutritional deficiencies/or exp vegan diet/or exp vegetarian diet/
2	exp Eating Behavior/or exp Obesity/or exp Health Promotion/or exp Food Intake/
3	(cafeteria* or canteen* or "food program*" or "food intervention*" or fruit* or "health* n2 eating" or menu* or "menu planning" or nutrition* or vegetable* or food* or eating or diet* or fruits* or vegetables* or "nutritional status" or "feeding behavior" or "feeding behaviour").mp.
4	1 or 2 or 3

	Smoking cessation
1	exp Smoking Cessation/or exp Passive Smoking/or exp Tobacco Smoking/or exp Smoking Prevention/
2	("anti smoking campaign" or anti-smoking campaign or "anti smoking education" or "anti-smoking education" or " anti-smoking campaign*" or " anti smoking education " or "anti-smoking education" or "cigaret* OR giving up smoking" or nicotine or "quitting smoking" or smok* or "smoking cessation" or "smoking prevention" or "stopping smoking" or "tobacco control" or tobacco).mp.
3	1 or 2

7.3.5 Epistemonikos

Exercise
(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:((exercise OR sport OR running OR fitness)) OR abstract:((exercise OR sport OR running OR fitness)))
Filter: Publication year: 2012-2023
Filter: Publication type: Systematic review

Horticulture
(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:(garden* OR horticulture OR plant OR farm*) OR abstract:(garden* OR horticulture OR plant OR farm*))
Filter: Publication year: 2012-2023
Filter: Publication type: Systematic review

Yoga
(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:(yoga OR meditation OR mindful OR mindfulness OR well-being OR wellbeing) OR abstract:(yoga OR meditation OR mindful OR mindfulness OR well-being OR wellbeing))
Filter: Publication year: 2012-2023
Filter: Publication type: Systematic review

Arts therapy
(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:(("art therapy" OR "music therapy" OR "dance therapy" OR "arts therapy" OR "arts psychotherapy" OR "drama therapy" OR Arts OR Music OR Dance OR Drama)) OR abstract:(("art therapy" OR "music therapy" OR "dance therapy" OR "arts therapy" OR "arts psychotherapy" OR "drama therapy" OR Arts OR Music OR Dance OR Drama)))
Filter: Publication year: 2012-2023

Filter: Publication type: Systematic review

Animal-assisted

(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:((pet OR animal OR animal-assisted OR dog OR dog-training OR equine OR horse)) OR abstract:((pet OR animal OR animal-assisted OR dog OR dog-training OR equine OR horse)))

Filter: Publication year: 2012-2023

Filter: Publication type: Systematic review

Peers

(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:(peer-support OR "peer support" OR "peer education" OR "per health" OR peer OR peer-based) OR abstract:(peer-support OR "peer support" OR "peer education" OR "peer health" OR peer OR peers OR peer-based))

Filter: Publication year: 2012-2023

Filter: Publication type: Systematic review

Nutrition

(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:(nutrition OR diet* OR food* OR feeding OR eating OR "healthy eating" OR "menu planning") OR abstract:(nutrition OR diet* OR food* OR feeding OR eating OR "healthy eating" OR "menu planning"))

Filter: Publication year: 2012-2023

Filter: Publication type: Systematic review

Smoking

(title:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*)) OR abstract:((prison* OR incarcerat* OR custod* OR imprison* OR detain* OR inmate* OR jail* OR gaol* OR penal* OR penitentiary OR "correctional facilit*" OR probation*))) AND (title:(smoke OR smoking cessation OR smoking OR

cigarette OR smoke-free OR "smoke free") OR abstract:(smoke OR smoking cessation OR smoking OR cigarette OR smoke-free OR "smoke free"))
Filter: Publication year: 2012-2023
Filter: Publication type: Systematic review

7.3.6 Cochrane Library

Exercise

	ID	Search
Exercise concept	#1	MeSH descriptor: [Exercise] explode all trees
	#2	MeSH descriptor: [Exercise Therapy] explode all trees
	#3	MeSH descriptor: [Physical Conditioning, Human] explode all trees
	#4	MeSH descriptor: [Running] explode all trees
	#5	MeSH descriptor: [Gymnastics] explode all trees
	#6	(("isometric exercise" OR "isometric exercises" OR "jogging" OR "physical" OR "physical activities" OR "physical activity" OR "physical endurance" OR "physical exercise" OR "physical exercises" OR "physical fitness" OR "sport" OR "sports for persons with disabilities")):ti,ab,kw (Word variations have been searched)
	#7	(("cardiorespiratory fitness" OR "exercise" OR "exercise test" OR "exercise therapy" OR "exercise training" OR "exercise trainings" OR "exercises")):ti,ab,kw (Word variations have been searched)
	#8	(("swimming" OR "tai ji" OR "team sports" OR "track and field" OR "volleyball" OR "walking" OR "weight lifting" OR "wrestling")):ti,ab,kw (Word variations have been searched)
	#9	(jogging OR "martial arts" OR "nordic walking" OR running OR soccer OR basketball OR boxing OR football OR gymnastics OR athletic OR "athletic performance" OR athletics OR "aerobic exercise" OR "aerobic exercises" OR activity or activities OR "acute exercise" OR "acute exercises"):ti,ab,kw (Word variations have been searched)
	#10	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9
Prisons/prisoner concept	#11	MeSH descriptor: [Prisoners] explode all trees
	#12	MeSH descriptor: [Prisons] explode all trees
	#13	MeSH descriptor: [Correctional Facilities] explode all trees
	#14	(convict* OR "criminal justice" OR "correctional facility" OR "correctional facilities" OR custody OR detainee* OR detention OR felon* OR "incarcerated offender" OR "incarcerated population" OR inmate* OR imprison* OR incarcerate* OR jail* OR offender* OR prisoner* OR reincarcerated OR "repeat offender" OR "repeat offenders" OR penal OR penitentiary OR prison* OR probation OR remand):ti,ab,kw (Word variations have been searched)
	#15	#11 OR #12 OR #13 OR #14
	#16	#10 AND #15
	#17	#16 in Cochrane Reviews with Cochrane Library publication date Between Jan 2012 and Sep 2023

The following tables contain the remaining individual search concepts added to the above prison/prisoners concept.

Horticulture

ID	Search
#1	MeSH descriptor: [Gardening] explode all trees
#2	MeSH descriptor: [Horticultural Therapy] explode all trees
#3	("garden therapy" OR "gardening therapy" OR "garden" OR "gardening" OR "horticulture therapy" OR "horticultural therapy" OR "therapeutic horticulture"):ti,ab,kw (Word variations have been searched)
#4	#1 OR #2 OR #3

Yoga

ID	Search
#1	(asana OR pranayama OR dhyana OR dharana or meditation OR meditations OR hatha OR ashtanga OR mindful OR mindfulness OR wellbeing OR well-being NEAR/5 intervention OR interventions OR program OR programs OR programme OR programmes OR session OR sessions):ti,ab,kw (Word variations have been searched)
#2	(yogic OR yoga OR yogas OR "Transcendental Meditation" OR Mindful OR mindfulness):ti,ab,kw (Word variations have been searched)
#3	MeSH descriptor: [Muscle Stretching Exercises] explode all trees
#4	MeSH descriptor: [Yoga] explode all trees
#5	MeSH descriptor: [Meditation] explode all trees
#6	#1 OR #2 OR #3 OR #4 OR #5

Arts Therapy

ID	Search
#1	("arts therap" OR "arts therapies" OR "arts psychotherapy" OR "arts psychotherapies" OR "art therapy" OR "art therapies" OR "art psychotherapy" OR "art psychotherapies" OR "musical intervention" OR "music intervention" OR "musical intervention" OR "music interventions" OR "music therapy" OR "music therapies" OR "musictherapy" OR "musictherapies" OR "drama therapy" OR "drama therapies" OR "dramatherapy" OR "dramaterapies" OR "drama psychotherapy" OR "drama psychotherapies" OR "dance therapy" OR "dance therapies" OR "dancetherapy" OR "dance therapies" OR "dance movement therapy" OR "dance movement therapies" OR "movement psychotherapy" OR "movement psychotherapies" OR "therapeutic movement" OR "therapy movement" OR "therapeutic dance" OR "therapy dance"):ti,ab,kw (Word variations have been searched)
#2	MeSH descriptor: [Art Therapy] explode all trees
#3	MeSH descriptor: [Dance Therapy] explode all trees

#4	MeSH descriptor: [Music Therapy] explode all trees
#5	#1 OR #2 OR #3 OR #4

Animal-based

ID	Search
#1	("animal assisted therapy" OR "animal assisted therapies" OR "animal-assisted therapy" OR "animal-assisted therapies" OR "animal facilitated therapy" OR "animal facilitated therapies" OR "animal facilitated therapy" OR "animal facilitated therapies" OR "pet assisted therapy" OR "pet-assisted therapies" OR "pet-assisted therapy" OR "pet-assisted therapies" OR "pet facilitated therapy" OR "pet-facilitated therapies" OR "pet therapy" OR "pet therapies" OR ("dog based" NEAR/3 intervention OR intevention) OR (dog-based NEAR/3 intervention OR interventions) OR "equine-assisted psychotherapy" OR "equine-assisted psychotherapies" OR "equine assisted psychotherapy" OR "equine assisted psychotherapies"):ti,ab,kw (Word variations have been searched)
#2	MeSH descriptor: [Animal Assisted Therapy] explode all trees
#3	#1 OR #2

Peer support

ID	Search
#1	((Peer-based NEAR/3 "intervention" OR "peer interventions") OR ((Peer based) NEAR/3 intervention or interventions) OR "peer intervention" OR "peer interventions" OR "peer education" OR "peer health" OR "peer group" OR "peer mentoring"):ti,ab,kw (Word variations have been searched)
#2	MeSH descriptor: [Social Support] explode all trees
#3	MeSH descriptor: [Self-Help Groups] explode all trees
#4	MeSH descriptor: [Peer Group] explode all trees
#5	MeSH descriptor: [Friends] explode all trees
#6	MeSH descriptor: [Therapeutic Community] explode all trees
#7	MeSH descriptor: [Social Support] explode all trees
#8	MeSH descriptor: [Community Support] explode all trees
#9	#1 OR #2 OR #3 OR #4 OR #5 0R #6 OR #7 OR #8

Healthy eating

ID	Search
#1	(cafeteria* OR canteen* OR fruit* OR menu* OR nutrition* OR vegetable*):ti,ab,kw (Word variations have been searched)

#2	("food program" OR "food programs" OR "food programme" OR "food programmes" OR "food programme" OR "food programmes" OR "food intervention" OR "food interventions" OR "menu planning"):ti,ab,kw (Word variations have been searched)
#3	("healthy NEAR/2 eating" OR "healthy NEAR/2 diet" OR "healthy NEAR/2 food"):ti,ab,kw (Word variations have been searched)
#4	MeSH descriptor: [Menu Planning] explode all trees
#5	MeSH descriptor: [Food Services] explode all trees
#6	MeSH descriptor: [Feeding Behavior] explode all trees
#7	MeSH descriptor: [Nutritional Status] explode all trees
#8	MeSH descriptor: [Eating] explode all trees
#9	MeSH descriptor: [Vegetables] explode all trees
#10	MeSH descriptor: [Fruit] explode all trees
#11	MeSH descriptor: [Diet] explode all trees
#12	MeSH descriptor: [Food] explode all trees
#13	#1 OR #S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12

Smoking cessation

ID	Search
#1	("anti smoking campaign" OR anti-smoking campaign OR "anti smoking education" OR "anti-smoking education" OR "anti-smoking campaign" OR "anti-smoking campaigns" OR " anti smoking education" OR "anti-smoking education" OR cigarettes OR cigarette OR cigar OR "giving up smoking" OR nicotine OR "quitting smoking" OR smoke OR smokes OR smoking OR "smoking cessation" OR "smoking prevention" OR "stopping smoking" OR "tobacco control" OR tobacco):ti,ab,kw (Word variations have been searched)
#2	MeSH descriptor: [Smoking Cessation] explode all trees
#3	MeSH descriptor: [Smoking Cessation Agents] explode all trees
#4	MeSH descriptor: [Tobacco Control] explode all trees
#5	MeSH descriptor: [Smoking Prevention] explode all trees
#6	MeSH descriptor: [Smoke-Free Policy] explode all trees
#7	#1 OR #2 OR #3 OR #4 OR #5 OR #6

7.3.7 Social System Evidence

https://www.socialsystemsevidence.org/

Exercise
(prison OR prisoner OR jail OR convict OR inmate) AND (health OR exercise OR fitness OR sport OR physical)
Limit to 2012+

Horticulture
(prison OR prisoner OR jail OR convict OR inmate) AND (horticulture)
(prison OR prisoner OR jail OR convict OR inmate) AND garden OR gardening)
Limit to 2012+

Yoga
(prison OR prisoner OR jail OR convict OR inmate) AND (yoga OR meditation OR mindful OR mindfulness)
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (yoga)
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (meditation)
Limit to 2012+

Arts Therapy
(prison OR prisoner OR jail OR convict OR inmate) AND (art OR arts OR dance OR dancing OR drama)
Limit to 2012+

Animal-based
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (animal or dog or horse)
Limit to 2012+

Peer Support
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (peer)
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (peers)
Limit to 2012+

Healthy eating
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (nutrition)
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (menu or food or diet or eat)
Limit to 2012+

Smoking cessation
(prison OR prisoner OR jail OR convict OR inmate) AND (smoking OR cigarette OR tobacco)
Limit to 2012+

7.3.8 Health System Evidence

https://www.healthsystemsevidence.org/

Exercise
(prison OR prisoner OR jail OR convict OR inmate) AND (health OR exercise OR fitness OR sport OR physical)
Limit to 2012+

Horticulture
(prison OR prisoner OR jail OR convict OR inmate) AND (horticulture OR garden OR gardening)
Limit to 2012+

Yoga
(prison OR prisons OR prisoner OR prisoners OR jail OR convict OR inmate OR inmates) AND (garden)
(prison OR prisons OR prisoner OR prisoners OR jail OR convict OR inmate OR inmates) AND (horticulture)
Limit to 2012+

Arts Therapy
(prison OR prisoner OR jail OR convict OR inmate) AND (art OR arts OR dance OR dancing OR drama)
Limit to 2012+

Animal based
(prison OR prison OR prisoner OR prisoners OR jail OR convict OR inmate)
Limit to 2012+

Peer Support
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (peer)
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (peers)
Limit to 2012+

Nutrition

(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (nutrition)
(prison OR prisons OR prisoner OR jail OR convict OR inmate) AND (menu or food or diet or eat)
Limit to 2012+

Smoking cessation
(prison OR prisoner OR jail OR convict OR inmate) AND (smoking OR cigarette OR tobacco)
Limit to 2012+

7.3.9 Prospero

Line	Search for	Hits
#1	MeSH DESCRIPTOR Prisoners EXPLODE ALL TREES AND (Review_Completed_not_published OR Review_Completed_published):RS WHERE CD FROM 01/01/2014 TO 08/01/2024	0
#2	MeSH DESCRIPTOR Prisoners EXPLODE ALL TREES AND (Review_Ongoing):RS WHERE CD FROM 01/01/2014 TO 08/01/2024	0
#3	MeSH DESCRIPTOR Prisoners EXPLODE ALL TREES AND (Review_Ongoing):RS WHERE CD FROM 01/01/2014 TO 08/01/2024	0
#4	MeSH DESCRIPTOR Prisoners EXPLODE ALL TREES AND (Review_Ongoing):RS WHERE CD FROM 01/01/2014 TO 08/01/2024	0
#5	prisoner* or inmate* AND (Review_Ongoing OR Review_Completed_not_published OR Review_Completed_published):RS WHERE CD FROM 01/01/2014 TO 08/01/2024	515
#6	prison* or jail* AND (Review_Ongoing OR Review_Completed_not_published OR Review_Completed_published):RS WHERE CD FROM 01/01/2014 TO 08/01/2024	1155
#7	#5 or #6	1168

7.4 Appendix 4 Excluded papers and reasons for exclusion at full text screening and extraction stages

Table 50 Papers excluded at full text screening (animal-based interventions) n =6

Systematic reviews	Exclusion rationale
Bachi K. Equine-Facilitated Prison-Based Programs Within the Context of Prison-Based Animal Programs: State of the Science Review. J Offender Rehabil 2013;52:46–74. doi:10.1080/10509674.2012.734371	Exclude on study design
Ciez T. Correctional Education as Therapeutic Change: Exploring the Use of Animal-Assisted Therapy Programs with Incarcerated Women. Ed.D. Northern Illinois University 2021. https://www.proquest.com/docview/2557474474	Exclude on study design
Cooke BJ, Farrington DP. The Effectiveness of Dog-Training Programs in Prison: A Systematic Review and Meta-Analysis of the Literature. Prison J 2016;96:854–76. doi:10.1177/0032885516671919	Exclude on methods
Doney E. Animal-assisted interventions with dogs: A review of the current literature. 2021. https://www.proquest.com/docview/2470049104	Exclude on methods
Mulcahy C, Mclaughlin D. Is the Tail Wagging the Dog? A Review of the Evidence for Prison Animal Programs. Aust Psychol 2013;48:370–8. doi:10.1111/ap.12021	Exclude on methods
Topbas ZS, Simsek N. Effect of Animal Assisted Interventions on Inmates: A Systematic Review/Hayvan Destekli Uygulamalarin Tutuklu Bireyler Uzerine Etkisi:Sistematik Bir Gozden Gecirme. Psikiyatr Guncel Yaklasimlar/Current Approaches Psychiatry 2022;14:12–21.	Exclude on methods

Table 51 Papers excluded at full text screening (art and creative interventions including music) n =8

Systematic reviews	Exclusion rationale
Abbing A, Ponstein A, van Hooren S, *et al.* The effectiveness of art therapy for anxiety in adults: A systematic review of randomised and non-randomised controlled trials. PloS One 2018;13:e0208716. doi:10.1371/journal.pone.0208716	Exclude on intervention
Abbing A, Haeyen S, Nyapati S, *et al.* Effectiveness and mechanisms of the arts therapies in forensic care. A systematic review, narrative synthesis, and meta-analysis. Front Psychiatry 2023;14.	Exclude on context/setting
Cohen-Yatziv L, Regev D. The effectiveness and contribution of art therapy work with children in 2018 -what progress has been made so far? A systematic review. Int J Art Ther 2019;24:100–12. doi:10.1080/17454832.2019.1574845	Exclude on methods
Coutinho BV, Hansen AL, Waage L, *et al.* Music Making Interventions with Adults in the Forensic Setting – A Systematic Review of the Literature – Part I: Group Interventions. Music Med 2015;7:40–53. doi:10.47513/mmd.v7i3.409	Exclude on methods

Coutinho BV, Hansen AL, Waage L, *et al.* Music Making Interventions with Adults in the Forensic Setting – A Systematic Review of the Literature – Part II: Case Studies and Good vibrations. Music Med 2015;7:50–71. doi:10.47513/mmd.v7i4.435	Exclude on intervention
Daykin N, de Viggiani N, Pilkington P, *et al.* Music making for health, well-being and behaviour change in youth justice settings: a systematic review. Health Promot Int 2013;28:197–210. doi:10.1093/heapro/das005	Exclude on Context/setting
Maujean A, Pepping CA, Kendall E. A Systematic Review of Randomized Controlled Studies of Art Therapy. Art Ther 2014;31:37–44. doi:10.1080/07421656.2014.873696	Exclude on methods
Regev D, Cohen-Yatziv L. Effectiveness of Art Therapy with Adult Clients in 2018—What Progress Has Been Made? Front Psychol 2018;9. doi:10.3389/fpsyg.2018.01531	Exclude on methods

Table 52 Papers excluded at full text screening (Healthy eating and nutrition interventions) n = 8

Systematic reviews	Exclusion rationale
Attebery J. Regenerating Soil, Soul, and Society: Garden-based Sustainability Pedagogy for Incarcerated Adult Learners. Ph.D. Prescott College 2017. https://books.google.ie/books?id=MV6kzQEACAAJ	Exclude on methods
Davison KM, D'Andreamatteo C, Smye VL. Medical nutrition therapy in Canadian federal correctional facilities. BMC Health Serv Res 2019;19:89. doi:10.1186/s12913-019-3926-3	Exclude scoping review
Guo W, Cronk R, Scherer E, *et al.* A systematic scoping review of environmental health conditions in penal institutions. Int J Hyg Environ Health 2019;222:790–803. doi:10.1016/j.ijheh.2019.05.001	Exclude scoping review
Herbert K, Plugge E, Foster C, *et al.* Prevalence of risk factors for non-communicable diseases in prison populations worldwide: a systematic review. Lancet Lond Engl 2012;379:1975–82. doi:10.1016/S0140-6736(12)60319-5	Exclude on intervention
Newman L, Baum F, Javanparast S, *et al.* Addressing social determinants of health inequities through settings: a rapid review. Health Promot Int 2015;30 Suppl 2:ii126-143. doi:10.1093/heapro/dav054	Exclude on methods

Qureshi FM, Kunaratnam N, Kolla NJ, *et al.* Nutritional supplementation in the treatment of violent and aggressive behavior: A systematic review. Aggress Behav 2021;47:296–309. doi:10.1002/ab.21953	Exclude on intervention
Santora L, Arild Espnes G, Lillefjell M. Health promotion and prison settings. Int J Prison Health 2014;10:27–37. doi:10.1108/IJPH-08-2013-0036	Exclude on methods
Smoyer AB. Food in correctional facilities: A scoping review. Appetite 2019;141:104312. doi:10.1016/j.appet.2019.06.004	Exclude on methods

Table 53 Papers excluded at full text screening (Horticultural) n = 1

Systematic reviews	Exclusion rationale
Moeller C, King N, Burr V, *et al.* Nature-based interventions in institutional and organisational settings: a scoping review. Int J Environ Health Res 2018;28:293–305. doi:10.1080/09603123.2018.1468425	Exclude scoping review

Table 54 Papers excluded at full text screening (multi-component interventions) n = 1

Systematic reviews	Exclusion rationale
Kouyoumdjian FG, McIsaac KE, Liauw J, *et al.* A systematic review of randomized controlled trials of interventions to improve the health of persons during imprisonment and in the year after release. Am J Public Health 2015;105:e13-33. doi:10.2105/AJPH.2014.302498	Exclude on intervention

Table 55 Papers excluded at full text screening (Uncategorised) n = 1

Systematic reviews	Exclusion rationale

Auty KM, Cope A, Liebling A. Psychoeducational programs for reducing prison violence: A systematic review. Aggress Violent Behav 2017;33:126–43. doi:10.1016/j.avb.2017.01.018	Exclude on intervention

Table 56 Papers excluded at full text screening (Peer support-based interventions) n = 8

Systematic reviews	Exclusion rationale
Bagnall A-M, South J, Hulme C, *et al.* A systematic review of the effectiveness and cost-effectiveness of peer education and peer support in prisons. BMC Public Health 2015;15:290. doi:10.1186/s12889-015-1584-x	Exclude duplicate
Di Lorito C, Völlm B, Dening T. The individual experience of ageing prisoners: systematic review and meta-synthesis through a Good Lives Model framework. Int J Geriatr Psychiatry 2018;33:252–62. doi:10.1002/gps.4762	Exclude on intervention
Moyes HCA, Heath JJ, Dean LV. What can be done to improve outcomes for prisoners with a dual diagnosis? Adv Dual Diagn 2016;9:14–25. doi:10.1108/ADD-07-2015-0016	Exclude on population
Netto NR, Carter JM, Bonell C. A Systematic Review of Interventions That Adopt the "Good Lives" Approach to Offender Rehabilitation. J Offender Rehabil 2014;53:403–32. doi:10.1080/10509674.2014.931746	Exclude on methods
Richardson J, Zini V. Are prison-based therapeutic communities effective? Challenges and considerations. Int J Prison Health 2020;17:42–53. doi:10.1108/IJPH-07-2020-0048	Exclude on methods
South J, Bagnall A-M, Woodall J. Developing a Typology for Peer Education and Peer Support Delivered by Prisoners. J Correct Health Care 2017;23:214–29. doi:10.1177/1078345817700602	Exclude on study design
Stewart W, Edmond N. Prisoner peer caregiving: a literature review. Nurs Stand R Coll Nurs G B 1987 2017;31:44–51. doi:10.7748/ns.2017.e10468	Exclude on methods

Topping KJ. Peer Education and Peer Counselling for Health and Well-Being: A Review of Reviews. Int J Environ Res Public Health 2022;19:6064. doi:10.3390/ijerph19106064	Exclude on study design

Table 57 Papers excluded at full text screening (Smoking cessation interventions) n = 8

Systematic reviews	Exclusion rationale
Cabral DCP, Lima M de FG, Albuquerque NLS de, *et al.* Preventive measures against risk factors for cardiovascular diseases in the prison environment: an integrative review. Rev Rene 2023;24:e83186–e83186. doi:10.15253/2175-6783.20232483186	Exclude on methods
Djachenko A, St John W, Mitchell C. Smoking cessation in male prisoners: a literature review. Int J Prison Health 2015;11:39–48. doi:10.1108/IJPH-10-2014-0035	Exclude on methods
Emerson A, Lipnicky A, Schuster B, *et al.* Physical health programs and interventions with women during incarceration: a scoping review. Int J Prison Health 2021;18:285–99. doi:10.1108/IJPH-06-2021-0055	Exclude scoping review
Gentry S, Forouhi NG, Notley C. Are Electronic Cigarettes an Effective Aid to Smoking Cessation or Reduction Among Vulnerable Groups? A Systematic Review of Quantitative and Qualitative Evidence. Nicotine Tob Res 2019;21:602–16. doi:10.1093/ntr/nty054	Exclude on population
Kennedy SM, Davis SP, Thorne SL. Smoke-Free Policies in U.S. Prisons and Jails: A Review of the Literature. Nicotine Tob Res 2015;17:629–35. doi:10.1093/ntr/ntu225	Exclude on methods
Puljević C, Segan CJ. Systematic Review of Factors Influencing Smoking Following Release From Smoke-Free Prisons. Nicotine Tob Res 2019;21:1011–20. doi:10.1093/ntr/nty088	Exclude on methods

Spaulding AC, Eldridge GD, Chico CE, *et al.* Smoking in Correctional Settings Worldwide: Prevalence, Bans, and Interventions. Epidemiol Rev 2018;40:82–95. doi:10.1093/epirev/mxy005	Exclude on methods
Wilson A, Guillaumier A, George J, *et al.* A systematic narrative review of the effectiveness of behavioural smoking cessation interventions in selected disadvantaged groups (2010-2017). Expert Rev Respir Med 2017;11:617–30. doi:10.1080/17476348.2017.1340836	Exclude on methods

Table 58 Papers excluded at full text screening (Sports and exercise-based) n = 15

Systematic reviews	Exclusion rationale
Flotron T, Büsser R, Gantschnig B, *et al.* Handlungsfähigkeit hinter Gittern ermöglichen : ältere Menschen im Gefängnis und mögliche Ansätze der Ergotherapie. Ergoscience 2015;10:21–9. doi:10.2443/skv-s-2015-54020150103	Exclude on language
Leigh-Hunt N, Perry A. A systematic review of interventions for anxiety, depression, and PTSD in adult offenders. Int J Offender Ther Comp Criminol 2015;59:701–25. doi:10.1177/0306624X13519241	Exclude on intervention
Luchenski S, Maguire N, Aldridge RW, *et al.* What works in inclusion health: overview of effective interventions for marginalised and excluded populations. The Lancet 2018;391:266–80. doi:10.1016/S0140-6736(17)31959-1	Exclude on methods
Maruca A. Self-Care Management for Correctional Populations: A Literature Review...28th Annual Scientific Session, June 2-6, 2017, Baltimore, Maryland: Nursing Research. Nurs Res 2016;65:E95–6. doi:10.1097/NNR.0000000000000152	Exclude on study design
McCann LJ, Peden J, Phipps E, *et al.* Developing gender-specific evidence-based standards to improve the health and wellbeing of women in prison in England: a literature review and modified eDelphi survey. Int J Prison Health 2019;16:17–28. doi:10.1108/IJPH-02-2019-0010	Exclude on intervention

Murray J, Wickramasekera N, Elings M, *et al.* The impact of care farms on quality of life, depression and anxiety among different population groups: A systematic review. Campbell Syst Rev 2019;15:e1061. doi:10.1002/cl2.1061	Exclude on context/setting
Mutz M, Müller J. Sport im Strafvollzug aus der Perspektive der Inhaftierten: Ein systematisches Review qualitativer Forschungsarbeiten. 2019. https://philpapers.org/rec/MUTSIS.	Exclude on methods
Papa V, Tafuri D, Vaccarezza M. Could Physical Activity Have any Role in Cardiovascular Disease Prevention in Prisoners? A Systematic Review. Int J Environ Res Public Health 2021;18:2307. doi:10.3390/ijerph18052307	Exclude on methods
Stevens BA, Shaw R, Bewert P, *et al.* Systematic review of aged care interventions for older prisoners. Australas J Ageing 2018;37:34–42. doi:10.1111/ajag.12484	Exclude on methods
Stephenson T, Leaman J, O'Moore É, *et al.* Time out of cell and time in purposeful activity and adverse mental health outcomes amongst people in prison: a literature review. Int J Prison Health 2021;17:54–68. doi:10.1108/IJPH-06-2020-0037	Exclude on intervention
South E, Rodgers M, Wright K, *et al.* Reducing lifestyle risk behaviours in disadvantaged groups in high-income countries: A scoping review of systematic reviews. Prev Med 2022;154:106916. doi:10.1016/j.ypmed.2021.106916	Exclude on scoping review
South E, Rodgers M, Wright K, *et al.* A scoping review of systematic reviews on reducing lifestyle risk behaviours in disadvantaged groups. Eur J Public Health 2021;31:ckab165.383. doi:10.1093/eurpub/ckab165.383	Exclude on scoping review
Song MJ, Yu L, Enright RD. Trauma and healing in the underserved populations of homelessness and corrections: Forgiveness Therapy as an added component to intervention. Clin Psychol Psychother 2021;28:694–714. doi:10.1002/cpp.2531	Exclude on study design
Rioux M-A, Laurier C, Gadais T, *et al.* De l'entraîneur à l'intervenant : réflexion sur l'apport des connaissances issues des sciences du sport aux interventions basées sur le sport auprès des jeunes contrevenants. Rev Psychoéducation 2017;46:313–36. doi:10.7202/1042253ar	Exclude on Language
Wigham S, McGovern R, Kaner E, *et al.* A review of recent innovation in psychosocial interventions for reducing violence and aggression in adults using a	Exclude on methods

horizon scanning approach. Aggress Violent Behav 2022;62:101685. doi:10.1016/j.avb.2021.101685

Table 59 Papers excluded at full text screening (Yoga, meditation, and mindfulness) n = 22

Systematic reviews	Exclusion rationale
Auty KM, Cope A, Liebling A. A Systematic Review and Meta-Analysis of Yoga and Mindfulness Meditation in Prison: Effects on Psychological Well-Being and Behavioural Functioning. Int J Offender Ther Comp Criminol 2017;61:689–710. doi:10.1177/0306624X15602514	Exclude on methods
Armstrong E, Eggins E, Reid N, *et al.* Parenting interventions for incarcerated parents to improve parenting knowledge and skills, parent well-being, and quality of the parent–child relationship: A systematic review and meta-analysis. J Exp Criminol 2018;14:279–317. doi:10.1007/s11292-017-9290-6	Exclude on intervention
Bartlett A, Jhanji E, White S, *et al.* Interventions with women offenders: a systematic review and meta-analysis of mental health gain. J Forensic Psychiatry Psychol 2015;26:133–65. doi:10.1080/14789949.2014.981563	Exclude on intervention
Bright A-M, Higgins A, Grealish A. Women's experiences of prison-based mental healthcare: a systematic review of qualitative literature. Int J Prison Health 2022;19:181–98. doi:10.1108/IJPH-09-2021-0091	Exclude on intervention
Bursky M, Kosuri M, Walsh Carson K, *et al.* The Utility of Meditation and Mindfulness-Based Interventions in the Time of COVID-19: A Theoretical Proposition and Systematic Review of the Relevant Prison, Quarantine and Lockdown Literature. Psychol Rep 2023;126:557–600. doi:10.1177/00332941211048734	Exclude on methods
Criss J, John A. Therapeutic Interventions for Mental Wellness in Correctional Facilities: A Systematic Review. Int J Offender Ther Comp Criminol 2023:306624X231159884. doi:10.1177/0306624X231159884	Exclude on methods

Eadeh H-M, Breaux R, Nikolas MA. A Meta-Analytic Review of Emotion Regulation Focused Psychosocial Interventions for Adolescents. Clin Child Fam Psychol Rev 2021;24:684–706. doi:10.1007/s10567-021-00362-4	Exclude on methods
Engstrom KV, van Ginneken EFJC. Ethical Prison Architecture: A Systematic Literature Review of Prison Design Features Related to Wellbeing. Space Cult 2022;25:479–503. doi:10.1177/12063312221104211	Exclude scoping review
Derlic D. A Systematic Review of Literature: Alternative Offender Rehabilitation—Prison Yoga, Mindfulness, and Meditation. J Correct Health Care 2020;26:361–75. doi:10.1177/1078345820953837	Exclude on study design
Frank Terry L, Praetorius RT, Nordberg A. Environmental influences on services for and mental health of incarcerated populations: A review. J Soc Work 2018;18:46–65. doi:10.1177/1468017316651999	Exclude on intervention
Gagnon JC, Benedick AR, Mason-Williams L. Mental health interventions for youth who are incarcerated: A systematic review of literature. Am J Orthopsychiatry 2022;92:391–404. doi:10.1037/ort0000587	Exclude on intervention
Gagnon JC, Ruiz E, Mathur SR, *et al.* Interventions addressing incarcerated youth behavior: A review of literature. Am J Orthopsychiatry 2022;92:405–17. doi:10.1037/ort0000621	Exclude on intervention
Griffiths C, Hina F. Prisoner's insomnia prevalence, insomnia associated factors and interventions with sleep as an outcome: a review and narrative analysis. Int J Prison Health 2021;18:27–42. doi:10.1108/IJPH-01-2021-0014	Exclude on methods
Kristofersson GK, Kaas MJ. Stress Management Techniques in the Prison Setting. J Forensic Nurs 2013;9:111. doi:10.1097/JFN.0b013e31827a5a89	Exclude on methods
Luu K, Hall PA. Hatha Yoga and Executive Function: A Systematic Review. J Altern Complement Med 2016;22:125–33. doi:10.1089/acm.2014.0091	Exclude on methods
Mallion JS, Wood JL, Mallion A. Systematic review of 'Good Lives' assumptions and interventions. Aggress Violent Behav 2020;55:101510. doi:10.1016/j.avb.2020.101510	Exclude on intervention

Per M, Spinelli C, Sadowski I, *et al.* Evaluating the Effectiveness of Mindfulness-Based Interventions in Incarcerated Populations: A Meta-Analysis. Crim Justice Behav 2020;47:310–30. doi:10.1177/0093854819891457	Exclude on methods
Perdacher E, Kavanagh D, Sheffield J. Well-being and mental health interventions for Indigenous people in prison: systematic review. BJPsych Open 2019;5:e95. doi:10.1192/bjo.2019.80	Exclude on intervention
Ratnam KKY, Nordin A, Tok PSK, *et al.* Mental Health Interventions in Juvenile Detention Institutions: A Systematic Review of What Works. Adolesc Psychiatry 2021;11:203–24. doi:10.2174/2210676611666211116163220	Exclude on methods
Simpson S, Mercer S, Simpson R, *et al.* Mindfulness-Based Interventions for Young Offenders: a Scoping Review. Mindfulness 2018;9:1330–43. doi:10.1007/s12671-018-0892-5	Exclude on population
Stewart W, Coppard C, Thompson A. Promoting resilience among older people in prisons: a systematic literature review. Nurs Older People Published Online First: 12 April 2023. doi:10.7748/nop.2023.e1436	Exclude on methods
Wimberly AS, Xue J. A Systematic Review of Yoga Interventions in the Incarcerated Setting. J Sociol 2016;43:Article 6.	Exclude on intervention

7.5 Appendix 5 Amended version of the JBI data extraction form

Review #: first author (year)

Parameter	Description
Review title	"Input the full title of the systematic review here"
First author and year of publication	First author *et al.* (year)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	
Contributing primary studies	The information presented in this extraction form applies only to the ?/X primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons).
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**:

Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: (e.g. n = 500 prisoners in X studies). **Age (mean and/or mode and/or range)**: **Sex**: **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**:
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: **Specific setting(s) (include number of studies in each setting)**: (e.g. Prison (n = 4 studies), jail (n = 3 studies). **Other features of the settings(s) relevant to the analysis**:
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: **Any other relevant details related to the intervention of interest**:
Databases and sources searched	**Number and names of databases searched**: **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: **Any search limits imposed (e.g. search dates, language restriction, etc.)**: **Protocol prepared (yes/no)**?

	• **If yes, was protocol published (yes/no)**? **Search strategy/key words provided (yes/no, full search or example provided)**? **Screening completed in duplicate (yes/no)**? • **If yes, how were disagreements resolved**? **Extraction completed in duplicate (yes/no)**? • **If yes, how were disagreements resolved**?
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: • **Number of studies by study design**:
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**:
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: **Reasons for including study design(s) provided (yes/no)**? • **If yes, describe the justification(s)**: **List of excluded studies at full text provided (yes/no)**? • **Reasons for exclusion provided (yes/no)**?
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: **Quality appraisal completed in duplicate (yes/no)**? • **If yes, how were disagreements resolved**?
Appraisal rating	**QUANTITATIVE COMPONENT** **Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality)**:

	• **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: **Assessment of publication bias (yes/no)**: • **If yes, how was publication bias assessed**? • **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: • **If present, how was publication bias dealt with**? **Only low risk of bias studies included in the review synthesis (yes/no)**? • **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? **If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)**? **QUALITATIVE COMPONENT** **Description of the results of the quality assessment of qualitative data**: **Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no)**: • **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**:
Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: • **GRADE assessment completed (yes/no)**? – **If yes, review authors' approach to GRADE assessment**: **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: • **If appropriate, justification for combining data in meta-analysis (yes/no)**:

	QUALITATIVE COMPONENT **Specific data analysis technique and procedures used by review authors to analyse qualitative data**:
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.	**List of authors' primary outcomes assessed relevant to this overview of reviews**: (continue with additional outcomes if needed, put Not reported or Not applicable if not applicable) • **Primary outcome 1**: • **Primary outcome 2**: **List of authors' secondary outcomes relevant to this overview of reviews**: (continue with addition outcomes if needed) • **Secondary outcome 1**: • **Secondary outcome 2**:
Findings:	[See separate extraction tables below for each research question]
General comments	(MK and LM to insert general thoughts here)
References to previously published versions of systematic review	e.g. Hiiri A, Ahovuo-Saloranta A, Nordblad A, Mäkelä M. Pit and fissure sealants versus fluoride varnishes for preventing dental decay in children and adolescents. Cochrane Database of Systematic Reviews 2006, Issue 4. Art. No: CD003067. [DOI: 10.1002/14651858.CD003067.pub2].

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**:

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

Overall findings (meta-analyses, authors' secondary outcome(s))

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**:

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)?

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)?

Certainty of evidence (if reported)

Systematic review primary outcome(s)	Review authors' GRADE assessment

Systematic review secondary outcome(s)	Review authors' GRADE assessment

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QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)?

	Descriptive account of intervention **Intervention tailoring and modification**: **Intervention planning**: **Intervention acceptability and feasibility**: **Fidelity monitoring**: **Other characteristics of intervention planning, delivery, and evaluation**: **Comparator(s) used in the interventions delivered in the included studies**: **Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.)**: • **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: **Duration(s) of the intervention**: **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**:
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	**QUANTITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: **Author's secondary outcome(s) relevant to this overview of reviews**: **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: **Author's secondary outcome(s) relevant to this overview of reviews**:
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: **List any of the review authors' secondary outcomes of interest for which there was no evidence**:
Heterogeneity	**QUANTITATIVE RESULTS**

Causes of heterogeneity investigated (yes/no)?

- **If yes, state methods of investigation**:
- **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**:

ALL RESULTS

Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence:

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? • **If yes, list and describe each factor according to the authors (include page number(s))**: **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? • **If yes, list and describe each factor according to the authors (include page number(s))**:

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the relevant intervention (yes/no)**? • **If yes, list and describe each barrier according to the authors (include page number(s))**: **Facilitators** **Did the review identify any explicit facilitators to the success of the relevant intervention (yes/no)**? • **If yes, list and describe each facilitator according to the authors (include page number(s))**: **Engagement** **How were prisoners attracted to taking part in the intervention**? **How were prisoners motivated to aim to achieve outcomes related to the intervention**? **Intervention** **Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive**? **What was stated regarding participant attrition**? • **If relevant, what efforts were made to help participants continue with the programme**? **Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention**? • **If so, why were they preferred**?

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)?

- **If so, were certain features of behaviour change found to be more attractive for participants**?
- **If so, how and why were these features more attractive**?

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies?

Review authors' comments on participants perceptions of the communication process in qualitative studies:

Review authors' overall conclusions from qualitative evidence:

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond th** • **If yes, state the follow-up period(s) and describe the findings at each one**: **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond t** • **If yes, state the follow-up period(s) and describe the findings at each one**:

7.6 Appendix 6 Health Evidence Quality Assessment Tool for Review Articles

First author (year)

Total scale: X/10

Rating: Strong/moderate/weak (8 or higher = strong; 5–7 = moderate; 4 or lower = weak)

Item	Minimum criteria to receive a YES	Justification for minimum criteria	Yes	No
1. Is the research question clearly focused, describing the population, intervention, comparison, and outcome(s) of interest?	Must have clearly described: **P**opulation **I**ntervention, and **O**utcomes.	Comparator(s) are not included in the minimum criteria because in some cases, comparators may not be feasible in a prison setting so a pre-post study will be used.		
2. Are appropriate criteria used to select studies to include in the review?	Must have appropriate: **P**opulation **I**ntervention **O**utcome(s), and Study design.	The selected study designs need to be appropriate to answer the systematic review research questions.		
3. Is the search strategy comprehensive and reproducible?	The systematic review authors should provide a list of the search terms used for each database and include a record of the search results retrieved from each source.	Search comprehensiveness already covered in the criteria for full-text screening and so the minimum criterion for this item relates only to on reproducibility.		
4. Does the search strategy cover an adequate number of years?	Database searches and supplementary resources should include at least the past 10 years of research.	The interventions of interest to this overview of reviews are being delivered and tested for some time. As such, as 10-year		

		(or longer) search is appropriate.
5. Is the level of evidence of studies included in the review described?	The systematic review authors should clearly report the designs of all included primary studies and distinguish between all quantitative designs. For qualitative primary studies, reporting that the included studies used a 'qualitative design' is sufficient.	Reporting the precise study designs is required to assess other decisions made for the purposes of the review; for example, study quality assessment, method of analysis, and evidence synthesis.
6. Are included studies rigorously assessed for risk of bias/methodological quality and reported on?	The included primary studies must be assessed in relation to methodological quality and/or risk of bias, and the results of the assessment must be clearly reported.	This criterion is covered in the criteria for full-text screening.
7. Are the quality assessments completed in duplicate with a method for conflict resolution described?	The review authors should independently assess the methodological quality/risk of bias of each included primary study. The systematic review authors should describe the method used for conflict resolution to receive a yes on this item.	Transparency is enhanced and errors/bias are reduced when two authors conduct these assessments independently and decisions are scrutinised.
8. Are the methods used to compare and/or combine	The systematic review authors should describe how they combined data across studies.	Similarities between and the quality of the included primary studies are key factors to

results across studies appropriate?	In a narrative systematic review (or a systematic review that presents some of the findings narratively), the authors should clearly report similarities in study characteristics e.g. PIO. If a meta-analysis is conducted, the systematic review authors should report their test for heterogeneity. If heterogeneity is high, the systematic authors should provide a rationale for still combining the results in a meta-analysis.	consider when combining the results of individual studies.
9. Are study quality and level of evidence taken into consideration when interpreting the results?	The systematic review authors should consider and report the implications of study quality/risk of bias on the effect of an intervention on the review outcomes.	For cause and effect between intervention and outcome to hold significance, then the contributing studies must have minimal errors.
10. Is the certainty of the review's conclusions supported by the methodological approach and review findings?	The systematic review authors' conclusions should be consistent with the results and methodology of the systematic review.	If the review is rated as under 5 thus far then the conclusions of the review must be uncertain. If Question 8 and/or Question 9 receive a No, then Question 10 should also receive a No.

7.7 Appendix 7 Completed extraction forms

7.7.1 Canada *et al.* (2020)

Parameter	Description
Review title	"A systematic review of interventions for older adults living in jails and prisons"
First author and year of publication	Canada *et al.* (2020)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Sports- and exercise-based interventions (BE-ACTIV) Art and creative interventions (Art expression and Good vibrations)
Contributing primary studies	The information presented in this extraction form applies only to the 3/7 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). 3 studies tested an intervention known a True Grist, which does not align with any of the HRB interventions, and 1 study tested a method of examining health needs of prisoners and was therefore not in scope for this overview of reviews.

Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: This systematic review intended to answer two research questions: 3. What interventions designed to improve the health or mental health of older adults living in jail or prison have been empirically tested? 4. What are the effects of the respective interventions on inmates' physical or mental health? Inclusion criteria for the review include: **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: The review only reported inclusion criteria, which were: 1. The article described and tested an intervention 5. The intervention was delivered in a jail or prison 6. The intervention was for older adults, aged 50 and older, 7. The intervention was tested using an experimental, quasi-experimental, or non-experimental design 8. The target of the intervention was health or mental health-related outcomes (measured quantitatively or qualitatively), and 9. The article was written in English
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants included in the 3 primary studies deemed relevant to this overview of reviews was 21. This included participants in: • Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): n = 4. • Art and creative interventions (Art expression) (Hongo, 2015): n = 4. • Art and creative interventions (Good vibrations) (Wilkinson, 2017): n = 13. **Age (mean and/or mode and/or range)**: Participants were all aged 47 years and older: • Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): Age range 47–81 years. • Art and creative interventions (Art expression) (Hongo, 2015): Age range 50–76 years.

	• Art and creative interventions (Good vibrations) (Wilkinson, 2017): Age range 50–65 years. **Sex**: • Male only participants in 2 intervention types (2 studies): – Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b). – Art and creative interventions (Good vibrations) (Wilkinson, 2017) . • Female only participants in 1 intervention type (1 study) : – Art and creative interventions (Art expression) (Hongo, 2015). **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Additional participant characteristics of note were: • Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): n = 4 residents of a prison-based nursing home; 50% white, 50% diagnosed with depression. 3 of the 4 participants met diagnostic criteria for major depressive disorder, and 1 was diagnosed with bipolar disorder. • Art and creative interventions (Art expression) (Hongo, 2015): n = 4 residents of a prison-based nursing home; 35% white.
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: UK (1 study), USA (3 studies). • Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): USA • Art and creative interventions (Art expression) (Hongo, 2015): USA • Art and creative interventions (Good vibrations) (Wilkinson, 2017): UK (England) **Specific setting(s) (include number of studies in each setting)**: All 3 studies were set in prisoners (2 were set in prison-based nursing homes (see above). **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**:

interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	The interventions of interest were "interventions aimed at addressing the complex health and mental health issues common to older prisoners" p1020. The following interventions were evaluated in the 3 primary studies considered relevant to this overview of reviews (Table 2): • Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): The primary study authors adapted this combined intervention for the prison environment, as it was previously tested with older adults living in nursing homes in the community. It comprised 10-week behavioural therapy for older adults with one-to-one sessions with counsellor and collaboration with nursing staff to implement activity plan. BE-ACTIV is intended to treat depression and its symptoms by increasing positive activity and opportunities for positive reinforcement. This behavioural intervention includes weekly individual sessions with inmates and a therapist, active and ongoing collaboration between a therapist and activity staff, a plan for increasing 'pleasant' activities and events, assessment of increased activity level, and removal of barriers that may be interfering with activity levels. • Art and creative interventions (Art expression) (Hongo, 2015): The intervention includes a series of six art expression workshops, offered weekly for six consecutive weeks. The workshops last approximately 1.5 hours and begin with introductions and a short exercise to promote sharing between group members. Each workshop features a planned art expression activity. The workshops were led by what authors describe as a 'healing squad' which included social workers and marriage and family therapists. • Art and creative interventions (Good vibrations) (Wilkinson, 2017): A combined one-week, prison-based Gamelan inspired music workshop involving education on musical pieces, learning how to improvise, composing an original piece of music, learning about Javanese culture and art, and a final performance. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: University library search (includes all databases in the University catalogue like Medline, Web of Science, PsychInfo, Academic Search Complete, JSTOR and ProQuest) was undertaken to identify manuscripts (Table 1). **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: Google Scholar and Scopus were also searched. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: • The search was restricted to research published during or after the year 2000 (the search was completed in May 2018). This search time frame was selected for several reasons. First, there was a substantial increase in older adults in custody between 2000 and 2010. For example, in prisons within the USA, the number of older prisoners increased by 79% compared to approximately 16% for the general prison population making older prisoners the focus of new healthcare policy (Williams, Stern, Mellow, Safer, &

Greifinger, 2012). Second, the first set of clinical guidelines for healthcare in corrections in the US was established in 2001 (National Commission on Correctional Health Care, 2018). Finally, the review included nearly 18 years of scholarship; with advances in medicine, authors wanted to capture interventions meeting standards for current practices

- All included studies were required to be written in English.
- The authors did not restrict the geographic location of the intervention.

Protocol prepared (yes/no)? Not reported

- **If yes, was protocol published (yes/no)**? Not applicable

Search strategy/key words provided (yes/no, full search or example provided)? Yes. Each of the categories of search terms were combined resulting in 240 search word combinations that were used in each of the databases listed. For example, each search includes one population, target, and intervention search term combined using Boolean logic. Each combination of search terms was entered into the databases listed in Table 1; however, the University library search tool searches hundreds of databases and journals. As noted in the table, JSTOR is a database included in the University search. JSTOR is particularly relevant for this study as it includes indexed journals from law, criminology, criminal justice, sociology, social work, and medicine.

Screening completed in duplicate (yes/no)? Partially, "The first author and university librarian trained a doctoral-level research assistant on conducting the search and selecting articles using inclusion and exclusion criteria. As part of this training, the first author and research assistant conducted a portion of the review together at each step of the process until the assistant was ready to review independently. Following the training, the research assistant conducted the literature search and initial review of titles and keywords with supervision from the first author. The research assistant conducted the abstract review with weekly audits from the first author. During this process, the first author and research assistant met weekly. The first author reviewed the work of the research assistant to ensure accuracy. […] The first author and a research assistant independently reviewed full manuscripts and mutually determined which reports met inclusion criteria. […] Any discrepancies were discussed, and full text articles were reviewed again during weekly meetings to determine inclusion collaboratively" p1021.

- **If yes, how were disagreements resolved**? The first author and a research assistant independently reviewed full manuscripts and mutually determined which reports met inclusion criteria. Any discrepancies were discussed, and full text articles were reviewed again during weekly meetings to determine inclusion collaboratively.

Extraction completed in duplicate (yes/no)? Not reported

	• **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 3 primary studies. • **Number of studies by study design**: There was 1 case study and 2 non-experimental studies: – Sports- and exercise-based interventions (BE-ACTIV): 1 case study (Meeks, 2008b). – Art and creative interventions (Art expression): Non-experimental, appears qualitative in approach (Hongo, 2015). – Art and creative interventions (Good vibrations): Non-experimental, appears qualitative in approach (Wilkinson, 2017).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2008 (1 study), 2015 (1 study), 2017 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: The review authors planned to include studies with an experimental, quasi-experimental, or non-experimental design. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? Not reported • **Reasons for exclusion provided (yes/no)**? Not reported
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: A checklist developed by Downs and Black (1998). **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The checklist was selected because it was developed for randomised and non-randomised studies. Articles were scored along five domains: (1) reporting, (2) external validity, (3) internal validity—bias, (4) internal validity—confounding, and (5) power. Once quality assessments were complete, the two reviewers compared results and discussed any discrepancies. The checklist includes a total of 27 questions with total quality scores ranging from 0–28 with 28 being the highest quality and zero being lowest quality. **Quality appraisal completed in duplicate (yes/no)**? Yes. All full-text articles included in the review were examined by two reviewers for quality. In order to ensure consistency across articles, reviewers evaluated one article together. The remaining articles were evaluated independently. Each article was evaluated by the third and fourth author.

If yes, how were disagreements resolved? Quality scores were averaged across the two reviewers; scores are presented in the results section by article and in Table 2. Inter-rater agreement on the quality assessment checklist was high. Average agreement for each item varied from 0.71–1 and indicate strong agreement for all items.

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): 1 fair quality (Meeks, 2008b; score of 9) and 2 poor-quality (, 2015; Wilkinson, 2017) studies based on HRB assessment of total scores using guidelines obtained on the internet.

Note. There is a maximum score of 28 points, with a higher score indicating better quality. Previous studies assigned a classification based on their score: excellent (26-28), good (20-25), fair (15-19) and poor (≤14) (Hooper *et al.*, 2008; Silverman *et al.*, 2012) [insert by HRB].

- Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): 15/28 (54%) or fair.
- Art and creative interventions (Art expression) (Hongo, 2015): 9/28 (32%) or poor.
- Art and creative interventions (Good vibrations) (Wilkinson, 2017): 9/28 (32%) or poor.

Appraisal rating

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "In general, the quality of these studies are relatively low, reflecting a lack of rigorous research in this area" p1026.

Assessment of publication bias (yes/no): No

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? Not applicable

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the

summary/discussion/conclusions (yes/no)? Yes, to some extent. The authors report the quality ratings when describing the narrative results and include one sentence (see above) in the discussion on the overall quality of the papers.

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: The review authors did not conduct qualitative synthesis. However, 2 of the included primary studies appear to have taken a qualitative approach to their analysis but did not use a qualitative theoretical approach to their design or analysis. A thematic-like narrative analysis was completed by the primary study authors in these studies.

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): All included primary studies were assessed using a quantitative assessment instrument and the results presented in analysis section.

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: All included primary studies were assessed using a quantitative assessment instrument but authors state, "In general, the quality of these studies is relatively low, reflecting a lack of rigorous research in this area" p1026.

Method of analysis

The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.

Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant): The authors do not outline an explicit method of analysis. Rather, a descriptive overview of the results of each study are presented.

- **GRADE assessment completed (yes/no)**? No
  - **If yes, review authors' approach to GRADE assessment**: Not applicable

QUANTITATIVE COMPONENT

Justification for narrative synthesis or meta-analysis (yes/no): No

- **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable

QUALITATIVE COMPONENT

Specific data analysis technique and procedures used by review authors to analyse qualitative data: The review authors did not conduct qualitative synthesis. However, 2 of the included primary studies appear to have taken a qualitative approach to their analysis but did not use a qualitative theoretical approach to their design or analysis.

Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	**List of authors' primary outcomes assessed relevant to this overview of reviews**: "Health- and mental health-related outcomes was broadly defined to include any intervention to address physical health (e.g. mobility, end of life planning) or mental health (e.g. dementia, mental illness, quality of life, happiness). These terms were broadly defined in order to capture a larger pool of studies" p1020. The following outcomes were described in each of the included interventions/studies: Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): • **Primary outcome 1**: Depression • **Primary outcome 2**: Affect positive [affect or mood change] • **Primary outcome 3**: Pleasant events • **Primary outcome 4**: Functioning Art and creative interventions (Art expression) (Hongo, 2015): • **Primary outcome 1**: Trauma definition • **Primary outcome 2**: Trauma experience in prison • **Primary outcome 3**: Trauma-related coping skills Art and creative interventions (Good vibrations): (Wilkinson, 2017): • **Primary outcome 4**: Experience • **Primary outcome 5**: Accessibility **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable **QUANTITATIVE RESULTS – NARRATIVE** **Provide the overall findings for each primary outcome via a statement indicating the following, where reported:** • **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. **Sports- and exercise-based interventions (BE-ACTIV) (n = 4)** • BE-ACTIV (i.e. Behavioral Activities Intervention) (Meeks, 2008b) involved 4 older adult men living in a prison-based nursing home of note, the primary study authors adapted this intervention for the prison environment, as it was previously tested with older adults living in nursing homes in the community. All participants completed a baseline assessment, 10-weeks of the intervention, and a follow-up assessment. BE-ACTIV was carried out by two clinical psychology doctoral students and one recreational therapist.

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value,	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

			heterogeneity, direction of effect)	
Depression	The Geriatric Depression Inventory	Meeks (2008b)	Decreased for all participants able to be assessed*	2 weeks prior and after the 10-week program
Positive and negative affect	The Philadelphia Geriatric Center Positive and Negative Affect Rating Scale	Meeks (2008b)	Positive affect did not increase but in 2 cases, negative affect decreased*	2 weeks prior and after the 10-week program
Pleasant events	The Pleasant Events Schedule-Nursing Home Version	Meeks (2008b)	Participants showed an increase in pleasant activities*	2 weeks prior and after the 10-week program
Global functioning	The Dartmouth COOP Scales of Functioning	Meeks (2008b)	Remained stable with global functioning increasing for each participant*	2 weeks prior and after the 10-week program

*This is a case study; statistics were Not reported.

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not reported Not applicable

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QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)?

Art and creative interventions (Art expression, n = 4)

- Hongo (2015) explored the advantages of an art therapy workshop for four older women prisoners aged 50 years and over, who were asked to complete a short questionnaire following the workshop. The researchers asked the women about trauma exposure and the utility of the workshop as a coping mechanism for their trauma. They then analysed notes taken during the workshop and questionnaires to evaluate the impact of the workshop as a tool for coping with trauma. Five themes emerged relating to impact of the program including finding support from the group, feeling connected with other women by sharing and recognising that others have gone through similar experiences (i.e. mutual understanding), using art to express feelings, as well as group collaboration and teamwork.

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Trauma definition Trauma experience in prison Trauma coping skills	Questionnaire asking three questions about how participant defines trauma, trauma exposure in prison, and whether art helped her cope with trauma.	Hongo (2015)	Using thematic analysis, the study authors identified five themes related to participation in the art expression sessions: - Having a potential to dream - Feeling connected with other women by sharing - Mutual understanding (recognising that others have gone through similar experiences) - Releasing and expressing feelings using art - Unselfish concern (group collaboration and teamwork)	NR (Following the sixth (i.e. last) session)

Art and creative interventions (Good vibrations, n = 9)

- Wilkinson & Caulfield (2017) described the impact of a music program called Good Vibrations. The 13 participants gave in in-depth interviews after the program.

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Experience	Experiences and perceived impact of the program were measured through in-depth interviews using thematic analysis	Wilkinson (2017)	Participants identified mediation and management of emotions, improved communication and social skills, achievement, and motivation, trying something new, and having something to do with their time as benefits of this program.	NR (After program, which last 1 week)
Accessibility	As above	Wilkinson (2017)	Participants also noted that regardless of disability, this program was accessible.	NR (After program, which last 1 week)

Descriptive account of intervention

Intervention tailoring and modification: BE-ACTIV (Meeks, 2008b) was adapted for the prison environment, as it was previously tested with older adults living in nursing homes in the community. None of the other programs were adapted.

Intervention planning: Not reported

Intervention acceptability and feasibility: Overall, intervention acceptability and feasibility were a focus of the review addressed. However, it was addressed in 1 study:

- Art and creative interventions (Good vibrations) (Wilkinson, 2015): "Despite disability, participants found the program to be accessible" (Table 2).

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? Not reported

Comparator(s) used in the interventions delivered in the included studies: There were no comparator groups in any of the 3 primary studies.

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.):

- Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): Delivered through one-to-one sessions with counsellor and collaboration with nursing staff to implement activity plan.
- Art and creative interventions (Art expression) (Hongo, 2015): Delivered by a group of social work and marriage and family therapy interns.
- Art and creative interventions (Good vibrations) (Wilkinson, 2017): Not reported

If relevant, characteristics of individuals who delivered the intervention (e.g. gender): See above, no other information was reported.

Duration(s) of the intervention:

- Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): 10 weeks.
- Art and creative interventions (Art expression) (Hongo, 2015): Not reported
- Art and creative interventions (Good vibrations) (Wilkinson, 2017): 1 week.

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies):

- Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): Not reported
- Art and creative interventions (Art expression) (Hongo, 2015): 6, 1.5-hour sessions of art.
- Art and creative interventions (Good vibrations) (Wilkinson, 2017): Not reported

Overall direction of results

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.

QUANTITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews:

- Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): After 10 weeks of treatment, participants' activity levels increased, depressive symptoms declined, global functioning increased, and control over mood increased. Affect, both positive and negative, did not significantly change; however, negative affect became more stable as treatment progressed (p1022-2024).

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

QUALITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews:

- Art and creative interventions (Art expression) (Hongo, 2015): Identified five themes related to participation in the art expression sessions: having a potential to dream, feeling connected, mutual understanding, releasing feelings, and unselfish concern.
- Art and creative interventions (Good vibrations) (Wilkinson, 2017): Participants identified mediation and management of emotions, improved communication and social skills, achievement, and motivation, trying something new, and having something to do with their time as benefits of this program. Participants also noted that regardless of disability, this program was accessible.

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: Although heterogeneity was not formally investigated, the reviews authors noted, "Taken together, the small pool of studies relied heavily on anecdotes and qualitative methods resulting in a lack of generalizable findings. Only one of five interventions included women which further limits the applicability of these findings to the population of incarcerated older adults. In general, the quality of these studies is low, reflecting a lack of rigorous research in this area. The studies were also heterogeneous in programing, measurement, and population prohibiting any kind of meta-analytic strategies. In fact, none of the studies reported statistics that could be synthesized. The studies were also heterogeneous in programming, measurement, and population prohibiting any kind of meta-analytic strategies. In fact, none of the studies reported statistics that could be synthesised" p1026.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? Yes. • **If yes, list and describe each barrier according to the authors (include page number(s))**: – Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): The “resources for activities (e.g. art supplies), time for activities, and privacy for therapy sessions was limited and created barriers for participants” p1024. – Art and creative interventions (Good vibrations) (Wilkinson, 2017): Although participants noted that the program “provided them with something meaningful to do with their time”, they also critiqued the program’s length, “as they thought it should be longer and offered more frequently” p1026. **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? Yes

- **If yes, list and describe each facilitator according to the authors (include page number(s))**:
  - Sports- and exercise-based interventions (BE-ACTIV) (Meeks, 2008b): “Although not thoroughly discussed, authors do report BE-ACTIV is a low-cost program and includes resources that are already available in prison settings” p1024.
  - Art and creative interventions (Art expression) (Hongo, 2015): The review authors noted that “the women in this project experienced trauma before prison and during their incarceration and conclude that an art expression workshop can support women with trauma exposure at low cost to the prison” p1025.

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? See above

If relevant, what efforts were made to help participants continue with the program? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? Not applicable
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.2 Chen *et al.* (2016)

Parameter	Description
Review title	"Music therapy for improving mental health problems of offenders in correctional settings: systematic review and meta-analysis"
First author and year of publication	Chen *et al.* (2016)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Art and creative interventions
Contributing primary studies	The information presented in this extraction form applies only to 2/5 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in correctional settings). Information pertaining to 3 studies included in the systematic review was not extracted as these studies were conducted in forensic hospitals (2 studies) and a treatment oriented detention centre for juvenile offenders (1 study).
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "This review aims to summarize the overall evidence of music therapy for improving the mental health of offenders in correctional settings" p212.

Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.:

- Study designs other that RCTs and quasi-RCTs were excluded (p213).
- "Studies conducted in youth service centers or residential homes for at risk children were not eligible because of the more preventive character of these institutions" p213.
- "Attrition (drop-out) rates were not allowed to exceed 30%" p213.
- "Eight studies that initially appeared suitable for inclusion were excluded for the following reasons: two were uncontrolled studies; two studies included a mixed sample of juvenile delinquents and at-risk children in residential homes or youth service centers; one study addressed choral singing rather than music therapy; and three studies were not obtainable for review" p216.

Participants

The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.

Number of participants in the included primary studies: n = 313 participants in 2 studies that were conducted in prison settings.

Age (mean and/or mode and/or range):

- Study 1 (Chen, 2014): Mean age = 35.5 (ranged from 18 to 57).
- Study 2 (Gold, 2014): Mean age = 31.38.

Sex:

- Study 1 (Chen, 2014): All male participants.
- Study 2 (Gold, 2014): All male participants.

Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour): Table 1 describes the following characteristics in addition to age and sex:

Diagnosis:

- Study 1 (Chen, 2014): "No diagnosis, prisoners with anxiety and depression symptoms".
- Study 2 (Gold, 2014): "No diagnosis".

Offence type:

- Study 1 (Chen, 2014): "Physical injury, theft".

	• Study 2 (Gold, 2014): “Traffic offenses, financial crime, drug-related crime, violence, burglary, and sexual offense”. Length of sentence: • Study 1 (Chen, 2014): “M = 13 (months)”. • Study 2 (Gold, 2014): “4 days to 2 years”.
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: China (1 study; Chen, 2014), Norway (1 study; Gold, 2014). **Specific setting(s) (include number of studies in each setting)**: Both studies were conducted in prisons. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors’ definition of the intervention(s) (typically in introduction, include page number(s))**: “Music therapy is commonly defined as a systematic process of intervention wherein the therapist helps the client to improve health, using music experiences and the relationships that develop through them as dynamic forces of change. In correctional institutions, its use dates back to at least the 1930s. Various music therapy methods have been used with offenders, such as improvisation, songs and metaphoric imagery, music creation and performance, and music relaxation, either in individual or group settings” p210. Table 1 describes the interventions in the 2 studies relevant to this overview of reviews as follows: • Study 1 (Chen, 2014): “Group music therapy (8 to 10 people). Music imagery, improvisation, songwriting”. • Study 2 (Gold, 2014): “Both individual and group music therapy (6 people). Song singing, improvisation, composition, sound development using a computer”. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: “In September 2012, a systematic electronic search was conducted using 19 databases [Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, PsycINFO, LILACS, CINAHL, ERIC, Sociological Abstracts, International Bibliography of Social Sciences, National Criminal Justice Reference Service Abstracts, RILM Abstracts of Music Literature, Social Science Citation Index, SCOPUS, Conference Proceedings Citation Index—Social Science & Humanities, WorldCat (theses search), Rutgers School of Law Gray Literature Database, ClinicalTrials.gov, ICTRP, metaRegister of Controlled Trials]. […] A simpler update search in three databases (CENTRAL, MEDLINE, PsycINFO) was conducted in April 2015 and yielded no new relevant studies” p214.

	Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.): "Websites of relevant professional and research organizations, music therapy journals, as well as reference lists of relevant studies were hand-searched to identify further relevant studies. […] We also contacted the authors of relevant studies for additional studies or to provide additional data if needed" p214. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: "No date or language restrictions were used on the searches" p214. **Protocol prepared (yes/no)**? Yes • **If yes, was protocol published (yes/no)**? Yes. Chen, X. J., Leith, H., Aarø, L. E., Manger, T., & Gold, C. (2015b). Music therapy for improving mental health in offenders: protocol for a systematic review and meta-analysis. http://arxiv.org/ftp/arxiv/papers/1503/1503.06524.pdf **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, example provided. "The highly sensitive search strategy contained relevant key terms for music therapy (search terms: music therapy, music, guided imagery, BMGIM, GIM, vibro-acoustic, vibroacoustic, sing, singing, song, choral, choir, percussion, rhythm, tempo, melody, improvise, improvisation), which were crossed with key terms for offenders (search terms: convict, delinquent, inmate, forensic patient, offender, probationer, prisoner)" p214. **Screening completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? **"**Two authors (X.J.C. and H.L.) independently examined titles and abstracts and excluded those studies that clearly failed to meet the inclusion criteria. Then, full texts of potentially relevant studies were retrieved and evaluated in the same way. The initial agreement rate on studies to be included was 85%, and any disagreements were resolved via discussion with the last author (C.G.)" p214. **Extraction completed in duplicate (yes/no)**? Yes. "Using a data extraction form, two authors independently collected data of the included trials regarding sample characteristics, diagnosis, therapy setting, intervention and comparison, information of the therapist, outcome measures, and attrition" p214. • **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 2 primary studies. • **Number of studies by study design**: 2 RCTs.

Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2014 (1 study), 2015 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: "Studies included in the review were randomized controlled trials (RCTs) or quasi-randomized controlled trials (qRCTs; i.e., allocation by any procedure that is intended to be random, such as date of birth, medical record number, day of the week, or the order in which participants are included in the study), regardless of sample size, published in any language, or unpublished" p212-213. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes. "Papers not meeting detailed inclusion criteria: n = 5 Reasons for exclusion: Uncontrolled study: n = 2, Mixed sample: n=2, Not music therapy: n = 1" (Figure 2 in Chen *et al.* 2016).
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Cochrane Collaboration's criteria. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: "Two authors also independently assessed the risk of bias of the included studies using the Cochrane Collaboration's criteria in the following domains: randomization, allocation concealment, blinding, addressing incomplete outcome data, selective outcome reporting, and other sources of bias" p214. **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Not reported
Appraisal rating	**QUANTITATIVE COMPONENT** **Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality)**: • Study 1 (Chen, 2014): Low risk of bias (authors rating excluded blinding) • Study 2 (Gold, 2014): Low risk of bias (authors rating excluded blinding) • **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: The authors do not appear to distinguish the two studies relevant to our overview when discussing the potential implications of study quality on the findings of the review. In the limitations section of the report, they state that overall, "The

methodological rigor of the studies was mixed: some of the studies had insufficient information on randomization, allocation concealment, and assessor blinding, resulting in a potential risk of bias" p224.

Assessment of publication bias (yes/no): No. "Publication bias is always a potential risk in systematic reviews. Publication bias may be an issue for this review given the small number of studies and the small sample sizes. The low number of studies meant that we were unable to use diagnostic tools such as funnel plots to examine the likelihood of publication bias. However, we included and searched specifically for unpublished studies" p224.

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No (for entire review), although the two meta-analyses relevant to this overview of review included only low risk of bias study.

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**?
  - The findings of Chen (2015) (low risk of bias) and Gold (2014) (low risk of bias) were pooled in a meta-analysis to assess effect of music therapy on anxiety.
  - The findings of Chen (2015) (low risk of bias) and Gold (2014) (low risk of bias) were pooled in a meta-analysis to assess effect music therapy on depression.

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Not applicable to meta-analyses pooling the 2 relevant studies conducted in prisons.

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable

Method of analysis

The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.

Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant): "We calculated between-group effect sizes from the means and standard deviations provided in each study. We used Hedges' g, the standardized mean difference effect size, which is interpreted as Cohen's d but corrected for small-sample bias. When a study used more than one measure for the same outcome domain and both or all measures were equally valid, we calculated an average effect size for all measures from that study before pooling results across studies. Multiple time points would have been entered into separate meta-analyses if that had been relevant. We used a random effects model of meta-analysis to aggregate the effect sizes of the same outcome across different studies. We used a two-sided 5% significance level" p215.

- **GRADE assessment completed (yes/no)**? No
  - **If yes, review authors' approach to GRADE assessment**: Not applicable

QUANTITATIVE COMPONENT

Justification for narrative synthesis or meta-analysis (yes/no): A explicit justification was not provided, but it may be inferred given that the aim of the review was to undertake a meta-analysis to resolve contradictory results.

- **If appropriate, justification for combining data in meta-analysis (yes/no)**: See above.

QUALITATIVE COMPONENT

Specific data analysis technique and procedures used by review authors to analyse qualitative data: Not applicable

Outcome(s) assessed

Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.

List of authors' primary outcomes assessed relevant to this overview of reviews:

- **Primary outcome 1**: Self-esteem (2 pooled studies; only 1 relevant to this overview of reviews, Chen (2015)).
- **Primary outcome 2**: Behaviour management (3 pooled studies; none relevant to this overview of reviews).
- **Primary outcome 3**: Anxiety (2 pooled studies; Chen (2015), Gold (2014)).
- **Primary Outcome 4**: Depression (2 pooled studies; Chen (2015), Gold (2014)).
- **Primary Outcome 5**: Social functioning (3 studies, only 2 relevant to this overview of reviews; Chen (2015), Gold (2014)).

- **Primary Outcome 6**: Empathy.
- **Primary Outcome 7**: Quality of life.

List of authors' secondary outcomes assessed, intended and actual timeframes, and intended approach to assess each outcome relevant to this overview of reviews: Not applicable

Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**:

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Self-esteem	N/A	N/A	The meta-analysis self-esteem outcome measures pooled 2 studies, only 1 of which was relevant to this overview of reviews (the second was conducted in a treatment-oriented detention centre for juvenile offenders). As such, the findings from this meta-analysis were not extracted.	N/A

	Anxiety	The State and Trait Anxiety Inventory (STAI). The Hospital Anxiety and Depression Scale - anxiety subscale (HADS-A) (1 study).	Chen (2015) Gold (2014)	The combined effect was not statistically significant (g = 0.46, 95% CI −0.49 to 1.42, p = 0.34, n = 132 participants), but there was a large amount of heterogeneity between the two studies (I^2 = 92%, Chi^2 = 11.88, p < 0.001). The effect was larger (g = 0.94, 95% CI 0.63 to 1.24, p < 0.001) in the high dose study (20 or more sessions) than the low dose study (g = −0.04, 95% CI −0.50 to 0.42, p = 0.87), and this moderator effect was statistically significant (Q = 11.88, df = 1, p < 0.001).	NR
	Depression	The Beck Depression Inventory (BDI) (1 study). The Hospital Anxiety and Depression Scale - depression subscale (HADS-D) (1 study).	Chen (2015) Gold (2014)	The overall effect was not significant (g = 0.44, 95% CI −0.40 to 1.27, p = 0.31, n = 132 participants), but substantial heterogeneity was found between the two studies (I^2 = 89%, Chi^2 = 9.16, p = 0.002). The effects were larger (g = 0.85, 95% CI 0.54 to 1.15, p < 0.001) for the study with 20 or more sessions than for the one that had fewer than 20 sessions (g = −0.01, 95% CI −0.47 to 0.45, p = 0.97), and this moderator effect was statistically significant (Q = 9.16, df = 1, p = 0.002).	NR
	Social functioning	N/A	N/A	The meta-analysis of social functioning outcome measures pooled 3 studies, only 2 of which were relevant to this overview of reviews (the third was conducted in a forensic hospital). As such, the findings	N/A

			from this meta-analysis were not extracted.	

Overall findings (meta-analyses, authors' secondary outcome(s))

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Yes

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? Not applicable

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

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Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? One of the authors' eligibility criteria was that attrition that attrition/drop-out rates were not allowed to exceed 30%. As such, attrition was below 30% in all three of the included studies that were relevant to this overview of reviews. The attrition rates in the three included studies deemed relevant to this overview of reviews were as follows (Table 1):

- Chen (2015): 16/200 (8%).
- Gold (2014): 33/113 (29%).

Comparator(s) used in the interventions delivered in the included studies: According to Table 1:

- Study 1 (Chen, 2014): "Standard care with no music therapy (n=100)".
- Study 2 (Gold, 2014): "Standard care with no music therapy (n=57)".

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): See below

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: According to Table 1:
  - Study 1 (Chen, 2014): Qualified music therapist.
  - Study 2 (Gold, 2014): Qualified music therapist.

Duration(s) of the intervention: "Four studies had more than 20 sessions during a period of 2 to 5 months" p217 (1 of these is Chen, 2014). The second relevant study (Gold, 2014) "had planned flexible duration but provided only five sessions on average due to short stay at the prison" p217.

	Frequencies of intervention exposure: According to Table 1: • Study 1 (Chen, 2014): 20 sessions, 2 sessions/week, 90 min/session. • Study 2 (Gold, 2014): Mean no. of sessions = 5.27, ranged from 0 to 22. **Timeframe(s) for follow-up**: "None of the included studies had follow-up measurements after the study, so the long-term effects of music therapy for offenders remain unclear" p224.
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	QUANTITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: • **Anxiety**: A significant effect of music therapy for improving anxiety was shown in two studies from China and Norway. However, it is noted that there was a large amount of heterogeneity between the two studies. In addition, although music therapy showed larger effects on anxiety in the study with 20 or more sessions than that with less than 20 sessions, the number of sessions is not the only possible explanation for the difference in effects; for example, the low-dose study (Gold, 2014) also had a high drop-out rate of 29%, in addition to numerous other problems. • **Depression**: A significant effect of music therapy for improving depression was shown in the same two studies from China and Norway. However, it is noted that there was a large amount of heterogeneity between the two studies. In addition, although music therapy showed larger effects on anxiety in the study with 20 or more sessions than that with less than 20 sessions, the number of sessions is not the only possible explanation for the difference in effects; see above for the same example. Overall, the systematic review authors conclude, "This review shows promising findings in an emerging new field" p225. However, it is our contention that the evidence found in this review on the effectiveness of music therapy for improving anxiety and depression in persons incarcerated in correctional institutions is inconclusive. **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable QUALITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which	**List any of the review authors' primary outcomes of interest for which there was no evidence**:

there was no useable evidence for the purposes of the overview	• Empathy. • Quality of life. *Note*. The results presented on self-esteem, behaviour management, and social functioning were not usable due to the inclusion of studies conducted in other settings (i.e. forensic/correctional psychiatric hospitals and a treatment oriented juvenile detention centre for juvenile offenders). **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? Yes • **If yes, state methods of investigation**: "We assessed statistical heterogeneity in a meta-analysis using the I2 statistic, a descriptive measure that represents the percentage of variability that is due to heterogeneity rather than sampling error or chance. The Chi2 test was used in addition to assess the presence of heterogeneity. Because this test is often underpowered when there are few studies, a p-value smaller than 0.10 was interpreted as an indication of possible heterogeneity of intervention effects. When statistical heterogeneity was found, we first examined whether it could be explained by clinical heterogeneity. Variation in the number of sessions was considered in particular, as it was shown in a previous dose– response meta-analysis to be an important predictor of the effects of music therapy. Similarly as in previous meta-analyses, treatment dosage was categorized a priori as 20 sessions or more versus less than 20 sessions. Second, we planned to examine the quality of music therapy methods if heterogeneity was not explained by the number of sessions" 216. • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: – **Anxiety**: Substantial heterogeneity was observed between the two pooled studies (I^2 = 92%, Chi^2 = 11.88, p < 0.001). – **Depression**: Substantial heterogeneity was observed between the two pooled studies (I^2 = 89%, Chi^2 = 9.16, p = 0.002). **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: "Despite the variability in music therapy approaches, settings, and cultural contexts, there was low statistical heterogeneity between these studies" p222. *Note*. This does not appear to be congruent with the results on heterogeneity.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS.** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Yes • **If yes, list and describe each factor according to the authors (include page number(s))**: Number of sessions: "Music therapy also showed larger effects on anxiety and depression in the studies with 20 or more sessions than those with less than 20 sessions. The positive effects on anxiety and depression were in line with previous findings" p222. **QUALITATIVE RESULTS (Not applicable)** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not reported **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not reported **Engagement**

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not reported

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not reported**
- **If so, how and why were these features more attractive**? Not reported

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not reported

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS**

longevity of the impact of effects of intervention.	**Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.3 de Andrade and Kinner (2017)

Parameter	Description
Review title	"Systematic review of health and behavioural outcomes of smoking cessation interventions in prisons"
First author and year of publication	de Andrade and Kinner (2017)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Smoking cessation interventions
Contributing primary studies	The information presented in this extraction form applies only to 19/20 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to 1 study included in the systematic

	review was not extracted as this study was an exclusively pharmacological intervention. This study (Makris *et al.* 2012) tested the effectiveness of an intervention in which 154 male prisoners received a pharmaceutical aid (Varenicline for 3 or 4 months) "and/or counselling". However, the uptake of counselling was not mentioned and as the study is described as a primarily pharmacological one, it was excluded from this data extraction.
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "In this paper, we report the results of a systematic review of studies that focus on cessation and behavioural outcomes of prison smoking cessation interventions for prisoners and prison staff. In addition, we identify gaps in the literature and consider implications for research, policy and practice" p495. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: "Studies were excluded if: the cessation programme was part of a multicomponent health intervention; there were no human participants; participants were juveniles; there was no quantitative component; or the study was not published in English" p496.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants across the included primary studies was calculated from participant numbers reported in the Supplementary Table; n = 4684. • Smoking cessation programme studies: n = 2237 (8 studies). • Indoor smoking ban studies: n = 1137 (4 studies; 1 pre-post study involved different participant samples at pre and post measures). • Complete smoking ban/combination studies: n = 1310 (7 studies; 2 pre-post studies involved different participant samples at pre and post measures, and the number of participants was Not reported for 1 of these pre-post studies). **Age (mean and/or mode and/or range)**: Not reported **Sex**: • Smoking cessation programme studies: 5/8 studies included males only; 1/8 studies included females only; 2/8 studies included a mix of males and females (65% male in 1 study; 63% male in 1 study). • Indoor smoking ban studies: 2/4 studies included males only; 2/4 included a mix of males and females (93% male in 1 study; % male/female Not reported in 1 study). • Complete smoking ban/combination studies: 5/7 studies included males only; sex is Not reported in the remaining 2 studies. **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Not reported

Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Australia (3 studies), Canada (2 studies), India (1 study), Iran (1 study), Switzerland (1 study), Turkey (1 study), UK (1 study), USA (9 studies). **Specific setting(s) (include number of studies in each setting)**: All included studies were conducted in prison settings. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The interventions of interest were a "smoking cessation programme or a smoking ban (complete or partial)" p496. In relation to the specific interventions evaluated in the included primary studies: • 8 studies evaluated a smoking cessation programme (7 combined), or an element of a smoking cessation programme. These 8 interventions were: 1) Pre-release intervention from prison with complete smoking ban 6 weekly sessions of motivational interviewing and CBT, 2 brief phone follow-up sessions 1 day and 1 week post-release. 2) 5 sessions of motivational interviewing over 5 weeks (intervention group 1) or 5 sessions motivational interviewing with 5 weeks Not reported (intervention group 2). 3) 2 brief CBT sessions, nicotine replacement therapy, nortriptyline. 4) Nicotine replacement therapy and 10-session group counselling intervention based on mood management. 5) Motivational interviewing (no. of sessions or setting details unknown). 6) Tobacco control pilot program (not ban) and nicotine replacement therapy. 7) Pilot Smoking Cessation Program involving nicotine replacement therapy for recommended course, and either group support with facilitator or one-on-one support by prison-based staff for 6 weeks. Included 3-phase social marketing approach. 8) 2 brief CBT sessions, not reported, bupropion and self-help resources. *Note*. The authors state that 10 studies evaluated a smoking cessation programme, and 3 studies evaluated an indoor smoking ban. This is supported in the Supplementary Table in which 10 studies and 3 studies are listed under smoking cessation programmes and indoor smoking bans, respectively. However, in the Results section, the authors report on one of the 10 studies evaluated a smoking cessation programme (Turan, 2016) under the results for indoor smoking bans, and the Supplementary Table describes

	the intervention in this study as “Pharmacological intervention in prison with indoor smoking ban”. Therefore, this study has been moved to the indoor smoking ban studies category. • 4 studies evaluated an indoor smoking ban whereby smoking was limited to outdoor areas for prisoners and staff, with an aim to reduce second-hand smoke and improve air quality. All involved indoor smoking bans; however, 3 studies involved additional interventions (i.e. 3 were combined interventions): 9) Pharmacological intervention in prison with indoor smoking ban; an information session was also held for all prisoners and staff. Intervention options for those with moderate/high FTND score & desire to quit included: Not reported, bupropion, or varenicline – participants required to pay for all options (1 study). 10) Nicotine replacement therapy was available for purchase (1 study). 11) Interviews & focus groups to develop prison-based interventions; the interventions in prison were based in 3 prisons: 1) (open): extension smoke-free zones; nicotine replacement therapy for purchase; self–help booklets; 2) (closed): limit smoking locations; counselling; free nicotine replacement therapy (limited); self-help booklets; 3) (remand): limit smoking locations; counselling; free nicotine replacement therapy; self-help booklets (1 study). • 7 studies evaluated a complete prisoner smoking ban, prohibiting smoking within the facility grounds for prisoners (and in some cases staff) with a focus on smoking cessation and/or reporting other behavioural impacts of smoking bans. All 7 involved indoor smoking bans; however, 1 study involved also offered nicotine replacement therapy for purchase and so this study can be considered a combined intervention. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: “We used a metasearch engine (‘Summon’), available through our institutional library, to systematically search 102 health databases and 205 criminology and law databases, including MEDLINE, EMBASE, Cochrane Library, PsycINFO, CINAHL, ProQuest and Science Direct” p496. **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: “Five prominent journals, namely Nicotine and Tobacco Research, Tobacco Control, Addiction, Journal of Correctional Health Care and the International Journal of Prisoner Health, were also manually screened for relevant articles. We used the backward snowballing technique to find new papers by searching the reference lists of included articles. We also use the forward snowballing technique, which involved identifying new articles by examining those that cited included papers” p496.

	Any search limits imposed (e.g. search dates, language restriction, etc.): "We searched for studies published between 1 January 1994 (to capture studies published following the 1993 US Supreme Court ruling) and 23 May 2016. […] The search was limited to title and abstract and included journal articles, dissertations, and grey literature such as reports and government documents" p496. **Protocol prepared (yes/no)**? No • **If yes, was protocol published (yes/no)**? Not applicable **Search strategy/key words provided (yes/no, full search or example provided)**? Yes. "The search string used was: (((smoking cessation) OR (smoking intervention) OR (smoking ban) OR (antismoking) OR (tobacco control)) AND ((jail) OR (prison*) OR (incarcerat*) OR (inmate*) OR (custod*) OR (detaine*) OR (detention) OR (gaol)))" p496. **Screening completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported **Extraction completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 19 primary studies. • **Number of studies by study design**: The review authors provide contradictory information regarding study design throughout the main report. However, the design of each individual primary study is reported in the Supplementary Table: RCT (5 studies; 1 was a double-blinded RCT); pre-post design (13 studies; 3 involved different samples for pre and post measures); cross-sectional survey (1 study). – Smoking cessation programme studies: 5 RCTs (1 was a double-blinded RCT) and 3 pre-post studies. – Indoor smoking ban studies: 4 pre-post studies (1 involved different participant samples at pre and post measures). – Complete smoking ban/combination studies: 6 pre-post studies (1 involved different participant samples at pre and post measures) and 1 cross-sectional survey.
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 1994 (1 study), 2001 (1 study), 2004 (1 study), 2005 (1 study), 2006 (1 study), 2008 (2 studies), 2009 (1 study), 2010 (1 study), 2011 (2 studies), 2012 (1 study), 2013 (3 studies), 2014 (1 study), 2015 (2 studies), 2016 (1 study).

Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: The authors did not state a prior which types of study designs would be explicitly included or excluded. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes. "Of these 199, 146 were excluded based on the title of the publication. […] Of these 28, 8 were excluded due to: the full text not being available in English (n=1); being a qualitative study (n=3); or not having human participants (n=4)" p496.
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Effective Public Health Practice Project's (EPHPP) Quality Assessment Tool for Quantitative Studies. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: "Each study was rated as strong, moderate, or weak on each of six criteria: selection bias, study design, confounders, blinding, data collection method and withdrawals. Consistent with standard practice, an overall rating was given for each study. Studies with a 'strong' overall rating could not have a weak rating for any criterion. Those with a 'moderate' overall rating had one weak rating, and those with a 'weak' overall rating had two or more weak ratings. A 'not applicable' rating was given for the withdrawal criterion if the study did not allow for participants to be followed over time (e.g., cross-sectional or retrospective studies)" p496. **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? "Methodological rigour was assessed independently by one author and a research assistant, and any discrepancies were resolved through discussion" p496.
Appraisal rating	QUANTITATIVE COMPONENT **Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality)**: The ratings of methodological quality were as follows: • Weak (11 studies) – Smoking cessation programme studies: 3 studies rated as weak.

  - Indoor smoking ban studies: 3 studies rated as weak.
  - Complete smoking ban/combination studies: 5 studies rated as weak.
- Moderate (5 studies)
  - Smoking cessation programme studies: 2 studies rated as moderate.
  - Indoor smoking ban studies: 1 study rated as moderate.
  - Complete smoking ban/combination studies: 2 studies rated as moderate.
- Strong (3 studies)
  - Smoking cessation programme studies: 3 studies rated as strong.
  - Indoor smoking ban studies: 0 studies rated as strong.
  - Complete smoking ban/combination studies: 0 studies rated as strong.
- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "Common limitations that reduced quality included high attrition rates, lack of blinding in RCTs and reliance on self-report data with regard to smoking behaviour. A number of studies also required participants to have sufficient time left to serve in prison for a prison-based follow-up, leading to selection bias" p496.

  In relation to smoking cessation programmes (n = 8 studies): The authors state, "These included five RCTs – three of which had strong methodological quality ratings, while two were rated as moderate quality. The lack of a control or comparison groups contributed to the weak rating of the […] cohort studies" p497.

  In relation to indoor smoking bans (n = 4 studies): The authors state, "…with only one study being rated moderate quality, and the other two [three] studies being considered of weak quality" p498.

  In relation to complete smoking bans/combination (n = 7 studies): The authors did not discuss the implications of the methodological quality ratings of these particular studies.

  Commenting on the implications of their quality ratings overall, the authors state, "With only three studies receiving a strong rating for methodological quality, this review highlights some of the challenges of conducting high-quality research in prisons, and the

need for researchers in the field to commit to more rigorous methodology in this setting. Given the restricted environment and congregate living circumstances, it can be difficult to prevent contamination—of the five RCTs, only one was blinded" p499.

Assessment of publication bias (yes/no): No

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Yes

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable

Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: The authors do not outline an explicit method of analysis. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: Yes.

	• **If appropriate, justification for combining data in meta-analysis (yes/no)**: "In line with Valentine et al's recommendations, a meta-analysis was not conducted as the few studies available of high methodological quality were heterogeneous in focus and methods" p496. **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: Change in smoking behaviour (including cessation/abstinence). • **Primary outcome 2**: Behavioural outcomes attributed to the programme or ban. **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))**

results relevant to each outcome (include statistics where they are presented).

For qualitative syntheses, the key synthesised findings should be extracted.

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Not applicable

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Primary outcome 1: Change in smoking behaviour

Smoking cessation programmes

8 studies evaluated the effectiveness of prisoner smoking cessation programmes/interventions; n = 3 RCTs of strong quality (Jalali, 2015; Richmond, 2013; Clarke, 2013); n = 2 RCTs of moderate quality (Cropsey, 2008; Naik, 2014); n = 3 pre-post studies of weak quality (Awofeso, 2001; MacAskill, 2008; Richmond, 2006).

Note. All participants in these studies had a desire to quit.

Note. The authors state that 10 studies evaluated a smoking cessation programme and 3 studies evaluated an indoor smoking ban. However, in the Results section, the authors report on one of the 10 studies evaluated a smoking cessation programme (Turan, 2016) under the results for indoor smoking bans, and the Supplementary Table describes the intervention in this study as "Pharmacological intervention in prison with indoor smoking ban". Therefore, this study has been moved to the indoor smoking ban studies category.

Daily/weekly smoking

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

	Cigarettes smoked per day proxy for change in smoking behaviour	Not specified, but presumed self-report	Naik (2014) RCT	An immediate, significant (within-group) reduction in the motivational interviewing intervention group's daily smoking ($p < 0.001$) (n = 300 male prisoners in intervention group). No significant difference in the motivational interviewing intervention group's daily smoking compared to control group at 6-month follow-up ($p = 0.92$) (n = Not reported at follow-up).	NR "Minimum 4 weeks" 6 months
	Cigarettes smoked per day proxy for change in smoking behaviour	Not specified, but presumed self-report	Jalali (2015) RCT	Significant (within-group) decrease in number of cigarettes smoked per day for the two interventions groups (motivational interviewing intervention group (n = Not reported) and combined motivational interviewing plus nicotine replacement therapy intervention group (n = Not reported at follow-up)) ($p = 0.02$).	3 months
	Cigarettes smoked per day proxy for change in smoking behaviour	Self-report, survey	Awofeso (2001) Pre-post study	Significant reduction in the number of cigarettes smoked per day among those who had relapsed in the intervention group (tobacco control pilot programme combined with nicotine replacement therapy) at 6 months' follow-up (45% of the 20 male and female prisoners (9/20) showed a reduction in the number of cigarettes smoked per day).	6 months

Cigarettes smoked per week proxy for change in smoking behaviour	Not specified, but presumed self-report	Richmond (2006) Pre-post study	A significant reduction in the number of cigarettes smoked per week following a multi-component (combined) smoking cessation intervention (2 brief CBT sessions, nicotine replacement therapy, bupropion and self-help resources) among prisoners who had relapsed at 6 months' follow-up ($p < 0.05$) (n = 30 male prisoners at baseline, Not reported at follow-up).	6 months

Note. It appears that reductions in cigarettes smoked per day and levels of expired carbon monoxide are treated as indicators by the authors and not outcomes. The primary outcome is Change in smoking behaviour (including cessation/abstinence) which is being measured via the indicators reported.

Expired carbon monoxide (CO) readings

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Expired carbon monoxide readings proxy for smoking behaviour the last 12–24 hours	Carbon monoxide readings	Naik (2014) RCT	An immediate, significant (within-group) reduction in the motivational interviewing intervention group's expired carbon monoxide readings ($p < 0.001$) (n = 300 male prisoners in intervention group). Significantly lower for the motivational interviewing intervention group compared to the control group at 6-month follow-up ($p < 0.001$) (n = Not reported at follow-up).	NR "Minimum 4 weeks" 6 months

	Expired carbon monoxide readings proxy for smoking behaviour the last 12–24 hours	Carbon monoxide readings	Jalali (2015) RCT	Significant (within-group) reduction in carbon monoxide readings (mean change) at the end of the 5 weeks of treatment (motivational interviewing group mean change = 7.80 ± 4.34 [p = 0.001] [n = 71 male prisoners in intervention group 1] and combined motivational interviewing plus nicotine replacement therapy mean change = 10.87 ± 4.53 [p = 0.001] [n = 71 male prisoners in intervention group 2]). Control group comparisons at the end of the 5 weeks of interventions also showed significant reductions for both intervention groups relative to the control group (n = 71 male prisoners in control group) (p489, no statistical results provided). The effect of the combined intervention was significantly greater than that of the singular motivational interviewing intervention (p = 0.001). Significant (within-group) reduction in carbon monoxide readings (mean change) at 3 months' follow-up (motivational interviewing group mean change = 7.81 ± 4.80 (p = 0.001) (n = 71 male prisoners in intervention group 1) and combined motivational interviewing plus nicotine replacement therapy mean	Immediately post 5-week intervention, 3 months' follow-up

			change = 11.24 ± 3.82 (p = 0.001)) (n = 71 male prisoners in intervention group 2). Control group comparisons at 3 months' follow-up also showed significant reductions for both intervention groups relative to the control group (n = 73 male prisoners in control group) (p489, no statistical results provided). The effect of the combined intervention was significantly greater than that of the singular motivational interviewing intervention (p = 0.001).	

Quitting smoking/quit attempts

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Quit smoking	Not specified, but presumed self-report	Naik (2014) RCT	An immediate (within-group) post-intervention (motivational interviewing) increase in 16% of participants who had quit smoking compared to pre-intervention (n = 300 male prisoners in intervention group).	NR "Minimum 4 weeks"
Quit attempts	Not specified, but presumed self-report	Naik (2014) RCT	An immediate (within-group) significant difference in the number of quit attempts among participants in the motivational interviewing intervention group pre-intervention (25.7%) compared	NR "Minimum 4 weeks"

			to post-intervention (78.3%) (n = 300 male prisoners in intervention group). Significant difference in the number of quit attempts among participants in the motivational interviewing intervention group (78.3%) compared to participants in the control group (30.7%) (p < 0.001).	6 months

Fagerstrom Test for Nicotine Dependence

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Nicotine dependence	FTND scores	Jalali (2015) RCT	FTND scores (within-group) decreased significantly for the two interventions groups (motivational interviewing intervention group (n = Not reported at follow-up) and combined motivational interviewing plus nicotine replacement therapy intervention group (n = Not reported at follow-up)) at 3 months' follow-up (p = 0.02).	3 months

Continuous abstinence

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value,	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

			heterogeneity, direction of effect)	
Continuous abstinence	Self-report, survey	Awofeso (2001) Pre-post study	No significant difference in the number of prisoners in the intervention group (tobacco control pilot programme combined with nicotine replacement therapy) who exhibited continuous abstinence (4/24 male prisoners (16.7%).	6 months
Continuous abstinence	Assumed self-report, and validated urine cotinine measures	Clarke (2013) RCT	Following a pre-release combined intervention (n = 122 male and female prisoners in intervention group) involving 6 weeks of motivational interviewing, cognitive behaviour therapy, as well as 2 brief telephone sessions post-release (in a prison with a complete smoking ban), 25.4% of the intervention group had achieved continuous abstinence compared with 7.2% of the control group (n = 125) at 3 weeks post-release, ($p<0.01$) (> 60% of the control group relapsed on the first day). At 3 months, 11.5% of the intervention group and 2.4% of the control group were continuously abstinent.	3 weeks' and 3 months' follow-up (post-release)
Continuous abstinence	Assumed self-report, and validated by expired carbon monoxide readings	Richmond (2006) Pre-post study	Following a multi-component (combined) smoking cessation intervention (2 brief CBT sessions, nicotine replacement therapy, bupropion and self-help resources), the study reported the following % differences in continuous	

			abstinence rates (within-group): 26% at 5 months' follow-up compared to 22% at 6 months' follow-up (n = 30 male prisoners at baseline, Not reported at follow-up). No inferential statistics were provided.	

Point prevalence abstinence

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Point prevalence abstinence validated using expired carbon monoxide readings proxy for smoking behaviour the last 12–24 hours	Routinely collected on smoking levels (assumed self-report), and validated by expired carbon monoxide readings	MacAskill (2008) Pre-post study	The point prevalence abstinence rate after the group intervention (pilot combined smoking cessation programme involving nicotine replacement therapy and either group support with facilitator/one-on-one support by prison-based staff for 6 weeks and included a 3-phase social marketing approach) across 3 prisons ranged from 58% to 82%) (n = 159 male prisoners). No inferential statistics provided. Point prevalence abstinence after a one-on-one intervention across 2 prisoners was 25% to 40%. No inferential statistics provided.	4 weeks
Point prevalence abstinence validated using expired carbon monxide	Assumed self-report, and validated by expired carbon monoxide readings	Cropsey (2008) RCT	Following a combined intervention involving nicotine replacement therapy and 10-	Immediately post-intervention, 3 months', 6

readings proxy for smoking behaviour the last 12–24 hours			session group counselling intervention based on mood management (n = 250 female prisoners in the intervention group, n = 289 female prisoners in the intervention group), the following point prevalence abstinence rates were reported: 18.4% (end of treatment), 16.8% (3-month follow-up), 14.0% (6-month follow-up), and 11.6% (12-month follow-up). The difference between the intervention and control groups at the 6-month follow-up was statistically significant (14.0% vs 2.8%, p = 0.001).	months', and 12 months' follow-up
Point prevalence abstinence validated using expired carbon monoxide readings proxy for smoking behaviour the last 12–24 hours	Assumed self-report, and validated by expired carbon monoxide readings	Richmond (2006) Pre-post study	Following a multi-component (combined) smoking cessation intervention (2 brief CBT sessions, nicotine replacement therapy, bupropion and self-help resources), the study reported the following % differences in point prevalence rates (within-group): 37% at 5 months' follow-up compared to 26% at 6 months' follow-up (n = 30 male prisoners at baseline, Not reported at follow-up). No inferential statistics were provided.	5 months' and 6 months' follow-up

Indoor smoking bans

4 studies evaluated the effectiveness of indoor smoking bans without or without additional cessation intervention components; all were pre-post studies, 1 of moderate quality (Kauffman, 2011), and 3 of weak quality (Turan 2016; Etter, 2012; Lasnier, 2011). Specific interventions in each study are described previously and below.

Note. All participants in these studies, with the exception of Turan (2016), had a desire to quit.

Daily/weekly smoking

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Cigarettes smoked per day	Not specified, but presumed self-report	Turan (2016) Pre-post study	Results from the indoor smoking ban combined with an information session and a pharmacological intervention (intervention options for those with moderate/high FTND score and desire to quit were nicotine replacement therapy, bupropion, or varenicline; participants were required to pay for all options) showed the average number of cigarettes smoked per day decreased significantly compared to pre-admission consumption (*Note*. The Supplementary Table appears to contradict the findings presented in text, implying that there had been an increase in the average number of cigarettes smoked per day increased since incarceration (20.2 to 22.3)) (n = 179 participants [106 prisoners and 70 staff; men and women]; 59 prisoners and staff paid for tobacco cessation treatment). *Note*. This study had high attrition rate at 1 month follow-up.	Unclear which data collection point of 4 possible points (baseline, 1 month, 2 months, and 6 months) Not useable

Cigarettes smoked per day	Modified NHANES (National Health and Nutrition Examination Survey) tobacco questionnaire	Kauffman (2011) Pre-post study	Results from the indoor smoking ban showed the number of cigarettes smoked per day decreased significantly following the implementation of the smoking ban ($p < 0.001$) (n = 200 male prisoners) (this is in contrast to the behavioural outcome reported for this study (see below under 'behavioural outcomes'). However, there was a significant increase in "smokeless tobacco consumption" following implementation of the smoking ban ($p < 0.001$).	NR Not useable as no end point
Cigarettes smoked per day	Not specified, but presumed self-report	Lasnier (2011) Pre-post study	This study found that a significant (within-group) reduction in the average number of cigarettes smokers per day compared to pre-ban smoking levels (89% reported reduction in no. cigarettes smoked per day) (total n = 113 male and female prisoners) (this is in contrast to the behavioural outcome reported for this study (see below under 'behavioural outcomes').	NR Not useable as no end point

'Smoking behaviours'

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
'Prisoner smoking behaviours'	NR	Etter (2012) *Separate pre-post study	Tested the effectiveness of an indoor smoking ban in 3	Approximately 2 years (pre-ban = 2009, post-ban = 2011)

			prisoners, combined with additional intervention (nicotine replacement therapy for purchase in 1 prison and free in 2 prisons, counselling in 2 prisons, and self-help booklets in all 3 prisons (pre-ban (2009) prison A) n = 70 male prisoners; prison B) n = 27 male prisoners; prison C) n = 116 “mainly male” prisoners; post-release (2011) prison A) n = 30 male prisoners; prison B) n = 30 male prisoners; prison C) n = 66 “mainly male” prisoners). Reported “no significant change in prisoner smoking behaviours”.	

Perceptions of air quality

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Perceived exposure to second hand smoke – prisoners and staff	Self-report, via interviews	Etter (2012) *Separate pre-post study	Overall, there was no significant change in the duration of exposure to second hand smoke across the 3 prisons. No inferential statistics provided. Prisoners and staff in Prison A (open: extension smoke-free zones combined with nicotine replacement therapy for purchase and self-help booklets) reported significantly decreased exposure to second	Approximately 2 years (pre-ban = 2009, post-ban = 2011)

			hand smoking (Prison A pre-ban n = 70 male prisoners and 51 staff, post-ban n = 60 male prisoners and 48 staff). Prisoners in Prison C (remand: limit smoking locations combined with counselling, free nicotine replacement therapy, and self-help booklets) reported "increased SHS exposure in medical service" (typo?) (Prison C pre-ban n = 116 "mainly male" prisoners and 126 staff, post-ban n = 66 "mainly male" prisoners and 0 staff).	
Perceived exposure to second hand smoke	Not specified, but presumed self-report	Lasnier (2011) Pre-post study	34% of prisoners (n = 133 male and female prisoners) reported perceived reduction in exposure to second-hand smoke.	NR

Medical support

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Medical attention	Self-report, via interviews	Etter (2012) *Separate pre-post study	Prisoners and staff in Prison A (open: extension smoke-free zones combined with nicotine replacement therapy for purchase and self-help booklets) reported receiving more medical attention ($p < 0.005$) (Prison A pre-ban n = 70 male prisoners and 51 staff,	Approximately 2 years (pre-ban = 2009, post-ban = 2011)

			post-ban n = 60 male prisoners and 48 staff).	

Complete smoking bans

4 studies evaluated the effectiveness of complete smoking bans; n = 2 pre-post studies of moderate quality (Cropsey, 2005; Thibodeau, 2010), n = 1 pre-post study of weak quality (Lincoln, 2009), and n = 1 cross-sectional survey or weak quality (Howell, 2015). Specific interventions in each study are described previously and below.

Fagerstrom Test for Nicotine Dependence

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Nicotine dependence	FTND scores, self-report	Cropsey (2005) Pre-post study	Smokers (within-group) were more nicotine dependent in a prison with a complete smoking ban (combined with nicotine replacement therapy (optional) available for purchase only) (n = 188 male prisoners classified as smokers or quitters, $p < 0.01$).	1 month
Nicotine dependence post-release	FTND mean scores, via post-release interview	Thibodeau (2010) Pre-post study	Significant (within-group) reduction in mean scores on the FTND (n = 49 male prisoners).	1 month (post-release)

Note. The results of Cropsey (2005) and Thibodeau (2010) in relation to nicotine dependence appear to contradict one another.

Smoking resumption following release from a smoking free prison

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

1-month-abstinence post-release	Self-report via post-release interview	Thibodeau (2010) Pre-post study	Following incarceration in a prison with a complete smoking ban, the study reported significant reductions in smoking rates; the 1-month abstinence rate (unknown if continuous) among the prisoners (incarceration time 2.3 years) post-release was 61% (n = 49 male prisoners).	1 month (post-release)
Continuous abstinence	Self-report via post-release interview	Lincoln (2009) Pre-post study	Following incarceration in a prison with a complete smoking ban, the study reported a continuous abstinence rate of 13.7% at the 1-month post-release follow-up interview, and a continuous abstinence rate of 3.1% at the 6-month post-release follow-up interview (n = 102 prisoners with high comorbidity rates and an average incarceration time of 2 months).	1 month and 6 months' follow-up (post-release)
Point prevalence abstinence	Self-report via post-release survey	Howell (2015) Cross-sectional survey	Following incarceration in a prison with a complete smoking ban, the study reported that 74% of ex-prisoners resumed smoking within 1 year of release (n = 172 ex-prisoners released from prison in the past 12 months but not in the past 3 months).	NR (but between 3 months and 1 year post-release)

Perceived improvement in health

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

Perceived improvement in health	Self-report via pre-release interview	Thibodeau (2010) Pre-post study	67.3% of prisoners reported perceived improvements in health in a 1-month pre-release interview.	NR

Primary outcome 2: Behavioural outcomes

5 studies reported what the review authors refer to as "behaviour outcomes". These were:

- Indoor smoking ban studies: 1 pre-post study of moderate quality (Kauffman, 2011) and 1 pre-post study of weak quality (Lasnier, 2011).
- Complete smoking ban/combination studies: 1 pre-post study of moderate quality (Cropsey, 2005), 2 pre-post studies (with separate pre- and post- participant samples) of weak quality (Leone, 1994; Turner, 2013).

Indoor smoking bans

Continued smoking despite indoor smoking ban

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Continued smoking despite ban	Modified NHANES (National Health and Nutrition Examination Survey) tobacco questionnaire	Kauffman (2011) Pre-post study	This study found that when prisoners still have access to tobacco (i.e. indoor bans), many will breach prison rules with 51.2% of prisoners (total n = 200) continuing to smoke indoors following the ban.	NR
Continued smoking despite ban	Not specified, but presumed self-report	Lasnier (2011) Pre-post study	This study found that when prisoners still have access to tobacco (i.e. indoor bans), many will breach prison rules with 93% of prisoners (total n = 133 male and female prisoners across 2 correctional centres) continuing to smoke indoors	NR

			following the ban (this is on contrast to results on no. cigarettes smoked per day; see previous results).	

Perceived health improvements

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Perceived improvements in overall health	Not specified, but presumed self-report	Lasnier (2011)	This study found that 45% of prisoners reported perceived improvements in overall health.	NR

<u>Complete smoking bans</u>

Continued smoking despite complete smoking ban

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Continued smoking despite ban	Not specified, but presumed self-report	Cropsey (2005) Pre-post study	In a prison with a complete smoking ban (combined with nicotine replacement therapy (optional) available for purchase only), this study found that 76% of participants were still smoking in prison 1 month after the ban was implemented (n = 188 male prisoners classified as smokers	1 month

			or quitters). No inferential statistics provided.	

Miscellaneous

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Prisoner-on-prisoner assaults without injury	Collection of administrative data	Leone (1994) *Separate pre-post study	A complete smoking ban was associated with an increase in prisoner-on-prisoner assaults without injury (1.31 to 3.73, $p < 0.001$, n = Not reported) from 1 year pre- to 1 year post-ban.	From 1 year pre- to 1 year post-ban
Prisoner-on-staff assaults without injury	Collection of administrative data	Leone (1994) *Separate pre-post study	A complete smoking ban was associated with an increase in prisoner-on-prisoner assaults without injury (0.08 to 0.64, $p < 0.05$, n = Not reported) from 1 year pre- to 1 year post-ban.	From 1 year pre- to 1 year post-ban
Number of staff sick days taken before and after complete smoking ban	Collection of administrative data	Leone (1994) *Separate pre-post study	No significant difference in the number of staff sick days taken before and after the ban was introduced.	From 1 year pre- to 1 year post-ban
Number of prisoners moved to segregation	Collection of administrative data	Leone (1994) *Separate pre-post study	Significant increase in the number of prisoners moved to SHU C (administrative segregation) (334.46 to 309.10, p<.005), but not SHU D (disciplinary segregation) (n = Not reported). *Note*. Table 3 describes the former as an increase, but the figures provided suggest a decrease (334.46 to 309.10, p<.005).	From 1 year pre- to 1 year post-ban

Tobacco used as currency	Self-report, survey	Turner (2013) *Separate pre-post study	Results of a pre- and post-ban gambling survey found a significant drop in tobacco used as currency by gambling offenders post ban from 28.6% to 2.3% (p<.001) and an increase in money wagers (pre-ban n = 254 male prisoners; post-ban n = 395 male prisoners).	NR

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Although the review did not include qualitative primary studies or aim to evaluate qualitative research, some reported more qualitative data:

- **Primary outcome 2: Behavioural outcomes**

  4 studies reported what the review authors refer to as “behaviour outcomes”. These were:

  - Smoking cessation programme studies: 1 pre-post study of weak quality (MacAskill, 2008).
  - Indoor smoking ban studies: 1 pre-post study of weak quality (Lasnier, 2011)

- Complete smoking ban/combination studies: 1 “separate” pre-post study of weak quality (Turner, 2013) and 1 pre-post study of moderate quality (Cropsey, 2005).

Smoking cessation programmes

- A pre-post study by MakAskill (2008) reported on a change in currency or the development of black markets following the introduction of a smoking cessation programme. This study reported the development of a black market for nicotine patches as an unintended consequence.

Indoor smoking bans

- A pre-post study by Lasnier (2011) reported on the outcomes of an indoor smoking ban in 3 prisons (male and female) where prisoners were limited in the number of cigarettes they could purchase per week. The mean self-reported number of cigarettes smoking per day far exceed the limits imposed, which the review authors suggested was an indicator of a cigarette black market. The Supplementary Table also states that there was “poor enforcement by smoking staff”.

Complete smoking bans

- A separate pre-post study by Turner (2013) conducted in-depth interviews with participants post-intervention and found that there was a decrease in the number of prisoners who gambled following the introduction of a complete smoking ban in a federal prison. This was due to the inability to use tobacco as a form of currency.
- A pre-post study by Cropsey (2005) reported (as stated in the Supplementary Table) that there was “poor enforcement of ban by staff.

Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? The authors did not include much description about participant attrition in the included studies or provide discussion of the potential impacts. They only states that attrition rates were a common limitation of the included primary studies that resulted in weaker methodological quality ratings. In the Supplementary Table, it is noted that 1 study (Turan, 2016) had high participant attrition at a 1-month follow-up, with attrition being due to prisoners being released or moving prison, or not taking planned pharmacotherapy and continuing smoking.

Comparator(s) used in the interventions delivered in the included studies:

Smoking cessation programmes

- In the Supplementary Table, 5 studies are listed as having a control group: 4 RCTs (Clarke, 2013; Jalali, 2015; Cropsey, 2008; Richmond, 2013) and 1 pre-post study (Naik, 2014).
  - In Clarke (2013) and Naik (2014), the nature of the control group was not specified.
  - In Jalali (2015) and Cropsey (2008), the control group received no intervention.
  - In Richmond (2013), the control group received 2 brief CBT sessions, nicotine replacement therapy, and placebo in place of nortriptyline.
  - The authors noted that the lack of a control or comparison group contributed to the weak rating of the cohort studies that tested the effectiveness of smoking cessation programmes (Richmond, 2006; MacAskill, 2008; Awofeso, 2001).

Indoor smoking bans

- Turan (2016), Kauffman (2011), and Voglewede (2004) were pre-post studies.
- Etter (2012) employed a separate pre-post study design with a separate group of participants assessed at the pre- and post-intervention stages.
- Lasnier (2011) was a pre-post study; however, only descriptive analyses were conducted without direct within person comparisons.

Complete smoking bans

- Cropsey (2005), Thibodeau (2010), and Lincoln (2009) were pre-post studies).
- There was no comparator in Howell (2015) as this was a cross-sectional survey study.

- Leone (1994) and Turner (2013) employed a separate pre-post study design with a separate group of participants assessed at the pre- and post-intervention stages.

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not reported

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported

Duration(s) of the intervention: For indoor and complete prison bans, the duration of the intervention would depend upon the length of prisoners' sentence. Intervention duration was Not reported in the studies that evaluated smoking cessation programmes in prisons.

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies): Not applicable for indoor and complete prison bans. In relation to studies that evaluated smoking cessation programmes in prisons, intervention frequency was reported as follows:

- 6 weekly sessions of motivational interviewing and CBT (Clarke, 2013).
- 5 sessions of MI over 5 weeks (Jalali, 2015).
- Nicotine replacement therapy and either group support with facilitator/one-on-one support by prison-based staff for 6 weeks (MacAskill, 2008)
- NR or not clear for Richmond (2013), Cropsey (2008), Naik (2014), Awofeso (2001), Richmond (2006), and Turan (2016).

Overall direction of results

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.

QUANTITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews: "[…] a complete smoking ban (rather than partial ban) can effectively interrupt smoking behaviour, and smoking cessation programmes (particularly multicomponent programmes) can increase the likelihood of abstinence in prison environments where tobacco is still available" p499.

"Ten [of 19 studies] studies involving the follow-up of a smoking cessation or abstinence programme demonstrated that such programmes in the prison setting can have a significant and immediate impact on smoking abstinence and/or frequency of smoking behaviour, particularly when pharmacological treatments are involved" p499.

Overall, the authors report that they "found no studies evaluating complete smoking bans in which all prisoners were provided with access to free pharmacological or behavioural cessation support (other than basic counselling). Furthermore, while there is evidence that cessation programmes and smoking bans in prison reduce smoking, there is also some evidence that bans can have unintended consequences, including aggressive behaviour" p499.

	Author's secondary outcome(s) relevant to this overview of reviews: Not applicable **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: The authors only state that there was "extensive heterogeneity regarding the scope, treatment, sample and follow-up" p500.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No. • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? Not explicitly • **If yes, list and describe each barrier according to the authors (include page number(s))**: – A pre-post study by Lasnier (2011) reported on the outcomes of an indoor smoking ban in 3 prisons (male and female) where prisoners were limited in the number of cigarettes they could purchase per week. The Supplementary Table also states that there was "poor enforcement by smoking staff". – A pre-post study by Cropsey (2005) examined the outcomes of a complete smoking ban and reported (as stated in the Supplementary Table) that there was "poor enforcement of ban by staff". **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable **Engagement** **How were prisoners attracted to taking part in the intervention**? Not reported **How were prisoners motivated to aim to achieve outcomes related to the intervention**? Not reported **Intervention**

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not reported

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? No

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not applicable

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? Yes. All of the following is already reported in the results for review questions 1 and 2; however, it is repeated here to present all results on longer-term effects together. • **If yes, state the follow-up period(s) and describe the findings at each one**: – An RCT by Clarke (2013) tested the effectiveness of extending the health benefits of forced abstinence (as part of a complete ban) at 3 weeks and 3 months post-release. Participants (n = 122 prisoners, male and female, in the intervention group and n = 125 prisoners, male and female, in the control group) were provided with 6 weeks of motivational interviewing and CBT pre-

release, as well as 2 brief telephone sessions post-release. At 3 weeks post-release, 25.4% of the intervention group had achieved continuous abstinence compared with 7.2% of the control group (p<0.01) (> 60% of the control group relapsed on the first day). At 3 months, 11.5% of the intervention group and 2.4% of the control group were continuously abstinent.

- Results reported in Supplementary Table: Predictors of abstinence at 3 weeks post-release (p = 0.05): Intervention (OR=6.6); incarcerated > 6 months (OR=4.6); Hispanic (OR= 3.2); planning to not smoke (OR=1.6).

– A double-blinded RCT by Jalali (2015) tested the effectiveness of motivational interviewing (n = 71 male prisoners in intervention group 1 who received 5 weeks of motivation interviewing, n = 71 male prisoners in intervention group 2 who received a combined intervention of 5 weeks of motivation interviewing with 5 weeks' nicotine replacement therapy, and n = 71 male prisoners in the control group) at 5 weeks and 3 months post-intervention. This study found a significant reduction in carbon monoxide readings (pre-post mean change) at the end of the 5 weeks of treatment follow-up (motivational interviewing group mean change = 7.80 ± 4.34 (p = 0.001) and motivational interviewing plus nicotine replacement therapy mean change = 10.87 ± 4.53 (p = 0.001)) and at 3 months' follow-up (motivational interviewing group mean change = 7.81 ± 4.80 (p = 0.001) and motivational interviewing plus nicotine replacement therapy mean change = 11.24 ± 3.82 (p = 0.001)). The same was also found for control group comparisons at both follow-up periods (no statistics provided). Moreover, the effect of the combined motivation interviewing and nicotine replacement therapy was significantly greater than that of motivation interviewing alone (p = 0.001) immediately after treatment and at 3 months' follow-up. The number of cigarettes smoked per day also decreased significantly (pre–post comparison) for the two interventions groups (p = 0.02) at 3 months' follow-up.

  - Additional results reported in Supplementary Table: Scores on the Fagerstrom Test for Nicotine Dependence also decreased significantly (pre–post comparison) for the two interventions groups (p = 0.02) at 3 months' follow-up RCT by Jalali (2015)

– An RCT by Richmond (2013) tested the long-term effectiveness (3 month, 6 month, and 12 month follow-up) of nicotine replacement therapy as part of an already effective combined smoking cessation interventions consisting of 2 brief CBT sessions, nicotine replacement therapy, and nortriptyline (control group received brief 2 CBT sessions, nicotine replacement therapy, and placebo in place of nortriptyline) (n = 206 male prisoners in the intervention group and n = 219 male prisoners in the control group). The study found that nicotine replacement therapy had no significantly long-term impact on continuous abstinence rates at the following follow-up periods: 23.8% in the intervention group vs 16.4% in the control group at 3 months' follow-up, 17.5% in the intervention group vs 12.3% in the control group at 6 months' follow-up, and 11.7% in the intervention group vs 11.9% in the control group at 23 months' follow-up

- An RCT by Cropsey (2008) tested the effectiveness of a combined intervention in which participants received nicotine replacement therapy and 10-session group counselling intervention based on mood management (no intervention control group) (n = 250 female prisoners in the intervention group and n = 289 female prisoners in the control group). This study reported the following point prevalence abstinence rates at 3-months, 6 months, and 12 months follow-up: 18.4% (end of treatment), 16.8% (3-month follow-up)m 14.0% (6-month follow-up), and 11.6% (12-month follow-up). The difference between the intervention and control groups at the 6-month follow-up was statistically significant (14.0% vs 2.8%, p = 0.001
- An RCT by Naik (2014) tested the short- and long-term effectiveness of motivational interviewing (n = 300 male prisoners in intervention group and n = 300 male prisoners in control group) (immediately post-intervention and 6 months post-intervention). This study found an immediate, significant reduction in the intervention group's daily smoking ($p < 0.001$), expired carbon monoxide readings ($p < 0.001$), and cigarettes smoked per day ($p < 0.001$) (pre-post comparisons). At the 6-month follow-up, expired carbon monoxide readings were significantly lower for the intervention group than the control group at the 6-month follow-up ($p < 0.001$); however, the number of cigarettes smoked per day was not significantly different at the 6-month follow-up ($p = 0.92$).
    - Additional results reported in Supplementary Table: In pre-post comparisons, immediately post-intervention, an increase of 16% of participants in the intervention group had quit smoking compared to pre-intervention, and there was a significant difference in the number of quit attempts among participants in the intervention group pre-intervention (25.7%) compared to post-intervention (78.3%). In addition, 64.3% of participants in the intervention group cited health as a motivation to quit pre-intervention, compared to 80.6% post-intervention ($p < 0.001$). In intervention vs control group comparisons at 6 months' follow-up, there was a significant difference in the number of quit attempts among participants in the intervention group (78.3%) compared to participants in the control group (30.7%), and 80.6% of participants in the intervention group cited health as a motivation to quit pre-intervention, compared to 72.8% in the control group ($p < 0.001$
- A pre-post study by Awofeso (2001) tested the effectiveness of a tobacco control pilot programme combined with nicotine replacement therapy (n = 24 prisoners, male and female). This study found a significant reduction in the number of cigarettes smoked per day (secondary outcome in the study) among those who had relapsed at 6 months' follow-up (45% of the 20 prisoners (9/20)) at follow-up showed a reduction in the number of cigarettes smoked per day).
    - Additional results reported in Supplementary Table: There was no significant difference in the number of prisoners who exhibited continuous abstinence at 6 months follow-up (4/24 prisoners (16.7%).

- A pre-post study by Richmond (2006) tested the feasibility of multi-component (combined) smoking cessation intervention that involved 2 brief CBT sessions, nicotine replacement therapy, bupropion and self-help resources (n = 30 male prisoners). This study found a significant reduction in the number of cigarettes smoked per week (secondary outcome in the study) among those who had relapsed at 6 months' follow-up ($p < 0.05$).
    - The study also reported the following % differences in point prevalence rates (pre-post comparisons): 37% at 5 months follow-up compared to 26% at 6 months follow-up. This study also reported the following % differences in continuous abstinence rates (pre-post comparisons): 26% at 5 months follow-up and 22% at 6 months follow-up (no p values provided).
- A pre-post study by Turan (2016) tested the effectiveness of a pharmacological intervention in a prison with an indoor smoking ban (combined intervention). An information session was also held for all prisoners and staff. Intervention options for those with moderate/high Fagerstrom Test for Nicotine Dependence score and desire to quit included: nicotine replacement therapy, bupropion, or varenicline (participants were required to pay for all options). There were 4 data collections point: baseline, 1, 2 and 6 months (n = 179 participants [106 prisoners and 70 staff; men and women]; 59 prisoners and staff paid for tobacco cessation treatment). The study found that the average number of cigarettes smoked per day decreased significantly compared to pre-admission consumption (*Note*. The Supplementary Table appears to contradict the findings presented in text, implying that there had been an increase in the average number of cigarettes smoked per day increased since incarceration (20.2 to 22.3)). This study had a high attrition rate, however, at 1 month follow-up due to prisoners being released or moving prison (19 prisoners), or not taking planned pharmacotherapy and continuing smoking (40 prisoners). Reasons for not taking pharmacotherapy included: the high cost (40%), unsuitable prison environment (35%), a strong desire to smoke (25%)).
- A pre-post study by Etter (2012), which involved different participant samples at pre (2009) and post (2011) measures, tested the effectiveness of an indoor smoking ban in 3 prisoners, combined with additional intervention (nicotine replacement therapy for purchase in 1 prison and free in 2 prisons, counselling in 2 prisons, and self-help booklets in all 3 prisons (pre-ban (2009) prison 1) n = 70 male prisoners; prison 2) n = 27 male prisoners; prison 3) n = 116 "mainly male" prisoners; post-release (2011) prison 1) n = 30 male prisoners; prison 2) n = 30 male prisoners; prison 3) n = 66 "mainly male" prisoners). This study found no significant change in prisoner smoking behaviours (precise measures not specified).
- A pre-post study by Lincoln (2009) tested the effectiveness of a complete smoking ban (n = 102 prisoners with an average incarceration time of 2 months only). This study found a continuous abstinence rate of 13.7% at the 1-month post-release follow-up interview and a continuous abstinence rate of 3.1% at the 6-month post-release follow-up interview.

QUALITATIVE RESULTS

Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)? Not applicable

- **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.4 Duindam *et al.* (2020)

Parameter	Description
Review title	"A Meta-Analysis on the Effectiveness of Prison-Based Dog Programs"
First author and year of publication	Duindam *et al.* (2020)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Animal-based interventions
Contributing primary studies	The information presented in this extraction form applies only to the 8/11 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to 3 studies included in the systematic review was not extracted as these studies focused exclusively on young offenders residing in juvenile justice centres. *Note*. Although the meta-analysis pools all studies (i.e. those conducted in adult justice centres and those conducted in juvenile justice centres), the review authors conducted a moderator analysis to test for differences in the effectiveness of the intervention across these two settings. Hence, this systematic review was retained.

Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "The aim of the present meta-analysis was to examine the effectiveness of PBDPs [prison-based dog programs] in reducing criminal recidivism and improving social-emotional functioning of people convicted of a crime, while testing to what extent study, program, and sample characteristics moderate the outcome of the program" p749. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: • Studies were excluded if they did not include a control group of participants who were not receiving the intervention under study. • Studies had to report quantitative outcomes that permitted the calculation of Cohen's d. If studies did not provide the needed information, authors were contacted and asked for the missing data • There were no exclusion criteria in relation to the intervention, "No criteria were formulated based on the type of PBDP [prison-based dog programs] (e.g., DTP [dog-training programs], AAI [animal-assisted intervention]), which means that studies were included as long as the animal was a dog, and the intervention was carried out in a correctional facility.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants included in the 8 primary studies relevant to this overview of review was 2421. **Age (mean and/or mode and/or range)**: The range of mean ages was reported. However, this range included all 11 primary studies in (mean ages ranged from 15.7 years to 39.1 years). The mean age of the participants in each individual study are Not reported. All participants in the 8 primary studies considered relevant to this overview were adult participants. **Sex**: • All male participants in 6 studies. • All female participants in 2 studies. **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Not reported
Setting/context Details of the setting of interest or the community or a	**Countries (in alphabetic order)**: The countries in which the included primary studies were set were Not reported. However, country was tested as a moderating factors, with only 2 categories: "United States" or "other" (see Table 3). **Specific setting(s) (include number of studies in each setting)**: All 8 included studies were set in adult correctional facilities.

geographical location should be included.	**Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: "Several types of PBDPs [prison-based dog programs] exist. One of these is the dog-training program (DTP), in which individuals who are incarcerated train asylum dogs, equipping them for adoption (i.e., community service design), or train dogs to become assistance dogs for people with disabilities or mental health problems (i.e., service animal socialization program; Furst, 2006)" p750. "DTPs are the most common form of PBDP in the United States and Australia. However, dogs are also incorporated into therapeutic interventions in correctional facilities in the form of Animal-Assisted Interventions (i.e., AAI) or Animal Assisted Therapy (i.e., AAT) to facilitate the achievement of therapeutic or educational outcomes. In AAI/T's, the interaction between dog and patient is controlled to serve a therapeutic purpose best achieved through exposure to the animal. […] DTPs differ from AAI/Ts in that their purpose is not to exclusively serve a therapeutic aim. Rather a substantial focus of DTPs is directed toward the training and future well-being of the dogs, without employing the therapeutic techniques that are used in AAI/Ts. Nevertheless, DTPs may contribute to rehabilitation by strengthening the bond to society (adherence to social norms and expectations) and improving psychological functioning" p750-751. "The current meta-analysis therefore assessed the effectiveness of all types of PBDPs that build on the benefits of dog–human interaction, including only quasi-experimental and RCT studies" p751. The specific interventions being evaluated in the 8 primary studies considered relevant to this overview of reviews were: • Dog-training programs (DTP) = 6 studies. • Animal assisted interventions (AAI) = 2 studies. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: PubMed, PsycInfo, Google Scholar, Criminal Justice Abstracts, Web of Science, Social Services Abstracts, Medline, and Scopus **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: "To maximize the chance of finding additional (nonpublished) studies conducted on PBDPs [prison-based dog programs], the search was extended by conducting a Google search examining the first 200 hits. These hits included grey literature, such as reports, conference proceedings, posters, master's theses, and dissertations. Furthermore, reference lists of a review (Mulcahy & McLaughlin, 2013) and a meta-analysis (Cooke & Farrington, 2016) on DTPs were checked for additional studies" p752.

	Any search limits imposed (e.g. search dates, language restriction, etc.): Not reported **Protocol prepared (yes/no)**? No. "No protocol for the current meta-analysis has been submitted" p754. • **If yes, was protocol published (yes/no)**? Not applicable **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, example provided. **Screening completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported **Extraction completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 8 primary studies. • **Number of studies by study design**: – RCT: 1 study. – Quasi-experimental: 7 studies (4 prospective, 2 retrospective, 1 prospective and retrospective).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2001 (1 study), 2007 (1 study), 2011 (1 study), 2013 (1 study), 2014 (1 study), 2017 (2 studies), 2018 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: RCTs and quasi-experimental studies. **Reasons for including study design(s) provided (yes/no)**? Yes. • **If yes, describe the justification(s)**: The authors noted that in a previous meta-analysis on this topic, RCTs and quasi-experimental studies were lacking, and state, "Recently, efforts have been made to evaluate PBDPs [prison-based dog programs] more rigorously. For example, Hill (2018) conducted a large, retrospective study on the effectiveness of DTPs [dog-training programs] on post-release recidivism in Florida and found that the likelihood of re-arrest within 1 year decreased. In addition, an RCT by Seivert *et al.* (2016) of an AAI [animal assisted intervention] for juveniles failed to show an improvement in behavioural functioning. These and similar research advances in the field warrant an updated, more stringent overview of the effectiveness of PBDPs, including both DTP and AAI/T, comparing their effectiveness for improving social-emotional and behavioural functioning. The current meta-

	analysis therefore assessed the effectiveness of all types of PBDPs that build on the benefits of dog–human interaction, including only quasi-experimental and RCT studies" p751. **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? No
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Quality Assessment Tool for Quantitative studies **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: "The following quality assessment components were scored: (presence of) selection bias, study design, (control of) confounders, blinding, validity/reliability of data collection methods, and withdrawals and dropout rates. Items were scored on a 3-point scale ranging from 0 (weak) to 2 (strong). The total scores were calculated by adding up the item scores, resulting in a quality score per study on a scale of 0 to 12 (mean score = 3.9; Thomas *et al.*, 2004)" p755. **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? "…two researchers independently scored the Quality Assessment Tool and inconsistencies were discussed until a consensus was reached under supervision of the third researcher
Appraisal rating	**QUANTITATIVE COMPONENT** **Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality)**: Total appraisal scores could range from 0-12 (it is assumed that the higher the scores the better the study quality). The mean score (from all 11 included primary studies) was 3.9. • Score of 0: 1 study • Score of 2: 2 studies • Score of 4: 3 studies • Score of 5: 1 study • Score of 8: 1 study • **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: There is limited commentary about the quality assessment. The authors note in the limitations section that the studies

had “relatively low-quality ratings” p762. They also noted, however, the quality of research in this area has improved over time: “Fortunately, the research quality of studies on AAI/Ts [animal assisted interventions/therapy] has improved in recent years; this positive trend is also apparent in the literature on PBDPs [prison-based dog programs] included in the current meta-analysis (i.e., pre-2015 mean quality score is 3, vs. 5 post-2015; Hoagwood *et al.*, 2017; May *et al.*, 2016). It is important that this positive trend continues so that more definitive conclusions about the effectiveness of PBDPs can be drawn. […] we make an appeal for future robust research in this area, and hope that the findings of this meta-analysis will be utilized as a stepping-stone for high quality research” p762-763.

Assessment of publication bias (yes/no): Yes

- **If yes, how was publication bias assessed**? The funnel-plot-based trim and fill method.
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: “Results of the trim and fill analyses demonstrated that results were positively biased, as indicated by an asymmetrical distribution of effect sizes on the funnel plot and five missing negative effect sizes. Five new effect sizes were computed and included in subsequent analyses. Results indicated that publication bias may exist, because missing data (i.e., publication bias) did influence the results because the new overall effect size was smaller and did no longer reach the level of significance (d = 0.082, p = .363)” p758.
- **If present, how was publication bias dealt with**? The authors considered the possible effect of publication bias on the overall estimates of effect on primary and secondary outcomes. “The overall effect of PBDPs on primary and secondary outcomes proved to be significant and small (Cohen’s d = 0.153) but may have been somewhat inflated due to possible publication bias” p761.

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? No

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? No. However, the review authors do concede that the included primary studies were of low quality: “Despite our extensive search, only 11 studies with relatively low-quality ratings were available (i.e., mean score of 3.9 out of 12). Often, studies received low scores on study design and methods, for example, few studies were prospective or RCTs, and the sample sizes were generally small (i.e., N < 80 for six of the 11 included studies)” p762.

In addition, the review authors refer to the limitations of including non-randomised studies which comprised the majority of studies in the meta-analysis (of the 8 studies that were relevant to our overview or reviews, 7 were quasi-experimental studies): “Quasi-

experimental designs are—because of non-random assignment—more susceptible to the biasing effects of confounding (unmeasured) factors, which are responsible for the treatment effect. As larger treatment effects were found for quasi-experimental studies, unknown or unmeasured confounders may have inflated the effects of PBDPs [prison-based dog programs]. Furthermore, somewhat larger treatment effects were found for older PBDP participants" p761.

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable

Method of analysis

The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.

Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant): The review authors used a three-level random effects model to compute the overall effect sizes and conduct moderator analyses. A three-level model "which accounts for the interdependency of effect sizes by modelling the sampling variance of effect sizes (Level 1), variance between effect sizes from the same study (Level 2), and the variance between studies (Level 3)" p756.

- First, an intercept only–model was used to calculate the overall effect of PBDPs [prison-based dog programs] on the outcome variables. Therefore, all outcomes were taken together to assess the effectiveness of PBDPs as a whole. Study results were weighted based on sample size; no corrections were made to the raw data.
- Second, log-likelihood ratio tests were run to determine whether there was significant heterogeneity between effect sizes from the same studies (Level 2) and between studies (Level 3). If significant variance was present, potential moderators were included in the model, and moderator tests were run to examine whether they (significantly) influenced the overall effect. Before conducting these moderator analyses, continuous (moderator) variables were centred around their mean, and dummy variables were created for the categorical moderators.
- Sensitivity analyses were conducted to investigate the robustness of the overall results. Effect sizes were recalculated 11 times, each time removing a different study, to examine the influence of the individual studies on the overall effect.
- **GRADE assessment completed (yes/no)**? No

	– **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: The review authors set out to perform a meta-analysis, so this was the planned method of analysis from the beginning. This is because few meta-analyses have been conducted in this area. • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: Criminal recidivism (not in scope for the current overview of reviews) **List of authors' secondary outcomes relevant to this overview of reviews**: • **Secondary outcome 1**: Socio-emotional functioning (e.g., self-esteem, depression, anxiety, aggression), associated with wellbeing.
Findings:	[See separate extraction tables below for each research question]
General comments	The primary and secondary outcomes are conflated in the same meta-analysis, with outcome type as a moderator. This is the only means by which the results of interest to this overview of reviews (i.e. social-emotional functioning) can be discerned.
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2	QUANTITATIVE RESULTS – META-ANALYSES

For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted.

For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented).

For qualitative syntheses, the key synthesised findings should be extracted.

Overall findings (meta-analyses, author's primary outcome(s))

- **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Overall findings (meta-analyses, authors' secondary outcome(s))

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**:

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Social-emotional functioning (e.g. self-esteem, depression, anxiety, aggression)	NR	8 primary studies in adult justice centres: Contalbrigo (2017) Cooke (2014) Fournier (2005/2007) Hill (2016/2018) Jasperson (2013) Mulcahy (2011) Richardson-Taylor (2001) Van Wormer (2017) AND 3 primary studies in juvenile justice centres: Chianese (2009) Grommon (2018) Sievert (2016)	The results section states "Results of the analysis indicated that there was a significant (t = 2.392, p = .019) and small overall mean effect (d = 0.153, 95% CI = [0.026, 0.281]) of PBDPs **on primary and secondary outcomes in terms of criminal recidivism and social-emotional functioning**, respectively" p758. This means that the primary and secondary outcomes were conflated in the main meta-analysis. Outcome type (primary or secondary) was tested as a moderator (see below), and the results of this analysis showed that **the intervention was more effective in reducing the primary outcome (criminal recidivism) then secondary**	NR

				outcomes (i.e., social-emotional functioning). Sensitivity, analyses showed that the overall effect remained significant after each rerun (11 reruns, each time removing a different study); i.e. none of the studies had an individual, disproportionate, impact on the findings. There was significant heterogeneity between effect sizes within studies. Therefore moderator analyses were conducted (see below).	
	Moderator analyses			**<u>Study characteristics</u>**: - **Outcome type** (primary or secondary) = F(1, 91) = 5.083 (p = 0.027) Publication year = NS - Publication status (published or not = NS - Research country (USA or other) = NS - Study quality = NS - Assessment points (multiple or one) = NS - Study type (prospective or retrospective) = NS - **Study design** (quasi or RCT) = F(1, 91) = 5.539 (p = 0.21) -Report type (self, staff, or registered data) = NS	NR

			- Nature control group (treatment as usual, waiting list, or intervention) = NS - Control group intervention (without animal or with animal) = NS - Control group dog contact (no likely contact or likely contact) = NS **<u>Sample characteristics</u>**: - Population (adult justice centre or juvenile justice centre) = NS (p = 0.052) - Sample size (N total, N experimental, and N control) = NS - **Age** = F(1, 76) = 6.921 (p = 0.10) - Addiction (non-addict or addict) = NS - Gender (male, female, or mixed) = NS Cultural background (% other) = NS **<u>Intervention characteristics</u>**: - Program type (dog training or animal-assisted intervention) = NS - Contact dog (part-time or full-time) = NS.	

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Yes

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: None of the results were presented narratively.

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

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Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

	Fidelity monitoring: "An important intervention aspect that could not be examined was implementation fidelity, as none of the studies reported to what extent the PBDPs [prison-based dog programs] were carried out (and received) as intended" p762. **Other characteristics of intervention planning, delivery, and evaluation**: Not reported **What was stated regarding participant attrition**? Not reported **Comparator(s) used in the interventions delivered in the included studies**: According to Table 3: • Treatment as usual = 3 studies • Waiting list = 1 study • Alternative intervention = 1 study. *Note*. The comparators in the remaining studies are unknown, and, importantly, the comparators used in the 8 studies of relevance were not distinguished. **Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.)**: Not reported • **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported **Duration(s) of the intervention**: "Program duration could not be examined due to lack of information" p762. **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**: "Program intensity, could not be examined due to lack of information" p762.
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	**QUANTITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: The review authors report that they found a "small-to-medium effect for PBDPs [prison-based dog programs] in terms of reducing the primary outcome of criminal recidivism, whereas no effect for PBDPs was found on the secondary outcomes (i.e., social-emotional functioning)" p761. "Findings demonstrated that there were three moderating effects (i.e., two study characteristics and one sample characteristic). First, outcome type significantly moderated the results, indicating that PBDPs [prison-based dog programs] were more effective in reducing the primary outcome criminal recidivism compared with secondary outcomes (i.e., social-emotional functioning). Second, a moderating effect of study design was found. The effects of PBDPs were larger for studies with a quasi-experimental (as opposed to randomized

controlled) design. Third, age was a significant moderator, indicating that larger effects were found for older participants. Population type just failed to reach significance (p = .052), indicating larger treatment effects for individuals in adult (vs. juvenile) Justice Centers at trend level. None of the (other) study, sample, and intervention characteristics were found to significantly moderate the effects on PBDPs" p758.

"The lack of a significant effect on secondary outcomes suggests that factors other than social-emotional functioning are responsible for the positive effect of PBDPs on criminal recidivism. For example, PBDPs may be effective in reducing criminal recidivism by helping individuals who are incarcerated build an alternative "anticriminal" identity, or by making them more susceptible to treatment targeting criminal recidivism. The secondary outcomes in the current meta-analysis encompassed social-emotional outcomes that primarily concern people's well-being instead of established dynamic criminogenic needs. Intermediate factors that promote improved social-emotional functioning and well-being may not be sufficiently targeted in PBDPs, which would explain the insignificant effect on secondary outcomes" p761.

QUALITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews: Not applicable

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not reported **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not reported
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? Yes • **If yes, state methods of investigation**: "…log-likelihood ratio tests were run to determine whether there was significant heterogeneity between effect sizes from the same studies (Level 2) and between studies (Level 3). If significant variance was present, potential moderators were included in the model, and moderator tests were run to examine whether they (significantly) influenced the overall effect" p756. • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: "Log-likelihood-ratio test results indicated that there was significant heterogeneity between effect sizes within studies, Level 2: $\chi2(1) = 133, 9541$, $p < .001$, and between studies, Level 3: $\chi2(1) = 6, 1853$, $p = .013$, indicating that the outcome of PBDPs depends on intervention, sample or study

characteristics. Results demonstrated that 40.4% of the overall variance in the outcome was attributable to differences between effect sizes within the same studies (Level 2), whereas 31% of the total variance was attributable to differences between studies (Level 3)" p758.

ALL RESULTS

Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence: "In the current meta-analysis, we were only able to detect three significant moderators, leaving some of the heterogeneity between effect sizes unexplained. As suggested, other factors may have influenced PBDPs' effectiveness that we could not account for (e.g., stronger effectiveness in certain subgroups, level of implementation fidelity). We therefore highly recommend the inclusion of detailed program, intervention, and sample descriptions in future studies, allowing future meta-analytic studies to test all relevant moderators, and to retain more of the included studies in moderator-analyses" p763.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Yes • **If yes, list and describe each factor according to the authors (include page number(s))**: Moderator analyses that were statistically significant: – Study characteristics: • Outcome type (primary or secondary): F(1, 91) = 5.083 (p = 0.027) (favouring primary outcome over secondary outcome). • Study design (quasi or RCT) (F(1, 91) = 5.539; p = 0.21) (favouring quasi-experimental design over RCT). – Sample characteristics: • Age (F(1, 76) = 6.921; p = 0.10) (larger effect sizes for older participants). *Note*. These factors were significant (statistically) moderators in a meta-analyses that conflated the primary and secondary outcomes. Therefore, it is not possible to determine if these factors would moderate the effect of the intervention on social-emotional functioning outcomes specifically.

QUALITATIVE RESULTS

Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)? Not applicable

- **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable **Engagement** **How were prisoners attracted to taking part in the intervention**? Not reported **How were prisoners motivated to aim to achieve outcomes related to the intervention**? Not reported **Intervention** **Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive**? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? "An important intervention aspect that could not be examined was implementation fidelity, as none of the studies reported to what extent the PBDPs [prison-based dog programs] were carried out (and received) as intended" p762.

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.5 Frazer *et al.* (2016)

Parameter	Description
Review title	"Impact of institutional smoking bans on reducing harms and secondhand smoke exposure"
First author and year of publication	Frazer *et al.* (2016)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Smoking cessation interventions
Contributing primary studies	The information presented in this extraction form applies only to the 3/17 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to the other 14 primary studies included in the systematic review was not extracted as these studies were not set in prisoners (12 were set in hospitals and 2 were set in universities).
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "To assess the extent to which institutional smoking bans may reduce passive smoke exposure and active smoking and affect other health-related outcomes" p5.

Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.: The authors outlined the following inclusion/exclusion criteria (p5-6):

- Study design: Randomized controlled trials (RCTs), Non-randomised trial (where investigators assign groups to conditions in a non-random manner), controlled before-and-after studies (where allocation to different comparison conditions is not made by the investigators), interrupted time series studies (where data are collected at multiple time points before and after an intervention to detect whether the intervention had a significantly greater effect than any underlying secular trend), uncontrolled before-and-after studies (comparing outcomes in the same participants or setting before and after implementation of the intervention).
- Follow-up: Studies with a minimum of 6 months follow-up.
- Types of interventions: Institutional (partial or complete) smoking bans in any specialist setting, including healthcare facilities, higher education, and correctional facilities. Studies set in general workplaces or school were excluded, as were studies that focused on smoking bans in cars or recreational play areas.

Participants

The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.

Number of participants in the included primary studies: The total number of participants in the 3 primary studies considered relevant to this overview of reviews was 41,155 (at baseline) including the 204 staff that participated in 1 of the studies (Etter, 2012), and 37,045 (at later data collection period for Etter 2012 only) including the 72 staff that participated at follow-up in the same study (Etter, 2012). Data taken from individual extraction sheets.

Age (mean and/or mode and/or range): Only reported in 1 study:

- Dickert (2014): Median age = 34 years

Sex: Only reported in 1 study:

- Etter (2012): The study included 3 prisons; prisoners were all male in 2 prisons and “almost all male” in the third prison. The sex of staff was Not reported.

Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour): The review authors included participants within the specialist settings, whether smoker or nonsmoker. In addition, the following participant characteristics were reported in Dickert (2015):

- 60% of prisoners were black, 23% white, 16% Hispanic and 1% Asian

- Persons placed on the special needs roster accounted for approx. 13% of the total prison population; this included all prisoners with a serious mental illness.

Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Switzerland (1 study), USA (2 studies). **Specific setting(s) (include number of studies in each setting)**: All 3 primary studies were conducted in prisons. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: "To be included in this review, the study must identify a partial or complete indoor smoking ban or policy in the specified settings. Studies were limited to those emerging since the introduction of the first Public Health (Tobacco) Act, prohibiting smoking in workplaces (GOI 2004), and following the implementation of the Treaty on Framework Convention on Tobacco Control in 2005 (WHO 2003). A reason for giving preference to studies with a background national smoke-free ban (including state or regional bans) is robustly policy-based. Many bans were put in place in public areas first, now progressing to bans in specialist settings. We can then compare and contrast studies with and without a national ban" p6. **Any other relevant details related to the intervention of interest**: A settings-level policy or ban implemented in the study, and a minimum of 6 months follow-up for measures of smoking behaviour were required. Additional details related to the interventions in each study are provided in the table of characteristics of included studies as follows (p9): • Binswanger (2014): – Evaluated the impact of smoke-free policies in prisons, including smoke-free policies when indoor smoking was banned, or policies which comprehensively banned smoking both indoors and outdoors, depending on state laws. • Dickert (2015): – Evaluated the impact of a tobacco-free policy in a prison banning the sale and use of tobacco products for all employees, visitors, and prisoners, again reflecting the New Jersey State ban. • Etter (2012): – Evaluated the effect of increased smoke-free zones in 3 prisons. In one prison, smoking was permitted anywhere with the exception of indoor workplaces initially. The policy was extended one year later to permit prisoners to smoke only in cells and outdoors. This prison was compared to two others with different smoking policies (control/comparison prisons) that permitted

	smoking in cells, during exercise outdoors, and in one of the control prisons smoking was also permitted in a designated smoking room.
Databases and sources searched	**Number and names of databases searched**: The review authors searched the following databases in June 2015: The Cochrane Central Register of Controlled Trials (CENTRAL), 2015 Issue 7 (via CRSO). MEDLINE to June (week 2) 2015 (via OVID), MEDLINE in progress 15th June 2015 (via OVID), EMBASE to 2015 week 24 (via OVID). **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: The authors searched reference lists of identified studies and contacted authors and relevant organisations for further information as necessary. They also searched Google Scholar using the term 'smoke ban' in July 2015, and Nicotine & Tobacco Research and tobacco addiction conference abstracts. Finally, they identified studies through personal communication with experts in the field and checked websites of state agencies and organisations to identify further studies and reports. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: • Search dates were limited to studies from 2005 to the present (present = 2015). • No language restrictions were implemented. **Protocol prepared (yes/no)**? Yes • **If yes, was protocol published (yes/no)**? No **Search strategy/key words provided (yes/no, full search or example provided)**? 2 examples provided; the search strategies for MEDLINE (MeSH) and EMBASE (EMTREE) are listed in Appendix 1. **Screening completed in duplicate (yes/no)**? Yes for title and abstract screening, and likely for full-text screening (2 authors independently screening titles and abstract, and in relation to full text screening, the authors state, “We made our final decision on eligibility based on the full text” p6). • **If yes, how were disagreements resolved**? “The authors resolved eligibility disagreements by discussion, by contacting study authors and by inviting a third review author (CK) to act as independent arbiter” p6. **Extraction completed in duplicate (yes/no)**? 1 author extracted and 1 validated, “One review author was responsible for entering all data into RevMan, Cochrane's statistical software. The authors recorded all decisions on the data extraction forms. A second review author checked the contents of the review”

	• **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 3 primary studies. • **Number of studies by study design**: – 2 controlled before-and-after studies (Binswanger, 2014; Etter, 2012). – 1 uncontrolled before-and-after study (Dickert, 2015).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2012 (1 study), 2014 (1 study), 2015 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: Any of the following study designs were eligible for inclusion: • Randomized controlled trials (RCTs). • Non-randomised trial (where investigators assign groups to conditions in a non-random manner). • Controlled before-and-after studies (where allocation to different comparison conditions is not made by the investigators). • Interrupted time series studies (where data are collected at multiple time points before and after an intervention to detect whether the intervention had a significantly greater effect than any underlying secular trend). • Uncontrolled before-and-after studies (comparing outcomes in the same participants or setting before and after implementation of the intervention. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? Yes • **Reasons for exclusion provided (yes/no)**? The review authors reported all reasons for exclusion in the characteristics of excluded studies table (p50).
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or	**The full name of the quality assessment tool(s) used**: The criteria in the Cochrane Handbook for Systematic Reviews of Interventions were used. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: Judgements of low, high, or unclear risk were assigned. The review authors considered the study designs used in this review, evaluating a policy-level health promotion outcome, and the

study quality should be reported.	evidence, to be at high risk of bias. However, it must be acknowledged that 2 of the 3 primary studies considered relevant to this overview of reviews employed mortality data from national registries (Binswanger, 2014; Dickert, 2015), and 2 studies included a control reference area for comparison (Binswanger, 2014; Etter, 2012) **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? By discussion and consultation with a third reviewer.
Appraisal rating	QUANTITATIVE COMPONENT **Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality)**: All studies were judged to be at a high risk of bias. • Binswanger (2014) was warded 3 high risk scores (random sequence generation and allocation concealment), 3 unclear risk scores (sampling, blinding of outcome, and other bias), and 2 low risk scores (incomplete outcome data and selective reporting). • Dickert (2015) was awarded 2 high risk scores (random sequence generation and allocation concealment), 2 unclear risk scores (blinding of participants and personnel and other bias), and 4 low risk scores (sampling, blinding of outcome, incomplete outcome data and selective reporting). • Etter (2012) was awarded 4 high risk scores (random sequence generation, allocation concealment, blinding of participants and incomplete outcome data), 3 unclear risk scores (sampling, blinding of outcome, and other bias), and 1 low risk scores (selective reporting). • Other biases included: – All 3 studies considered relevant to this overview of review reported issues with the reallocation of prisoners between prisons during the data collection periods for their studies, to other prisons with more or less stringent or enforced smoking tobacco policies. – Higher smoking rates in prisons with poorly ventilated areas may have influenced study outcomes. – A change to healthy heart diets in prisons during the period of Dickert (2015). – Etter (2012) reported that due to limited resources, no follow-up surveys of staff were completed in one of the comparison prisons and that the follow-up period for the survey of prisoners was only three months. This prison was identified as having difficulties with overcrowding, resulting in nonsmokers being placed in cells with smokers.

Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s)): "The quality of evidence included in this review is low, primarily reported from observational, uncontrolled before-and after study designs. Only three studies employed a control location for comparison. Confounding, including the impact of other anti-smoking activities on smoking outcomes, therefore needs to be considered. The 17 studies included in this review are heterogeneous and include patient surveys, staff surveys, university student surveys, prisoner surveys, and a review of mortality data, health outcomes data. […] However, large datasets were used by Binswanger 2014 and Dickert 2015" p16.

Assessment of publication bias (yes/no): Not reported

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Yes, GRADE was assessed, and it considered study design, risk of bias and control for confounding.

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s)): Not applicable

Method of analysis The type of research synthesis as stated by the authors of the	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**:

included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	• Measures of treatment effect: – The authors calculated risk ratios (RRs) with 95% confidence intervals (CIs) for dichotomous data in studies where possible, to measure the effects of the intervention and in keeping with the methods of the Cochrane Tobacco Addiction Group. For continuous data they intended to use mean differences (MDs) if outcomes were measured in the same way. They planned to use standardised mean differences (SMDs) to combine trials that measured the same outcomes but using different methods or scales (p7). • Unit of analysis issues: – The authors used the individual as the unit of analysis in studies and dealt with unit-of-analysis issues using guidance from the Cochrane Handbook (Higgins 2011) (p7). • Dealing with missing data: – If the proportion of missing data suggested a risk of bias, the authors reported this. When handling quit rates, they planned to use an intention-to-treat analysis where possible, including all participants originally randomised (p7). • Assessment of heterogeneity: – The authors visually explored heterogeneity between effect sizes using tables and forest plots. The authors planned to pool groups of studies that they considered sufficiently similar, provided that there was no evidence of substantial heterogeneity, as assessed by the I^2 statistic (greater than 50%) (Higgins 2003). However, the authors do report two meta-analyses with I^2 results of 72% and 76%, as they deemed the studies sufficiently similar, and could partially account for statistical heterogeneity through further investigation (Higgins 2011) (p7). • Data synthesis: – The authors anticipated complexities with data synthesis in this review, similar to those encountered when carrying out the review of legislative smoking bans (Frazer 2016). The authors have not pooled all studies in a meta-analysis and instead present a qualitative narrative synthesis of results. The authors' considered studies were sufficiently similar, they report pooled risk ratios, generated using the Mantel-Haenszel fixed-effect method, based on quit rates at the longest follow-up for trials (at least six months from the start of the intervention). They have produced a 'Summary of findings' table to present the smoking prevalence outcome (p7). • Subgroup analysis:

- The authors considered different specialist settings, including correctional facilities, for subgroup analyses.

- **GRADE assessment completed (yes/no)**? Yes
  - **If yes, review authors' approach to GRADE assessment**: Not reported

QUANTITATIVE COMPONENT

Justification for narrative synthesis or meta-analysis (yes/no): Yes

- **If appropriate, justification for combining data in meta-analysis (yes/no)**: "We anticipated complexities with data synthesis in this review, similar to those encountered when carrying out the review of legislative smoking bans (Frazer 2016). We have not pooled all studies in a meta-analysis and instead present a qualitative narrative synthesis of results. Where we considered studies were sufficiently similar, we report pooled risk ratios, generated using the Mantel-Haenszel fixed-effect method, based on quit rates at the longest follow-up for trials (at least six months from the start of the intervention)" p7.

QUALITATIVE COMPONENT

Specific data analysis technique and procedures used by review authors to analyse qualitative data: Not applicable

Outcome(s) assessed

Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.

Not recidivism, substance use, or mental illness treatment metrics

List of authors' primary outcomes assessed relevant to this overview of reviews:

- **Primary outcome 1**: The impact of indoor smoking bans or policies in specialist settings on protection from passive smoke exposure or health-related outcomes, or both.
  - In order to examine sustained impact the authors required studies which reported baseline data and outcomes for at least six months after the introduction of the indoor smoking ban. Implementation of health promotion initiatives is challenging; previous research identified the need for a data collection period of a minimum of six months to one year, and up to two years for evaluating maintenance, at individual and organizational levels (Glasgow 1999; Green 2006). Sustainability of interventions at the settings level is essential (Glasgow 2006). To assess passive smoke exposure, the authors preferred either biochemical confirmation of exposure to environmental tobacco smoke, with biological indicators in people such as cotinine or carbon monoxide measures, or information on health impacts, including hospital admission rates for conditions known to be related to smoke exposure, or both types of measure (p6).

List of authors' secondary outcomes relevant to this overview of reviews:

- **Secondary outcome 1**: Active smoking outcomes, including reported smoking rates in the exposed or target population, and evidence of smoking cessation or quit attempts.
  - The authors preferred studies that reported biochemically validated data on smoking cessation, as with passive smoke exposure.

Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	QUANTITATIVE RESULTS – META-ANALYSES **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable QUANTITATIVE RESULTS – NARRATIVE **Provide the overall findings for each primary outcome via a statement indicating the following, where reported:**

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Passive smoke exposure

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Passive smoking rate	Self-report	Etter (2012)	**Prison A** (intervention prison; pre n = 70 prisoners and 51 staff, post n = 60 prisoners and 48 staff): - Both prisoners and staff reported less exposure to second-hand smoke in 2011 than in 2009: 31% of prisoners were exposed to smoke at indoor workplaces in 2009 compared with 8% in 2011 (p = 0.001); in common rooms: 43% compared with 8% (p < 0.001); but not outdoor workplaces. **Prison B** (control prison; pre n = 27 prisoners and 27 staff, post n = 30 prisoners and 24 staff): - No changes were observed. **Prison C** (control prison; pre n = 116 prisoners and 126 staff, post n = 66 prisoners and 0 staff): - No changes were observed. **All prisons:** Staff reported reductions in second-hand smoke exposure. **Prison A:**	6-9 months for prisons A (intervention prison) and C (comparison prison). 3 months for prison B (comparison prison). Also reported follow-up of 13 months later in 2010/2011. (It is not clear from the report at which point follow-up data were collected; therefore, this finding is unlikely to be useable)

			- Median significant decrease in time of smoke exposure 25 minutes per day (2009) reduced to 2 minutes (2011) ($p < 0.001$). - No significant difference when compared to prison B. - Prisoner environmental tobacco smoke exposure significantly reduced in follow-up in prison A in cafeteria, common rooms, break rooms and indoor workplaces, but not outdoor workplaces.	

Health-related outcomes

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Smoking-related mortality	Observation (large dataset)	Binswanger (2014)	Mortality associated with smoking-related illness was reduced in prisons which had a smoking ban established for a period of 9 or more years, when compared to prisons with no smoking policies (n = 14499 prisoners): - Overall deaths: RR = 0.89, 95% CI: 0.85 to 0.94 (compared to states with no bans). - Cancer deaths: RR = 81, 95% CI: 0.74 to 0.90 (compared to states with no bans)	Data on deaths in custody from 2001 to 2011 stratified by age and sex

			- Pulmonary deaths RR = 0.66, 95% CI 0.54 to 0.80 (compared to states with no bans).	
Smoking-related mortality	Observation (large dataset)	Dickert (2015)	Significant annual reductions in smoking related mortality in prisons were identified for all prisoners, and particularly for those with a diagnosed mental illness, after the introduction of smoking bans (2005 total n = 26239 prisoners, of which 3533 had special needs; 2011 total n = 22318 prisoners, of which 3020 had special needs). - Total mortality was 3 times higher for persons with special health needs compared to all prisoners. - Annual mortality rate decreased 13% from 232 to 203/100,000 population between 2005 and 2013 after smoking ban introduced. - The mortality rate for persons with special mental health needs decreased 48% from average of 676/100,000 to 353/100,000 in 18 months after ban introduced. *Note*. The author acknowledges that the changes may be confounded by other factors in prisons, including improved healthy heart diets introduced between 2005 and 2007, during the period of the study.	Census data from January-June 2005 to January-June 2011 were analysed

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Active smoking rate

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Active smoking rate (prisoners)	Self-report	Etter (2012)	No changes were observed in prisoners active smoking. **Prison A** (intervention prison; pre n = 70 prisoners (52 smoked), post n = 60 prisoners (43 smoked)). **Prison B** (control prison; pre n = 27 prisoners (19 smoked), post n = 30 prisoners (17 smoked)). **Prison C** (control prison; pre n = 116 prisoners (67 smoked), post n = 66 prisoners (40 smoked)). When Etter (2012) was included in a prison subgroup analysis, there was no evidence of change (RR = 0.99 (95% CI: 0.84 to 1.16): 829 (active smoking) per 1000 (no intervention) compared with 820 (696 to 961) per 1000 (policy intervention to ban smoking) (n = 130 prisoners; only before and after data from the intervention prison are	6-9 months for prisons A (intervention prison) and C (comparison prison). 3 months for prison B (comparison prison). Also reported follow-up of 13 months later in 2010/2011. (It is not clear from the report at which point follow-up data were collected; therefore, this finding is unlikely useable)

			included in this analysis, not the 2 control prisons). In addition, "No significant change detected in any of the prisoners in smoking status, quit attempts or relapse" p59.	
Active smoking rate (staff)	Self-report	Etter (2012)	Staff smoking rates increased in one comparison prison (assumed Prison B as Prison C did not have a staff follow-up due to staff shortages) during the reporting period of the study (no statistics provided). **Prison A** (intervention prison; pre n = 51 staff, post n = 48 staff). **Prison B** (control prison; pre n = 27 staff, post n = 24 staff). **Prison C** (control prison; pre n = 126 staff, post n = 0 staff).	6-9 months for prisons A (intervention prison) and C (comparison prison). 3 months for prison B (comparison prison). Also reported follow-up of 13 months later in 2010/2011. (It is not clear from the report at which point follow-up data were collected; therefore, this finding is unlikely useable)

Other smoking-related outcomes

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Quit attempts and relapse	Assumed self-report	Etter (2012)	No significant changes were detected in any of the prisoners in quit attempts or relapse in the intervention prison compared to the 2 comparison prisons (no statistics provided). **Prison A** (intervention prison; pre n = 70 prisoners (52	6-9 months for prisons A (intervention prison) and C (comparison prison). 3 months for prison B (comparison prison). Also reported follow-up of 13 months later in 2010/2011.

			smoked), post n = 60 prisoners (43 smoked)). **Prison B** (control prison; pre n = 27 prisoners (19 smoked), post n = 30 prisoners (17 smoked)). **Prison C** (control prison; pre n = 116 prisoners (67 smoked), post n = 66 prisoners (40 smoked)).	(It is not clear from the report at which point follow-up data were collected; therefore, this finding is unlikely useable)
Receipt of medical help to quit smoking	Self-report	Etter (2012)	In Prison A (intervention prison; pre n = 70 prisoners (52 smoked), post n = 60 prisoners (43 smoked)), more prisoners reported receiving medical help to quit smoking in 2011 (20%) than in 2009 (4%, p = 0.012). *Note*. Nicotine replacement therapy was not free in Prison A, unlike one of the comparison prisons (Prison C).	13 months (2009 – 2011)
Prisoner perceptions of staff help	Self-report	Etter (2012)	When compared to Prison B (control prison; pre n = 27 prisoners (19 smoked), post n = 30 prisoners (17 smoked)), prisoners in Prison A (intervention prison; pre n = 70 prisoners (52 smoked), post n = 60 prisoners (43 smoked)) felt that staff should do more to help quit attempts (p = 0.015).	13 months (2009 – 2011)

One study reported smoking prevalence rates in prison. Etter (2012) identified little change in smoking prevalence among staff or prisoners, with no significant change in quit rates either in the intervention prison or when compared to the two control prisons. Staff smoking rates increased in one comparison prison during the reporting period of the study. Prisoners in the intervention prison reported receiving more medical help to quit smoking after the introduction of the smoking policy. Not reported in this prison was not free, unlike one of the comparison prisons.

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported)

Systematic review primary outcome(s)	Review authors' GRADE assessment
N/A	N/A

Systematic review secondary outcome(s)	Review authors' GRADE assessment
Passive smoking rate	Not assessed
Active smoking rate	Low
Smoking-related mortality	Low

- Overall the authors GRADE assessment and summary of findings for the main comparison identify the evidence in this review as low quality, due to the study designs employed. Confidence in the effect estimates is limited, and the true effect may be different from the estimate of the effect made in the review (p16).

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

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Descriptive account of intervention

Intervention tailoring and modification: **Not reported**

Intervention planning: **Intervention acceptability and feasibility**: Not reported

Fidelity monitoring: **Not reported**

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition?

- Binswanger (2014): Not reported
- Dickert (2014): n = 13 prisons; Census prisoners January – June 2005 n = 26,239 (prisoners with special needs, n = 3533), and Census January – June 2011 n = 22,318 (prisoners with special needs, n = 3020).
- Etter (2012):
  - Prison A (intervention prison)
    - Pre- 2009: n = 70 male prisoners' individual cells (response rate 58%), n = 51 staff (response rate 435).
    - Follow-up 13 months later in 2010/2011: n = 60 (response rate 50%), n = 48 staff (response rate 40%).
  - Prison B (comparison prison)
    - Pre- 2009: n = 27 male prisoners, individual cells within walls (response rate 40%), n = 27 staff (response rate 77%).
    - Follow-up 13 months later in 2010/2011: n = 30 (response rate 44%), n = 24 staff (response rate 63%).
  - Prison C (comparison prison)
    - Pre- 2009: n = 116 (response rate 23%), n = 126 staff (response rate 54%).
    - Follow-up 13 months later in 2010/2011: n = 66 (response rate 17%), no follow-up for staff 2011.

Comparator(s) used in the interventions delivered in the included studies:

- 2 studies included control reference areas for comparison (Binswanger (2014) used 2 comparator prisons, and Etter (2012) used States with no prison smoking bans).

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not reported

If relevant, characteristics of individuals who delivered the intervention (e.g. gender): Not reported

Duration(s) of the intervention:

- Binswanger (2014): Data on deaths in custody from 2001 to 2011 stratified by age and sex were analysed.
- Dickert (2014): 9 years.

	• Etter, 2012: Follow-up period: "Follow-up 13 months later in 2010/2011. 6-9 months follow-up in prisons A and C and only 3 months follow-up in prison B". **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**: Not reported
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	QUANTITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: In prisons, there was a reduction in the number of people who died from diseases related to smoking and a reduction in exposure to second-hand smoke after policies and bans were introduced, but there was no evidence of reduced active smoking rates: "In prisons, despite evidence of reduced mortality associated with smoking-related illnesses in two studies, there was no evidence of effect on active smoking rates" p2. **Author's secondary outcome(s) relevant to this overview of reviews**: No evidence of reduced active smoking rates. QUALITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not reported **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not reported
Heterogeneity	QUANTITATIVE RESULTS **Causes of heterogeneity investigated (yes/no)**? Yes, however, this is Not applicable to the results of the only 3 primary studies considered relevant to this overview of reviews, as these 3 studies conducted were not pooled into a meta-analysis focusing just on prison settings. • **If yes, state methods of investigation**: The authors visually explored heterogeneity between effect sizes using tables and forest plots. The authors planned to pool groups of studies that they considered sufficiently similar, provided that there was no evidence of substantial heterogeneity, as assessed by the I^2 statistic (greater than 50%) (Higgins 2003). However, the authors do report two meta-analyses with I^2 results of 72% and 76%, as they deemed the studies sufficiently similar, and could partially account for

statistical heterogeneity through further investigation (Higgins 2011) (p7). They also considered various subgroups for subgroup analyses, including prisons.

- **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable

ALL RESULTS

Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence: Not applicable

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No

- **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? No

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not reported

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not reported

Parameter	Description

FINDINGS: Q5

The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.

QUANTITATIVE RESULTS

Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)? No

- **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

QUALITATIVE RESULTS

Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)? Not applicable

- **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.6 Han (2022)

Parameter	Description
Review title	"Effects of mindfulness-based interventions on psychological distress and mindfulness in incarcerated populations: A systematic review and meta-analysis"
First author and year of publication	Han (2022)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Yoga, meditation, and mindfulness-based interventions
Contributing primary studies	The information presented in this extraction form applies only to 11/13 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to 2 studies included in the systematic review was not extracted as these studies were conducted on incarcerated youth in juvenile facilities.
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "This systematic review and meta-analysis, thus, aimed to assess effects of MBIs [Mindfulness-Based Interventions] on psychological distress, including depressive symptoms, anxiety, stress, and

overall psychological distress, and mindfulness in incarcerated populations with subgroup analyses according to the type of control groups" p50.

Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.: The systematic review authors only outlined inclusion criteria (p50); however, this denoted that excluded studies were:

Non-randomised trial

-

- Studies involving participants who were not incarcerated, interventions other than mindfulness-based interventions, and outcome measures other than those of interest, and
- Non-English language studies.

Participants

The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.

Number of participants in the included primary studies: To total number of participants in included in the 11 primary studies to this overview of review was 772.

Age (mean and/or mode and/or range): The mean (SD) age of participants across all 13 included studies was "32.8 years (SD = 8.5), ranging from 16.5 to 44.5 years" p52. Information pertaining to age in each individual study was provided in 'Online Supplemental 2' (table 2).

- Mean age in the 11 primary studies relevant to this overview of reviews ranged from 26.47 years to 44.5 years, with the majority of population samples having a mean age in the 30s and early 40s.

Sex: Information pertaining to sex in the 11 primary studies relevant to this overview of reviews was provided in 'Online Supplemental 2' (table 2).

- All male participants in 6 studies.
- All female participants in 5 studies.

Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour): Additional information on participant mental health-related symptoms and diagnoses is provided in 'Online Supplemental 2' (table 2). The following is noted:

- Depression/depressive symptoms:

	– Exhibiting depressive symptoms (Bradley, 2003) – Diagnosed with moderate levels of depression (Eisenbeck, 2016) • Substance use disorder/dependence: – Diagnosis of current abuse or dependence (Gonzalez-Menendez, 2014; Lanza, 2014; Lee, 2011) – Participating in a drug treatment programme (Lyons, 2019) Mental health-related symptoms or diagnoses were not described for participants in the remaining studies.
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: China (2 studies), Hungary (1 study), Spain (2 studies), Taiwan (1 study), USA (5 studies). **Specific setting(s) (include number of studies in each setting)**: All 11 studies were conducted in prisons. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The intervention of interest was mindfulness-based interventions, which "include mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990), mindfulness-based cognitive therapy (MBCT; Segal *et al.*, 2002), acceptance and commitment therapy (ACT; Hayes *et al.*, 1999), dialectical behaviour therapy (DBT; Linehan, 1993), and other variations facilitating mindfulness (Baer & Krietemeyer, 2006). Mindfulness-based stress reduction employs the formal practice of mindfulness meditation (e.g., body scan meditations, breathing meditations, and gentle yoga movement), typically involving 2.5 h group therapy per week for 8 weeks with a 1-day retreat and homework assignments (Kabat-Zinn, 1990). Mindfulness-based cognitive therapy combines elements of cognitive behavioural therapy with MBSR to teach skills for disengaging from dysfunctional thoughts and promoting behaviour changes while practicing mindfulness (Segal *et al.*, 2002; Williams *et al.*, 2008). Acceptance and commitment therapy aims to foster greater psychological flexibility, defined as the ability to face challenging experiences in an open, conscious manner and change one's behaviours to participate in valued activities (Hayes *et al.*, 2012). Metaphors, mindfulness exercises, cognitive defusion exercises (i.e., exercises to step back from unhelpful thoughts and emotions), self-as-context exercises (i.e., observing thoughts and emotions without judgement), clarification of values, and action plans aligned with personal values are used in ACT (Hayes *et al.*, 2012). Dialectical behaviour therapy uses acceptance-oriented strategies (mindfulness and distress tolerance) and change-oriented strategies (emotion regulation and interpersonal effectiveness) aiming for the right balance in terms of acceptance and change (Linehan, 1993)" p49. Mindfulness-based interventions in the 11 included studies relevant to this overview of reviews involved:

	• Acceptance and commitment therapy (Eisenbeck, 2016; González-Menéndez, 2014; Lanza, 2014). • Mindfulness-based cognitive therapy (Song, 2020). • Mindfulness meditation (Nidich, 2016, Nidich, 2017). • Dialectical behaviour therapy (Bradley, 2003). • A combination of mindfulness-based stress reduction and mindfulness-based cognitive therapy integrated with relapse prevention therapy (Lee, 2011; Lyons, 2019). • Mindfulness-based cognitive therapy [combined with] with some elements of mindfulness-based stress reduction (An, 2019). • A combination of acceptance and commitment therapy, dialectical behaviour therapy, mindfulness-based stress reduction, and mindfulness-based cognitive therapy (Malouf, 2017). **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: PubMed (1966-2021), CINAHL (1981-2021), PsycINFO (1935-2021), and SCOPUS (1966-2021) **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: "Articles were also manually searched through searching reference lists of identified articles and related article features in databases" p51. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: "The database search was limited to studies written in English, possibly leading to publication bias" p57. **Protocol prepared (yes/no)**? Yes, but the protocol was not registered. • **If yes, was protocol published (yes/no)**? As the protocol was not registered, it can be assumed that it was not published. **Search strategy/key words provided (yes/no, full search or example provided)**? Yes. Full search provided in 'Online Supplemental 1' (table 1) **Screening completed in duplicate (yes/no)**? No. "One author with extensive experiences in comprehensive literature reviews and expertise in MBIs searched the literature and went through the study selection process" p50.

	• **If yes, how were disagreements resolved**? Not applicable **Extraction completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 11 primary studies. • **Number of studies by study design**: 11 RCTs.
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2003 (1 study), 2011 (1 study), 2014 (2 studies), 2016 (2 studies), 2017 (2 studies), 2019 (2 studies), 2020 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: Only RCTs were eligible for inclusion. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes. "A further 11 articles were excluded after reading the full-text due to the following reasons: not including relevant outcomes (seven articles); subgroup analyses of the included study (three articles); and not a RCT (one article)" p51.
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Cochrane Risk of Bias tool. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: "The methodological quality of the included RCTs was assessed using the Cochrane Collaboration risk of bias tool. The domains in the tool include: (a) random sequence generation; (b) allocation concealment; (c) blinding of participants and personnel; (d) blinding of outcome assessment; (e) incomplete outcome data; and (f) selective reporting. Risk of bias in each of the domains were judged as 'low risk' of bias, 'high risk' of bias, or 'unclear risk' of bias following the criteria provided in the Cochrane Collaboration's handbook" p51. **Quality appraisal completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported
Appraisal rating	QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): The risk of bias ratings for the 11 RCTs relevant to this overview of reviews were as follows:

- Low risk of bias = 0 studies.
- Unclear risk of bias = 5 studies.
- High risk of bias = 6 studies.
- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: They systematic review authors do not discuss how the rick of bias of the included RCTs affected the analysis or certainty of evidence. They simply state in the discussion, "The overall risk of bias across the included RCTs was interpreted as present or unclear, indicating a need for more high-quality studies to better determine the effects of MBIs on incarcerated populations" p57.

Assessment of publication bias (yes/no): No.

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? No

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? No

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

	• **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable
Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: "Means, SDs, and sample sizes of intervention and control groups in the included studies were entered into RevMan Version 5.3 for meta-analyses and pooled for each of the outcomes at the immediate post-test and at follow-up. The I2 statistic was used to measure statistical heterogeneity across studies, and I2 greater than 60% was interpreted as substantial heterogeneity. Either a random effects model or fixed effects model with the inverse variance method was used depending on I2 for each outcome. Either the standardised mean difference (SMD) or the MD with 95% confidence intervals was used as a summary statistic for the size of the intervention effect for outcomes measured using different assessment tools and the same assessment tool, respectively. SMDs lower than 0.4 indicate a small effect, SMDs between 0.4 and 0.7 indicate a moderate effect, and SMDs higher than 0.7 indicate a large effect. Subgroup analyses for each outcome were conducted according to the type of control groups, if applicable, to see whether effects of the MBIs differed when compared to the active control groups provided with other comparable interventions or passive control groups provided with only treatment as usual (TAU), including waiting list control groups" p51. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: No • **If appropriate, justification for combining data in meta-analysis (yes/no)**: No **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: Depressive symptoms • **Primary outcome 2**: Anxiety • **Primary outcome 3**: Stress

synthesis, i.e. the names or labels of the outcomes.	• **Primary outcome 4**: Overall psychological stress • **Primary outcome 5**: Mindfulness **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	This review includes studies that delivered interventions such as acceptance and commitment therapy and dialectical behaviour therapy. These interventions are often implemented to treatment mental ill health, which makes sense as several of the participant samples in the included studies have diagnosed substance use disorder, depressive symptoms, or a diagnosis of moderate depression. Although this overview of reviews does not focus on treating diagnosed mental health disorders, the systematic review authors definition of mindfulness-based interventions includes these forms of therapy, and the systematic review does not appear to be focused on treatment mental health disorders; but rather on reducing distress and promoting mindfulness. Some of the included studies included people with diagnosed SUD. Factors to note: 1) This is a single author systematic review, and 2) the review author does not discuss the results/impact of heterogeneity on the overall conclusions.
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**:

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Depressive symptoms	Zung Self-Rating Depression Scale (SDS) (1	An (2019) Bradley (2003)	MBIs had a moderate effect on reducing depressive symptoms	NR

outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.		study). Beck Depression Inventory (BDI) (2 studies). BDI-Short form (1 study). Depression subscale of Trauma Symptom Checklist (TSC) (1 study).	Eisenbeck (2016) Nidich (2016) Song (2020)	compared to control groups overall (SMD = 0.48, 95% CI = [0.25, 0.71]; 5 RCTs; n = 307 participants). MBIs did not differ when compared to the active control groups or passive control groups (not effect of control group type) (p = 0.39). MBIs had a moderate effect when compared to passive control groups only SMD = 0.50, 95% CI = [0.27, 0.73]; 4 RCTs; n = 297), but there was no significant between-group difference in depressive symptoms when MBIs were compared with other active interventions (SMD = −0.05, 95% CI = [−1.29, 1.19]; 1 RCT; n = 10).	
	Anxiety	Zung Self-Rating Anxiety Scale (SAS) (1 study). Arousal subscale of Trauma Symptom Inventory (TSI) (1 study). Beck Anxiety Inventory (BAI) (2 studies). Anxiety Sensitivity Index (ASI) (2 studies). Anxiety subscale of Trauma Symptom Checklist (TSC) (1 study). State-Trait Anxiety Inventory (STAI) (1 study).	An (2019) Bradley (2003) Eisenbeck (2016) González-Menéndez (2014) Lanza (2014) Lyons (2019) Nidich (2016) Song (2020)	MBIs had a small effect on reducing anxiety compared to control groups overall (SMD = 0.21, 95% CI = [0.04, 0.38]; 8 RCTs; n = 537 participants). There was a statistically significant difference according to control type subgroup (p < 0.001); i.e. effects of the MBIs differed when compared to the active control groups or passive control groups. MBIs had a moderate effect when compared to passive control	NR

			groups (SMD = 0.45, 95% CI = [0.23, 0.67]; 5 RCTs; n = 328), but when MBIs were compared to active control groups only there was no significant effect for MBI on anxiety (SMD = −0.16, 95% CI = [−0.44, 0.11]; 4 RCTs; n = 209).	
Stress	Perceived Stress Scale (PSS) (3 studies).	An (2019) Nidich (2016) Song (2020)	MBIs had a large effect on reducing stress compared to passive control groups (SMD = 4.60, 95% CI = [2.93, 6.27]; 3 RCTs; n = 266)	NR
Overall psychological distress	Symptom Checklist 90 (SCL-90) (1 study). PTSD Symptom Checklist (1 study). Trauma Symptom Checklist (TSC total) (1 study). Posttraumatic Stress Disorder Checklist-Civilian version (PCL-C) (1 study).	An (2019) Lyons (2019) Nidich (2016) Nidich (2017)	MBIs had a moderate effect on reducing overall psychological distress compared to control groups overall (SMD = 0.50, 95% CI = [0.01, 0.99]; 4 RCTs; n = 372).	NR
Mindfulness	N/A	N/A	The meta-analysis of mindfulness outcome measures pooled 5 studies, 1 of which was conducted in juvenile facilities. As such, the findings from this meta-analysis were not extracted.	N/A

Overall findings (meta-analyses, authors' secondary outcome(s))

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Yes

QUANTITATIVE RESULTS – NARRATIVE QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. None of the results were presented narratively.

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? Not applicable

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

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Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? The author does not specifically discuss attrition; however, but there is a reference to incomplete outcome data in a number of studies which may be related. “Among the eight studies with a high risk of bias, for seven studies this was mainly accounted for in the domain of incomplete outcome data” p54.

‘Online Supplemental 2’ (table 2) provides completion rates at post-test for all included studies. Among the 11 RCTs considered relevant to the current overview of reviews, the lowest was 54.2% completion rate among participants the intervention group; however, the majority of completion rates were at 70% and above.

The systematic review authors also state, “Among the included studies, some studies (e.g., Bradley & Follingstad, 2003; Eisenbeck *et al.*, 2016) had lower completion rates of participants at post-test than the other studies (see Table S2). These studies had participants who dropped out of the study because of transfer to another incarceration setting during the study period (Bradley & Follingstad, 2003; Eisenbeck *et al.*, 2016” p56-57.

Comparator(s) used in the interventions delivered in the included studies: “In the ‘active control groups’ the other interventions were variously: cognitive behavioural therapy; relaxation; psychotherapy focussing on motivational interviewing and goal planning for successful re-entry into their communities ; and a communication skills intervention. It should be noted, however, that there were fewer studies comparing MBIs with other interventions than to TAU/waiting list conditions” p56.

- Active control groups (n = 4 studies):
  - “10 weekly group sessions (1.5 hours per session) of CBT with elements of psychodrama, aiming to change behaviours through coping skills training and identifying and changing problematic mental events” (Eisenbeck, 2016).
  - “16 weekly group sessions (1.5 hours per session) of CBT, adapted for substance abuse disorder, involving review of drug use and high-risk situations, skill instructions, and development of a coping plan for high-risk situations” (Gonzalez-Menendez, 2014).
  - 2 control groups, 1 of which was an active control group, in 1 study: CG1: 16 weekly group sessions (1.5 hours per session) of CBT, adapted for substance abuse disorder, involving activities for recognizing behavioural chains, analysing drug abuse situations, identifying negative emotional states, cognitive restructuring, practicing alternatives to drug use, and relapse prevention. CG2: Waitlist control” (Lanza, 2014).

- "6 weekly group-based sessions of a communication skills intervention" (Lyons, 2019).

- Waiting lists/treatment as usual control group (n = 7 studies)
  - *Note*. 1 study included both an active control group and a waitlist control group (Lanza, 2014).

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not explicitly reported. The systematic review authors did note, "Mindfulness-based interventions were delivered as in-person, guided, and group-based sessions in all studies" p51.

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported

Duration(s) of the intervention: 'Online Supplemental 2' (table 2) provides information pertaining to the duration of interventions (duration was not clear for 1 study):

- 4 weeks (Malouf, 2017).
- 6 weeks (An, 2019; Lyons, 2019).
- 8 weeks (Song, 2010).
- 10 weeks (Eisenbeck, 2016; Lee, 2011)
- 16 weeks/4 months (Nidich, 2016; Nidich, 2017; Lanza, 2014; Gonzalez-Menendez, 2014)

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies): "The average number of sessions delivered was 9.9 (SD = 4.4), ranging from 5 to 18 sessions in total" p51-52. 'Online Supplemental 2' (table 2) provides additional information pertaining to intervention intensity; indicating that in the majority of intervention groups, sessions lasted for 1.5 hours, with some lasting for 2.5 – 3 hours.

Overall direction of results

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.

QUANTITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews:

"Meta-analysis showed moderate effects of MBIs on depressive symptoms and overall psychological distress, large effects on stress, and small effects on anxiety […]. This compares with the previous review, covering a limited range of MBIs for incarcerated populations (Per *et al.*, 2020), which used meta-analysis and suggested small effects of MBIs on anxiety but was based on only two studies; only one study was found testing effects on depressive symptoms, and finding a large effect" p55.

	"When the present meta-analyses were conducted according to the type of control groups, when applicable, all MBIs invariably emerged as significantly superior to TAU/waiting list controls, with a large effect of MBIs on stress and moderate effects of MBIs on anxiety, depressive symptoms, stress, and overall psychological distress. By contrast, when the comparison group was of people having some other intervention, differences were barely detectable" p56. "This meta-analysis shows moderate effects of MBIs on depressive symptoms and overall psychological distress, large effects on stress, and small effects on anxiety and mindfulness in incarcerated samples. The overall risk of bias across studies was unclear. Most included studies compared MBIs to 'treatment as usual/waiting list controls; the few studies comparing them to other interventions showed little difference between interventions" p57. **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No. The author report that statistical heterogeneity was measured but there is no investigation of the likely cause. • **If yes, state methods of investigation**: "The I^2 statistic was used to measure statistical heterogeneity across studies, and I^2 greater than 60% was interpreted as substantial heterogeneity. Either a random effects model or fixed effects model with the inverse variance method was used depending on I^2 for each outcome" p51 • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not reported **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: Not reported

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable **Engagement** **How were prisoners attracted to taking part in the intervention**? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? Not reported

- **If so, why were they preferred**? Not reported

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not reported**
- **If so, how and why were these features more attractive**? Not reported

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not reported

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not applicable

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the	QUANTITATIVE RESULTS **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

longevity of the impact of effects of intervention.	**QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.7 Harrison (2020)

Parameter	Description
Review title	"The 'Sub-Culture' Created Through Austere Measures: Understanding the Cycle to Break It"
First author and year of publication	Harrison (2020)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Horticultural interventions (Timler, 2019) Art and creative interventions (Daveson, 2001) Animal-based interventions (Smith, 2019)

Contributing primary studies	Only 3/9 primary studies included in the systematic review reported information from studies of interventions of interest to the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). The other 6 studies included in the systematic review was reported findings from studies of interventions that we not among Department of Health's selected interventions. These were: shared reading (1 study), wellness workshops (2 studies), time management (1 study), listening therapy (delivered by the Samaritans) (1 study), and problem-solving training (1 study). However, as this review speaks predominantly to Q4 on barriers and facilitators to implementing interventions in a prison setting, it was decided that the specific intervention types were less relevant than they are to answer Q1, Q2, Q3, and Q5. Therefore, this extraction includes information pertain to *all* included studies and, where relevant, the 3 studies that focused on interventions relevant to this overview of reviews are highlighted.
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "The aim of this review is to synthesise the qualitative literature exploring the experiences of individuals in prison and custodial environments and their experiences of accessing and engaging in MH [mental health] support whilst in custody" chapter 1, p7. While "experiences of accessing and engaging in MH [mental health] support" is not a focus of this overview of reviews, some of the interventions included are and some of the learnings can contribute to Question 4 barriers and facilitators. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: The following exclusion criteria were outlined (chapter 1, p9): • Non-peer reviewed studies were excluded. • Studies focusing on mental healthcare support outside of prisons (i.e. community-based projects, psychiatric hospitals and 'outpatients') were excluded to maintain a specific focus on individuals' experiences whilst in custodial settings. • Results focusing on experiences of substance misuse programmes, gang-focused interventions, and experiences of prisoners with a diagnosis of a learning disability were excluded. • Previous literature reviews and non-English papers were excluded.
Participants The defining characteristics of the participants in studies included in the research	**Number of participants in the included primary studies**: Whole review: "The nine studies represent the experiences of 202 men and women, aged 18 to 85 years, from areas of the United Kingdom, Australia, the United States, Canada, and the Republic of Ireland. Studies did not consistently detail their sampling and recruitment methods, but those that did used purposive or randomised recruitment from anonymous lists. The study sample sizes ranged from five to 65 participants" p1-12.

syntheses/review should be detailed.	Studies with Department of Health interventions: The total number of participants included in the 3 primary studies with the relevant interventions was 46. Specifically (Table 3): • Music therapy (Daveson, 2001): 5 female prisoners. • Animal therapy (Smith, 2019): 31 male prisoners. • Agricultural therapy (Timler, 2019): 10 male prisoners. **Age (mean and/or mode and/or range)**: This was Not reported in any of the 3 primary studies relevant to this overview of reviews. Daveson (2011) reported that the 5 female participants in their study were all aged over 18 years. **Sex**: This was reported in all 3 primary studies relevant to this overview of reviews (1 female sample and 2 male samples; see above) **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Not reported
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Whole review: Australia (1 study), Canada (1 study), Ireland (1 study), UK (4 studies), USA (2 studies). Studies with Department of Health interventions: Australia (1 study; Daveson, 2001), Canada (1 study; Timler, 2019), USA (1 study; Smith, 2019). **Specific setting(s) (include number of studies in each setting)**: All 3 primary studies were conducted in correctional settings. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency,	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: Whole review: "Each study included in this review focuses on the experiences of prisoners engaging in mental health support programmes within prison environments. They aim to capture prisoners' experiences and perspectives of MH [mental health] support, reflecting what they had found beneficial as well as what they perceived was missing. Several studies also captured the reflections of prison staff (Billington, Longden & Robinson, 2016; Lennox *et al.*, 2019; Magee & Foster, 2011; Perry, Waterman, House & Greenhalgh, 2019), in addition to prisoner perspectives, however due to the focus of this literature review, these third-party responses were not included. The studies included varying interventions; 'shared-reading' programmes promoting literature-based support and wellbeing improvement (S1), music therapy groups (S2), wellness workshops following 'prison health' surveys and information (S3), wellness workshops focusing on MH improvement (S4), 'Critical Time' interventions focusing on future planning to manage stressors and anxiety (S5), 'Listening schemes' promoting peer support and emotional and psychological support (S6), problem-solving training interventions (S7), animal therapy with 'Healing Species' programme involving rescue dogs (S8), and agricultural therapy delivered through correctional agriculture

and/or intensity of the intervention.	programmes (S9). All interventions shared the aims of developing MH awareness whilst in prison, providing support for imprisoned individuals, developing emotional and psychological management skills, some specifically focusing on suicidal ideation and self-harming behaviours, and developing problem-solving and anxiety management skills for working towards the future" chapter 1, p12-13. The interventions delivered in the 3 primary studies with Department of Health interventions were as follows (Table 3): • Daveson (2001): Music therapy, "12-session music therapy project in a female correctional facility. Focus on impact upon MH [mental health] and well-being". • Smith (2019): Animal therapy, "'Healing Species' program with rescue dogs, bringing the community-based programme into secure settings. Focus on impact upon MH and rehabilitation". • Timler (2019): Agricultural therapy, "Correctional agriculture programme. Focus on impact upon MH and wellbeing, including self-esteem and self-worth". **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: PsycInfo, MedLine Complete, The Cumulative Index to Nursing and Allied Health Literature (CINAHL), Academic Search Ultimate (ASU), and SocIndex. **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: The author also used the Cochrane Library and Prospero register to identify similar reviews already in publication (chapter 1, p8). In addition, "Hand searching of grey literature and citation chaining was conducted through Google Scholar and Science Direct, accessing literature not identified by systematic searching" chapter 1, p9. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: The authors states that "only peer-reviewed studies published in English were included" chapter 1, p9. **Protocol prepared (yes/no)**? No • **If yes, was protocol published (yes/no)**? Not applicable **Search strategy/key words provided (yes/no, full search or example provided)**? Yes. A full search strategy including keywords is available in the appendices (Table 2) **Screening completed in duplicate (yes/no)**? No.

	• **If yes, how were disagreements resolved**? Not applicable **Extraction completed in duplicate (yes/no)**? • **If yes, how were disagreements resolved**? Not applicable
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 9 primary studies (whole review). • Billington, Longden, and Robinson (2016) (S1) Qualitative study (theoretical approach unspecified) (Table 3) • Daveson and Edwards (2001) (S2) Qualitative study (theoretical approach unspecified) (Table 3) • Harner and Riley (2013) (S3) Qualitative study (theoretical approach unspecified) (Table 3) • Keogh, McBennett, deVries, Higgins, O'Shea, and Doyle (2017) (S4) Qualitative study (using thematic analysis) (Table 3) • Lennox, Stevenson, Edge, Hopkins, Thornicroft, Susser, Conover, Herman, Senior, and Shaw (2019) (S5) Qualitative study (using framework analysis) (Table 3) • Magee and Foster (2011) (S6) Qualitative study (using thematic analysis) (Table 3) • Perry, Waterman, House, and Greenhalgh (2019) (S7) Qualitative study (using thematic framework analysis) (Table 3) • Smith and Smith (2019) (S8) Qualitative survey (using grounded qualitative approach for analysis) (Table 3) • Timler, Brown, and Varcoe (2019) (S9) Qualitative study (using grounded theory for analysis) (Table 3) **Number of studies by study design**: Studies with Department of Health interventions were all qualitative studies. Specifically: • 1 study involved semi-structured interviews (Timler, 2019); Qualitative study (using grounded theory for analysis) (Table 3). • 1 involved self-report qualitative measures delivered through semi-structured questionnaires (Daveson, 2001), whereby the data were analysed and "coded into overarching themes" (Table 3) Qualitative study (theoretical approach unspecified) (Table 3). • 1 involved self-report to open-ended questions in a survey (Smith, 2019), whereby the data was analysed using a "grounded qualitative approach" (Table 3).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2001–2019 The 9 primary studies years of publication were:

	• Billington, Longden, and Robinson (2016) (S1) • Daveson and Edwards (2001) (S2) • Harner and Riley (2013) (S3) • Keogh, McBennett, deVries, Higgins, O'Shea, and Doyle (2017) (S4) • Lennox, Stevenson, Edge, Hopkins, Thornicroft, Susser, Conover, Herman, Senior, and Shaw (2019) (S5) • Magee and Foster (2011) (S6) • Perry, Waterman, House, and Greenhalgh (2019) (S7) • Smith and Smith (2019) (S8) • Timler, Brown, and Varcoe (2019) (S9) Studies with Department of Health interventions: 2001 (1 study; Daveson), 2019 (2 studies; Smith study and Timler study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: Qualitative studies **Reasons for including study design(s) provided (yes/no)**? Yes • **If yes, describe the justification(s)**: "Qualitative methodology was chosen for design and research type with the requirement of MH [mental health] to focus on the experiences of individuals within the prison system, reporting [mental health] difficulties and accessing relevant support" chapter 1, p8-9. **List of excluded studies at full text provided (yes/no)**? Yes • **Reasons for exclusion provided (yes/no)**? The PRISMA flow diagram (Figure 1 in Harrisson 2020) states the following reasons for exclusion: – Mixed methods/quantitative methodology – Intervention description with no qualitative data, and – Targeted interventions for specific mental health diagnoses.
Appraisal instrument(s)	**The full name of the quality assessment tool(s) used**: The Critical Appraisal Skills Programme (CASP)

The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: "CASP for qualitative studies is considered appropriate for assessment of methodology quality in qualitative research and considered the most commonly used assessment tool for qualitative studies. Critical appraisal was not utilised to exclude studies, rather, it enabled an opportunity to quality-check studies as literature suggests that removal of lower scoring studies from quality assessments does not ultimately affect the synthesis" chapter 1, p10. Studies are assessed against the following criteria (Table 4): • CASP 1: Clear statement of aims • CASP 2: Qualitative methodology as appropriate • CASP 3: Was the research design appropriate for the aims? • CASP 4: Was the recruitment strategy appropriate? • CASP 5: Data collection appropriate for the research issue? • CASP 6: Consideration of relationship between researcher and participants • CASP 7: Ethical issues taken into consideration? • CASP 8: Sufficiently rigorous data analysis • CASP 9: Clear statement of findings presented? CASP 10: Is there a clear value of research? The review author does not provide information pertaining to the scoring process; however, Table 4 provides some insight in scoring such that: • Studies awarded a score of 7 are considered to be of moderate quality • Studies award awarded a score of 8 are considered to be of moderate/strong quality, and • Studies awarded a score of 9 or 10 are considered to be of strong quality. *Note*. No study included in the review was awarded a score of 6 or below. **Quality appraisal completed in duplicate (yes/no)**? Yes. "Study quality was assessed by the first author and their colleague who was not associated with the review. The colleague was chosen due to their specific interest in MH within prison and custodial settings and their experience with qualitative literature reviews" chapter 1, p10.

- **If yes, how were disagreements resolved**? "The ratings for the quality of studies reached were similar; where disagreements were noted, discussions were held to review the full texts and resolve any differences, resulting in the final decisions" chapter 1, p10.

Appraisal rating

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): Not applicable

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: Not applicable

Assessment of publication bias (yes/no): Not applicable

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? Not applicable

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Not applicable

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: The results section did no provide results of the quality appraisal; this was outlined in the strengths and limitations section of the chapter.

"It should be considered that a risk of thematic analysis as a methodology is drawing conclusions based on studies that are not entirely reliable when considering context diversity, quality or participants. The CASP criteria demonstrate study quality; studies that were considered 'moderate' were due to lack of clarity around ethical issues, specific analysis approach or research design (S2, S3). S8 also neglected to clarify their ethical considerations, which impacted upon the subsequent scoring. All included studies did present qualitative methodology, with clear statement of aims, offering valuable research findings" p1-30.

The quality rating for all 9 primary studies included in the review were:

- Billington, Longden, and Robinson (2016) (S1): Strong quality (score of 9).
- Daveson and Edwards (2001) (S2): Moderate quality (score of 7).
- Harner and Riley (2013) (S3): Moderate quality (score of 7).
- Keogh, McBennett, deVries, Higgins, O'Shea, and Doyle (2017) (S4): Moderate/strong quality (score of 8).
- Lennox, Stevenson, Edge, Hopkins, Thornicroft, Susser, Conover, Herman, Senior, and Shaw (2019) (S5): Strong quality (score of 9).
- Magee and Foster (2011) (S6): Strong quality (score of 9).
- Perry, Waterman, House, and Greenhalgh (2019) (S7): Strong quality (score of 10).
- Smith and Smith (2019) (S8): Moderate/strong quality (score of 8).
- Timler, Brown, and Varcoe (2019) (S9): Strong quality (score of 9).

"By ascertaining study quality, all included studies could be considered of good quality and the focus of analysis could be spread across all" chapter 1, p10.

Studies with Department of Health interventions:

- Daveson (2001), music therapy: Moderate quality (score of 7).
- Smith (2019) animal therapy: Moderate/strong quality (score of 8).
- Timler (2019), agricultural therapy: Strong quality (score of 9).

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Yes, briefly.

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: "It should be considered that a risk of thematic analysis as a methodology is drawing conclusions based on studies that are not entirely reliable when considering context diversity, quality or participants. The CASP criteria (see Table 4, Appendices) demonstrate study quality; studies that were considered 'moderate' were due to lack of clarity around ethical issues, specific analysis approach or research design (S3 and S8). S8 [Smith, 2019] also neglected to clarify their ethical considerations,

which impacted upon the subsequent scoring. All included studies did present qualitative methodology, with clear statement of aims, offering valuable research findings" chapter 1, p30.

- All 9 studies had clear statement of aims, were suitable for investigation using a qualitative approach, and provided valuable research (Table 3).
  - Two studies (S3 and S8) were assessed as not having a research design appropriate for the aims.
  - One study (S4) was judged as not having an appropriate recruitment strategy.
  - For six studies (S3–S7 and S9) did not critically examined their own role with respect to the participants.
  - Three studies (S2, S3 and S8) were assessed as not adequately addressing all ethical issues.
  - Two studies (S1 and S2) were assessed as not having a sufficiently rigorous data analysis.
  - One study (S2) was judged as not presenting findings clearly.

Method of analysis

The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.

Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant): "The thematic synthesis method detailed by Thomas and Harden (2008) was used to synthesise findings from the included studies. Thomas and Harden's method (2008) enables the development of line-by-line coding of study findings, according to content, to gain greater understanding across the studies. The coding stage of the synthesis enables comparison of concepts between studies, using the themes identified in the original study findings and adding new codes where necessary. Using the original codes ensured consistency of interpretation, given the lack of access to the original data. Throughout the development of the overall bank of codes, the process of synthesising occurs. Through further interpretation and synthesising, new codes were generated to represent the content of grouped initial codes. Thomas and Harden (2008) describe the third stage as the point at which analytical themes are generated, based on the developed code bank. The initial synthesis which remains close to the studies' original findings, is interpreted and developed into analytical themes – reflecting the focus of this review. This stage is "going beyond" (p.7) the original findings and is considered to be the defining feature of thematic synthesis" chapter 1, p11.

GRADE assessment completed (yes/no)? No

- **If yes, review authors' approach to GRADE assessment**: Not applicable

QUANTITATIVE COMPONENT

Justification for narrative synthesis or meta-analysis (yes/no): Not applicable

	• **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: See above, no further information provided.
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	**List of authors' primary outcomes assessed relevant to this overview of reviews**: Not applicable (this is a qualitative review aiming to synthesise qualitative literature on experiences of individuals in prison and custodial environments and their experiences of accessing and engagement in mental health support whilst in custody). **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented).

For qualitative syntheses, the key synthesised findings should be extracted.

Overall findings (meta-analyses, authors' secondary outcome(s))

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Not applicable

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? Not applicable

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? No analysis of effectiveness. The analysis documents experience.

	Descriptive account of intervention **Intervention tailoring and modification**: Not reported **Intervention planning**: Not reported **Intervention acceptability and feasibility**: Not reported **Fidelity monitoring**: Not reported **Other characteristics of intervention planning, delivery, and evaluation**: Not reported **What was stated regarding participant attrition**? Not reported **Comparator(s) used in the interventions delivered in the included studies**: Not reported **Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.)**: See intervention-related findings under Q4. • **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported **Duration(s) of the intervention**: Not reported **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**: Not reported
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	**QUANTITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable

for the purposes of the overview	
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? Not applicable **If yes, state methods of investigation**: Not applicable **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: The author notes the following in the strengths and limitations section of the thesis, "The flexibility of thematic analysis allows adaptable exploration of prisoners' experiences. Thematic analysis enables inferences based on commonalities across "otherwise heterogenous studies". This review importantly adds qualitative data to the existing literature body, with research based on human data where subtleties of the topic are explored; often missed by quantitative research" chapter 1, p29.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4	**Barriers**

The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.

Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)? Yes, all 9 included studies were used to inform this question.

- Billington, Longden, and Robinson (2016) (S1) (9 or strong)
- Daveson and Edwards (2001) (S2) 7 (moderate quality)
- Harner and Riley (2013) (S3) 7 (moderate quality)
- Keogh, McBennett, deVries, Higgins, O'Shea, and Doyle (2017) (S4) 8 (moderate/strong quality)
- Lennox, Stevenson, Edge, Hopkins, Thornicroft, Susser, Conover, Herman, Senior, and Shaw (2019) (S5) (9 or strong)
- Magee and Foster (2011) (S6) (9 or strong)
- Perry, Waterman, House, and Greenhalgh (2019) (S7) (10 or strong)
- Smith and Smith (2019) (S8) 8 (moderate/strong quality)
- Timler, Brown, and Varcoe (2019) (S9) (9 or strong)
- **If yes, list and describe each barrier according to the authors (include page number(s))**:
  - **Theme 2**: Barriers (5 studies): (S3, S4, S6, S7, S8)
  - "Five of the studies highlighted barriers, both physical and attitudinal, to accessing MH [mental health] support and interventions whilst in prison (S3, S4, S6, S7, S8), including challenges presented by the immediate environment, perceived attitudes towards MH and resources… Participants described the MH intervention and staff support available to them as 'overworked' (S3), 'rejecting' (S6) and 'abandoning' (S3)" chapter 1, p16.
    - This theme reflects the "barriers, both physical and attitudinal, to accessing MH [mental health] support and interventions whilst in prison, including challenges presented by the immediate environment, perceived attitudes towards MH and resources" chapter 1, p15. Participants reported that the level of staff support received and perceived staff attitudes towards mental health difficulties impacted their experience of and motivation to engage in the interventions. "Some participants felt that the discouraging attitudes of staff affected their MH, and therefore created additional barriers to engaging in MH support" chapter 1, p16.

- Another important factor highlighted by the review author was the impact that feeling a lack of personal control (i.e. powerlessness in prison) had on individuals' abilities to access and engage in the interventions. This left prisoners unable to understand their own mental health. Problem solving was not possible within a prison setting, and limited freedoms restricted prisoners' ability to make active change, further impacting on mental health and wellbeing.
- One of the included studies reported prisoners' ability "to focus on the MH [mental health] support that was offered was influenced by additional, potentially unresolved, concerns in their lives (S7)" chapter 1, p17.
- One of the included studies reported "how the lack of available care for their physical health led to additional anxieties and worries, contributing to poor MH [mental health] (S3)" chapter 1, p17.
- Participants in one study (S3) highlighted the increase in stress and anxiety within the prison environment added to mental health difficulties that individuals experienced before entering prison

– **Theme 4**: Hopes and plans for the future

- Overall, themes relating to the need for hope for the future, which positively impacts mental health, were consistentyly experienced across all included studies in the review. Those were engaged in the interventions reported a newly found hope for the future, which created a sense of normality. This hope, however, was balanced with limited available resources in prison (staffing, time, etc.), which were a barrier to participants feel a sense of control over their own wellbeing and ability to engage in the interventions. The review authors note that, while staff perspectives were not included in the study, staff burnout should be considered, as lack of resources, staffing and environment pressures negatively impact on prisoners' opportunity to create hope and purpose.

Facilitators

Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)? Facilitating factors were not explicitly described. However, there were a number of notable points that speak to this concept (see below).

- **If yes, list and describe each facilitator according to the authors (include page number(s))**:
  – "The third theme identified encapsulated concepts relating to the value of being able to develop coping strategies, communication and organisation skills, emotional awareness and expression and stress management" chapter 1, p17.

- "The interventions offered to prisoners were found to support development of strategies and skills to manage MH [mental health] difficulties (S1, S2, S3, S4, S6, S7, S8, S9). Individuals talked about having a space to reflect (S1), a space for escape and relaxation (S2) and support for self-expression all leading to reduced stress (S2 & S4)" chapter 1, p17.
- In two studies "individuals discussed novel methods introduced for MH [mental health] support and wellbeing, feeling encouraged to use literature and reading in a 'literature-based intervention', to systematically work through problems (S1 & S7), with others being introduced to visual imagery for problem solving and relaxation (S7). Music therapy was utilised to encourage emotional expression and management (S2), as well as through the opportunity to engage in animal therapy (S8)" chapter 1, p17.
    - **Normalising mental health**
        - "This review highlights the importance of 'normalising' MH [mental health] difficulties within the prison environment, enabling open and non-judgemental conversations, encouraging individuals to feel accepted in discussing their difficulties" chapter 1, p28.
    - **Peer support**
        - "The value of peer support is recognised in supporting MH [mental health] and wellbeing, given the loneliness, isolation and vulnerability reported as part of being in prison" chapter 1, p28.
    - **Accessibility**
        - "An additional perspective highlighted here, emphasises the need for accessibility and convenience when considering intervention content, thinking about skills to create hope and promote future planning for individuals to use within prison and upon release, encouraging autonomy and empowerment" chapter 1, p28.
    - **Normality**
        - "From individual reports, given the surrounding environment of prison, the interventions have a responsibility to offer a 'sense of real life' and 'normality', allowing individuals to feel valued, humanised and accepted" chapter 1, p29.
    - **Empowerment**
        - "By enabling empowerment, choice and control, individuals could develop skills to support their own MH [mental health] and wellbeing in varying situations" chapter 1, p29.

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? The review does not explicitly identify techniques by which participants were motivated to engage and achieve positive outcomes from the intervention; however, the following points from 3 themes appear pertinent:

- **Theme 1**: Loneliness and the value of peer support
  - Prisoners discussed the concept of 'vulnerable prisoners' and the value of peer support when engaging in the interventions. In addition, "Many individuals reported an increase of acceptance, achieved through peer support and interaction, thereby reducing their feelings of loneliness and isolation" chapter 1, p15.
- **Theme 3**: Opportunities and coping strategies
  - Having a space for escape and relaxation and support for self-expression, which all lead to reduced stress. The opportunity to engage in these kinds of interventions "offered a sense of 'normality', feeling temporarily away from prison. Participants discussed intentions to continue utilising the coping strategies and increased MH [mental health] awareness when released from prison" chapter 1, p19.
- **Theme 2**: Barriers
  - Where staff attitudes were perceived to be discouraging or dismissive towards mental health difficulties, participants reported increased reluctance to engage in the intervention chapter 1, p16.

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? The author states that "Peer support and interaction, gained through MH interventions, was reported throughout numerous studies as imperative" (p 1–14). The participants were more attracted to interventions which had a component of socialisation and support building. Additionally, "Participants highlighted the increase in stress and anxiety within the prison

environment adding to any MH [mental health] difficulties that individuals experienced before entering prison" p 1–17). Another component to these interventions was the sense of normality that arose from participation (p 1–19).

The author also states that "A sense of hope appeared to be gained from interventions, feeling valued and worthwhile, which had a direct positive impact on individuals' MH [mental health] and wellbeing. Furthermore, the interventions that provided for hope for a life outside of prison created feelings of pride in their work and insight into how this could apply to the 'real world' upon release" (p 1–21).

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No. "In contrast to existing literature around effective group therapy and positive outcomes, the relationship with intervention facilitators was not commonly mentioned" chapter 1, p24. The review author notes that the therapeutic relationship is considered a key factor for change and positive outcomes in group therapeutic interventions, yet this was only discussed in 2 of the included primary studies (S4, S9).

- **If so, why were they preferred**? The review author notes, "Where discussed, participants stated that accessible facilitators providing collaborative leadership, enabled increased self-esteem, a sense of purpose and hope for the future. It should however be considered that whilst there is limited reporting in this review regarding the therapeutic relationship within MH [mental health] interventions, this may not accurately reflect the individuals' experiences, but more the content and focus of the data collection within each study" chapter 1, p24–25. Not referenced to primary studies.

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? 3 of the studies considered relevant to this overview of reviews offered training to support participants beyond the programme (S2, S7 and S8).

- **Theme 3**: Opportunities and coping strategies

"The third theme identified encapsulated concepts relating to the value of being able to develop coping strategies, communication and organisation skills, emotional awareness and expression and stress management" chapter 1, p17.

"The interventions offered to prisoners were found to support development of strategies and skills to manage MH [mental health] difficulties (S1, S2, S3, S4, S6, S7, S8, S9). Individuals talked about having a space to reflect (S1), a space for escape and relaxation (S2) and support for self-expression all leading to reduced stress (S2 & S4)" chapter 1, p17.

In two studies “individuals discussed novel methods introduced for MH [mental health] support and wellbeing, feeling encouraged to use literature and reading in a ‘literature-based intervention’, to systematically work through problems (S1 & S7), with others being introduced to visual imagery for problem solving and relaxation (S7). Music therapy was utilised to encourage emotional expression and management (S2), as well as through the opportunity to engage in animal therapy (S8)” chapter 1, p17.

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not reported**
- **If so, how and why were these features more attractive**? Not reported

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors’ comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors’ overall conclusions from qualitative evidence: “This review considers an important area of mental healthcare, reflecting on the needs of a potentially neglected population group of prison leavers in society, where unsupported and ongoing MH [mental health] difficulties require primary and secondary care support. With the prevalence of MH difficulties in the prison population and the importance of successfully reintegrating prison leavers into society by supporting MH and wellbeing, this review presents valuable evidence, supporting the need for effective and accessible interventions for those whilst in prison. The impact on wider social aspects upon release, without MH intervention and support in prison, should be noted. The consequential effect on society, including primary and secondary care, crisis services, benefit systems and housing, is noteworthy. This review supplements such knowledge and existing literature, adding the value of qualitative findings and experiences, exploring what prison leavers really benefit from whilst in prison and therefore need upon release. Areas consistently lacking identified in the themes in this review included resources, motivation, for both prisoners and staff facing burnout, impact of attitudes towards MH, and unstructured or ineffective focuses of support. Such information can contribute to conversations within clinical psychology and mental healthcare, thinking about our role in the social aspect of supporting prison leavers and about the wider social and healthcare impact” chapter 1, p31–32.

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the	QUANTITATIVE RESULTS **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

longevity of the impact of effects of intervention.	**QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.8 Lindson *et al.* (2019)

Parameter	Description
Review title	"Motivational interviewing for smoking cessation (Review)"
First author and year of publication	Lindson *et al.* (2019)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Smoking cessation interventions
Contributing primary studies	The information presented in this extraction form applies only to the 1/37 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). The review includes one study on incarcerated men in a prison in India (1 study). The other settings/populations were: • General population (11 studies) • Adolescents or young people (8 studies)

	• People with substance abuse problems (3 studies) • People attending, or who had attended screening, for smoking-related cancers (2 studies) • Patients with a variety of acute health problems (8 studies) • African-American/black light smokers (1 study) • **Incarcerated men in a prison in India (1 study)** • Homeless adults recruited from homeless shelters (1 study) • Friends and family of people who had been diagnosed with lung cancer (1 study) • People with a low income: defined as primary care patients who were uninsured or receiving healthcare benefits (1 study)
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "To evaluate the efficacy of MI [motivational interviewing] for smoking cessation compared with no treatment, in addition to another form of smoking cessation treatment, and compared with other types of smoking cessation treatment. We also investigated whether more intensive MI is more efficacy than less intensive MI for smoking cessation. We explored whether motivational interviewing for smoking cessation could enhance well-being" p8. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: • Studies that recruited pregnant women were excluded. • Studies in which the intervention did not encompass motivational interviewing (even as one arm in a complex intervention) were excluded. No exclusion was made on the modality of the intervention. • Studies that did not include a comparison (control) intervention of either 1) no smoking cessation treatment, 2) another smoking cessation intervention, of any length or intensity (including usual care), or 3) another type of motivational interviewing intervention were excluded. • The authors introduced an exclusion criterion to exclude studies that incorporated additional non-motivational interviewing components in the motivational interviewing intervention arm but not the comparison arm (nine previously included/ongoing studies have been now excluded for this reason). "It is plausible that the apparent effect of MI [motivational interviewing] seen in the previous review may have been partly because the interventions incorporated these other active elements. The authors excluded quasi-randomised studies at this update as non-randomised studies are of lower quality and the larger body of

	randomised trials allowed us to draw conclusions on the best quality evidence (we excluded one previously included study for this reason)" p24. The authors also excluded one previously included study that tested a motivational interviewing intervention to encourage people to participate in the trial rather than to aid them to quit smoking, and another study that was based primarily on the stages of change theory. The authors noted that these changes reduced biases that previously existed in the review.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: Participants in the only included study conducted in a prison setting were 600 adult smokers (mean cigarettes per day: 21 to 30 in intervention group, control Not reported; nicotine dependence: Not reported; participants were not selected on their motivation to quit). **Age (mean and/or mode and/or range)**: Modal age of participants in the only included study conducted in a prison setting = 21 to 30 years. **Sex**: Participants in the only included study conducted in a prison setting were all male. **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Not reported
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: India (1 study). **Specific setting(s) (include number of studies in each setting)**: The only relevant study to this overview of reviews was conducted in a prison in India. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: "The concept of motivational interviewing (MI) evolved from experiences in treating alcohol abuse, and was first described by Miller in 1983. It is defined as "a directive, client-centred counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence" (Miller 1983). The four guiding principles: (a) expressing empathy, (b) developing discrepancy, (c) rolling with resistance, (d) supporting self-efficacy, have been detailed elsewhere (Miller 2002)" p8. In relation to the types of interventions the review authors were interested it, "Interventions labelled as either MI or MET [motivation enhancement therapy], targeted at tobacco smoking cessation. Eligible interventions were based on the principles and practices of MI (e.g. engaging, focussing, evoking, planning, exploring ambivalence, assessment of motivation and confidence to quit, eliciting 'change talk' and supporting self-efficacy) as described in Miller 2013, and, in the opinion of the review authors, complied with these principles and practices beyond simply referring to the concepts" p8.

	In relation to the only included study conducted in a prison setting, the intervention was described as “motivational interviewing: the topics for the intervention included: introduction to tobacco, prevalence of tobacco use, effects of tobacco use on general health and dental health, psychosocial factors influencing tobacco use, healthy diet and behavioural intervention for prevention of tobacco use” p71. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: The authors conducted a search of the Cochrane Tobacco Addiction Group's Specialised Register in August 2018. The Register has been developed from electronic searching of the Cochrane Central Register of Controlled trials (CENTRAL), MEDLINE, Embase and PsycINFO. **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: The authors also searched 2 online trial registries to identify unpublished studies: ClinicalTrials.gov and the International Clinical Trials Registry Platform (ICTRP). Handsearching of specialist journals, conference proceedings and reference lists of previous trials and overviews was completed. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: No search limitations were reported. **Protocol prepared (yes/no)**? Yes • **If yes, was protocol published (yes/no)**? Not reported **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, full search provided. **Screening completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Disagreements were referred to a third author. **Extraction completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Disagreements were referred to a third author.
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 1 primary study (out of 27 included studies). • **Number of studies by study design**: 1 RCT
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2014

Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: Randomised controlled trials and cluster randomised controlled trials. **Reasons for including study design(s) provided (yes/no)**? Yes **If yes, describe the justification(s)**: "The previous version of this review (Lindson-Hawley 2015) resulted in a modest but significant increase in quitting smoking when MI was used in comparison to brief advice or usual care. However, this review encountered the same challenges described by Morton 2015 above, pooled studies with a range of different comparator types, and only included studies that reported providing a form of motivational interviewing fidelity monitoring. This may have biased the inclusion of studies and thus the results. Therefore, inclusion criteria for this version of the review have been revised to reduce bias (although still control for fidelity monitoring), attempt to isolate the effects of motivational interviewing, and to be mindful of the comparator group when pooling studies, to allow a range of useful comparisons" p8. **List of excluded studies at full text provided (yes/no)**? Yes • **Reasons for exclusion provided (yes/no)**? Yes. The authors listed 117 studies that were potentially relevant but excluded, with reasons, in the characteristics of excluded studies table.
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: Not reported (the authors state they used "standard Cochrane methods" (p10), so it is assumed that they used the Cochrane risk-of-bias tool for randomised trials (RoB 2)). **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The authors "evaluated studies on the basis of randomisation procedure, allocation concealment, incomplete outcome data, and any other bias using standard Cochrane methods (Higgins 2011). We also assessed detection bias based on the outcome measure, according to standard methods of the Cochrane Tobacco Addiction Group. If the outcome was objective (i.e. biochemically validated) and/or if contact was matched between arms, we judged the studies as being at low risk of bias, but if the outcome was self-reported and the intervention arm received more support than the control arm, we judged differential misreport to be possible and rated these studies as being at high risk of bias. For trials of behavioural interventions (such as those included here), it is deemed inappropriate to assess performance bias, as blinding of participants and personnel is not feasible due to the nature of the intervention" p10. **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Discussion with a third author.
Appraisal rating	**QUANTITATIVE COMPONENT**

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): The only included trial conducted in a prison setting was assessed as being at an unclear risk of bias across all domains. The authors judged this study (Naik, 2014) to be at unclear risk of detection bias as they were unsure whether the rates reported were biochemically verified. Judgements of unclear risk were made because information on follow-up was Not reported in the sources available to the authors (p15).

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: The authors pooled five studies (including the only study relevant to this overview of reviews) comparing motivational interviewing smoking cessation intervention with no smoking cessation treatment. However, heterogeneity was substantial (I^2 = 87%), and so the authors did not deem it appropriate to present the pooled result of this analysis. Examining the forest plots, individual RRs and 95% CIs provided evidence that this heterogeneity was due to the large positive effect of motivational interviewing in Naik (2014) (RR 8.00; 95% CI 3.48 to 18.41; N = 600). This was confirmed by a sensitivity analysis removing Naik (2014) (I^2 = 0%). The authors state that the heterogeneity introduced by Naik (2014) can potentially be explained by the nature of the population recruited, which differs substantially to the populations studied in the other 4 pooled studies. Naik (2014) recruited incarcerated male smokers and, as a result, took place in a prison setting where participants were potentially unable to drop out, and also very unlikely to try to quit smoking in the no treatment group.

Assessment of publication bias (yes/no): Yes

- **If yes, how was publication bias assessed**? The authors used funnel plots to assess small-study effects and investigate the possibility of publication bias for the 'motivational interviewing as an adjunct' and ''motivational interviewing compared with other smoking cessation treatment' comparisons. There were not enough studies (fewer than ten) included in the other analyses to create funnel plots.
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: In neither case did these plots provide evidence of publication bias.
- **If present, how was publication bias dealt with**? Considered as part of GRADE

Only low risk of bias studies included in the review synthesis (yes/no)? Not applicable as the HRB only extracted information pertaining to the only included study set in a prison.

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

	If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Not applicable **QUALITATIVE COMPONENT** **Description of the results of the quality assessment of qualitative data**: Not applicable **Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no)**: Not applicable • **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable
Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: In relation to the only included study conducted in a prison setting, this was not included in any pooled analyses due to the population. As a result, the findings of this study were presented separately. • **GRADE assessment completed (yes/no)**? Yes – **If yes, review authors' approach to GRADE assessment**: The authors used the five GRADE considerations (study limitations, consistency of effect, imprecision, indirectness and publication bias) to assess the certainty of the body of evidence for the smoking cessation outcome, and to draw conclusions about the certainty of the evidence within the text of the review. **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: Yes • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**:
Outcome(s) assessed	**List of authors' primary outcomes assessed relevant to this overview of reviews**:

Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	– **Primary outcome 1**: Smoking cessation ("We preferred continuous/prolonged cessation over point prevalence cessation, and biochemically validated over self-reported cessation, where multiple measures were available in included studies. We reported cessation at the longest follow-up, and excluded trials that did not include data on smoking cessation rates at least six months after baseline" p9). **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	Lindson-Hawley N, Thompson TP, Begh R. Motivational interviewing for smoking cessation. *Cochrane Database of Systematic Reviews* 2015, Issue 3. [DOI: 10.1002/14651858.CD006936.pub3]

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented).	QUANTITATIVE RESULTS – META-ANALYSES **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**?

For qualitative syntheses, the key synthesised findings should be extracted.

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Smoking cessation

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Incidence of smoking cessation	Unclear. The study report stated that carbon monoxide was measured; however, it was unclear whether this was used to motivate participants, verify cessation rates, or both.	Naik (2014) RCT	The quit rates in the intervention group (n = 300 male prisoners who received a motivational interviewing smoking cessation intervention) were much higher than in the comparator group (n = 300 male prisoners who did not receive the intervention) (48/300 (16%) and 6/300 (2%), respectively; relative risk = 8.00; 95% CI: 3.48 –18.41).	6 months follow-up

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? Not applicable

Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

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Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? Not reported

Comparator(s) used in the interventions delivered in the included studies: The comparator group in Naik (2014) were reported as being a 'waiting- list control', waiting to receive the motivational interviewing intervention treatment following the intervention group (verified through contact with author); however, it was unclear whether participants knew that they were on a waiting list.

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not reported

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not applicable

Duration(s) of the intervention: Not reported

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies): Not reported

Overall direction of results

QUANTITATIVE RESULTS

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	**Author's primary outcome(s) relevant to this overview of reviews**: Naik (2014) reported the quit rates were much higher in the intervention group than in the comparator group (48/300 and 6/300, respectively) and demonstrated a large positive effect of motivational interviewing in prisons at 6 months follow-up (RR = 8.00; 95% CI: 3.48 to 18.41; n = 600). However, the trial authors recruited incarcerated male smokers and, as a result, took place in a prison setting where participants were potentially unable to drop out, and also very unlikely to try to quit smoking in the no treatment group. **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Mental health and well-being. Any measure of mental health and well-being as defined by included studies Quality of life (QOL). Any validated QOL scale reported in included studies.
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? Yes. Heterogeneity was formally assessed and discussed; however, it is not relevant to this overview of reviews as only 1 primary study in the review is relevant. • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: Not applicable

Parameter	Description
FINDINGS: Q3	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No

The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.

- **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable
- Being in prison and having reduced choices

QUALITATIVE RESULTS

Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)? Not applicable

- **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

FINDINGS: Q4

The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.

Barriers

Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)? No

- **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable

Facilitators

Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)? No

- **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.9 Martinez-Merino *et al.* (2017)

Parameter	Description
Review title	"Physical activity practiced by incarcerated women: A systematic review"
First author and year of publication	Martinez-Merino *et al.* (2017)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Sports and exercise-based interventions
Contributing primary studies	The information presented in this extraction form **in relation to Q1 and Q2** (effectiveness) applies only to 29/33 primary studies included in the systematic review that were conducted in adult prisons. Information pertaining to 4 studies included in the systematic review was not applicable to Q1 and Q2 as these studies were conducted in young offender institutions. Information from all 33 included studies was considered relevant to **Q4** (barriers and facilitators). Therefore, where relevant, information for all 33 and 29/33 included studies conducted in adult prisons is presented herein.
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "Our aim doing this SR [systematic review] was to identify and assess the quality of studies on women's participation in SPAs [sport and physical activities] in prison. Furthermore, we sought to ascertain the methodological characteristics – type of research, sampling, data collection and data analysis techniques – of the selected research studies, as well as their central themes" p1154.

Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.: The authors excluded studies conducted on prison and juvenile detention centre staff, and in cases where the study sample was mixed (men and women), they excluded studies in which the gender variable was not differentiated in the results (p1155).

Number of participants in the included primary studies: The total number of participants across 33 included primary studies was 12,304 (sample size was Not reported for 1 study, and 1 study included 144 reports). The total number of participants the 29 studies conducted in adult prisons was 12,031 (sample size was Not reported for 1 study, and 1 study included 144 reports).

For the purpose of transparency, the precise number of participants, where reported, in each of the 33 included primary studies in the table below (note the 4 excluded studies on the basis of population/setting).

Participants

The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.

Study no.	Study author	Number of participants (by gender and youth)
1	Andrews and Andrews (2003)	20 (5 F, 15 M)
2	Belknap (1996)	68 (all F)
3	Bucci (1989)	20 (4 F, 16 M) [excluded from Q1 and Q2 as sample were young offenders]
4	Buzzini, Gold, Buzzini, Aaron, & Murray	9,446 (F, M)
5	Cashin, Potter, & Butler	914 (167 F, 747 M)
6	Davila-Figueroa (2011)	45 (all F)
7	Day (2012)	16 (3 F, 13 M)
8	De Graaf (2013)	12 (all F)
9	Douglas *et al.* (2009)	37 (all F)
10	Elwood-Martin *et al.* (2013)	16 (all F)
11	Flanagan (2011)	189 (all F)
12	Fryer (2005)	35 (all F)
13	Gallant, Sherry, & Nicholson (2015)	36 (15 F, 21 M)
14	Garnier, Minotti, & Labridy (1996)	29 (all F)
15	Harner & Riley (2013)	65 (all F)
16	Harner, Hanlon, & Garfinkel (2010)	17 (all F)
17	Jones (2013)	5 (all F) [excluded from Q1 and Q2 as sample were young offenders]
18	Leberman (2007)	27 (all F)
19	Lewis & Meek (2012)	144 reports
20	Martinez-Merino, Martin-Gonzalez, Usabiaga, & Martos-Garcia (2015)	5 (all F)
21	Martos-Garcia, Devis-Devis, & Sparkes (2009)	20 (F & M)
22	Meek & Lewis (2014)	44 (all F)
23	Orton (1977)	147 (43 F, 104 M)
24	Ozano (2008)	9 (all F)
25	Peterson & Johnstone (1995)	43 (all F)
26	Piot & Cliquennois (2009)	Number Not reported (all F)

27	Plugge, Foster, Yudkin, & Douglas (2009)	505 (all F)
28	Sas-Nowosielski (2000)	168 (40 F, 128 M) [excluded from Q1 and Q2 as sample were young offenders]
29	Straub & Felock (1974)	80 (all F) [excluded from Q1 and Q2 as sample were young offenders]
30	Summar (2001)	50 (12 F and 38 M)
31	Tibbetts (2015)	24 (all F)
32	Young, Waters, Falconer, & O'Rourke (2005)	212 (all F)
33	Yuen, Arai, & Fortune (2012)	61 (all F)

Age (mean and/or mode and/or range): Not reported

Sex: The population of interest was female (women and young girls); see information on participants' sex in the above Table. "Most of the authors restricted their sample to women (n = 22), while 10 conducted research with the participation of men and women. In [7 of 10] of these latter documents, with the exception of one, the number of male prisoner participants was twice or three times greater than that of female prisoners. In three studies, the authors do not specify the exact number of men and women who participated, although they differentiate the gender dimension in the results. The greatest number of women participants was 505, while the smallest was five, and one [study] does not specify the exact number of female participants." p1159.

Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour): Not reported

Setting/context

Details of the setting of interest or the community or a geographical location should be included.

Countries (in alphabetic order): Whole review (Q4): Australia (3 studies), Canada (3 studies), France (2 studies), Italy (1 study), Mexico (1 study), New Zealand (1 study), Poland (1 study), Spain (2 studies), UK (7 studies), USA (12 studies).

29 studies conducted in adult prisons: Australia (3 studies), Canada (3 studies), France (2 studies), Mexico (1 study), New Zealand (1 study), Spain (2 studies), UK (7 studies), USA (10 studies).

Specific setting(s) (include number of studies in each setting): The population of interest was women and young girls "in a penitentiary context or with people deprived of freedom serving sentence in open prison, ordinary or closed systems" p1155. All 29 studies considered relevant to this overview of reviews were set in prisons.

Other features of the setting(s) relevant to the analysis: The authors noted that they "included those studies in which ex-convicts (people who at the time of conducting the study had been released from prison) participated if they had been incarcerated for at least two years" p1155.

Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The authors report they are interested in examining studies that have documented female prison inmates' engagement in sport and physical activities. "Turning to the kind of motive practices offered in prison, we may divide these into two groups attending to the social interactions they foster. In socio-motor activities, there is a social interaction, whereas in psychomotor activities, there is no interaction. As regards the socio-motor category, the disciplines that most frequently appear in the results are volleyball and basketball, followed by badminton, table-tennis, boxing, and softball. On the other hand, aerobic is the most practiced activity among individual activities, although other activities appear such as yoga, cycling, weightlifting and fitness training. Not to forget, the fact that researchers from one study note interest on nature activities for women inmates. As regards the SPAs [sport and physical activities] most in demand among these inmates, dance – zumba and aerobic –, volleyball, yoga and swimming are the most mentioned, followed to a lesser extent by tennis and horse-riding and team games in general" p1162. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: Psycinfo (EBSCOhost), Sportdiscus (EBSCOhost), Medline (Ovid), Proquest Dissertation and Theses (ProQuest) and Eric (ProQuest). **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: "We included other studies following the pointers of the references contained in the selected studies (manual search) or proposed by an expert on the subject – chosen by virtue of his long experience in the development of studies on prison inmates' participation in SPAs [sport and physical activities] and of their having published in this specific field over the last 10 years" p1155. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: "We limited the search to those studies whose title and abstract were in English, although we included studies whose complete text was in another language. As regards the types of documents, empirical studies and reviews were added – articles published in scientific journals, doctoral theses and master's degree dissertations (MDD) – assessed or revised by academic peers or examining boards and published no later than 1st February 2017" p1154-1155. **Protocol prepared (yes/no)**? Not reported • **If yes, was protocol published (yes/no)**? Not reported **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, key words provided. **Screening completed in duplicate (yes/no)**? Yes

- **If yes, how were disagreements resolved**? "The selection process was carried out by two researchers who, independently from each other, used an ad hoc verification list (yes = 1/no = 2) to ascertain whether the documents met the three inclusion criteria…Subsequently, the interobserver agreement was calculated using Cohen's kappa coefficient (Cohen, 1960). We found an acceptable interobserver agreement (criterion 1 = 0.82; criterion 2 = 0.82; criterion 3 = 0.80) as well as we resolved discrepancies on the selection process through consensus agreement" p1155.

Extraction completed in duplicate (yes/no)? Yes

- **If yes, how were disagreements resolved**? Not reported

Number and types of primary studies included in the systematic review

Number of studies relevant to this overview of review: All 33 primary studies (relevant to Q4), 29/33 primary studies (conducted in adult prisons).

- **Number of studies by study design**:

  Whole review (Q4):

  – Qualitative studies (17 studies)

  – Quantitative studies (10 studies)

  – Mixed methods studies (6 studies).

  29/33 studies conducted in adult prisons:

  – Qualitative studies (16 studies)

  – Quantitative studies (7 studies)

  – Mixed methods studies (6 studies).

Note. No information in relation to specific study designs beyond quantitative, qualitative, and mixed methods, was provided. The review authors do report data collection methods used in all 33 included studies, but they do not identify which studies used which form of data collection: "The data were collected mainly by the interview – in its different versions: in-depth, discussion groups or focal groups (n = 22), followed by questionnaires (n = 11), surveys (n = 7), observation (n = 5) body measurements (n = 4) ethnography (n = 2). In this respect, we should point out that in 12 studies; research works combined two or more data collection techniques. And as far as analysis techniques are concerned, in 19 studies, the authors used descriptive data analysis, while the rest combined this with inferential analysis (n = 14)" p1159-1160.

Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: Whole review (Q4): 1974 (1 study), 1977 (1 study), 1989 (1 study), 1995 (1 study), 1996 (2 studies), 2000 (1 study), 2001 (1 study), 2003 (1 study), 2005 (3 studies), 2007 (1 study), 2008 (2 studies), 2009 (4 studies), 2011 (2 studies), 2012 (3 studies), 2013 (5 studies), 2014 (1 study), 2015 (3 studies). 29/33 studies conducted in adult prisons: 1977 (1 study), 1995 (1 study), 1996 (2 studies), 2001 (1 study), 2003 (1 study), 2005 (3 studies), 2007 (1 study), 2008 (2 studies), 2009 (4 studies), 2011 (2 studies), 2012 (3 studies), 2013 (4 studies), 2014 (1 study), 2015 (3 studies).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: Not reported **Reasons for including study design(s) provided (yes/no)**? Not reported • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Not reported
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The five quality criteria were developed ad hoc. "We took the scientific rigor criteria established on the proposal by Lincoln and Guba (1985) differing for the qualitative (credibility, transferability, dependence and confirmation) and the quantitative studies (internal validity, external validity, reliability and objectivity). Concerning mixed studies, we assessed it applying both the qualitative and quantitative rigor criteria. Thus, the quality of the study was determined by adding the scores for the five criteria" p1155-1156. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The five quality criteria used to assess the quality of the primary studies are: 2. Is the study aim explicitly defined? 10. Are the number of participants and the kind of sample specified? 11. Is the data collection instrument or technique explicitly described? 12. Is the analysis technique explicitly described? 13. Do the documents meet a minimum number of scientific rigour criteria? **Quality appraisal completed in duplicate (yes/no)**? Yes

- **If yes, how were disagreements resolved**? "We analysed the selected documents in accordance with five quality criteria developed ad hoc. All the criteria were given a score – with the two researchers' consensus – based on a binary scale (0/1)" p1155.

Appraisal rating

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): Whole review (Q4): "Regarding the quality of our selected studies, of the total of 33, eight met all the criteria specified, 14 met four and 11 met three. Thus, the average score of all the analysed publications was 3.8 points out of five. The deficiencies encountered in those studies that did not comply with the five criteria related to the lack of information on the kind of sampling and to scientific rigor criteria" p1158.

- 29 studies conducted in adult prisons: 7 met all the criteria specified, 12 met 4 criteria, and 10 met 3 criteria:
  - Of the 7 quantitative studies specifically: 4 met 4 criteria, and 3 met 3 criteria.
  - Of the 6 mixed methods studies specifically: 3 met 4 criteria, and 3 met 3 criteria.
- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "As regards quality criteria, we underline how high scores are obtained by most of the investigators. Even so, we should also point out that sampling and scientific rigor criteria are the aspects that achieved lowest scores. In this context, many of the researchers stress the restrictions (population, security, prison regime and so on) that they encountered when it came to conducting their studies. It need not surprise us, therefore, that given the difficulties encountered in carrying out certain measurements researchers should have opted for less reliable alternatives (instruments). Moreover, in some studies there is no mention – perhaps due to the publication format– of scientific rigor criteria, which does not mean that they were not taken into consideration, since most of the PhD theses provide indications on rigor criteria" p1163.

Assessment of publication bias (yes/no): No

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? Not applicable

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? "As regards quality criteria, we underline how high scores are obtained by most of the investigators. Even so, we should also point out that sampling and scientific rigor criteria are the aspects that achieved lowest scores. In this context, many of the researchers stress the restrictions (population, security, prison regime and so on) that they encountered when it came to conducting their studies. It need not surprise us, therefore, that given the difficulties encountered in carrying out certain measurements researchers should have opted for less reliable alternatives (instruments). Moreover, in some studies there is no mention – perhaps due to the publication format– of scientific rigor criteria, which does not mean that they were not taken into consideration, since most of the PhD theses provide indications on rigor criteria" p1163.

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data:

Whole review (Q4):

- Of the 17 qualitative studies, specifically: 8 met all the criteria specified, 6 met 4 criteria, and 3 met 3 criteria.
- Of the 6 mixed methods studies, specifically: 3 met 4 criteria, and 3 met 3 criteria.

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no):

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: The authors reported on the quality assessment from the perspective of a mixed-methods review: "As regards quality criteria, we underline how high scores are obtained by most of the investigators. Even so, we should also point out that sampling and scientific rigor criteria are the aspects that achieved lowest scores. In this context, many of the researchers stress the restrictions (population, security, prison regime and so on) that they encountered when it came to conducting their studies. It need not surprise us, therefore, that given the difficulties encountered in carrying out certain measurements researchers should have opted for less reliable alternatives (instruments). Moreover, in some studies there is no mention – perhaps due to the publication format– of scientific rigor criteria, which does not mean that they were not taken into consideration, since most of the PhD theses provide indications on rigor criteria" p1163.

Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: Overall, the authors were guided by the principles of Content Analysis using three categories of analysis; descriptive, inferential and descriptive and inferential: "As regards methodology, and in reference to the types of studies, we conducted our analysis in terms of the type of methodology applied: qualitative, quantitative, or mixed. And regarding sampling types, on the one hand the number of men and women was specified by the researchers (except in one study where the sample consisted of reports), while on the other, in accordance with the classification system proposed by Bryman (2015), codification was made into four categories (probability sampling, nonprobability sampling, probability and nonprobability sampling and without specifying). Likewise, for the analysis of the instruments and techniques applied, we contemplated seven categories – body measurements, category system, ethnography, interview, observation, questionnaire and survey – that were not mutually exclusive; more than one category could therefore be assigned to those types of studies in which researchers employed more than one technique. And to conduct content analysis of the analysis techniques, and taking the classification proposed by Rubin and Babbie (2015) as our benchmark, we used three categories (descriptive, inferential and descriptive and inferential). With a view to completing the methodological aspects, we considered the provenance (country) and year of publication of the studies (year of the viva voce in the case of end-of-course MDD and PhD theses)" p1156. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable QUANTITATIVE COMPONENT **Justification for narrative synthesis or meta-analysis (yes/no)**: No • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable QUALITATIVE COMPONENT **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Content Analysis (See comments above)
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research	**List of authors' primary outcomes assessed relevant to this overview of reviews**: The authors did not identify specific outcomes of interest a priori. "Among those studies in which the main subject was SPAs [sport and physical activities], seven were grouped together as interventions, in which an analysis was made of their relationship with rehabilitation (1), the benefits of the program (10), prevention of heart diseases (11), health (14) or mental health (16) experimental apprenticeship (18) and dropping out of school (30). On the other hand, when inmates were asked, through interviews or questionnaires/surveys, about the experiences

synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	generated by the practice of physical activities (n = 15), authors analysed variables such as motivation, attitude toward practice, perceptions of physical education, participation levels in SPAs, psychological wellbeing, quality of life, rehabilitation, identity transformation, the meanings women inmates attach to physical activity practice, and the benefits they obtain and barriers they face in prison" p1160-1161. **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable **QUANTITATIVE RESULTS – NARRATIVE** **Provide the overall findings for each primary outcome via a statement indicating the following, where reported: Not applicable**

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? Not applicable

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)?

Note. The results are reported using a narrative qualitative account, but the results derive from a mixed-methods review that collected and analysed both qualitative and quantitative (non-statistical data).

According to the authors "The data were collected mainly by the interview – in its different versions: in-depth, discussion groups or focal groups – (n = 22), followed by questionnaires (n = 11), surveys (n = 7), observation (n = 5), body measurements (n = 4) and ethnography (n = 2). In this respect, we should point out that in 12 studies; research works combined two or more data collection techniques. And as far as analysis techniques are concerned, in 19 studies, the authors used descriptive data analysis, while the rest combined this with inferential analysis (n = 14).

"For example, different researchers have detected certain allegedly benefits that women inmates perceive as having derived from the practice of physical activities, such as an increase in social relations (6, 7, 12, 13, 17, 18, 22, 24, 25, 26, 31 and 33), both among inmates themselves and between inmates and prison staff; improved mental health (10, 13, 16, 22, 24 and 31) and quality of life (12 and 20); reduced stress (10, 13 and 17) and hopelessness (5) and the perception of a somewhat lesser degree of anxiety and

depression (16); increased happiness (13) and better mood (17); an improved sensation of wellbeing (30) and relaxation (21) and the emergence of feelings of pleasure and amusement (7, 10 and 13); coming to forget the fact that they are incarcerated (13, 20, 21, 24, 26 and 31), thereby giving constructive vent to frustration and anger (13 and 20); improved perception of self-image, self-esteem (14, 16, 22, 24 and 31) and self-confidence (18 & 24); the sensation of improved health (13, 16, 20 and 31) and the belief that they have attained greater awareness of their own state of health (7) and of their bodies (16); perception of the fact that physical activities help them desist from crime (7 and 13) and drugs (7, 13, 21 and 25) and favour the construction of a new identity that might transform their lives (7 and 24); and the opportunity to undertake personal and interpersonal apprenticeship (18)" p1161

Increase in social relations between inmates and between inmates and prison staff

Davila-Figueroa (2011)
Day (2012)
Fryer (2005)
Gallant, Sherry, & Nicholson (2015)
Jones (2013)
Leberman (2007)
Meek & Lewis (2014)
Ozano (2008)
Peterson & Johnstone (1995)
Piot & Cliquennois (2009)
Tibbetts (2015)
Yuen, Arai, & Fortune (2012)

Improved mental health

Elwood-Martin *et al.* (2013)
Gallant, Sherry, & Nicholson (2015)
Harner, Hanlon, & Garfinkel (2010)
Meek & Lewis (2014)
Ozano (2008)
Tibbetts (2015)

Improved quality of life

Fryer (2005)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)

Reduced stress

Elwood-Martin *et al.* (2013)
Gallant, Sherry, & Nicholson (2015)
Jones (2013)

Reduced hopelessness

Cashin, Potter, & Butler (2008)

The perception of a somewhat lesser degree of anxiety and depression

Harner, Hanlon, & Garfinkel (2010)

Increased happiness

Gallant, Sherry, & Nicholson (2015)

Better mood

Jones (2013)

Improved sensation of wellbeing

Summar (2001)

Improved sensation of relaxation

Martos-Garcia, Devıs-Devıs, & Sparkes (2009)

The emergence of feelings of pleasure and amusement

Day (2012)
Elwood-Martin *et al.* (2013)
Gallant, Sherry, & Nicholson (2015)

Coming to forget the fact that they are incarcerated

Gallant, Sherry, & Nicholson (2015)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)
Martos-Garcia, Devıs-Devıs, & Sparkes (2009)
Ozano (2008)
Piot & Cliquennois (2009)
Tibbetts (2015)

Giving constructive vent to frustration and anger

Gallant, Sherry, & Nicholson (2015)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)

Improved perception of self-image and self-esteem

Garnier, Minotti, & Labridy (1996)
Harner, Hanlon, & Garfinkel (2010)
Meek & Lewis (2014)
Ozano (2008)
Tibbetts (2015)

Improved perception of self-confidence

Leberman (2007)
Ozano (2008)

The sensation of improved health

Gallant, Sherry, & Nicholson (2015)
Harner, Hanlon, & Garfinkel (2010)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)
Tibbetts (2015)

The belief that they have attained greater awareness of their own state of health and of their bodies

Day (2012)
Harner, Hanlon, & Garfinkel (2010)

Perception of the fact that physical activities help them desist from crime

Day (2012)
Gallant, Sherry, & Nicholson (2015)

Perception of the fact that physical activities help them desist from drugs

Day (2012)
Gallant, Sherry, & Nicholson (2015)
Martos-Garcia, Devis-Devis, & Sparkes (2009)
Peterson & Johnstone (1995)

Perception of the fact that physical activities help them favour the construction of a new identity that might transform their lives

Day (2012)
Ozano (2008)

The opportunity to undertake personal and interpersonal apprenticeship

Leberman (2007)

Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? Not reported

Comparator(s) used in the interventions delivered in the included studies: Not reported

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not reported

	• **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported **Duration(s) of the intervention**: Not reported **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**: Not reported
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	QUANTITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable QUALITATIVE RESULTS (***Note*. This is related to Q4)** **Author's primary outcome(s) relevant to this overview of reviews**: "Despite the benefits perceived by the women prisoners, acquaintance with the barriers mentioned in different studies will provide specialized knowledge so that future researchers or health-allied professionals may anticipate and attempt to design methodological strategies with which to overcome them" p1165. **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable
Heterogeneity	QUANTITATIVE RESULTS **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: Not reported

Parameter	Description

FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not reported • **If yes, list and describe each factor according to the authors (include page number(s))**: Not reported **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not reported • **If yes, list and describe each factor according to the authors (include page number(s))**: Not reported

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? Yes • **If yes, list and describe each barrier according to the authors (include page number(s))**: According to the authors "The obstacles women prison inmates encounter when it comes to engaging in SPAs [sports and physical activities], include mainly the following: an overlap between visiting times, work periods and parole and the gym schedule; strict security measures imposed when it comes to gaining access to SPA facilities, resulting even in access denial or standing in long queues in order to use sporting material; long waiting lists for certain activities, which denotes a lack of qualified personnel; prison architecture unconducive to and the lack of open space for the practice of SPAs; lack of variety for the practice of SPAs; and low involvement rates due to lack of motivation or ill-humour" p1161. **The primary studies that are reported to contribute to each of the thematic findings were:** **An overlap between visiting times, work periods and parole and the gym schedule** Day (2012) Douglas *et al.* (2009) Harner & Riley (2013) Harner, Hanlon, & Garfinkel (2010)

Meek & Lewis (2014)

Strict security measures imposed when it comes to gaining access to SPA facilities

Elwood-Martin *et al.* (2013)
Peterson & Johnstone (1995)

Access denial

Tibbetts (2015)

Standing in long queues in order to use sporting material

De Graaf (2013)

Long waiting lists for certain activities

De Graaf (2013)
Harner & Riley (2013)
Tibbetts (2015)

A lack of qualified personnel

Gallant, Sherry, & Nicholson (2015)

Prison architecture unconducive to and the lack of open space for the practice of SPAs

Douglas *et al.* (2009)
Harner, Hanlon, & Garfinkel (2010)
Lewis & Meek (2012)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)
Tibbetts (2015)

Lack of variety for the practice of sports and physical activities

Elwood-Martin *et al.* (2013)
Gallant, Sherry, & Nicholson (2015)
Harner & Riley (2013)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)

Martos-Garcia, Devis-Devis, & Sparkes (2009)
Meek & Lewis (2014)

Low involvement rates due to lack of motivation

Day (2012)
Meek & Lewis (2014)
Meek & Lewis (2014)
Tibbetts (2015)

Low involvement due to ill-humour

Jones (2013)

Facilitators

Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)? Not explicitly

If yes, list and describe each facilitator according to the authors (include page number(s)): The review did not explicitly name any specific facilitators that may be associated with the success of sport and exercise interventions in a prison setting. However, the authors of the review report on a number of benefits which reportedly accrue to the female participants, and which may be seen as proxies to facilitate the uptake and success of sport and exercise interventions in prisons among female inmates.

According to the authors "Benefits that women inmates perceive as having derived from the practice of physical activities, such as an increase in social relations, both among inmates themselves and between inmates and prison staff; coming to forget the fact that they are incarcerated, thereby giving constructive vent to frustration and anger; the opportunity to undertake personal and interpersonal apprenticeship" p1161.

The primary studies that are reported to contribute to each of the thematic findings were:

Increase in social relations between inmates and between inmates and prison staff

Davila-Figueroa (2011)
Day (2012)

Fryer (2005)
Gallant, Sherry, & Nicholson (2015)
Jones (2013)
Leberman (2007)
Meek & Lewis (2014)
Ozano (2008)
Peterson & Johnstone (1995)
Piot & Cliquennois (2009)
Tibbetts (2015)
Yuen, Arai, & Fortune (2012)

Coming to forget the fact that they are incarcerated

Gallant, Sherry, & Nicholson (2015)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)
Martos-Garcia, Devıs-Devıs, & Sparkes (2009)
Ozano (2008)
Piot & Cliquennois (2009)
Tibbetts (2015)

Giving constructive vent to frustration and anger

Gallant, Sherry, & Nicholson (2015)
Martinez-Merino, Martın-Gonzalez, Usabiaga, & Martos-Garcia (2015)

The opportunity to undertake personal and interpersonal apprenticeship

Leberman (2007)

Engagement

How were prisoners attracted to taking part in the intervention? See benefits/facilitators section above

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

A small number of the included studies reported on levels of participations/engagement with sporting and exercise interventions in the prison setting among female inmates: "The level of participation in SPAs (or attitudes toward them) is another common issue in different studies. In two of them – conducted on adolescents – negative attitudes or indifference were detected, another study stresses low participation rates among minors. As regards adults, lower participation rates have been detected among female as opposed to male inmates in both SPAs and recommended daily activity. Furthermore, it has been noted that the kind of prison and of prison policy – which varies greatly from country to country – interfere with women inmates' participation and their opportunity to accede to such motor practices. p1161-1162.

The primary studies that are reported to contribute to each of the thematic findings were:

Negative attitudes or indifference

Sas-Nowosielski (2000)
Straub & Felock (1974)

Low participation rates

Buzzini, Gold, Buzzini, Aaron, & Murray (2005)
Young, Waters, Falconer, & O'Rourke (2005)

The kind of prison

De Graaf (2013)

The kind of prison policy

Plugge, Foster, Yudkin, & Douglas (2009)

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? See benefits/facilitators section above

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? Not reported

- **If so, why were they preferred**? Not reported

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not reported**
- **If so, how and why were these features more attractive**? Not reported

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not reported

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not reported

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.10 Mohan *et al.* (2018)

Parameter	Description
Review title	"A systematic review of interventions to improve health factors or behaviours of the cardiovascular health of prisoners during incarceration"
First author and year of publication	Mohan *et al.* (2018)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Sports- and exercise-based interventions Healthy eating and nutrition interventions Smoking cessation interventions
Contributing primary studies	The information presented in this extraction form applies to all 12 articles detailing 11 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons).
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "This current systematic review was therefore conducted to identify interventions used to improve health factors or behaviours of the cardiovascular health of prisoners during incarceration and to assess their effectiveness" p73.

	Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.: Studies were excluded if they only presented baseline results or if they measured outcomes after participants were released from prison because this review looked at the effect on prisoners while they are incarcerated. The authors only included peer-reviewed studies that were based on a correctional setting and had participants who were current prisoners, defined as "people incarcerated in prisons, jails and other correctional institutions, including inmates and offenders" p3.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants included across the 12 primary studies was 1398. • Physical activity interventions: n = 300 prisoners (4 studies). • Nutrition interventions: n = 265 prisoners (3 studies). • Physical activity interventions combined with education: n = 48 prisoners (2 studies). • Smoking cessation combined interventions: n = 785 prisoners (2 studies). **Age (mean and/or mode and/or range)**: • Physical activity interventions: Aged ≤ 50 years (1 study); aged ≤ 40 years (1 study); age range = 20-35 years (1 study); Not reported (1 study). • Nutrition interventions: Mean age = 35.2 years for intervention group and 34.4 years for control group (1 study); mean age = 44.7 years (1 study); age range = 22-65 years (1 study). • Physical activity interventions combined with education: Aged ≤ 18 years (1 study); aged ≤ 40 years (1 study) • Smoking cessation combined interventions: Aged > 18 years (1 study); mean age = 33.8 years (1 study). **Sex**: 8 studies included only men, 3 included only women, and 2 included both men and women. • Physical activity interventions: All studies were conducted in male only samples (4 studies). • Nutrition interventions: Male only sample (2 studies), male and female sample (1 study). • Physical activity interventions combined with education: Male only sample (1 study), female only sample (1 study) (i.e. 41.7% male participants for studies examining this type of intervention).

	• Smoking cessation combined interventions: Male only sample (1 study), female only sample (1 study) (i.e. 54.1% male participants for studies examining this type of intervention). **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Some notable participants characteristics reported in the tables of characteristics (tables 2 – 5) are: • Male prisoners "co-infected with HIV/HCV co-infected but not immuno-compromised and had an opioid addiction (1 study; physical activity; Perez-Moreno, 2007). • "Male prisoners enrolled in a behavioural substance abuse program" (1 study; nutrition; Curd, 2013). • Male and female prisoners "who either had potential cardiovascular risk factors, cachexia due to HCV/HIV or were in need of special diet" (1 study; nutrition; Gil-Delgado, 2011). • Male prisoners "who either had chronic illness or ≥ 2 risk factors for chronic illness" (1 study; physical activity combined with education; Cashin, 2008). • Male prisoners "who had moderate/high nicotine dependence and expressed a readiness to quit smoking" (1 study; smoking cessation; Richmond, 2012). • Female prisoners "who smoked at least 5 cigarettes per day and expressed interest in smoking cessation" (1 study; smoking cessation; Cropsey, 2008).
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Australia (2 studies), Belgium (1 study), Canada (1 study), Italy (1 study), Spain (2 studies), USA (4 studies). • Physical activity interventions: Italy (Battaglia, 2013), Spain (Perez-Moreno, 2007), USA (Amtmann, 2001; Gettman, 1976). • Nutrition interventions: Belgium (Sioen, 2009), Spain (Gil-Delgado, 2011), USA (Curd, 2013). • Physical activity interventions combined with education: Australia (Cashin, 2008), Canada (Elwood Martin, 2013). • Smoking cessation combined interventions: Australia (Richmond, 2012), USA (Cropsey, 2008/2011). **Specific setting(s) (include number of studies in each setting)**: In this review, the term prisoners refer to people incarcerated in prisons, jails, and other correctional institutions, including inmates and offenders. **Other features of the setting(s) relevant to the analysis**: All included studies were conducted in prisons or jails, or variable security.

Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The authors reported that interventions were classified into four types: structured physical activity interventions, nutrition interventions, physical activity interventions combined with educational sessions, and smoking cessation combined interventions. • Physical activity interventions: 4 studies (Amtmann, 2001; Perez-Moreno, 2007; Battaglia, 2013; Gettman, 1976) evaluated the effect of supervised structured physical activity interventions (Table 2). Two studies (Amtmann, 2001; Perez-Moreno, 2007) compared a single intervention group that participated in an exercise program with a control group. Two studies compared two or more intervention groups with a control group (Battaglia, 2013; Gettman, 1976). • Nutrition interventions: 3 studies (Curd, 2013; Gil-Delgado, 2011; Sioen, 2009) evaluated the effect of nutrition interventions (Table 3). Two studies evaluated interventions in which the diet of prisoners was modified (Gil-Delgado, 2011; Sioen, 2009) and the third study evaluated the impact of education and behavioural workshops on the nutrition practices of prisoners (Curd, 2013). • Physical activity interventions combined with education: 2 studies evaluated combined interventions (Elwood Martin, 2013; Cashin, 2008) that combined physical activity and educational sessions (Table 4). Both studies used a prisoner or prisoners to lead part or all of the intervention. One study evaluated the effect of supervised physical activity combined with health education classes on the health of prisoners with chronic illness or risk factors for a chronic illness (Cashin, 2008). The other study evaluated the effect of a nutrition and fitness programme on the health and well-being of female prisoners (Elwood Martin, 2013). The programme incorporated the use of behaviour change techniques such as self-monitoring of eating behaviour and goal setting to help prisoners track their personal fitness progress. • Smoking cessation combined interventions: 2 studies (3 papers) (Richmond, 2012; Cropsey, 2008/2011) evaluated the effect of combined smoking cessation interventions on smoking abstinence in prisoners (Table 5). Both studies used nicotine replacement therapy along with behavioural therapy to support smoking cessation. One study delivered the intervention in a group setting and focused on mood management training to prevent smoking relapse based on previous cognitive-behavioural research (Cropsey, 2008/2011). The other study delivered two face-to-face brief cognitive behavioural therapy sessions to prisoners and had support systems in place in the form of a telephone counselling service and self-help materials such as booklets and a quit calendar (Richmond, 2012). **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: CINAHL, MEDLINE via OVID, PubMed, PsychINFO, and the Knowledge Network.

Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.): Reference lists of relevant articles were searched by hand to identify any appropriate studies that could potentially be included in the review.

Any search limits imposed (e.g. search dates, language restriction, etc.): Searches were conducted from database inception to May 2016. The review authors did not comment on limitation by language. Studies were excluded if they only presented baseline results or if they measured outcomes after participants were released from prison because this review looked at the effect on prisoners while they are incarcerated.

Protocol prepared (yes/no)? Not reported

- **If yes, was protocol published (yes/no)**? Not applicable

Search strategy/key words provided (yes/no, full search or example provided)? Yes, an example of a search using CINHAL is given in Table 1.

Screening completed in duplicate (yes/no)? No, "Abstracts were reviewed to identify the articles according to the inclusion criteria", and "The search strategy and selected full-text articles were reviewed and verified by another researcher" p5.

- **If yes, how were disagreements resolved**? "Any discrepancies were discussed" p5.

Extraction completed in duplicate (yes/no)? Not reported

- **If yes, how were disagreements resolved**? Not reported

Number and types of primary studies included in the systematic review

Number of studies relevant to this overview of review: 11 primary studies (12 papers).

- **Number of studies by study design**: 6 randomised control trials, 1 nonrandomised control trial, 1 before and after study, 2 cohort studies, and 1 case-control study
  - Physical activity interventions: 1 non-randomised control trial (Amtmann, 2001) and 3 RCTs (Perez-Moreno, 2007; Battaglia, 2013; Gettman, 1976).
  - Nutrition interventions: 1 case-control study (Curd, 2013) and 2 cohort studies (Gil-Delgado, 2011; Sioen, 2009)
  - Physical activity interventions combined with education: 1 before and after study (Elwood Martin, 2013) and 1 RCT (Cashin, 2008).

	– Smoking cessation combined interventions: 2 RCTs (3 papers) (Richmond, 2012; Cropsey, 2008/2011).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 1976 (1 study), 2001 (1 study), 2007 (1 study), 2008 (2 studies), 2009 (1 study), 2011 (1 study), 2012 (1 study), 2013 (3 studies).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: "Studies of differing designs (including RCTs)" p4. **Reasons for including study design(s) provided (yes/no)**? Yes • **If yes, describe the justification(s)**: "As the nature of correctional regimes makes it difficult to randomize prisoners, studies of differing designs (including RCTs) were included to not eliminate any potentially important studies" p4. **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Not applicable
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The quality of the studies was assessed using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project. The Effective Public Health Practice Project instrument was selected above other instruments such as the Cochrane Collaboration Risk of Bias Tool because it allows for the assessment of range of study designs and therefore does not limit the number of studies that can be included in the review based on design. **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Any discrepancies were discussed and resolved by the two researchers who undertook quality assessment.
Appraisal rating	QUANTITATIVE COMPONENT **Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality)**: Overall, the varied in terms of overall quality. "Three studies received a strong overall rating, 4 received a moderate overall rating, and 4 received a weak overall rating. Most of the ''weak'' studies had selection bias, did not report the withdrawal rates of participants, or had high dropout rates of participants. Most studies received a strong rating for study design, considering confounders, and using reliable data collection methods" p9.

- Physical activity interventions: 1 study received a strong overall rating (Perez-Moreno, 2007), 2 received a moderate overall rating (Amtmann, 2001; Battaglia, 2013), and 1 received a weak overall rating (Gettman, 1976).
- Nutrition interventions: 2 studies received a strong overall rating (Gil-Delgado, 2011; Sioen, 2009), and 1 received a weak overall rating (Curd, 2013).
- Physical activity interventions combined with education: 2 studies received a weak overall rating (Elwood Martin, 2013; Cashin, 2008).
- Smoking cessation combined interventions: 2 studies (3 papers) received a moderate overall rating (Richmond, 2012; Cropsey 2008/2011).
- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "The majority of studies included in this review were of weak or moderate quality which brings into question the validity of their findings. They were still included in this review as details of their interventions could be useful in the development of future, more robust studies to improve the cardiovascular health of prisoners" p12.

Assessment of publication bias (yes/no): Not reported

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Yes, the quality of the studies is presented alongside the effectiveness of each of the four interventions in the narrative synthesis.

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

	Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable • **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable
Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: A narrative synthesis approach was used to organise the evidence from the studies. The authors noted that this approach is more appropriate when studies are too methodologically diverse to be combined in a meta-analysis. The studies were grouped according to the type of intervention they examined and were presented in tabular form. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: No QUANTITATIVE COMPONENT **Justification for narrative synthesis or meta-analysis (yes/no)**: The authors reported that this approach is used when studies are too methodologically diverse to be combined in a meta-analysis. • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable QUALITATIVE COMPONENT **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	**List of authors' primary outcomes assessed relevant to this overview of reviews**: Studies had to observe outcomes of at least one of the following health factors and behaviours related to cardiovascular health as outlined by the American Heart Association: • **Primary outcome 1**: Blood pressure • **Primary outcome 2**: Cholesterol levels • **Primary outcome 3**: Blood glucose levels • **Primary outcome 4**: Physical activity • **Primary outcome 5**: Diet

	• **Primary outcome 6**: Weight • **Primary outcome 7**: Smoking status **List of authors' secondary outcomes relevant to this overview of reviews**: Not reported
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	QUANTITATIVE RESULTS – META-ANALYSES **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable QUANTITATIVE RESULTS – NARRATIVE **Provide the overall findings for each primary outcome via a statement indicating the following, where reported:**

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Structured physical activity interventions

Overall, in relation to this intervention type, the authors state "One of two studies that measured physical fitness study observed significant positive effects on the physical fitness of prisoners [Amtmann, 2001] whereas the other study did not observe any significant effects [Perez-Moreno, 2007]. Another study evaluated 2 different training protocols and found that cardiovascular and resistance training was more effective in improving the physical fitness of prisoners compared with high-intensity strength training [Battaglia, 2013]. The fourth study compared exercise frequency and found that more frequent exercise had more positive effects on body composition compared with less frequent exercise [Gettman, 1976]" p74.

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Body composition	Measure unspecified but assumed measured using machinery	Amtmann (2001) Non-randomised trial	Significant improvement in the intervention group (n = 62 older prisoners who participated in an exercise program to improve physical fitness) compared to the control group (n = 32 prisoners who did not participate in the exercise program). No statistics were provided.	Intervention lasted for 14 weeks
Resting heart rate	Measure unspecified but assumed measured using machinery	Amtmann (2001) Non-randomised trial	The review authors present contradictory results on this outcome: "Significant differences between the intervention and control groups for body composition, **resting HR**, and muscular endurance. No significant differences between the 2 groups for body weight, flexibility, **resting HR** and	Intervention lasted for 14 weeks

			resting BP" (Table 2). No statistics were provided.	
Muscular endurance	Measure unspecified but assumed measured using machinery	Amtmann (2001) Non-randomised trial	Significant improvement in the intervention group compared to the control group. No statistics were provided.	Intervention lasted for 14 weeks
Body weight	Measure unspecified but assumed measured using machinery	Amtmann (2001) Non-randomised trial	No significant difference between the intervention group and the control group. No statistics were provided.	Intervention lasted for 14 weeks
Flexibility	Measure unspecified but assumed measured using machinery	Amtmann (2001) Non-randomised trial	No significant difference between the intervention group and the control group. No statistics were provided.	Intervention lasted for 14 weeks
Resting blood pressure	Measure unspecified but assumed measured using machinery	Amtmann (2001) Non-randomised trial	No significant difference between the intervention group and the control group. No statistics were provided.	Intervention lasted for 14 weeks
***Note*. Overall, the authors state that Amtmann (2001) "observed significant positive effects on the physical fitness of prisoners" (p74). It is assumed that the above outcomes informed this conclusion.**				
Cardiorespiratory fitness	Measure unspecified but assumed measured using machinery	Perez-Moreno (2007) RCT	No significant difference between the intervention group (n = 14 male prisoners who engaged in an exercise program) and the control group (n = 13 male prisoners who followed usual sedentary lifestyle). No statistics were provided.	Intervention lasted for 4 months
Lower and upper body strength endurance	Measure unspecified but assumed measured using machinery	Perez-Moreno (2007) RCT	No significant difference between the intervention group and the control group. No statistics were provided.	Intervention lasted for 4 months
***Note*. Overall, the authors state that Perez-Moreno (2007) "did not observe any significant effects" on the physical fitness of prisoners (p74). It is assumed that the above outcomes informed this conclusion.**				
Body composition variable: Total skinfold fat	Measure unspecified but assumed measured using machinery	Gettman (1976) RCT	Significant difference between the 5-d intervention group (n = 30 male prisoners who	Intervention lasted for 20 weeks

				engaged in endurance-oriented exercise for 5 days per week) and the control group (n = 20 male prisoners who engaged in non-endurance recreational activity for 2 days per week). No statistics were provided. No significant difference between the 1-d intervention group (n = 24 male prisoners who engaged in endurance-oriented exercise for 1 day per week) and the control group. No statistics were provided. *Note*. Results related to this outcome for the 3-d intervention group were Not reported.	
	Body composition variable: Percentage body fat	Measure unspecified but assumed measured using machinery	Gettman (1976) RCT	Significant difference between the 5-d intervention group and the control group. No statistics were provided. No significant difference between the 1-d intervention group and the control group. No statistics were provided. *Note*. Results related to this outcome for the 3-d intervention group were Not reported.	Intervention lasted for 20 weeks
	Body composition variable: Waist girth	Measure unspecified but assumed measured using machinery	Gettman (1976) RCT	Significant difference between both the 5-d and the 3-d intervention groups and the control group. No statistics were provided. No significant difference between the 1-d intervention	Intervention lasted for 20 weeks

			group and the control group. No statistics were provided.	
Physical fitness variable: Maximum heart rate	Measure unspecified but assumed measured using machinery	Gettman (1976) RCT	No significant difference between any of the intervention groups (5-d, 3-d, or 1-d) and the control group. No statistics were provided.	Intervention lasted for 20 weeks
Physical fitness variable: Resting blood pressure	Measure unspecified but assumed measured using machinery	Gettman (1976) RCT	No significant difference between any of the intervention groups (5-d, 3-d, or 1-d) and the control group. No statistics were provided.	Intervention lasted for 20 weeks
All other physical fitness variables (e.g. resting heart rate, V_2 max)	Measures unspecified but assumed measured using machinery	Gettman (1976) RCT	Significant differences between all 3 intervention groups (5-d, 3-d, or 1-d) and the control group in "all physical fitness variables except maximum HR and resting BP" (Table 2). *Note*. The full list of physical fitness variables was not provided.	Intervention lasted for 20 weeks
***Note*. Overall, the authors state that Gettman (1976) found that "more frequent exercise had more positive effects on body composition compared with less frequent exercise" (p74). The full list of physical fitness variables is not provided, but the intervention had a positive impact on all variables except maximum heart rate and resting blood pressure.**				
Health status variable: Oxygen saturation	Measure unspecified but assumed measured using machinery	Battaglia (2013) RCT	Significant improvement in both intervention groups (1. the CRT group, n = 25 male prisoners who engaged in a cardiovascular plus resistance training and aerobic exercises alternating with resistance strength training; and 2. the HIST group, n = 25 male prisoners who engaged in a high-intensity strength training with anaerobic exercise alternating with maximal strength exercises and active recovery) compared to the control group (n = 25 male prisoners who performed habitual	Intervention lasted for 9 months

			activities). No statistics were provided.	
Health status variable: High-density lipoprotein	Measure unspecified but assumed measured using machinery	Battaglia (2013) RCT	Significant improvement in the CRT intervention group compared to the control group. No significant difference between the HIST intervention group and the control group. No statistics were provided.	Intervention lasted for 9 months
All other health status variables	Measures unspecified but assumed measured using machinery	Battaglia (2013) RCT	No significant difference between either of the intervention groups and the control group. No statistics were provided. *Note*. The full list of health status variables was not provided.	Intervention lasted for 9 months
Physical fitness variable: Abdominal strength	Measure unspecified but assumed measured using machinery	Battaglia (2013) RCT	No significant difference between either of the intervention groups and the control group. No statistics were provided.	Intervention lasted for 9 months
Physical fitness variable: Endurance	Measure unspecified but assumed measured using machinery	Battaglia (2013) RCT	No significant difference between the CRT intervention group and the control group. Significant improvement in the HIST intervention group compared to the control group. No statistics were provided.	Intervention lasted for 9 months
Physical fitness variable: Upper body strength	Measure unspecified but assumed measured using machinery	Battaglia (2013) RCT	Significant improvement in both intervention groups compared to the control group. No statistics were provided.	
All other physical fitness variables	Measures unspecified but assumed measured using machinery	Battaglia (2013) RCT	Significant improvement in the CRT intervention group compared to the control group on all physical fitness variables except abdominal strength and endurance.	Intervention lasted for 9 months

			No significant difference between the HIST intervention group and the control group on all physical fitness variables except upper body strength and endurance. No statistics were provided. *Note*. The full list of physical fitness variables was not provided.	
***Note*. Overall, the authors state that Battaglia (2013) found that "cardiovascular and resistance training was more effective in improving the physical fitness of prisoners compared with high-intensity strength training" (p74). The full lists of physical fitness variables and health status are not provided.**				
Cholesterol	Not measured			
Blood glucose levels	Not measured			
Diet	Not measured			
Smoking status	Not measured			

Nutrition interventions

- Overall, in relation to this intervention type, the authors state "The study that changed entire diets observed significant positive effects on the body composition of intervention participants [Gil-Delgado, 2011], whereas the other study that used enhanced fatty acid supplementation only observed significant positive effects on diastolic blood pressure and high-density lipoproteins in prisoners who smoked [Sioen, 2009]. The third study evaluated the impact of education and behavioural workshops on the nutrition practices of prisoners [Curd, 2013]. This study found that nutrition education and reinforcement of positive healthy nutrition habits had a significant positive effect on prisoners' nutrition practices" p77.

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Nutritional practices	Measure unspecified	Curd (2013) Case-control study	Significant difference between the intervention group (n = 19 male prisoners who attended 3 nutrition workshops and participated in a vegetable	Intervention lasted for 6 months

			garden project) and the control group (n = 37 male prisoners who did not participate in the workshops) for improved nutrition practices. No information was provided in relation to what was measured. No statistics were provided.	
***Note*. Overall, the authors state that Curd (2013) found that "nutrition education and reinforcement of positive healthy nutrition habits had a significant positive effect on prisoners' nutrition practices" p77.**				
Body composition variables	Measures unspecified but assumed measured using machinery	Gil-Delgado (2011) Cohort study	Significant (within-group) improvements in the intervention group (n = 139 prisoners who had changes to diet made by a nutritionist) compared with baseline for body composition variables. No statistics were provided. *Note*. The list of body composition variables was not provided.	Intervention lasted for 1 year
Diastolic blood pressure	Measure unspecified but assumed measured using machinery	Gil-Delgado (2011) Cohort study	Significant (within-group) improvements in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year
Triglycerides	Measure unspecified but assumed measured using machinery	Gil-Delgado (2011) Cohort study	No significant (within-group) change in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year
Blood glucose	Measure unspecified but assumed measured using machinery	Gil-Delgado (2011) Cohort study	No significant (within-group) change in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year
Glycated haemoglobin	Measure unspecified but assumed measured using machinery	Gil-Delgado (2011) Cohort study	No significant (within-group) change in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 1 year

	All other clinical variables	Measures unspecified but assumed measured using machinery	Gil-Delgado (2011) Cohort study	No significant differences compared with baseline for all clinical variables except triglycerides, blood glucose, and glycated haemoglobin. No statistics were provided. *Note*. The list of clinical variables was not provided.	Intervention lasted for 1 year
	Metabolic syndrome	Measure unspecified but assumed measured using machinery	Gil-Delgado (2011) Cohort study	Significant reduction in the number of participants with metabolic syndrome according to International Diabetes Federation (IDF).	Intervention lasted for 1 year
	***Note*. Overall, the authors state that Gil-Delgado (2011) "observed significant positive effects on the body composition of intervention participants" p77.**				
	Diastolic blood pressure	Measure unspecified but assumed measured using machinery	Sioen (2009) Cohort study	Significant (within-group) improvement in the intervention group (n = 70 male prisoners, all smokers, who were given a standard diet for 6 weeks and then supplied with a polyunsaturated fatty acids enriched diet for 12 weeks) compared with baseline. No statistics were provided	Intervention lasted for 12 weeks
	High-density lipoprotein	Measure unspecified but assumed measured using machinery	Sioen (2009) Cohort study	Significant (within-group) improvement in the intervention group compared with baseline. No statistics were provided.	Intervention lasted for 12 weeks
	All other anthropometric variables	Measures unspecified but assumed measured using machinery	Sioen (2009) Cohort study	No significant differences compared with baseline for all other anthropometric variables except. No statistics were provided. *Note*. The list of anthropometric variables was not provided.	Intervention lasted for 12 weeks

All other clinical variables	Measures unspecified but assumed measured using machinery	Sioen (2009) Cohort study	No significant differences compared with baseline for all other clinical variables except. No statistics were provided. *Note*. The list of clinical variables was not provided.	Intervention lasted for 12 weeks
***Note*. Overall, the authors state that Sioen (2009) "observed significant positive effects on diastolic blood pressure and high-density lipoproteins in prisoners who smoked" p77.**				
Cholesterol	Not measured			
Physical activity	Not measured			
Weight	Not measured			
Smoking status	Not measured			

Structured mixed physical activity interventions combined with education:

- Overall, in relation to this intervention type, the authors state "One study evaluated the effect of supervised physical activity combined with health education classes on the health of prisoners with chronic illness or risk factors for a chronic illness [Cashin, 2008). Changes in anthropometric and clinical variables were measured including weight and blood pressure and blood glucose levels. Significant positive effects were only observed for resting heart rate and endurance. The other study evaluated the effect of a nutrition and fitness program on the health and well-being of female prisoners [Elwood Martin, 2013]. The program incorporated the use of behaviour change techniques (BCTs) such as self-monitoring of eating behaviour and goal setting to help prisoners track their personal fitness progress. Changes in weight, body mass index, waist-to-hip ratio, and chest diameter were measured, but only a significant positive effect was observed for chest diameter" p77.

Systematic review primary outcome(s)	**How the outcome was assessed (e.g. self-report, observation, etc.)**	**First author (year) of all primary studies that measured the outcome**	**Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)**	**Length of time between intervention delivery and outcome assessment (i.e. follow-up period)**
Chest measurement	Measure unspecified but assumed measured using machinery	Elwood Martin (2013) Pre-post study	Significant (within-group) improvement in the intervention group (n = 28 female prisoners who participated in circuit class or	Intervention lasted for 6 weeks

			followed personalized exercise plans and received nutrition educational sessions) compared with baseline. No statistics were provided.	
Weight	Measure unspecified but assumed measured using machinery	Elwood Martin (2013) Pre-post study	No significant (within-group) change observed from baseline. No statistics were provided.	Intervention lasted for 6 weeks
BMI	Measure unspecified but assumed measured using machinery	Elwood Martin (2013) Pre-post study	No significant (within-group) change observed from baseline. No statistics were provided.	Intervention lasted for 6 weeks
Waist-to-hip ratio	Measure unspecified but assumed measured using machinery	Elwood Martin (2013) Pre-post study	No significant (within-group) change observed from baseline. No statistics were provided.	Intervention lasted for 6 weeks
Resting heart rate	Measure unspecified but assumed measured using machinery	Cashin (2008) RCT	Significant difference between the intervention group (n = 20 male prisoners who attended cardiorespiratory endurance, strength, and flexibility training, and 3 health education classes on health eating and self-management) and the control group (n = 20 male prisoners who continued with usual exercise regimen). No statistics were provided.	Intervention lasted for 12 weeks
Endurance	Measure unspecified but assumed measured using machinery	Cashin (2008) RCT	Significant difference between the intervention group and the control group. No statistics were provided.	Intervention lasted for 12 weeks
Diastolic blood pressure	Measure unspecified but assumed measured using machinery	Cashin (2008) RCT	A significant difference was observed between the two groups for diastolic blood pressure, with the control group seeing the greatest improvement after the	Intervention lasted for 12 weeks

			intervention (this difference occurred on pretesting).	
"All other measured outcomes"	Measured unspecified	Cashin (2008) RCT	No significant differences observed for all other measured outcomes. No statistics were provided. *Note*. These variables were not specified.	Intervention lasted for 12 weeks
Cholesterol levels	Not measured			
Blood glucose levels	Not measured			
Diet	Not measured			
Smoking status	Not measured			

Smoking cessation combined interventions

- Overall, in relation to this intervention type, the authors state "One study delivered the intervention in a group setting and focused on mood management training to prevent smoking relapse based on previous cognitive-behavioural research [Cropsey, 2008]. A significant positive effect on smoking abstinence 1 week after the quit date was observed, and this significant effect was sustained up to 6 months after intervention. The other study delivered 2 face-to-face brief cognitive behavioural therapy sessions to prisoners and had support systems in place in the form of a telephone counselling service and self-help materials such as booklets and a quit calendar.33 This intervention had no significant effect on smoking abstinence" p77-78.

Systematic review primary outcome(s)	**How the outcome was assessed (e.g. self-report, observation, etc.)**	**First author (year) of all primary studies that measured the outcome**	**Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)**	**Length of time between intervention delivery and outcome assessment (i.e. follow-up period)**
Smoking: Continuous abstinence	Measure unspecified	Richmond (2012) RCT	No significant difference between the prisoners who received a combined intervention (n = 206 male prisoners who received 2 face-to-face bCBT sessions, active NOR, and active nicotine patches and had access to telephone counselling service and support instruments, as	3 months, 6 months, and 12 months follow-up

				well as nicotine patched) and prisoners in the control group (n = 219 male prisoners who received the same as the intervention group except with placebo NOR). No statistics were provided.	
	Smoking: Point prevalence abstinence	Measure unspecified	Richmond (2012) RCT	No significant difference between the prisoners who received a combined intervention and prisoners in the control group. No statistics were provided.	3 months, 6 months, and 12 months follow-up
	Smoking abstinence	Measure unspecified	Cropsey (2008) RCT	One week after targeted quit date, there was a significantly greater increase in smoking abstinence for the intervention group (n = 250 female prisoners who received mood management training to prevent smoking relapse and not reported in week 3 of the intervention) compared with the control group (n = 289 females on a 6-month waiting list). The difference remaining until 6 months after completion of the intervention. For the intervention group, there was a gradual decline in abstinence from week 5 until the 6-month follow-up point. 46% of the intervention participants relapsed after 1 week of abstinence. No statistics were provided	Intervention lasted for 10 weeks and 6 months follow-up
	Blood pressure	Not measured			
	Cholesterol levels	Not measured			
	Blood glucose levels	Not measured			

Physical activity	Not measured			
Diet	Not measured			
Weight	Not measured			

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: **Not applicable**

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

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Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? Attrition rates were Not reported. However, withdrawal/dropout was a criterion on the quality assessment:

- Physical activity interventions:
  - Moderate rating on withdrawal/dropout (Battaglia, 2013; Perez-Moreno, 2007).
  - Weak rating on withdrawal/dropout (Amtmann, 2001; Gettman, 1976).
- Nutrition interventions:
  - Strong rating on withdrawal/dropout (Curd, 2013; Sioen, 2009)
  - Weak rating on withdrawal/dropout (Gil-Delgado, 2011).
- Physical activity interventions combined with education:
  - Moderate rating on withdrawal/dropout (Cashin, 2008).
  - Weak rating on withdrawal/dropout (Elwood Martin, 2013).
- Smoking cessation combined interventions:
  - Strong rating on withdrawal/dropout (Richmond, 2012).
  - Weak rating on withdrawal/dropout (Cropsey, 2008).

Comparator(s) used in the interventions delivered in the included studies:

- Physical activity interventions: The comparators were no intervention/usual activities/lifestyle (3 studies; Amtmann, 2001; Battaglia, 2013; Perez-Moreno, 2007) and non-endurance exercise (Gettman, 1976).
- Nutrition interventions: The comparator in the case control study was no intervention (Curd, 2013). The other 2 studies (Gil-Delgado, 2011; Sioen, 2009) were cohort studies.
- Physical activity interventions combined with education: The comparator in the RCT (Cashin, 2008) was continued with their usual exercise regimen. The other study was a before-and-after study (Elwood Martin, 2013).

- Smoking cessation combined interventions: The comparator in 1 RCT received the same intervention with the exception of a placebo in the place of Not reported (Richmond, 2012) and the comparator in the other RCT were people on a waiting list (Cropsey 2008/2011).

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.):

- Physical activity interventions: Not reported
- Nutrition interventions: Not reported for 2 studies (Curd, 2013; Sioen, 2009). In the third study, a nutritionist who made changes to prisoners' diets (Gil-Delgado, 2011).
- Physical activity interventions combined with education: Both studies used a prisoner or prisoners to lead part or all of the intervention (Cashin, 2008; Elwood Martin, 2013).
- Smoking cessation combined interventions: Not reported
- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported

Duration(s) of the intervention:

- Physical activity interventions: 9 months (Battaglia, 2013), 4 months (Perez-Moreno, 2007), 14 weeks (Amtmann, 2001), 20 weeks (Gettman, 1976).
- Nutrition interventions: 6 months (Curd, 2013), 1 year (Gil-Delgado, 2011), 12 weeks (Sioen, 2009).
- Physical activity interventions combined with education: 6 weeks (Elwood Martin, 2013), 12 weeks (Cashin, 2008).
- Smoking cessation combined interventions: Not reported

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies):

- Physical activity interventions: Duration and intensity of sessions for both groups were gradually increased, and sessions were 1 hour long, twice per week. (Battaglia, 2013); 90 minutes 3 days per week (Perez-Moreno, 2007); 3 days per week (Amtmann, 2001); 1 day per week (group 1), 3 days per week (group 2), and 5 days per week (group 3) (Gettman, 1976).
- Nutrition interventions: The first 2 workshops were 4 times per week, 90 min long and the third workshop had five 90-min sessions (Curd, 2013); Not reported (Gil-Delgado, 2011; Sioen, 2009).

- Physical activity interventions combined with education: Not applicable (Elwood Martin, 2013; Cashin, 2008).
- Smoking cessation combined interventions: Not reported (Richmond, 2012); 1 session per week for 10 weeks (Cropsey, 2011).

Overall direction of results

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.

QUANTITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews:

- Physical activity interventions: One of two studies that measured physical fitness study observed significant positive effects on the physical fitness of prisoners, whereas the other study did not observe any significant effects, so mixed results. Another study evaluated 2 different training protocols and found that cardiovascular and resistance training was more effective in improving the physical fitness of prisoners compared with high-intensity strength training. The fourth study compared exercise frequency and found that more frequent exercise had more positive effects on body composition compared with less frequent exercise.
- Nutrition interventions: The nutrition intervention study that changed entire diets for prisoners observed significant positive effects on the body composition of intervention participants,35 whereas the other study that used enhanced fatty acid supplementation only observed significant positive effects on diastolic blood pressure and high-density lipoproteins in prisoners who smoked.38 The third study evaluated the impact of education and behavioural workshops on the nutrition practices of prisoners and found that nutrition education and reinforcement of positive healthy nutrition habits had a significant positive effect on prisoners' nutrition practices.
- Physical activity interventions combined with education: Health and anthropometric measurements following combined physical activity plus education interventions demonstrated significant improvements between the intervention and control groups for resting heart rate, endurance diastolic blood pressure in one study, and significant improvement in chest measurement compared with baseline in another study.
- Smoking cessation combined interventions: Mixed results with respect to smoking abstinence following smoking ban and nicotine replacement therapy in two studies (three papers): i.e. one positive effect on abstinence and the other no effect on abstinence.

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

QUALITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews: Not applicable

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Cholesterol levels **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? The review authors state studies are too methodologically diverse to be combined in a meta-analysis, otherwise heterogeneity is not mentioned or investigated. • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: The review authors do not make further comment on heterogeneity, and do not GRADE the certainty of evidence.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4	**Barriers**

The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.

Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)? No

- **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable

Facilitators

Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)? No

- **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? Yes • **If yes, state the follow-up period(s) and describe the findings at each one**: **Smoking cessation combined interventions**

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Smoking: Continuous abstinence	Measure unspecified	Richmond (2012) RCT	No significant difference between the prisoners who received a combined intervention (n = 206 male prisoners who received 2 face-to-face bCBT sessions, active NOR, and active nicotine patches and had access to telephone counselling service and support instruments, as well as nicotine patched) and prisoners in the control group (n = 219 male prisoners who received the same as the intervention group except with	3 months, 6 months, and 12 months follow-up

			placebo NOR). No statistics were provided.	
Smoking: Point prevalence abstinence	Measure unspecified	Richmond (2012) RCT	No significant difference between the prisoners who received a combined intervention and prisoners in the control group. No statistics were provided.	3 months, 6 months, and 12 months follow-up
Smoking abstinence	Measure unspecified	Cropsey (2008) RCT	One week after targeted quit date, there was a significantly greater increase in smoking abstinence for the intervention group (n = 250 female prisoners who received mood management training to prevent smoking relapse and not reported in week 3 of the intervention) compared with the control group (n = 289 females on a 6-month waiting list). The difference remaining until 6 months after completion of the intervention. For the intervention group, there was a gradual decline in abstinence from week 5 until the 6-month follow-up point. 46% of the intervention participants relapsed after 1 week of abstinence. No statistics were provided	Intervention lasted for 10 weeks and 6 months follow-up

QUALITATIVE RESULTS

Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)? Not applicable

- **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.11 Perry *et al.* (2023)

Parameter	Description
Review title	"Effects of interventions on depression and anxiety in older people with physical health problems in the criminal justice system: a systematic review"
First author and year of publication	Perry *et al.* (2023)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Yoga-based interventions (5 studies) Positive psychology or mindfulness-based interventions (4 studies) Art and creative interventions (4 studies) Sports- and exercise-based interventions (combined) (1 study) Animal-based interventions (1 study) *Note*. The first 2 intervention categories above (as described by the review authors) fall under 1 intervention family for the purposes of this overview of reviews. The systematic review authors analyse and report on these categories as separate, which is reflected in this extraction form. However, the 5 yoga-based studies and the 4 positive psychology or mindfulness-based intervention will be analysed under 1 intervention family in this overview of review; 'Yoga, meditation, and mindfulness-based interventions'.
Contributing primary studies	The information presented in this extraction form applies only to the 15/24 primary studies (and 26 reports) included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). The HRB excluded nine studies as they did not cover the interventions of interest to this overview of reviews: four on psychotherapy and five on a variety of other interventions.
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "The aim of this systematic review was to identify and examine RCTs [randomised controlled trials] of interventions for older people (aged ≥50 years) involved in the CJS [criminal justice

system] that focused on outcomes of depression or anxiety (or both) in people with the physical health needs of either obesity, COPD [chronic obstructive pulmonary disease], or diabetes (or a combination). This review also assessed the feasibility and acceptability of these interventions." e431-2.

Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.: The review authors excluded:

- Any trials that focused on participants whose primary diagnosis was post-traumatic stress disorder, obsessive-compulsive disorder, schizophrenia, dementia, or any mental health problem other than anxiety and depression.
- Trials that focused on physical health problems other than obesity, diabetes, or COPD, as well as trials that focused on prisoners of war, abuse of older people, or fear of crime.
- Interventions that focused on medication management or prescribing, health-care service access, drug withdrawal, prison-based needle and syringe programmes, alcohol-only or drug-only focused programmes, programmes targeting sexual offending behaviour, pharmacological interventions, and end of life interventions.

Participants

The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.

Number of participants in the included primary studies:

- Yoga-based interventions: n = 580 prisoners (5 studies).
- Positive psychology or mindfulness-based interventions: n = 326 prisoners (4 studies).
- Creative arts-based interventions: n = 357+ prisoners (4 studies).
- Sports- and exercise-based interventions combined with education: n = 20 prisoners (1 study).
- Animal-based interventions: n = 81 prisoners (1 study).

Age (mean and/or mode and/or range):

- Yoga-based interventions: Mean ages across the studies ranged from 36.08 years to 37.92 years, age range = 19-70 years (5 studies; Not reported in 1 study).
- Positive psychology or mindfulness-based interventions: Mean ages across the studies ranged from 34.8 years to 42.2 years, age range = 19-60 years (4 studies).
- Creative arts-based interventions: Mean ages were reported in 2 studies (31.38 years to 35.5 years), age range was reported in 3 studies (18-59 years) (4 studies).

	• Sports- and exercise-based interventions combined with education: Mean age = 51 years (1 study). • Animal-based interventions: Mean age = 36 years, range = 19-58 years (1 study). **Sex**: 9 male, 3 female prison settings, and 2 mixed prison setting • Yoga-based interventions: Male only sample (1 study), female only sample (2 studies), mixed sample (1 study; 89% male), Not reported (1 study). • Positive psychology or mindfulness-based interventions: Male only sample (4 studies). • Creative arts-based interventions: Male only sample (3 studies), mixed sample (1 study; 39% male). • Sports- and exercise-based interventions combined with education: Male only sample (1 study). • Animal-based interventions: Female only sample (1 study). **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Not reported
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Australia (1 study), China (4 studies), India (1 study), Norway (1 study), Sweden (1 study), UK (1 study), USA (6 studies). • Yoga-based interventions: India (1 study), Sweden (1 study), UK (1 study), USA (2 studies). • Positive psychology or mindfulness-based interventions: China (1 study), Norway (1 study), USA (2 studies). • Creative arts-based interventions: China (3 studies), USA (1 study). • Sports- and exercise-based interventions combined with education: Australia (1 study). • Animal-based interventions: USA (1 study). **Specific setting(s) (include number of studies in each setting)**: 14 of the primary studies were set in prisons, 1 was set in a jail. **Other features of the setting(s) relevant to the analysis**: Not reported

Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The review authors were interested in interventions for older people (aged ≥50 years) involved in the criminal justice system that focused on outcomes of depression or anxiety (or both) in people with the physical health needs of either obesity, COPD, or diabetes (or a combination) (e431-2). **Any other relevant details related to the intervention of interest**: For the purposes of the review search, the review authors did not specify particular interventions of interest; rather, they focused on interventions that addressed outcomes of depression or anxiety (or both). In relation to the interventions of interest to this overview of reviews: • Yoga-based interventions: Lundstrom (2021), Kerekes (2017), Ambhore (2009), Bilderbeck (2013), Danielly (2017). • Positive psychology or mindfulness-based interventions: Yu (2021), An (2019), Deng (2019), Yang (2018). • Creative arts-based interventions: Gold (2014), Chen (2016), Gussak (2006), Gussak (2009). • Sports- and exercise-based interventions combined with education: Cashin (2008). • Animal-based interventions: Jasperson (2013).
Databases and sources searched	**Number and names of databases searched**: MEDLINE ALL (Ovid), Embase (Ovid), PsycINFO (Ovid), CINAHL Plus (Ebsco), Criminal Justice Abstracts (Ebsco), ASSIA (ProQuest), Social Science Citation Index (Clarivate analytics and Web of Science), Social Policy and Practice (Ovid), Cochrane Central Register of Controlled Trials (Wiley), and ProQuest Dissertations and Theses A&I (ProQuest). Previous and ongoing reviews were identified via the Cochrane Database of Systematic Reviews (Wiley), Database of Abstracts of Effects (DARE), Epistemonikos, and PROSPERO. Economic evaluations and Health Technology Assessments were sought from the UK National Health Service Economic Evaluations Databases and the Health Technology Assessment database (e432). **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: The authors searched the Campbell Collaboration website for any ongoing or completed systematic reviews beyond health; the National Institute of Health Research Journals Library for any published reports or ongoing studies; and ClinicalTrials.gov, WHO International Clinical Trials Registry Platform, and International Standard Randomised Controlled Trial Number for any unpublished or ongoing trials. After screening, the authors did forward (via the Web of Science) and backward citation checking of included studies and previous systematic reviews (e432-433). **Any search limits imposed (e.g. search dates, language restriction, etc.)**: Retrieval was limited to studies published from 1990–26 November 2021. The authors did not apply any language restrictions. **Protocol prepared (yes/no)**?NR

	• **If yes, was protocol published (yes/no)**? Not reported **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, example provided. **Screening completed in duplicate (yes/no)** ? Yes • **If yes, how were disagreements resolved**? Not reported **Extraction completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 15 primary studies. • **Number of studies by study design**: Most studies (n = 11) were parallel group randomised controlled trials, and the remaining 9 were two-armed trials. There were two pilot randomised controlled trials, one cluster randomised controlled trial, and one crossover study. Two of the studies were three-arm trials. – Yoga-based interventions: 4 RCTs (Kerekes, 2017; Ambhore, 2009; Bilderbeck, 2013; Danielly, 2017) and 1 crossover trial (Lundstrom, 2021). – Positive psychology or mindfulness-based interventions: 3 RCTs (Yu, 2021; An, 2019; Deng, 2019) and 1 cluster trial (Yang, 2018). – Creative arts-based interventions: 2 RCTs (Chen, 2016; Gussak, 2009), 2 pilot RCTs (Gold, 2014; Gussak, 2006). – Sports- and exercise-based interventions combined with education: 1 RCT (Cashin, 2008). – Animal-based interventions: 1 RCT (Jasperson, 2013).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2006–2021. • Yoga-based interventions: 2009 (1 study), 2013 (1 study), 2017 (2 studies), 2021 (1 study). • Positive psychology or mindfulness-based interventions: 2018 (1 study), 2019 (2 studies), 2021 (1 study). • Creative arts-based interventions:2006 (1 study), 2009 (1 study), 2014 (1 study), 2016 (1 study). • Sports- and exercise-based interventions combined with education: 2012 (1 study).

	• Animal-based interventions: 2021 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: The authors included RCTs (including pilot and cluster randomised studies) with male or female adult participants who were aged 50 years or older determined by using the age range mean age, or the standard deviation of the sample. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not reported **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes, excluded due to: – Duplication – Inappropriate design (not an RCT) – Inappropriate intervention – Inappropriate population – Primary diagnoses – Ongoing study – Unfinished study – No full-text available – Protocol – Participant age not clear or not reported
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Cochrane Collaboration Risk of Bias Tool. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The tool assessed several sources of bias, including selection, performance, detection, attrition, and reporting of other potential sources of bias such as funding rated as either low, high, or unclear risk on each item. The authors did not rate studies on performance bias as the nature of intervention delivery did not allow for masking of participants.

Quality appraisal completed in duplicate (yes/no)? Yes

- **If yes, how were disagreements resolved**? Not reported

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): All 15 primary studies included in this extraction had at least one high risk of bias score. One of 15 studies (An, 2019) was rated as having a high risk of bias due to no reporting of the randomisation process and allocation concealment. All 15 studies were considered to be of unclear or high risk on masking of the outcome assessors, as no details were provided on who administered the outcome measures. Nine of the 15 studies were rated high risk for the incomplete outcome data assessment, and the common reason for studies being judged to have a high risk of bias was high dropout rate and missing outcome data (An, 2019; Gold, 2014; Lundstrum, 2021; Kerekes, 2017; Bilderbeck, 2013; Danielly, 2017; Gussak, 2006; Gussak, 2009). Seven of the 15 studies were considered to be of high or unclear risk in selective reporting, mainly due to absence of protocol registration (Kerekes, 2017; Ambhore, 2009; Danielly, 2017; Gussak, 2006; Jasperson, 2013; Deng, 2019; Yang, 2018). Thirteen of the 15 studies were rated as having an unclear or high risk of bias in other biases, due to small sample size or self-reported outcomes (Yu, 2021; An, 2019; Gold, 2014; Chen, 2016; Lundstrum, 2021; Kerekes, 2017; Ambhore, 2009; Danielly, 2017; Gussak, 2006; Gussak, 2009; Deng, 2019; Yang, 2018; Cashin, 2008):

Appraisal rating

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "Despite calls from the scientific community, the evidence to support effective treatment of older people involved in the criminal justice system is sparse. […] The overall number of participants aged 50 years or older was negligible (representing only 10% of the study sample), providing little evidence to guide either service or research decision making. We did not synthesise the effectiveness of these studies nor report on any economic findings for this reason" e438.

Assessment of publication bias (yes/no): Not reported

- **If yes, how was publication bias assessed**? Not reported
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not reported
- **If present, how was publication bias dealt with**? Not reported

Only low risk of bias studies included in the review synthesis (yes/no)? Not applicable

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

	If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? No **QUALITATIVE COMPONENT** **Description of the results of the quality assessment of qualitative data**: Not applicable **Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no)**: Not applicable • **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable
Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: Due to the paucity of evidence, the authors reported that they were unable to explore heterogeneity with statistical methods (e.g. Q and T^2 statistics), nor could they conduct a meta-analysis to estimate the effect size (e.g. Hedges' g). Instead, they used a narrative approach to summarise the overall result. The authors represented differences between trial arms at $p < 0.05$ as indicators of effect on relevant outcome measures of depression, anxiety, and physical outcomes and counted the frequency of reporting across each item on the TIDieR checklist. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: Yes, due to the paucity of evidence, the authors reported that they were unable to explore heterogeneity with statistical methods (e.g. Q and T^2 statistics), nor could they conduct any meta-analysis to estimate the effect size (e.g. Hedges' g). • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable

Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: Symptoms of Anxiety • **Primary outcome 2**: Symptoms of depression **List of authors' secondary outcomes relevant to this overview of reviews**: • **Secondary outcome 1**: Reporting on physical conditions of obesity, COPD, or diabetes (as some of the most prevalent physical health problems reported in the criminal justice system)
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each	QUANTITATIVE RESULTS – META-ANALYSES **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

outcome (include statistics where they are presented).

For qualitative syntheses, the key synthesised findings should be extracted.

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Not applicable

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

Yoga-based interventions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)†
Anxiety*	Measured using standard rating scales	Ambhore (2009) Danielly (2017)	Statistically significant difference (Ambhore, 2009) No significant difference (Danielly, 2017). *Note*. No statistics were provided.	NR
Depression*	Measured using standard rating scales	Lundstrom (2021) Danielly (2017)	No significant difference. *Note*. No statistics were provided.	NR
No results for anxiety or depression		Kerekes (2017) Bilderbeck (2013)	Does not appear to meet eligibility criteria (use of a valid scale)	

*Primary outcomes were symptoms of depression and anxiety measured by standard rating scales such as the Hamilton Anxiety Scale, the Beck Anxiety Inventory, or the Generalised Anxiety Disorder questionnaire.

† Range for intervention length: 2 weeks–9 months

Positive psychology or mindfulness-based interventions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)†
Anxiety*	Primary outcomes were symptoms of depression and anxiety measured by standard rating scales	Yu (2021) An (2019)	Reported a statistically significant difference 32, 33	NR
Depression*	Primary outcomes were symptoms of depression and anxiety measured by standard rating scales	Yu (2021) An (2019)	Reported a statistically significant difference 32, 33	NR
No results for anxiety or depression		Deng (2019) Yang (2018)	Do not appear to meet eligibility criteria (use of a valid scale)	

*Primary outcomes were symptoms of depression and anxiety measured by standard rating scales such as the Hamilton Anxiety Scale, the Beck Anxiety Inventory, or the Generalised Anxiety Disorder questionnaire.

† Range for intervention length: One per week for 1 hour-daily for unspecified period of time

Creative arts-based interventions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)†
Anxiety*	Measured using standard rating scales	Chen (2016) Gold (2014)	Statistically significant difference (Chen, 2016). No significant difference (Gold, 2016). *Note*. No statistics were provided.	NR
Depression*	Measured using standard rating scales	Chen (2016) Gussak (2006) Gussak (2009) Gold (2014)	Statistically significant difference (Chen, 2016; Gussak, 2006; Gussak, 2009).	NR

			No significant difference (Gold, 2016). *Note*. No statistics were provided.	

*Primary outcomes were symptoms of depression and anxiety measured by standard rating scales such as the Hamilton Anxiety Scale, the Beck Anxiety Inventory, or the Generalised Anxiety Disorder questionnaire.

† Range for intervention length: 4 weeks–15 weeks

Exercise combined with education

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
No results for anxiety or depression		Cashin (2008)	Does not appear to meet eligibility criteria (use of a valid scale)	

Animal assisted therapy interventions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
No results for anxiety or depression		Jasperson (2013) Cashin *et al.* (2008)	Does not appear to meet eligibility criteria (use of a valid scale)	

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. No study reported any outcomes of physical health relating to either COPD, diabetes, or obesity.

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Not applicable

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

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Descriptive account of intervention

Intervention tailoring and modification: Tailoring of and modifications to the interventions were poorly reported. 5/15 studies (2 yoga-based interventions [Lundstrum, 2021; Kerekes, 2017]; 1 arts-based intervention [Gold, 2014]; 1 positive psychology/mindfulness-based intervention [An, 2019]; and 1 sports- and exercise-based intervention [Cashin, 49]) made any mention of tailoring beyond what would be expected as part of standard practice, and 2 of those (An, 2019; Lundstrum, 2021) reported minor modifications.

Intervention planning: In most cases integrity was reported, with only 3 studies (Danielly, 2017; Gussak, 2006; Jasperson, 2013) not providing details. Measures of integrity included standardised manuals or protocols (Yu, 2021; An, 2019; Chen, 2016; Lunstrum, 2021; Kerekes, 2017; Ambhore, 2009; Bilderbeck, 2013; Deng, 2019), use of standardised training, and supervised training (Chen, 2016; Gussak, 2009; Yang, 2018; Cashin, 2008). Other techniques, such as use of a single therapist across participants or keeping logs of the intervention, were used in 4 studies (Yu, 2021; Gold, 2014; Lunstrum, 2021; Gussak, 2009; Yang, 2018). 3/15 studies (Gold, 2014; Chen, 2016; Yang, 2018) reported details on actual adherence to treatment for the participants. This adherence was usually monitored through the number of sessions completed or the rate of dropout from the intervention.

Intervention acceptability and feasibility: 5/15 studies reported on the acceptability of their respective interventions in their discussion (Chen, 2016; Kerekes, 2017; Gussak, 2009; Deng, 2019; Cashin, 2008) of which only one (Kerekes, 2017) reported on acceptability in relation to older people involved in the criminal justice system. Feasibility of interventions was reported in 13 studies (Yu, 2021; Gold, 2014; Gussak, 2009; Deng, 2019; Cashin, 2008).

Fidelity monitoring: The TIDieR checklist revealed that most studies had some transparency of reporting, with little evidence on tailoring interventions, modification, intervention fidelity, acceptability, and feasibility. Dropout rates varied greatly (ranging from 0% to 61%), indicating concerns about the acceptability of interventions for this population.

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? "Dropout rates varied greatly (ranging from 0% to 61%), indicating concerns about the acceptability of interventions for this population" e438.

Comparator(s) used in the interventions delivered in the included studies: The authors included comparators of placebo, treatment as usual (defined as routine clinical services that the prisoners would receive had they not been included in the trial) with or without active control elements, no intervention, or waiting list (e432).

- Yoga-based interventions: Range = No intervention control (1 study), treatment as usual control (1 study), waiting list control (3 studies).
- Positive psychology or mindfulness-based interventions: Waiting list control (1 study), treatment as usual control (2 studies), 'Carey Guides' (1 study).
- Creative arts-based interventions: Range = Standard care control (2 studies), treatment as usual control (2 studies).
- Sports- and exercise-based interventions combined with education: Waiting list control (1 study).
- Animal-based interventions: Psychoeducational therapy control (1 study).

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not reported

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not applicable

Duration(s) of the intervention:

- Yoga-based interventions: Range = 2 weeks–9 months (5 studies).

- Positive psychology or mindfulness-based interventions: Range = 5 weeks–6 months (4 studies).
- Creative arts-based interventions: Range = 4 weeks–15 weeks (4 studies).
- Sports- and exercise-based interventions combined with education: 12 weeks (1 study).
- Animal-based interventions: 8 weeks (1 study).

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies):

- Yoga-based interventions: Range = Once per week for 1 hour–5 days per week for 75 minutes per day (5 studies).
- Positive psychology or mindfulness-based interventions: Range = Once per week for 1 hour–daily (4 studies).
- Creative arts-based interventions: Range = Once per week–2 sessions per day (4 studies).
- Sports- and exercise-based interventions combined with education: 2 sessions per week (1 study).
- Animal-based interventions: 1 hour per week (1 study).

Study	Brief name	Why		What		Who	How		Where	When and how much?		Tailored	Modified	How well		Acceptability		Feasibility
		Theory	Rationale	Materials	Procedure		Mode	Individual or group		Duration	Intensity			Plan	Actual	General	Older	
Yoga-based interventions																		
Ambhore and Joshi 2009[38]	Yoga practice	●	●	○	●	○	●	○	●	●	●	○	○	●	○	○	○	○
Bilderbeck et al 2013[39]	Yoga	●	●	○	●	●	●	●	●	●	●	○	○	●	○	○	○	○
Danielly and Silverthorne 2017[40]	Yoga therapy	●	●	○	○	●	●	●	●	●	○	○	○	○	○	○	○	○
Kerekes et al 2017[37]	Yoga	●	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	○
Lundstrom et al 2021[36]	Yoga	○	●	●	●	●	●	●	●	●	●	○	●	●	○	○	○	○
Creative-arts-based interventions																		
Chen et al 2016[35]	Music therapy	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●	○	○
Gold et al 2014[34]	Music therapy	●	●	○	●	●	●	●	●	●	●	●	○	●	●	○	○	●
Gussak 2006[41]	Art therapy	●	●	●	●	●	●	●	●	●	●	○	○	○	○	●	○	○
Gussak 2009[42]	Art therapy	○	●	●	●	●	●	●	●	●	●	○	○	●	○	●	○	●
Positive-psychology-based or mindfulness-based interventions																		
An et al 2019[33]	Mindfulness training	○	●	●	●	●	●	●	●	●	○	○	●	●	○	○	○	○
Deng et al 2019[47]	Counting blessings	●	●	●	●	●	●	●	●	●	●	○	○	●	○	○	○	●
	Sharing gratitude	●	●	●	●	●	●	●	●	●	●	○	○	●	○	●	○	○
Yu et al 2021[32]	Forgiveness therapy	●	●	●	●	●	●	●	●	●	●	○	○	●	○	○	○	●
Yang et al 2018[48]	Kindness	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○	○	○
	Gratitude	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○	○	○
Psychotherapy interventions																		
Pratt et al 2015[29]	Cognitive behavioural	○	○	●	●	●	●	●	●	●	●	○	●	●	●	○	○	●
Johnson and Zlotnick 2012[31]	Interpersonal	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●	○	●
Johnson et al 2019[30]	Interpersonal	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●	○	●
Walker et al 2017[44]	Psychodynamic interpersonal	●	●	●	●	●	●	●	●	●	●	○	●	●	○	○	○	●
Other treatments																		
Jasperson 2013[43]	Animal-assisted therapy	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○
Lennox et al 2017[28]	Complex collaborative care	●	●	○	●	●	●	●	●	●	●	●	○	●	●	●	○	●
Messina and Calhoun 2022[44]	Psychoeducational violence prevention	●	●	●	●	●	●	●	●	●	●	○	○	●	○	○	○	●
Pardini et al 2014[45] (two studies)	Cognitive bibliotherapy	●	●	●	●	●	●	●	●	●	○	○	○	●	○	○	○	●
Van Deinse et al 2022[27]	Specialised mental health probation	●	●	●	●	●	●	●	●	○	○	○	○	●	●	○	○	●
Cashin et al 2008[49]	Exercise	●	●	●	●	●	●	●	●	●	●	●	○	●	○	●	○	●

● Reported ○ Not reported

Figure 2: Template for Intervention Description and Replication checklist

Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	**QUANTITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: • Outcomes of anxiety were reported in 6/15 studies. Of those 6 studies, 4 reported a significant difference, with interventions reducing symptoms of anxiety in studies on yoga (1/5 studies), creative arts (1/4 studies), and positive psychology (2/4 studies). • Outcomes of depression were reported in 8/15 studies. Of those 8 studies, 7 reported a significant difference, with interventions reducing symptoms of depression in studies on yoga, creative arts, positive psychology. **Author's secondary outcome(s) relevant to this overview of reviews**: No data **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: No study reported any outcomes of physical health relating to either COPD, diabetes, or obesity.
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: Not reported

Parameter	Description
FINDINGS: Q3	**QUANTITATIVE RESULTS**

The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable **Engagement** **How were prisoners attracted to taking part in the intervention**? Not reported **How were prisoners motivated to aim to achieve outcomes related to the intervention**? Not reported **Intervention**

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? Not reported

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? See 'Intervention planning' row above.

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Yes. The TIDieR checklist revealed that most studies had some transparency of reporting, with little evidence on tailoring interventions, modification, intervention fidelity, acceptability, and feasibility. See 'Intervention planning' row above.

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not applicable

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS**

longevity of the impact of effects of intervention.	**Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.12 Sanchez-Lastra *et al.* (2019)

Parameter	Description
Review title	"Effectiveness of Prison-Based Exercise Training Programs: A Systematic Review"
First author and year of publication	Sanchez-Lastra *et al.* (2019)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Sports- and exercise-based interventions
Contributing primary studies	The information presented in this extraction form applies to all 11 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons).

Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: This review had 2 main objectives: 14. To conduct a systematic review of the methodological quality and the main results of the RCTs published to date that analysed the effects of physical education programs performed by incarcerated people. 15. To provide detailed information on the characteristics and types of physical education programs carried out, to facilitate its implementation by health professionals in the penitentiary field. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: Studies were excluded it: • The intervention was based on the performance of a single-exercise training session. • The full text of the study was not available. • The research was not written in the English, French, Portuguese, or Spanish language. • The investigation was published as a review, a dissertation, a thesis, or a communication to congress. In addition studies were only included if: • Participants were randomly assigned into an experimental or control group. • The same consisted of people service a prison sentence. • An exercise training program was the main intervention, with detailed regarding the training program provided.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants included in the 11 primary studies = 697. Samples sizes ranged from 20 to 157 participants. **Age (mean and/or mode and/or range)**: Mean age = 24.25 years (range = 17-65 years). **Sex**: Sex was reported in all 11 studies, except 1 (Ghanbarzadeh, 2012): • All studies included male only prisoners, except for 1 study that included both male and female prisoners (with only 7 females out of 100 participants; Bilderbeck, 2013) **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: “In most of the studies, the inmates were healthy and imprisoned for at least 2 months and up to 15 years. The

criminal profile (financial crime, narcotic addiction, arson, rape, or robbery) was reported in just 2 studies" p1197. Some notable participant characteristics reported in table 2 were:

- "No specific medical conditions except narcotic addiction" (1 study, Ghanbarzadeh, 2012).
- "Sedentary male adults between 30 and 55 y, HIV/HCV coinfected, opioid addiction for at least 5 y (heroin + cocaine) and enrolled in a methadone maintenance program" (1 study; Perez-Morona, 2007).
- "Males with chronic diseases, 2 or more risk factors for developing a chronic disease or people older than 40 y" (1 study; Cashin 2008a/b).

Setting/context

Details of the setting of interest or the community or a geographical location should be included.

Countries (in alphabetic order): Not reported

Specific setting(s) (include number of studies in each setting): All studies were undertaken in prison settings.

Other features of the setting(s) relevant to the analysis: Not reported

Description of interventions/phenomena of interest to this overview of reviews

Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.

Authors' definition of the intervention(s) (typically in introduction, include page number(s)): The intervention of interest was physical exercise (PE), described as "organized and guided PA [physical activity] with a health purpose" p1196.

"It has been highlighted that people living in prisons face limitations regarding physical activity practice, mainly due to the prisons' dimensions and that inmates rely on staff members for every aspect of their existence, including the possibility to exercise whenever they want to. Therefore, it is particularly important that penal institutions design special programs that allow the performance of organized and guided physical activity with a health purpose—that is, physical exercise (PE). The promotion of PE would be facilitated by implementing the types of programs that can take place in prisons after identifying and interpreting their feasibility and potential benefits by considering each penitentiary system" p1196.

Of the 11 included primary studies:

- 4 studies evaluated interventions based on aerobic exercise (Ghanbarzadeh, 2012; Gettman, 1976; Pollock, 1977; Acevedo-Pabon, 2015).
- 5 studies evaluated a variety of exercise interventions:
  - Cashin (2008a/b): Strength exercises, cardiorespiratory resistance, and flexibility.

	– Perez-Moreno (2007): Warm up, cycle ergometer, strength training, and cooldown. – Battaglia (2013): 2 intervention groups (both with warm up, training (aerobic training in 1 group and anaerobic training in another group), both with strength exercise, and both with cooldown). – Battaglia (2015): 2 intervention groups (both with warm up, training (aerobic training in 1 group and anaerobic training in another group), both with strength exercise, and both with cooldown). • 1 study interventions the effects of a yoga programme (yoga stretches and postures) (Bilderbeck, 2013). • 1 investigated the effects of a mixed sports activities intervention: – Munson (1988): 2 intervention groups (1 involved an education program concerning communication skills, self-perception, verbal and nonverbal communication, awareness of leisure resources, and making decisions about what to do in free time (combined intervention); and 1 involved strength training, golf frisbee, volleyball, ultimate frisbee, hockey, soccer, and basketball). **Any other relevant details related to the intervention of interest**:
Databases and sources searched	**Number and names of databases searched**: MEDLINE/PubMed, SPORTDiscus, and Scopus. **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: "…the full texts of all the studies that met the inclusion criteria were manually screened for any additional potentially relevant investigations" **Any search limits imposed (e.g. search dates, language restriction, etc.)**: No date limits were imposed. Otherwise, no search limits were described. **Protocol prepared (yes/no)**? Yes • **If yes, was protocol published (yes/no)**? "The selected search strategy and methods of analysis wereregistered with the International Prospective Register of Systematic Reviews (PROSPERO) database (ref: CRD42018100453)" p1197. **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, example provided. **Screening completed in duplicate (yes/no)**? Yes

	• **If yes, how were disagreements resolved**? If it was unclear whether the study met the selection criteria, advice was sought from a third researcher (M.A.S.L.), and a consensus of opinion was reached" p1197. **Extraction completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? "All discrepancies were reviewed, and an agreement was reached by discussion. In the event of disagreement, a third researcher (C.A.P.) was consulted" p1197.
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 11 primary studies, • **Number of studies by study design**: 11 RCTs.
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 1976 (1 study), 1977 (1 study), 1988 (1 study), 2007, (1 study), 2008 (2 studies; both published from the same intervention), 2012 (1 study), 2013 (2 studies), 2015 (2 studies).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: RCTs **Reasons for including study design(s) provided (yes/no)**? Yes • **If yes, describe the justification(s)**: "To provide the highest level of scientific evidence, this kind of research should be based on the inclusion and detailed analysis of the randomized controlled trials (RCTs) that have been published on the subject so far" p1196. **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes, studies were excluded because (Figure 1 in Sanchez-Lastra *et al.* 2019): – They did not evaluate an intervention with physical exercise – They were not an RCT – The review authors could not retrieve the full text
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Downs and Black scale **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The scale consists of 27 questions related to quality of reporting (10 questions), external validity (3 questions), internal validity (bias and confounding; 13 questions), and statistical power (1 question). Items are awarded 1 point if the answer is "yes," and 0 point if the answer is "no" or "unable to determine," with the exception of item 5, in which a positive answer is awarded 2 points and 1 point if the answer is "partially". The highest possible score

for the checklist was 28 (instead of 32 due to a modification). Downs and Black score ranges were given corresponding quality levels based on the following cutoff points: excellent (26–28), good (20–25), fair (15–19), and poor (≤14).

Quality appraisal completed in duplicate (yes/no)? Yes

- **If yes, how were disagreements resolved**? "In case of doubt, advice was sought from a third researcher" p1197.

Appraisal rating

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): The obtained scores ranged from 15 to 19 points (median 17 points). The methodological quality of all the studies was classified as acceptable. The main methodological flaws were the absence of a clear description of the principal potential confounders, the lack of a calculation on the sample size before conducting the study, and the absence of blinding of the participants or the assessors of the study variables.

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "The 11 RCTs included in the final analysis showed an acceptable methodological quality" p1206. The only other reference to the quality of the included studies was: "On a final note, it must also be highlighted that most of the analysed investigations were focused on middle-aged male adults, implying that little quality research has been carried out regarding the effects of exercise on young inmates or female prisoners" p12.6.

Assessment of publication bias (yes/no): No

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? No

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable

Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: The review authors did not explicitly outline a method of analysis. The results were presented narratively by intervention type. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: No • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: Physical condition • **Primary outcome 2**: Mental health • **Primary outcome 3**: Anthropometric parameters • **Primary outcome 4**: Biochemical and haematological parameters *Note*. Only primary outcomes 1 and 2 were specified a priori in the review; primary outcomes 3 and 4 are first described in the results section.

Not recidivism, substance use, or mental illness treatment metrics	**List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable **QUANTITATIVE RESULTS – NARRATIVE** **Provide the overall findings for each primary outcome via a statement indicating the following, where reported: The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.

"All the studies reported significant changes in variables related to physical and mental health after the intervention took place, except for the research by Munson (1988)" p1198.

Aerobic exercise programs

4 RCTs tested the effects of aerobic exercise programs on physical and mental health outcomes (Gettman, 1976; Pollock, 1997; Ghanbarzadeh, 2012; Acevedo-Pabon; 2015).

Primary outcome 1: Physical condition

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
VO máx (treadmill, Bruce 2 protocol) Maximum O_2 pulse Ventilation expiratory maximum (spirometer) Resting heart rate Resting systolic and diastolic blood pressure	Objective measures	Gettman (1976)	Overall, cardiovascular fitness improved following the aerobic exercise interventions: The following metrics were significantly greater ($p < 0.05$) among participants in all 3 intervention groups (3 groups, with increasing frequency of training; n = 24 in group 1, n = 26 in group 2, n = 30 in group 3) compared to the control group (n = 20 prisoners who maintained normal activity and habits): - VO máx - Maximum O_2 pulse - Ventilation expiratory maximum - Time in Bruce test. Resting heart rate was significantly lower ($p < 0.05$) among participants in all 3 intervention groups compared to the control group.	NR (Intervention lasted for 20 weeks)

				The exercise program also exercise program led to improvements in systolic and diastolic blood pressure (no statistics provided). *Note*. Maximal heart rate was also measured but not reported on (Table 2 only reports on statistically significant results).	
	VO máx (treadmill, Astrand protocol) Maximum stress time (treadmill, Bruce protocol) Number of injuries Number of dropouts	Objective measures	Pollock (1977)	There were 6 intervention groups that increased in frequency and duration (n = 20, 25, 24, 15, 25, 18, respectively) and 2 control groups (unspecified; n = 18 and 13). Overall, cardiovascular fitness improved following the aerobic exercise interventions: VO máx and maximum stress time were significantly greater ($p < 0.05$) among participants in 3 of the higher frequency and duration intervention groups compared to both control groups. The % of participants who left was significantly lower ($p < 0.05$) in at least 1 of the higher frequency and duration intervention groups compared to at least 1 of the control groups. There was a significantly greater % of injuries ($p < 0.05$) among participants in at least 1 of the intervention groups	NR (Intervention lasted for 20 weeks)

			compared to at least 1 of the control groups. There was a significantly greater % of dropouts ($p < 0.05$) among participants in at least 1 of the intervention groups compared to at least 1 of the control groups. There was a significantly greater % of dropouts due to injuries ($p < 0.05$) among participants in at least 1 of the intervention groups compared to at least 1 of the control groups.	

Primary outcome 2: Mental health

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Mental health (precise aspect unspecified)	General Health Questionnaire-28	Ghanbarzadeh (2012)	Overall, mental health outcomes improved following the aerobic exercise interventions: The 2 intervention groups (n = 15 in each group) showed significant (within-group) improvements in mental health from pre- to post-intervention ($p < 0.05$). When compared to the control groups (2 groups who continued to engage in normal activity; n = 15 in each group), prisoners in both intervention	NR (Intervention lasted for 12 weeks)

			groups showed significant improvements in mental health ($p < 0.05$).	

Primary outcome 3: Anthropometric parameters

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Total skinfolds fat Fat percentage Waist girth Body weight	Objective measures	Gettman (1976)	Overall, anthropometric parameters improved following aerobic exercise: The following metrics were significantly lower ($p < 0.05$) among participants in the intervention group with the highest frequency exercise (3 groups, with increasing intensity of training; n = 24 in group 1, n = 26 in group 2, n = 30 in group 3) compared to the control group (n = 20 prisoners who maintained normal activity and habits): - Skinfolds' fat - Percentage of fat - Waist girth. *Note*. Results regarding body weight were Not reported on (Table 2 only reports on statistically significant results).	NR (Intervention lasted for 20 weeks)

Primary outcome 4: Biochemical and haematological parameters

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
L-carnitine	Objective measure	Gettman (1976)	The aerobic exercise programs (3 groups, with increasing frequency of training (n = 24 in group 1, n = 26 in group 2, n = 30 in group 3) were found to improve the serum levels of L-carnitine. *Note*. There is limited information provided in relation to this outcome, both in the text and in Table 2; it is unclear whether this is a within-group or between-group effect.	NR (Intervention lasted for 20 weeks)
L-carnitine free L-carnitine total	Objective measure	Acevedo-Pabon (2015)	There was a significantly greater amount of both free and total L-carnitine ($p < 0.05$) post-intervention between the intervention group (n = 22 prisoners who participated in an aerobic dancing intervention) and the control group (n = 22 prisoners to maintained normal activity).	NR (Intervention lasted for 12 weeks)

Combined exercise programs

5 RCTs tested the effects of combined exercise programs on physical and mental health outcomes (Cashin, 2008a/b; Perez-Moreno, 2007; Battaglia, 2013; Battaglia, 2015).

Primary outcome 1: Physical condition

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Resting systolic and diastolic blood pressure Average heart rate Cardiorespiratory endurance (6-min walking test) Peripheral oxygen saturation Peak blood flow level	Objective measures	Cashin (2008a)	Overall, cardiovascular fitness improved following the combined exercise programs: Post-intervention, the intervention group (n = 10 prisoners who engaged in a program of strength exercise, cardiorespiratory resistance, and flexibility) had significantly lower average heart rate ($p < 0.05$) and could travel a significantly greater distance (6-min walking test) ($p < 0.05$) compared to the control group (n = 10 prisoners who maintained normal activity). The combined exercise program also led to improvements in systolic and diastolic blood pressure (no statistics provided). The combined exercise program was not effective in improving peak blood flow (no statistics provided). *Note*. Pre-intervention, the intervention group had significantly ($p < 0.05$) lower resting diastolic blood pressure compared to the control group. In addition, results regarding peripheral oxygen saturation were Not reported on (Table 2	NR (Intervention lasted for 12 weeks)

				only reports on statistically significant results).	
	VO_2máx (step test) Flexibility (sit and reach) Abdominal strength (half sit up test) Strength upper body and shoulder (push up test) Strength upper body (arm curl test) Balance (Flamingo balance test) Anaerobic power, speed and agility (10 × 5 shuttle test) Systolic and diastolic blood pressure Risk of coronary heart disease Pulse oximetry Tiffeneau's Index Forced expiratory volume	Objective measures	Battaglia (2013)	Overall, cardiovascular fitness improved following the combined exercise programs: Significant (within-group) ($p < 0.05$) increases among the participants in 1 or both of the intervention groups (2 groups, either incorporating aerobic or anaerobic exercise; n = 25 in each group) in the following parameters: - VO máx - Flexibility - Abdominal strength - Strength upper body and shoulder - Strength upper body - Anaerobic power, speed and agility. Significant (within-group) decreases among the participants in 1 or both of the intervention groups (which group varies across outcomes) in the following parameters: - Number of losses balance - Systolic blood pressure - Diastolic blood pressure - Risk of coronary heart disease. The following metrics were significantly greater ($p < 0.05$) among participants in 1 or both of the intervention groups compared to the control group (n = 25 prisoners who maintained normal activity):	NR (Intervention lasted for 36 weeks)

				- VO_2máx - Flexibility - Abdominal strength - Strength upper body and shoulder - Strength upper body - Pulse oximetry. Loss of balance was significantly lower ($p < 0.05$) among participants in both of the intervention groups compared to the control group. The interventions did not result in significant changes on the Tiffeneau–Pinelli index related to expiratory volume (no statistics provided). *Note*. Results regarding forced expiratory volume were Not reported on (Table 2 only reports on statistically significant results).	
	Peak heart rate (Pulsometer) Peak completed workload (cycle ergometer) Health rates decline post-exercise Dynamic strength of the upper body (bench press) Dynamic strength of the knee extensors	Objective measures	Perez-Morena (2007)	Overall, cardiovascular fitness improved following the combined exercise program: Significant (within-group) increases ($p < 0.05$) among participants in the intervention group (n = 14 HIV/HCV coinfected prisoners enrolled in methadone maintenance program) in the following parameters: - Peak completed workload (Significantly lower (within-group) in control group) - Heart rate peak	NR (Intervention lasted for 4 months)

			- Heart rate declines post-exercise - Bench press performance There were no significant differences in any of the parameters between the intervention and the control group (n = 13 prisoners who maintained normal activity).	

Primary outcome 2: Mental health

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Psychological distress	A modified Kessler-10 tool	Cashin (2008b)	The combined exercise program (n = 10 prisoners who engaged in a program of strength exercise, cardiorespiratory resistance, and flexibility) did not have a significant effect on psychological distress. *Note*. There is limited information provided in relation to this outcome, both in the text and in Table 2; it is unclear whether this is a within-group or between-group effect.	
Interpersonal sensitivity Depression Global severity index Anxiety	Symptom checklist-90-revised	Battaglia (2015)	In 1 or both of the combined exercise intervention groups (2 groups; n = 25 in each), there was a significant (within-group) reductions ($p < 0.05$) in: - Interpersonal sensitivity	NR (Intervention lasted for 36 weeks)

Phobic anxiety Somatization Obsessive compulsive disorder Hostility Psychoticism Paranoid ideation Sleep disorders Total positive symptoms Positive symptoms distress index			- Depression - Global severity index - Anxiety - Phobic anxiety Compared to the control group (n = 25 prisoners who maintained normal activity), both intervention groups had significantly lower ($p < 0.05$) levels of depression post-intervention. *Note*. Results regarding the remaining outcomes were Not reported on (Table 2 only reports on statistically significant results).	
Health-related quality of life	Health-related quality of life questionnaire	Perez-Morena (2007)	Significant (within-group) increase in health-related quality of life ($p < 0.05$) among participants in the intervention group (n = 14 HIV/HCV coinfected prisoners enrolled in methadone maintenance program). Table 2 reports that there were no significant differences between the intervention and control groups (n = 13 prisoners who maintained normal activity), which is assumed to the include health-related quality of life outcome (among other physical outcomes).	NR (Intervention lasted for 4 months)

Primary outcome 3: Anthropometric parameters

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Weight BMI Waist girth	Objective measures	Cashin, 2008a	There were no significant changes in any of the anthropometric variables measured (n = 10 in intervention group). *Note*. There is limited information provided in relation to the outcomes, both in the text and in Table 2; it is unclear whether this is a within-group or between-group effect (n = 10 in control group who maintained normal activity).	
Body mass Muscle mass	Objective measures	Perez-Morena (2007)	Significant (within-group) increase in estimated body mass ($p < 0.05$) among participants in the intervention group (n = 14 HIV/HCV coinfected prisoners enrolled in methadone maintenance program) (no within-group results regarding muscle mass were reported). Table 2 reports that there were no significant differences between the intervention and control groups (n = 13 prisoners who maintained normal activity), which is assumed to the include body mass and muscle mass (among other physical outcomes).	NR (Intervention lasted for 4 months)

BMI	Objective measure	Battaglia (2013)	Significant (within-group) ($p < 0.05$) decrease in BMI among the participants in both intervention groups (2 groups, either incorporating aerobic or anaerobic exercise; n = 25 in each group) (significant with-group increase in BMI in the control group; n = 25 prisoners who maintained normal activity).	NR (Intervention lasted for 36 weeks)

Primary outcome 4: Biochemical and haematological parameters

Systematic review secondary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Blood glucose level	Objective measure	Cashin (2008b)	The combined intervention was not effective for the reduction of glucose levels (n = 10 in intervention group). *Note*. There is limited information provided in relation to the outcomes, both in the text and in Table 2; it is unclear whether this is a within-group or between-group effect (n = 10 in control group who maintained normal activity).	NR (Intervention lasted for 12 weeks)
Haemoglobin Platelet count CD4 lymphocyte count	Objective measures	Perez-Morena (2007)	Significant (within-group) increase in CD4 lymphocyte count ($p < 0.05$) among participants in the intervention group (n = 14 HIV/HCV coinfected prisoners enrolled in methadone maintenance	NR (Intervention lasted for 4 months)

				program), “whereas haemoglobin, leukocyte, and platelet count did not show significant changes” p1206 (it is presumed that this statement refers to within-group changes). Table 2 reports that there were no significant differences between the intervention and control groups (n = 13 prisoners who maintained normal activity), which is assumed to the include these haematological outcomes (among other physical outcomes).	
	Total cholesterol HDL cholesterol LDL cholesterol Triglycerides	Objective measures	Battaglia (2013)	Significant (within-group) ($p < 0.05$) increases in total cholesterol and HDL cholesterol among the participants in 1 or both interventions groups (2 groups, either incorporating aerobic or anaerobic exercise; n = 25 in each group) (significant with-group increase in triglycerides in the control group; n = 25 prisoners who maintained normal activity). Significant (within-group) ($p < 0.05$) decrease in triglycerides among the participants in 1 of interventions groups (the group incorporating aerobic exercise; n = 25). HDL cholesterol was significantly greater ($p < 0.05$) among participants in 1 of	NR (Intervention lasted for 36 weeks)

			interventions groups (the group incorporating aerobic exercise; n = 25) compared to the control group (results regard between-group differences in the remaining outcomes were Not reported on). There were no significant changes to LDL cholesterol (no statistical results were provided, and it is unclear if this result represents a within-group or a between-group difference).	
N/A	N/A	Battaglia (2015)	*Note*. p1206 states that Battaglia (2015) "led to significant changes in total cholesterol and triglycerides". However, this study only investigated psychological outcomes.	N/A

Other exercise programs

2 RCTs tested the effects of other exercise programs on mental health outcomes (Bilderbeck, 2013; Munson, 1988).

Primary outcome 1: Physical condition

No studies reported on the effects of other exercise programs on physical condition.

Primary outcome 2: Mental health

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

	Self-esteem Leisure performance Attitude Participation and satisfaction during free time	Self-esteem inventory (unspecified) Leisure diagnostic battery (unspecified) NR for attitude NR for participation and satisfaction during free time	Munson (1988)	The intervention was a multisport program (see previous descriptions (combined intervention)) (2 intervention groups, n = 13 and 14), and the control group (n = 12) talked about interesting topics. No significant differences (within-group or between-group) on self-esteem, attitude, participation, and satisfaction with free time or leisure performance. *Note*. There is limited information provided in relation to this outcome, both in the text and in Table 2.	NR (Intervention lasted for 10 weeks)
	Positive affect Perceived stress Psychological anguish Impulsiveness Executive function, particularly attentional capacity and behavioural response inhibitors	Positive affect: The Positive and Negative Affect Scale Perceived stress: The Stress Perception Scale Psychological anguish: The Brief Inventory of Symptoms Impulsiveness: The Barrat Impulsivity Scale Executive function, particularly attentional capacity and behavioural response inhibitors: The GO/NO-GO stimulus task	Bilderbeck (2013)	The intervention was a yoga program (see previous descriptions) (n = 45), and the control group (n = 55) maintained normal activity. Significant (within-group) increase ($p < 0.05$) in positive affect in the intervention group after the yoga intervention. Significant (within-group) decreases ($p < 0.05$) in perceived stress and psychological anguish in the intervention group after the yoga intervention (significant within-group decrease in perceived stress in the control group also). The intervention group had significantly ($p < 0.05$) lower	NR (Intervention lasted for 10 weeks)

			perceived stress and psychological anguish compared to control group, both before and after the yoga intervention. The intervention group had significantly ($p < 0.05$) greater positive affect and executive function compared to the control group after the yoga intervention. *Note*. Results regarding the impulsiveness were Not reported on (Table 2 only reports on statistically significant results).	

Primary outcome 3: Anthropometric parameters

No studies reported on the effects of other exercise programs on anthropometric parameters.

Primary outcome 4: Biochemical and haematological parameters

No studies reported on the effects of other exercise programs on biochemical and haematological parameters.

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? Not applicable

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<u>Certainty of evidence (if reported)</u> Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? Not applicable

Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Adherence was only reported for 1 primary study; Perez-Moreno (2007) reported 71% adherence (n = 14 in intervention group and 13 in control group).

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? Six studies reported information about dropouts during the interventions (Cashin, 2008a/b; Pollock, 1977; Perez-Moreno, 2007; Battaglia, 2013; Battaglia, 2015). Only Pollock (1977) mentioned dropouts directly related to the exercise program (sports injuries). Other reasons that led to abandoning the program were voluntary decision (Perez-Moreno, 2007; Battaglia, 2013; Battaglia, 2015), release from prison during the study (Perez-Moreno, 2007) or transfer to another prison (Battaglia, 2013; Battaglia, 2015). “Another remarkable finding of this study is the fact that the RCTs included showed a low drop-out rate, and generally, no adverse effects were found” p1207.

- Aerobic exercise interventions:
  - Pollock (1977): 6 intervention groups and 2 control groups: IG1 = 5/20; IG2 = 8/25; IG3 = 11/24; CG1 = 2/18; IG4 = 4/15; IG5 = 5/15; IG6 = 5/18; CG2 = 1/13.
- Combined exercise interventions:
  - Cashin (2008a/b): 1 intervention group and 1 control group: IG = 5/10; CG = 2/10.

- Perez-Moreno (2007): 1 intervention group and 1 control group: IG = 5/14; CG = 3/13.
- Battaglia (2013): 2 intervention groups and 1 control group: IG1 = 4/25; IG2 = 6/25; CG = 7/25
- Battaglia (2015): 2 intervention groups and 1 control group: IG1 = 3/25; IG2 = 3/25; CG = 5/25.

Comparator(s) used in the interventions delivered in the included studies:

- Aerobic exercise interventions:
  - 3 studies (Gettman, 1976; Ghanbarzadeh, 2012; Acevedo-Pabon, 2015) compared aerobic exercise to normal activity.
  - 1 study did not report the nature of the 2 control groups (Pollock, 1977).
- Combined exercise interventions:
  - All 4 studies (Cashin, 2008a/b; Perez-Moreno, 2007; Battaglia, 2013; Battaglia, 2015) compared a combined intervention programme (see description of these interventions previously in 'intervention' row) exercise to normal activity.
- Yoga intervention
  - The comparator group maintained normal activity (Bilderbeck, 2013).
- Mixed sports activities intervention
  - The comparator group talked about interesting topics (Munson, 1988).

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not reported

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported

Duration(s) of the intervention:

- Aerobic exercise interventions:
  - The exercise interventions in 2 studies (Gettman, 1976; Pollock, 1977) lasted for 20 weeks.
  - The exercise interventions in 2 studies (Ghanbarzadeh, 2012; Acevedo-Pabon, 2015) lasted for 12 weeks.
- Combined exercise interventions:

  - The exercise interventions in 1 study (Perez-Moreno, 2007) lasted for 4 months.
  - The exercise interventions in 2 studies (Cashin, 2008a/b) lasted for 12 weeks.
  - The exercise interventions in 2 studies (Battaglia, 2013; Battaglia, 2015) lasted for 36 weeks.
- Yoga intervention
  - The yoga intervention in Bilderbeck (2013) lasted for 10 weeks.
- Mixed sports activities intervention
  - The multisport intervention in Munson (1988) lasted for 10 weeks.

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies): "Regarding exercise frequency, the proposed interventions analysed in this work varied considerably. For an accurate exercise prescription, the findings of one study observed that exercising at least 2 times per week was related to a higher quality of life on inmate, could provide guidance. On the basis of the reviewed studies, exercise should be performed at moderate to high intensity. A feasible goal would be running consecutively for 30 minutes at a moderate pace, as it has been observed in other penitentiary systems" p1207.

- Aerobic exercise interventions:
  - Gettman (1976): 3 intervention groups increasing in frequency (30 mins, 1 day per week; 30 mins 3 days per week; 30 mins 5 days per week).
  - Pollock (1977): 6 intervention groups increasing in frequency and duration (15 mins, 3 days per week; 30 mins, 3 days per week; 45 mins, 3 days per week; 30 mins (assumed 1 day per week); 30 mins, 3 days per week; 30 mins, 5 days per week).
  - Ghanbarzadeh (2012): 2 interventions groups (1 for financial crimes and 1 for narcotic crimes), both engaged in exercise for 60 mins (days per week not specified).
  - Acevedo-Pabon (2015): 1 intervention group (50 mins, 7 days per week).
- Combined exercise interventions:
  - Cashin (2008a/b): 1 intervention group (frequency Not reported).
  - Perez-Moreno (2007): 1 intervention group (90 mins, 3 days per week).

- Battaglia (2013) and Battaglia (2015): 2 interventions groups in both studies (60 mins, 2 days per week).

- Yoga intervention
  - Bilderbeck (2013): 1 intervention group (2 hrs, 1 day per week).
- Mixed sports activities intervention
  - Munson (1988): 2 intervention groups (frequency Not reported).

Overall direction of results

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.

QUANTITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews: Overall, "Physical exercise constitutes a feasible and useful strategy for improving the physical and mental health status of prison inmates. The few RCTs that have been carried out in this regard have mainly focused on aerobic and muscular exercise training programs and have generally included middle-aged male adults in their sample. Future RCTs aimed at testing the efficacy of alternative exercise programs on female, young, and older inmates are needed. The impact of these types of interventions on markers of health such as blood pressure or on disorders such as substance abuse should also be considered as a potential area of research" p1207.

- **Primary outcome 1** (Physical condition): "…the results of a systematic review of interventions designed to improve cardiovascular health-related factors among inmates suggested that the performance PE [physical exercise] was an effective strategy for reducing modifiable cardiovascular disease risk factors" p1206.
- **Primary outcome 2** (Mental health): The findings "partially support" (p1207) the idea that physical exercise has a positive influence on mental health-related outcomes; not all included studies found significant changes in mental health measures post-intervention. However, the authors note that there are myriad factors that influence prisoners' mental health and quality of life (e.g. food, substance use, etc.), and recommend that "the development of PE exercise aimed at improving should be accompanied by other health strategies in order to achieve the greatest possible impact"
- **Primary outcome 3** (Anthropometric parameters): Anthropometric parameters improved following aerobic exercise; however, only 1 primary study reported on these parameters following the implementation of an aerobic exercise program. The findings from combined exercise interventions regarding these outcomes were inconsistent.
- **Primary outcome 4** (Biochemical and haematological parameters): The findings regarding these outcomes from both aerobic exercise interventions and combined exercise interventions were inconsistent; however, the review authors suggest that variability

	in intervention characteristics (e.g. duration, frequency, and exercise type) and the lack of concurrent reported on caloric intake and the nutritional habits of the participants may explain this variability. Of note, "Another remarkable finding of this study is the fact that the RCTs included showed a low drop-out rate, and generally, no adverse effects were found. This fact highlights the importance of promoting the performance of well-structured and professionally delivered PE training programs. These programs should replace other unsupervised exercise modalities frequently observed among inmates (i.e., work-out challenges), which often lead to serious exercise-related injuries" p1207. **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not reported **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not reported
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: Not applicable

Parameter	Description
FINDINGS: Q3	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No

The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	• **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? Not explicitly. However, the review authors make some notable points in relation to the delivery of exercise-based interventions in the prison setting (see below). • **If yes, list and describe each facilitator according to the authors (include page number(s))**: – "The secondary aim of the present research was to identify the kind of PE training programs that could successfully be put into practice within the prison context. It is obvious that the exercise modalities that can be performed in jail are limited due to the lack of resources and sport facilities. Moreover, some correctional institutions have opted for eliminating altogether the availability of exercise equipment, to make jail "less comfortable" for inmates. Therefore, a first aspect to consider when designing PE programs to develop in prisons is that exercises should be performed without the need for expensive or specific material resources" p1207.

- "A second important point that should be given a particular attention is the fact that inmates might prefer to exercise outdoors. Thus, aerobic exercise like walking or running stand out as important options to be considered, as the other training modalities found in this review (muscular strengthening and anaerobic exercise) are usually performed indoors" p1207.
- "Regarding exercise frequency, the proposed interventions analysed in this work varied considerably. For an accurate exercise prescription, the findings of one study observed that exercising at least 2 times per week was related to a higher quality of life on inmate, could provide guidance. On the basis of the reviewed studies, exercise should be performed at moderate to high intensity. A feasible goal would be running consecutively for 30 minutes at a moderate pace, as it has been observed in other penitentiary systems" p1207.
- "Finally, it is advisable to perform these activities in groups because it seems to be an accurate strategy for improving inmate behaviour" p1207.

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not applicable

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.13 Shonin *et al.* (2013)

Parameter	Description
Review title	"Mindfulness and other Buddhist-Derived Interventions in Correctional Settings: A Systematic Review"
First author and year of publication	Shonin *et al.* (2013)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Yoga, meditation, and mindfulness-based interventions
Contributing primary studies	The information presented in this extraction form applies only to the 7/8 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to 1 study included in the systematic review was not extracted as this study reanalysed data from another included study "to assess interactions of Post-Traumatic Stress Disorder (PTSD) symptom severity on course participation and treatment outcomes" (p15). Psychiatric illness severity is beyond the scope of this overview of reviews.

Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "The purpose of this study was to systematically review the evidence for Buddhist-derived interventions (BDIs) in correctional settings" p2. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: Studies were excluded if they: • Did not include new data (e.g. a theoretical and/or descriptive review paper). • Were foreign language studies. • Did not utilise an incarcerated participant sample. • Did not include both pre- and post-intervention measures of outcomes with adequate statistical analysis. • Were qualitative studies. • Employed non-Buddhist forms of meditation (e.g. Transcendental Meditation).
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants included in the 8 included primary studies was 2753. • Mindfulness-based intervention studies: n = 2104 (2 studies). • Vipassana meditation studies: n = 605 (3 studies). • Other Buddhist-derived interventions: n = 44 (2 studies). **Age (mean and/or mode and/or range)**: Not reported, participants are only reported as "adult offenders" **Sex**: • Mindfulness-based intervention studies: All male (2 studies). • Vipassana meditation studies: All male (1 study), mixed male and female participant sample (2 studies). • Other Buddhist-derived interventions: All male (1 study), all female (1 study). **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: "…prisoner sentencing profile was reasonably diverse (i.e., short-term to indeterminate sentences, violent offenders, drug-use related offenders)" p11.

	Some descriptions of the participants in the studies included in the review should be noted: • Mindfulness-based intervention studies: – "Adult males serving 1-year sentences for possession of supply of illicit substances" (Table 1) (1 study: Lee, 2010) – "Adults incarcerated for drug-related convictions"; all had drug dependency (Table 1) (1 study: Samuelson, 2007) • Vipassana meditation studies: – "Male and female prisoners with an SUD" (Table 1) (2 studies: Bowen, 2006; Bowen 2007) – "…approximately one-third had a documented medical condition such as hypertension, diabetes, or SUD" (p14) (Perelman, 2012)
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Taiwan (1 study), USA (6 studies). **Specific setting(s) (include number of studies in each setting)**: All studies were set in prisons. **Other features of the setting(s) relevant to the analysis**: "Minimum, medium, and maximum-security facilities were reflected in the included studies" p11.
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: "Mindfulness derives from Buddhist practice and forms the basis of a number of third wave psychotherapies. Mindfulness is described in the psychological literature as purposeful, moment-to-moment, non-judgemental awareness (Kabat-Zinn, 1990). Examples of mindfulness-based interventions utilised in correctional settings are Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Relapse Prevention (MBRP). MBSR (Kabat-Zinn, 1990) is a group-based intervention generally delivered over an eight-week period and comprises (i) weekly sessions typically of three hours duration, (ii) guided mindfulness exercises, (iii) yoga exercises, (iv) a CD of guided meditation to facilitate self-practice, and (v) an all-day eight-hour silent retreat component. MBRP (Witkiewitz, Marlatt, & Walker, 2005) follows a similar structure but is specifically tailored for treating substance use disorders (SUDs) and integrates various cognitive-behavioural techniques designed to modify drug-related beliefs (Lee, Bowen, & An-Fu, 2010)" p5. "A Buddhist-derived technique known as Vipassana Meditation (VM) has received significant attention in this respect. […] within psychological settings, VM refers to an alternative form of mindfulness practice that was formulated by Satya Narayan Goenka. Goenka's VM is typically taught as part of an intensive 10-day silent retreat program involving mindfulness of breath (Pali: anapanasati) and becoming aware of the impermanent (i.e., transient) nature of thoughts and feelings (Perelman, *et al.*, 2012)" p6.

	In relation to the interventions delivered in the 8 included primary studies: • Mindfulness-based intervention studies (n = 2 studies). • Vipassana meditation (n = 3 studies). • Other Buddhist-derived interventions (n = 2 studies). Both involved meditation programs; one program followed Tibetan, Zen, as well as other Buddhist and non-Buddhist meditation approaches, and another that was not affiliated to any particular meditation tradition but was included as it significantly resembled Buddhist-based mindfulness meditation. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: MEDLINE, Science Direct, ISI Web of Knowledge, PsychInfo, and Google Scholar. **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: "Reference lists of retrieved articles and review papers were also examined for any further studies" p8. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: • "Only English language studies were included, which, given the popularity of Buddhism in Eastern-language counties, may have resulted in the omission of relevant empirical evidence" p23. • The search targeted paper published up to September 2012. **Protocol prepared (yes/no)**? Not reported • **If yes, was protocol published (yes/no)**? Not reported **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, keywords provided. **Screening completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? "Disagreements regarding study eligibility or quality were resolved via discussion between the two assessors and a 100% consensus was reached in all cases" p10. **Extraction completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? See above.

Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 8 primary studies • **Number of studies by study design**: – Mindfulness-based intervention studies: 1 RCT and 1 trial (specific design unspecified). – Vipassana meditation studies: 3 trials (specific designs unspecified). – Other Buddhist-derived interventions: 1 RCT and 1 trial (specific design unspecified).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 1983 (1 study), 2006 (1 study), 2007 (2 studies), 2009 (1 study), 2010 (1 study), 2012 (2 studies).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: Intervention studies with a control group and pre- and post-outcome measures. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not reported **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes. Reasons for exclusion were: – Non-incarcerated sample (n = 4 studies). – Non-Buddhist intervention (n = 3 studies). – Uncontrolled Study (n = 8 studies).
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Jadad Scale **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The Jadad Scale assesses study quality based on the following criteria: 3. Presence/absence of randomisation 16. Whether randomisation was appropriate 17. Presence/absence of double blinding 18. Whether blinding was appropriate, and

19. Presence/absence of drop-out and withdrawal data.

"The scale was modified to account for the difficulties of blinding participants in psychotherapy studies. The maximum score was therefore 4 with a score of less than 3 indicating a poor-quality study. The maximum score was therefore 4 with a score of less than 3 indicating a poor-quality study" p9.

Quality appraisal completed in duplicate (yes/no)? Yes

- **If yes, how were disagreements resolved**? "Disagreements regarding study eligibility or quality were resolved via discussion between the two assessors and a 100% consensus was reached in all cases" p10.

Appraisal rating

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): All 8 included studies were deemed to be of poor methodological quality.

- Mindfulness-based intervention studies:
  - Score of 1 (poor quality): n = 2 studies.
- Vipassana meditation studies:
  - Score of 0 (poor quality): n = 1 study.
  - Score of 1 (poor quality): n = 2 studies.
- Other Buddhist-derived interventions:
  - Score of 1 (poor quality): n = 2 studies.
- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "Although findings across the eight studies evaluated indicate that BDIs have rehabilitative application in correctional settings, the quality of the studies that met the inclusion was reasonably poor. Few of the studies employed random assignment and, in all cases, adherence to practice and fidelity of implementation was not assessed. Therefore, factors unrelated to participation in the BDI may have exerted a therapeutic influence and confounded the findings. Over-reliance on self-report measures was a further limitation. This is an important consideration when researching incarcerated populations as there is likely to be a pronounced risk of recall bias and/or deliberate under/over reporting (e.g., due to fear of being reprimanded by penal

system authorities). Additional across-the-board quality issues were a lack of clearly described inclusion/exclusion criteria, non-justification of sample sizes, and poorly defined intervention and control conditions" p19.

Assessment of publication bias (yes/no): Not reported

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Yes

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable

Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: "A meta-analysis was deemed to be inappropriate due to heterogeneity between intervention types and target outcomes, and so results are presented according to a narrative synthesis method" p9. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT**

	Justification for narrative synthesis or meta-analysis (yes/no): Yes. "A meta-analysis was deemed to be inappropriate due to heterogeneity between intervention types and target outcomes, and so results are presented according to a narrative synthesis method. Finally, studies were stratified according to intervention-type: (i) mindfulness-based interventions, (ii) vipassana meditation interventions, and (iii) other BDIs" p10. • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: The primary outcome measure was reduction in rates of reoffending, assessed via risk of reoffending, adjudication records, or records of proven convictions. However, this outcome is beyond the scope of the current overview of reviews, and so these findings were not extracted. **List of authors' secondary outcomes relevant to this overview of reviews**: • **Secondary outcome 1**: Negative affective states • **Secondary outcome 2**: Anger and hostility • **Secondary outcome 3**: Self-esteem and optimism • **Secondary outcome 4:** Mindfulness and relaxation capacity *Note.* All secondary outcomes were assessed via self-report.
Findings:	[See separate extraction tables below for each research question]
General comments	As in South (2014) and other papers, some of the interventions and outcomes do not appear to be in scope (e.g. Lee (2011) investigated the effects of a modified program of mindfulness-based relapse prevention on various substance-use concomitants), but the studies also reported on some outcomes of relevance despite the aim of the intervention being beyond scope.
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable **QUANTITATIVE RESULTS – NARRATIVE** **Provide the overall findings for each primary outcome via a statement indicating the following, where reported: Not applicable** • **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable **Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported:** • **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. **Mindfulness-based interventions** 2 RCTs reported on mindfulness-based interventions, both rated as being of poor quality. In addition, the review authors noted factors which limit the generalisability and applicability of the findings of both studies:

- Lee (2011): The review authors note that the generalisability of the findings from Lee (2011) is limited due to small sample size. In addition, the trial authors did not report attrition rate, which made it difficult to gauge the acceptability and feasibility of the intervention.
- Samuelson (2007):
  - The intervention was not homogeneously delivered (e.g., due to variances in total intervention hours) making it difficult to compare with other mindfulness-based stress reduction programs.
  - Participants were exclusively recruited from specialist drug rehabilitation units (all were drug dependent), and so the findings may not be generalisable to other offender groups.
  - The overall scope of the study was somewhat ambiguous because substance use-related outcomes were not even assessed.
  - Adherence to practice data was not elicited and the inclusion/exclusion criteria were not clearly defined. Therefore, the possibility of interaction of factors such as such as concurrent psychotherapy and/or psychopharmacology cannot be ruled out.

Secondary outcome 1: Negative affective states

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Depression	Beck Depression Inventory-II	Lee (2011)	The intervention was a modified mindfulness-based relapse prevention programme on various substance-use concomitants (n = 10 male prisoners serving one-year sentences for possession or supply of illicit substances). Prisoners in the intervention group showed significant within-group improvements in levels of depression. No statistical results were provided.	NR (Intervention lasted for 10 weeks)

Negative outcome expectancies	This concept was not defined, and the measure was unspecified	Lee (2011)	Participants in the intervention group (see above; n = 10 male prisoners) experienced significant improvements (78% increase) in negative outcome expectancies compared to participants in the control group (34% decrease), who received treatment as usual (n = 14 male prisoners who received a substance abuse educational program). No inferential statistics were provided.	NR (Intervention lasted for 10 weeks)
Mood disturbance	Profile of Mood States	Samuelson (2007)	The intervention was a mindfulness-based stress reduction delivered to prisoners incarcerated for drug-related convictions (n = 1953 male and female prisoners). Prisoners in the intervention group showed significant (within-group) improvement in mood disturbance (31% reduction). No significant changes were reported for the control condition (n = ~180 male and female prisoners who received treatment as usual involving smoking cessation training, literacy education, and exercise). Effects of the intervention were maintained at 6-8 weeks follow-up. No inferential statistics were provided.	Presumed immediately post-intervention (length of time: 6-8 weeks), and 6-8 weeks' follow-up

Secondary outcome 2: Anger and hostility

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Anger and hostility	Cook and Medley Hostility Scale	Samuelson (2007)	Participants in the intervention group (see above; n = 1953 male and female prisoners) group showed significant (within-group) improvement in hostility (8% increase). No significant changes were reported for the control condition (see above; n = ~180 male and female prisoners). Effects of the intervention were maintained at 6-8 weeks follow-up. No inferential statistics were provided.	Presumed immediately post-intervention (length of time: 6-8 weeks), and 6-8 weeks' follow-up

Secondary outcome 3: Self-esteem and optimism

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Self-esteem	Rosenberg Self-Esteem Scale	Samuelson (2007)	Participants in the intervention group (see above; n = 1953 male and female prisoners) group showed significant (within-group) improvement in self-esteem (5% increase). No significant changes were reported for the control condition (see above; n = ~180 male and female prisoners). Effects of the intervention were maintained at 6-8 weeks	Presumed immediately post-intervention (length of time: 6-8 weeks), and 6-8 weeks' follow-up

			follow-up. No inferential statistics were provided.	

Secondary outcome 4: Mindfulness and relaxation capacity

None of the primary studies included in the review that evaluated mindfulness-based interventions reported on this outcome.

Vipassana meditation

3 trials reported on vipassana meditation interventions, all rated as being of poor quality. In addition, the review authors noted factors which limit the generalisability and applicability of the findings of the studies:

- Perelman (2012):
  - The study did not report specific drop-out rates, making it impossible to determine whether the missing data reported corresponded to participants who had completed the intervention but were simply unavailable for post-test assessment, or to participants who dropped out prior to completion.
  - The control group specificity was limited as it integrated mindfulness practice.
  - Fidelity of the intervention implementation was not assessed and adherence to practice was Not reported.
  - Approximately 23% of intervention group participants had previously completed the intervention, which obfuscates the extent to which the findings can be generalised to those without prior experience.
- Bowen (2006):
  - There was substantial attrition with only 29% of baseline participants (29 intervention and 58 control group participants) completing 3-month follow-up measures.
  - The trial was limited by the absence of randomisation that likely introduced selection bias.
  - The 3-month follow-up assessment did not provide a balanced measure of maintenance effects because it was conducted 3 months following release from prison rather than 3 months post-intervention completion.
  - Adherence to practice data was not elicited and fidelity of implementation was not assessed

- Bowen (2007):
  - This study involved a secondary data analysis (n = 81) of the Bowen (2006) dataset to examine the effects of vipassana meditation on thought suppression. Therefore, the limitations described above in relation to Bowen (2006) also apply to this study.

Secondary outcome 1: Negative affective states

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Mood disturbance	The Profile of Mood States-Short Form	Perelman (2012)	The intervention group (n = 60 male prisoners) participated in a 10-day vipassana meditation retreat in prison. Compared to the control group (n = 67, attended a 10-week program called Houses of health that also integrated mindfulness principles), the intervention group showed significant improvements in mood disturbance (8% reduction). These improvements were partially maintained at 1-year follow-up. No statistical results were provided.	Presumed immediately post-intervention (length of time: 10 days), and 1 year follow-up
Thought suppression	The White Bear Suppression Inventory	Bowen (2007)	Prisoners in the 10-day vipassana meditation intervention showed significantly greater reductions in thought suppression compared to controls (total n = 81 male and female prisoners) "which was shown to partially mediate the effects of VM on alcohol use".	NR *Note*. Follow-up is at 3 months post-release in Bowen (2006)

			Note. This study conducted a secondary data analysis (n = 81) of the Bowen (2006) data.	

Secondary outcome 2: Anger and hostility

None of the primary studies included in the review that evaluated vipassana meditation interventions reported on this outcome.

Secondary outcome 3: Self-esteem and optimism

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Optimism	The Life Orientation Test	Bowen (2006)	The review authors reported that prisoners in the 10-day vipassana meditation intervention (n = 63 male and female prisoners at baseline, 29 at 3 months' follow-up) showed "significant [within-group] improvements in psychosocial outcomes". However, they do not report results on optimism specifically.	3 months (post-release)

Secondary outcome 4: Mindfulness and relaxation capacity

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Mindfulness	The Cognitive and Affective Mindfulness Scale-revised	Perelman (2012)	Prisoners in the intervention group (see above; n = 60 male prisoners) showed significant	Presumed immediately post-intervention (length of time: 10 days), and 1 year follow-up

			improvements in mindfulness (9% increase). These improvements were partially maintained at 1-year follow-up. No statistical results were provided.	
Emotional intelligence	The Trait Meta-Mood Scale	Perelman (2012)	Prisoners in the intervention group (see above; n = 60 male prisoners) showed significant improvements in emotional intelligence (2% increase). These improvements were partially maintained at 1-year follow-up. No statistical results were provided.	Presumed immediately post-intervention (length of time: 10 days), and 1 year follow-up

Other Buddhist-derived interventions

2 studies (1 RCT and 1 trial) reported on other Buddhist-derived interventions, both rated as being of poor quality. In addition, the review authors noted factors which limit the generalisability and applicability of the findings of both studies:

- Rhead (1983):
  - There was high attrition, which the study authors noted was partly due to a number of participants realising that meditation was unlikely to yield mystical experiences of be an opportunity to "get high".
  - Although meditators reported maintaining their practice between weekly sessions, data relating to duration and frequency of individual practice was not elicited. It was therefore not possible to determine the extent of adherence to meditation practice and whether other factors may have influenced the results.
  - In addition to the small sample size, the study was limited due to a complete lack of detail regarding the intervention design (e.g. total intervention hours, number of weekly sessions, etc.).
- Sumpter (2009):
  - Participants were detained for a fixed 20-week term that limits the generalisability of findings to females serving longer-term sentences.

- Adherence to practice data was not elicited. This means that the interplay of other therapeutic agents cannot be ruled out (e.g. prisoners conducted their daily routine in silence, which may have exerted a therapeutic effect).

Secondary outcome 1: Negative affective states

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Psychological distress	Symptom Check List-90	Rhead (1983) Trial	The intervention followed Tibetan, Zen, and other Buddhist and non-Buddhist meditation approaches, involving weekly group meditation classes with instruction on meditation, chanting, and experience-sharing (n = 6 male prisoners). Relative to the control group (n = 5 male prisoners who received treatment as usual in the form of weekly psychotherapy), prisoners in the intervention group showed significant improvements in overall psychological distress. No statistical results were provided.	NR (Intervention lasted for 2 months)

Secondary outcome 2: Anger and hostility

None of the primary studies included in the review that evaluated other Buddhist-derived interventions reported on this outcome.

Secondary outcome 3: Self-esteem and optimism

None of the primary studies included in the review that evaluated other Buddhist-derived interventions reported on this outcome.

Secondary outcome 4: Mindfulness and relaxation capacity

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Sleeping difficulties	The Medical Symptom Checklist	Sumpter (2009) RCT	The intervention was a meditation program that significantly resembled Buddhist-based mindfulness meditation (n = 17 female prisoners). Relative to the control group (n = 16 female prisoners who continued with routine as usual consisting of exercise, free time, reading, and/or being outside), prisoners in the intervention group showed significant improvements in sleeping difficulties. No statistical results were provided.	NR (Intervention lasted for 7 weeks)

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? This was for all intents and purposes a

systematic review of studies quantitative. However, one included study provided qualitative feedback from an-open ended questionnaire:

Other Buddhist-derived interventions

- Sumpter (2009) evaluated a meditation program that significantly resembled Buddhist-based mindfulness meditation. The review authors stated, "Qualitative feedback indicated that meditators were more able to relax, had improved their anger management skills, and experienced increased hope about the future" p18.

Descriptive account of intervention

Intervention tailoring and modification: Lee (2011) tested the effects of a modified mindfulness-based relapse prevention program on various substance-use concomitants.

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: "Adherence to practice and fidelity of implementation was not assessed" p19.

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition?

- Samuelson (2007): This study investigated the effects of mindfulness-based stress reduction on prisoners incarcerated for drug-related convictions (n = 1953 prisoners, approx. 75% male). A total of 113 MBSR courses (each of 12-20 participants) were delivered across six minimum and medium security correctional facilities in the USA (completion rate = 69%).

- Bowen (2006): The review authors reported that there was substantial attrition, with only 29% of baseline participants (29 intervention and 58 control group participants) completing 3-month follow-up measures.
- Rhead (1983): "The authors reported that the high attrition rate was due, in part, to a number of participants' realising that meditation was unlikely to yield mystical experiences or be an opportunity to "get high". Despite this, the authors reported that

the six participants who completed the program indicated that they would continue with their meditation practice post-intervention" p17.

Comparator(s) used in the interventions delivered in the included studies: Not reported

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): This was only reported for 1 study, in which clinical psychologists with 2 years of experience delivered the mindfulness-based intervention (Lee, 2010).

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: See above.

Duration(s) of the intervention:

- Mindfulness-based intervention studies:
  - 10-week program (Lee, 2010)
  - 6–8-week program (Samuelson, 2007)
- Vipassana meditation:
  - 10-day program (Perelman, 2012; Bowen, 2006; Bowen, 2007)
- Other Buddhist-derived interventions:
  - 2-month program (Rhead, 1983)
  - 7-week program (Sumpter, 2009)

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies):

- Mindfulness-based intervention studies:
  - Weekly group sessions of 1.5 hours duration (Lee, 2010)
  - Weekly group session that lasted from 1-1.5 hours (Samuelson, 2007)
- Vipassana meditation:
  - 10-day retreat in which participants ate, slept, and meditated in isolation from the other prisoners (Perelman, 2012; Bowen, 2006; Bowen, 2007)

	• Other Buddhist-derived interventions: – Weekly group meetings (Rhead, 1983) – Weekly meetings of 2.5 hours duration (Sumpter, 2009)
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	**QUANTITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: "Intervention participants demonstrated significant improvements across five key criminogenic variables: (i) negative affect, (ii) drug-related attitudes and locus of control, (iii) anger and hostility, (iv) relaxation capacity, and (v) self-esteem and optimism. Although findings across the eight studies evaluated indicate that BDIs have rehabilitative application in correctional settings, the quality of the studies that met the inclusion was reasonably poor" p18-19. **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: • Mindfulness-based interventions: – There was no evidence for secondary outcome 4: Mindfulness and relaxation capacity. • Vipassana meditation interventions: – There was no evidence for secondary outcome 3: Self-esteem and optimism. • Other Buddhist-derived interventions: – There was no evidence for secondary outcome 2: Anger and hostility. – There was no evidence for secondary outcome 3: Self-esteem and optimism.

Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: Not applicable

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Yes • **If yes, list and describe each factor according to the authors (include page number(s))**: **Mindfulness-based interventions** • **Secondary outcome: Negative affective states** – The RCT by Samuelson (2007) investigated the effects of mindfulness-based stress reduction on prisoners incarcerated for drug-related convictions (n = 1953 prisoners, approx. 75% male). The results showed that participants in the intervention group showed significant improvement in mood disturbance (31% reduction), measured using the Profile of Mood States measure. Women showed greater improvements than men (reduction of 39% in mood disturbance for female prisoners versus 28% for men. No other statistical results were provided. • **Secondary outcome: Anger and hostility** – The RCT by Samuelson (2007) showed that participants in the intervention group showed significant improvement in hostility (8% increase), measured using the Cook and Medley Hostility Scale. Women showed greater improvements than men. Effects of the intervention were maintained at 6-8 weeks follow-up. No statistical results were provided. See also issues with this trial, as outlined above.

- **Secondary outcome: Self-esteem and optimism**
  - RCT by Samuelson (2007) showed that participants in the intervention group showed significant improvement in self-esteem (5% reduction), measured using the Rosenberg Self-Esteem Scale. Women showed greater improvements than men. Effects of the intervention were maintained at 6-8 weeks follow-up. No statistical results were provided. See also issues with this trial, as outlined above.

QUALITATIVE RESULTS

Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)? Not reported

- **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable **Engagement** **How were prisoners attracted to taking part in the intervention**? Not reported **How were prisoners motivated to aim to achieve outcomes related to the intervention**? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not applicable

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? Yes • **If yes, state the follow-up period(s) and describe the findings at each one**: – Mindfulness-based interventions: Samuelson (2007): Effects of the intervention were maintained at six to eight weeks follow-up (see results presented under the findings for Q1 and Q2 above).

QUALITATIVE RESULTS

Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)? Not applicable

- **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.14 Sourry *et al.* (2022)

Parameter	Description
Review title	"Impact of smoking bans and other smoking cessation interventions in prisons, mental health and substance use treatment settings: A systematic review of the evidence"
First author and year of publication	Sourry *et al.* (2022)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy	Smoking cessation interventions

eating and nutrition interventions	
Contributing primary studies	The information presented in this extraction form applies only to the 4/13 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). The HRB excluded 9 studies that were conducted in mental health and substance use treatment settings 9 mental health service (including 1 study in forensic services and 1 study in substance use treatment service).
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: To "examine the effectiveness of complete facility-based smoking bans with a specific focus on these three high-risk sub-populations together" (p1529), i.e. prisons, mental health, and substance use treatment settings. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: The authors excluded studies that had only a partial smoking ban, were published in a language other than English, included persons under 18 years, or only reported outcomes of a smoking ban during incarceration. Research that looked at other types of tobacco and nicotine use, such as snus or vaping devices/electronic cigarettes were not included in this review.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants in the 4 primary studies considered relevant to the current overview of review is 1061. • Clarke (2013): n = 247. • Frank (2017): n = 143. • Jin (2021): n = 557. • Puljevic (2018): n = 114. **Age (mean and/or mode and/or range)**: Adults 18 years or over. No other information pertaining to age in the participant samples was reported. **Sex**: 8%–35% female or 65%–92% male: • Clarke (2013): 35% female. • Frank (2017): 13% female.

	• Jin (2021): 8% female. • Puljevic (2018): 14% female. **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Not applicable
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Australia (2 studies), USA (2 studies). **Specific setting(s) (include number of studies in each setting)**: All 4 primary studies were set in prisoners. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The interventions of interest were "complete facility-based smoking bans and other smoking cessation interventions in bringing about long-term smoking cessation" p1529. "Interventions utilised by researchers varied widely in terms of strength, content and implementation. In 8 of 13 studies, interventions were delivered by researchers, 1 study had technicians and trained therapists deliver the intervention and 1 study had facility staff members consisting of a nurse and hospital-based social workers deliver the intervention. Smoking cessation interventions extended to the post-discharge/release period in eight studies, all of which were trials. Interventions consisted of follow-up phone calls, phone calls and automated text and web-based counselling, a combination of follow-up phone calls and up to 4 months additional nicotine replacement therapy (NRT), or 3–6 months' supply of Not reported, 10 weeks supply or usual care (3 days of Not reported) which was offered to both treatment and control groups" p1531. All 4 studies were conducted on people previously in prison were smoke-free prisons, and interventions utilised by researchers varied widely in terms of strength, content, and implementation (Table 3): • Clarke (2013): Combined intervention involving 6 weekly motivational interviewing and cognitive behavioural therapy sessions (pre-release), followed by 2 follow-up phone call sessions 1 day and 1 week post-release. • Frank (2017): Smoke-free prison (no pre- or post-release intervention or support). • Jin (2021): Combined intervention involving 1 face-to-face motivational intervention session. • Puljevic (2018): Smoke-free prison (pre- or post-release intervention or support).

	Any other relevant details related to the intervention of interest: 2 studies researched the effect of usual care, where participants were compared using pre-prison smoking rates and those after release/discharge (the prospective cohort study by Frank (2017) and one observational study by Puljevic (2018)).
Databases and sources searched	**Number and names of databases searched**: The following health and social science databases were searched from 1 January 2000 to 25 February 2022: MEDLINE, EMBASE and PsycINFO (via OVID), Web of Science (via Clarivate Analytics), CINAHL (via EBSCO) and Google Scholar. **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: A manual hand search was also completed on prominent journals including Drug and Alcohol Review, Tobacco Control, Nicotine and Tobacco Research, Drug and Alcohol Dependence, Journal of Correctional Health Care and Addictive Behaviours and authors were contacted, if necessary. Backwards and forwards snowballing was carried out on the reference lists and by searching the texts of selected studies. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: Research was included if published in English language, included only adult humans and between 1 January 2000 to 25 February 2022. **Protocol prepared (yes/no)**? Not reported • **If yes, was protocol published (yes/no)**? Not applicable **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, example provided (Table 1). **Screening completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Disagreements being settled by a third reviewer. **Extraction completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 4 primary studies. • **Number of studies by study design**: 2 RCTs (Clarke, 2013; Jin, 2021), 1 prospective cohort study (Frank, 2017), and 1 observational study (Puljevic, 2018).

Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2013 (1 study), 2017 (1 study), 2018 (1 study), 2021 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: Not reported **Reasons for including study design(s) provided (yes/no)**? Not reported • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? No, the authors provided reasons but not by study so no list. • **Reasons for exclusion provided (yes/no)**? The authors provided a list of reasons in their PRISMA: – Did Not reported on post-release/post-discharge outcomes. – No control/comparator. – Did not report on a complete facility smoking ban. – Did not report on smoking-related intervention. – Did not report on smoking-related outcomes. – Did not contain original data. – Duplicate.
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Effective Public Health Practice Project's Quality Assessment Tool for Quantitative Studies. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: This tool was used to assess the quality of the studies used, rating each of the 6 sections (selection bias, study design, confounders, blinding, data collection and withdrawals) as 'strong', 'moderate' or 'weak'. Based on this, a global rating was awarded. **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Not reported
Appraisal rating	**QUANTITATIVE COMPONENT**

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): Among the 4 studies in prison settings, 2 of the studies, both trials, achieved a global rating of strong (Clarke, 2013; Jin, 2021), and 2 were rated weak (Frank, 2017; Puljevic, 2018).

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: The following is stated in the discussion: "One reason for the paucity of evidence-based interventions is the difficulty of conducting high-quality studies in these settings. […] While it is still valuable to evaluate the effects of a facility smoking ban alone, it is difficult to draw conclusions when poor quality controls and a lack of randomisation are offered in these interventions" p1539. In addition, "there is a need for more high-quality research that rigorously evaluates tailored evidence-based interventions to support cessation and abstinence in specific populations. Randomised samples from similar settings and various locations would increase generalisability and allow for tailored interventions to suit the unique needs of each of those released from prison, MH and substance use populations and the considerable co-morbidities that they face" p1540.

Assessment of publication bias (yes/no): No

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? Not applicable (no meta-analysis)

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no) Not applicable

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Not applicable

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Not applicable

	• **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable
Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: The review authors do not outline a specific method of analysis. The results are presented narratively. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: No • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	**List of authors' primary outcomes assessed relevant to this overview of reviews**: Only studies that reported on at least one of the following outcomes were included: (i) smoking-related outcomes of a pre- or post-release/discharge smoking cessation intervention and/or smoking ban; and/or (ii) changes in smoking behaviours as a result of time spent in a smoke-free facility. The outcomes assessed in the included studies are: • **Primary outcome 1**: Smoking abstinence • **Primary outcome 2**: Smoking relapse **List of authors' secondary outcomes relevant to this overview of reviews**: The review authors do not identify secondary outcomes. However, some of the included studies report on their secondary outcomes (identified in the results tables, below).
Findings:	[See separate extraction tables below for each research question]
General comments	

References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable **QUANTITATIVE RESULTS – NARRATIVE** **Provide the overall findings for each primary outcome via a statement indicating the following, where reported:** • **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. **Abstinence**

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

	7-day point prevalence abstinence	Urine cotinine measure	Clarke (2013) RCT	25.5% of the intervention group (n = 122 males and females released from a smoke-free prison who received 6 weekly motivational interview and CBT sessions pre-release, and 2 follow-up phone sessions post-release (combined intervention)) were abstinent at 3 weeks' follow-up compared with 7.2% of the control group (n = 125 males and females released from a smoke-free prison who also received 6 weekly sessions of educational videos in prison). 11.5% of the intervention group abstinent at 3 months' post-release follow-up compared with 2.4% of the control group. No inferential statistics provided.	3 weeks and 3 months post release
	Smoking abstinence at post-release follow-up	Self-report	Frank (2017) Prospective cohort study	42% (n = 60) of the intervention group (n = 143 male and female smokers released from a smoke-free prison) were trying to quit smoking at post-release follow-up. No inferential statistics were provided.	Post-release follow-up Does not state exact time when data were collected
	Smoking abstinence at 3-months post-release follow-up	Biochemically verified with expired air carbon monoxide of <5 parts per million	Jin (2021) RCT	No significant difference in continuous abstinence between the intervention group (8.6%) (n = 266 males and females released from a smoke free prison who received 1 motivational interview session (combined intervention)) and the control	At 3-months post-release follow-up

			group (7.4%) (n = 291 males and females released from a smoke free prison). No inferential statistics were provided.	
Daily number of cigarettes (secondary outcome in the study)	Measure unspecified	Jin (2021) RCT	Intervention participants smoked on average one less cigarette daily than controls 3 months after release ($p < 0.01$).	3 months post-release
Daily number of cigarettes	Self-report	Puljevic (2018) Observational: cross-sectional study	Compared to pre-prison smoking rates, 62% (total n = 114 male and female smokers released from a smoke-free prison) smoked less per day at post-release follow-up.	Post-release follow-up Does not state exact time when data were collected

Smoking relapse

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Smoking relapse on first day of release	Urine cotinine measure	Clarke (2013) RCT	>60% of controls (n = 125 males and females released from a smoke-free prison who also received 6 weekly sessions of educational videos in prison (combined intervention)) relapsed to smoking on first day of release.	First day of release
Smoking relapse post release	Self-report	Frank (2017) Prospective cohort study	74% started (n = 143 male and female smokers released from a smoke-free prison) were smoking within 1 day of release. 26% started smoking between 2 days and 21 days post-release.	Post-release follow-up Does not state exact time when data were collected

Smoking relapse post-release	Biochemically verified with expired air carbon monoxide of <5 parts per million	Jin (2021) RCT	66.9% relapsed on the day of release (unclear if this relates to the intervention group (n = 266 males and females released from a smoke free prison who received 1 motivational interview session (combined intervention)) or the control group (n = 291 males and females released from a smoke free prison) or both). 90.2% relapsed within 3 months.	Day of release and 3 months post-release (may only refer to abstinence)
Time to smoking relapse	Self-report	Puljevic (2018) Observational: cross-sectional study	Compared to pre-prison smoking rates (n = 114 male and female smokers released from a smoke-free prison): - 72% relapsed the day of release. - 89% relapsed 1 week after release. - 94% relapsed to smoking after 2 months.	Post-release follow-up Does not state exact time when data were collected

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)?

Descriptive account of intervention: Question 4

Intervention tailoring and modification:

Intervention planning:

Intervention acceptability and feasibility:

Fidelity monitoring:

Other characteristics of intervention planning, delivery, and evaluation:

What was stated regarding participant attrition? Attrition rates were Not reported. However, withdrawal/dropout was a criterion on the quality assessment:

- Clarke (2013): Strong on withdrawal criterion.
- Frank (2017): Not applicable
- Jin (2021): Moderate on withdrawal criterion
- Puljevic (2018): Not applicable

Comparator(s) used in the interventions delivered in the included studies:

- Clarke (2013): Smoke-free prison plus 6 weekly sessions of educational videos (RCT).
- Frank (2017): Participants were compared using pre-prison smoking rates and those after release/discharge (prospective cohort study).
- Jin (2021): Smoke-free prison (i.e. no additional intervention component alongside incarceration in a smoke-free prison) (RCT).

	• Puljevic (2018): Participants were compared using pre-prison smoking rates and those after release/discharge (observational ross-sectional stud). **Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.)**: Interventions utilised by researchers varied widely in terms of strength, content, and implementation. In 2 of the 4 studies, interventions were delivered by researchers (Clarke, 2013; Jin, 2021). Two studies did not report who delivered the intervention (Frank, 2007; Puljevic, 2018). • **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not applicable **Duration(s) of the intervention**: Duration not provided for smoke free prisons in the 4 studies. The intervention in 1 study (Clarke, 2013) involved 6 weekly motivational interviewing and cognitive behavioural therapy sessions pre-release, and 2 follow up phone call sessions 1 day and 1-week post-release. **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**: Smoking ban in all four prison settings, date of introduction Not reported.
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	QUANTITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: The authors reported that prisons offer the opportunity for promising smoking cessation outcomes where intervention began in the pre-release period. **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable QUALITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not reported **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not reported
Heterogeneity	QUANTITATIVE RESULTS **Causes of heterogeneity investigated (yes/no)**? No

- **If yes, state methods of investigation**: Not applicable
- **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable

ALL RESULTS

Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence: Not reported

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No

- **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not reported

- **If so, were certain features of behaviour change found to be more attractive for participants**? Not applicable
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not applicable

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not applicable

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description

FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? Yes • **If yes, state the follow-up period(s) and describe the findings at each one**: See all results above to review Q1 and 2, as all studies reported results on post-release smoking variables. **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.15 South *et al.* (2014)

Parameter	Description
Review title	"A systematic review of the effectiveness and cost-effectiveness of peer-based interventions to maintain and improve offender health in prison settings"
First author and year of publication	South *et al.* (2014)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-	Peer support-based interventions

based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	
Contributing primary studies	The information presented in this extraction form applies only to the 54/57 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to 3 studies included in the systematic review was not extracted as these studies were conducted in young offender institutions (O'Hagan, 2011; The Learning Ladder, 201; Schlapman 2000).
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: The aims of the study were to conduct an evidence synthesis on peer-based interventions in prison settings, including YOIs, and to provide research-based information on types of intervention, outcomes, costs and benefits to aid decision-making within the prison health service. The study sought to examine the outcomes for both the target population (recipients) and the individuals who deliver the intervention (peer deliverers). The main research question was 'What is the effectiveness and cost-effectiveness of peer-based interventions to maintain and improve health in prisons and YOIs?' Specific questions framing the review were as follows: • Review question 1 – what are the effects of peer-based interventions on prisoner health and the determinants of prisoner health? • Review question 2 – what are the positive and negative impacts on health services within prison settings of delivering peer-based interventions? • Review question 3 – how do the effects of peer-based approaches compare with those of professionally led approaches? • Review question 4 – what are the costs and cost-effectiveness of peer-based interventions in prison settings?" p3. *Note*. This extraction pertains to review questions 1 and 3. Findings pertaining to review question 2 can be found in the South *et al.* (2016) extraction forms (high level and detailed). Findings pertaining to review question 4 have not been extracted for the purposes of this overview of reviews as cost-effectiveness is beyond the scope. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: The systematic review authors predominantly outlined inclusion criteria (p50); however, this denoted that excluded records were:

	• Studies in which the population was not prisoners residing in prisons or young offender institutions. In addition, "The population was limited to those taking part in peer-based interventions, whether peer deliverers or programme recipients. For other questions, studies involving the whole prison population, including staff, were eligible for inclusion" p3. • Studies in which the intervention did not fall under the umbrella of 'peer-based interventions' (i.e. including peer education, peer support, peer mentoring, befriending, peer counselling and self-help groups. • Studies that reported only reoffending or other non-health outcomes. • Cross-sectional surveys ("unless there was no other evidence to answer a review question" p11), opinion pieces, or raw data. In addition, "Multicomponent interventions that include a peer-to-peer element were included, although post hoc decisions were made to exclude studies of group therapies and therapeutic communities (TCs) unless a peer-to-peer intervention was mentioned in the abstract" p11.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants was only reported for 10 of the 54 included studies (see Table 4) (n = 700 in 1 study; n = 196 in 1 study; n = 93 in 1 study; n = ~5600 in 1 study; n = 343 in 1 study; n = 263 in 1 study; n = 78 in 1 study; n = 56 in 1 study; n = 300 in 1 study; n = 25 in 1 study). *Note*. The review authors noted, "Included studies reported outcomes for peer deliverers much more often than for service recipients" p92. It was often not clear in Table 5 (the table of characteristics) whether the participant characteristics being described pertained to the deliverers of peer-based intervention, the recipients, or both (all are prisoners). It may be assumed that the participant characteristics being described in the review pertain to both deliverers and recipients of peer-based interventions. In addition, for several included studies, prison capacity (rather than the number of participants) was provided; however, this was not considered a valid proxy for sample size for the purposes of the current overview of reviews. **Age (mean and/or mode and/or range)**: Age range only was reported for 15 of the 54 included studies (see Table 4) (mean age = 30.4 years in 1 study; mean age = 36 years (SD = 6.35) in 1 study; mean age = 24 years (range = 18-30 years) in 1 study; mean age = 35 years (range = 19-59 years) in 1 study; mean age = 35 years in 1 study; modal age category = 18-29 years followed by 30-39 years in 1 study; aged between 18 and 29 years in 1 study; mean age = 34 years in 1 study; age range = 20-50 years in 1 study; aged 34-43 years in 1 study; mean age = 27 years (range = 17-55) in 1 study; mean age = 34.5 years (SD = 9.07) in 1 study; mean age = 35.1 years (SD = 11.3) in 1 study; mean age = 26 years in 1 study; mean age = 30 years (range = 18-51) in 1 study). **Sex**: Sex was reported for 31 of the 54 included studies (see Table 4) (all female in 9 studies; all male in 16 studies; explicitly stated mixed male and female sample in 6 studies; sex not stated but can be assumed mixed in 23 studies).

Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour): In Table 4, some descriptions of the participants in the studies included in the review should be noted:

- "A small (28-bed) minimum/medium security prison for Aboriginal women" (Ashton, 2010).
- "Ill/dying prisoners at Dixon Hospice in Illinois" (Cichowlas, 2010).
- "Aimed at women in prison with HIV/AIDS" (Collica, 2010).
- "Women prisoners 'in distress'" (Correctional Service of Canada, 2009).
- "Vulnerable or distressed prisoners or those at risk of suicide" (Dhaliwal, 2009).
- "Male colony for drug-dependent prisoners in Siberia" (Dolan, 2004).
- "At-risk prisoners in eight state prisons" (Farrin, n.d.).
- "Two correctional facilities; incarcerated women with current or history of behavioural issues and/or substance abuse" (Goldstein, 2009).
- "45% had a history of injection drug use and >75% of these reported having shared equipment" (Grinstead, 1997).
- "Those prisoners judged to be suicidal" (Junker, 2005).
- "Ill prisoners at US Medical Centre for Federal Prisoners" (Maull, 1991).
- "Prisoners with mental health problems at HMP Liverpool" (Mentor2work, 2005).
- "A state correctional facility in California. Drug treatment programme is located on a medium-security prison yard that houses male inmates" (Munoz-Plaza, 2005).
- "Prisoners with addictions at HMP Downview" (Player, 1996).
- "3 UK prisons. Originally for older prisoners but including those with learning disabilities, mental health problems and physical and sensory disabilities" (Stewart, 2011).
- "Dying prisoners in 14 prison hospices" (Wright, 2007a/2007b).

Note. 3 studies included in the report on peer-based interventions being delivered in multiple prisons and 1 young offender institution/probation setting. As the results of these studies did not distinguish between participants in prisons and those in young

	offender institutions/probation settings and the majority of settings in which the intervention was delivered were adult prisons, the studies were included in this extraction. They are: • Boyce (2009): "Serving prisoners in three category B prisons (male) and one YOI (male)" • Brooker (2007): "Serving prisoners in 4 adult prison, one Young Offenders Institution and one probation setting", and • Hunter (2009): "Prisoners requiring housing advice in 5 prisons in Southeast England (Three Category B prisons (male), one young offender institution (male) and one female open prison.)".
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Australia (2 studies), Canada (9 studies), Ireland (1 study), Israel (1 study), Moldova (1 study), Mozambique (1 study), Russia (1 study), South Africa (1 study), UK (18 studies), USA (19 studies). **Specific setting(s) (include number of studies in each setting)**: All 54 included studies were set in prisons (some referred to as correctional centres/facilities and other were facilities for specific groups of prisoners (e.g. ill/dying prisoners or prisoners with SUD; see above in 'population' row). **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The review authors define 'peer' as "prisoners and ex-prisoners delivering interventions to prisoners" p3. "Peer-based interventions involve the provision of education, support or counselling between individuals who are of equal social status or who share similar characteristics or who have common experiences. Peer interventions are considered to work on the principle of homophily, which suggests that contacts will be more frequent, communication will be of better quality and relationships will have more meaning between people who share attributes or specific experiences. Lay or peer educators typically bring culturally specific knowledge and access to social networks, and this can help with reaching marginalised groups and heightening social influence" p6. "Peer-based interventions can be considered complex interventions as there are typically a number of inter-related components both in relation to the preparation, training and supervision of peer workers and in relation to their subsequent role and interactions with the target population. This study used an initial categorisation based on the results of a systematic scoping review on lay public health roles, conducted by South and colleagues: peer education, peer support, popular opinion leaders and bridging models" p7. In relation to the specific intervention delivered in the 54 included studies deemed relevant to this overview of reviews; the number of included studies by intervention mode is reported in Table 3 (p19).

- Peer education (19 studies)
- Peer support (14 studies)
- Listeners (6 studies)
- Peer mentoring (3 studies)
- Prison hospice volunteers (3 studies)
- Peer advisors (2 studies)
- Health trainers (2 studies)
- Peer counselling (2 studies)
- Peer outreach (1 study)
- Peer observers (1 study)
- Peer training (1 study)

The review authors developed a typology of peer interventions with working definitions for the major intervention modes (Table 15, p94):

1. **Peer education**
   - "Communication, education and skills development occurring between individuals who share similar attributes or types of experience with the aim of increasing knowledge and awareness of health issues or effecting health behaviour change. Prison peer educators can deliver formal educational interventions to fellow prisoners and/or engage in awareness raising through social interactions within the prison."
2. **Peer support**
   - "Support provided and received by those who share similar attributes or types of experience. Peer support in a prison setting involves peer support workers providing either social or emotional support or practical assistance to other prisoners on a one-to-one basis or through informal social networks."
3. **Prison peer support interventions**

- "Specific forms of prison peer support include listeners, insiders, the PST programme and prison hospice volunteers."

4. **Listeners**
   - "A suicide prevention scheme in which prisoners provide confidential emotional support to fellow prisoners who are experiencing distress. Listeners are selected, trained and supported by the Samaritans and the scheme operates across most prisons in England and Wales."
5. **Insiders**
   - "Volunteer peer support workers who provide reassurance, information and practical assistance to new prisoners on arrival in prison."
6. **PST programme**
   - "A Canadian model in which women prisoners provide emotional support on a one-to-one basis to other women prisoners. The model uses a holistic, culturally sensitive approach that aims to develop women's autonomy and self-esteem."
7. **Prison hospice volunteers**
   - "Prison hospice volunteers provide companionship, practical assistance and social support to terminally ill prisoners. They work as part of a multidisciplinary hospice team."
8. **Peer mentors**
   - "Peer mentors develop supportive relationships with and act as role models for mentees who share similar attributes or types of experience. Prison peer mentoring involves prisoners or ex-prisoners working one-to-one with offenders both in the prison setting and 'through the gate'. Prison peer mentoring schemes focus on education and training and/or resettlement and the prevention of reoffending."
9. **Health trainers**
   - "Health trainers are lay public health workers who use a client-centred approach to support individuals around health behaviour change and/or to signpost them to other services. Prison health trainers work with fellow prisoners around healthy lifestyles and mental health issues. Prison health trainer schemes are adapted from the community-based health trainer model."
20. **Peer advisors**

– "Peer advisors provide housing and/or welfare benefits advice to other prisoners, particularly new prisoners and those planning for resettlement. Some peer advisors support prisoners 'through the gate' when prisoners leave prison."

21. Other intervention modes

– "Other specific interventions identified in the review: peer training (violence reduction), peer outreach (harm reduction), peer counsellors (substance misuse) and peer observers (suicide prevention)."

In relation to the aims of these peer-based interventions:

- 19 studies looked at the prevention of HIV/acquired immunodeficiency syndrome (AIDS)/hepatitis C or other blood-borne viral infections or sexually transmitted infections (STIs) (these were mostly peer education studies) (Zack, 2005; Grinstead, 1999; Ross, 2006; Bryan, 2006; Collica, 2007; Collica, 2010; Grinstead, 1997; MacGowan, 2006; Martin, 2008; Munoz-Plaza, 2005; Scott, 2004; Zucker, 2009; Peek, 2011; Ashton, 2010; Taylor, 1994; Dolan, 2004; Sifunda, 2008; Hoover, 2009; Vaz, 1996).
- 12 studies looked at general health and/or hygiene (Edgar, 2011; Levenson, 2002; Boothby 2011; Wright 2007a/2007b; Cichowlas, 2010; Maull, 2008; Wright 2007b; Brooker, 2007; Jacobson, 2008; Sirdifield, 2006; Stewart, 2011; Farrin, n.d.; Betts-Symonds, 2011).
- 8 studies looked at general emotional support (Richman, 2004; Blanchette, 2998; Correctional Service of Canada, 2009; Delveaux, 2000; Eamon, 2012; Syed & Blanchette, 2000 (Joliette Institution); Syed, 2000 (Grand Valley Institution); Chen, 2006)
- 7 studies looked at the prevention of suicide or self-harm (Snow, 2006; Daigle, 2007; Davies, 1994; Hall, 2004; Junker, 2005; Dhaliwal, 2009; Foster, 2011).
- 4 studies looked at issues affecting prisoners on release such as employment or housing (Boyce, 2009; Brooker, 2007; Mentor2work, 2005; Schinkel, 2012).
- 2 studies looked at mental health or substance abuse (Goldstein, 2009; Player, 1996).
- 1 study looked at parenting (Penn State Erie, 2001).
- 1 study looked at violence reduction (Walrath, 2001).

Any other relevant details related to the intervention of interest:

Databases and sources searched	**Number and names of databases searched**: "For the systematic review of effectiveness the following databases were searched: MEDLINE, PsycINFO, Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, International Bibliography of the

Social Sciences (IBSS), Applied Social Sciences Index and Abstracts (ASSIA), Web of Science, Social Sciences Citation Index, National Criminal Justice Reference Service Abstracts, Social Services Abstracts, Sociological Abstracts, Database of Abstracts of Reviews of Effects, Trials Register of Promoting Health Interventions (TRoPHI), Database of Promoting Health Effectiveness Reviews (DoPHER), Social Care Online, Academic Search Complete and The Cochrane and Campbell Collaboration databases" p10.

Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.): "Electronic content lists of key journals (Journal of Correctional Health Care, Health Education & Behavior, Criminal Justice and Behavior) were searched" p10.

"Unpublished (grey) literature was identified from contacts with experts, including at the expert symposium, conference and dissertation abstracts, reference lists of identified and key papers, hand searches of relevant book chapters and searches of websites such as Google Scholar and Google and websites of relevant organisations (e.g. the Home Office). Contact was made with national and international experts including Offender Health Research Networks, Prison and Offender Research in Social Care and Health, the Samaritans (Listener scheme), Volunteering England, NOMS, primary care trusts (health trainers), the Ministry of Justice, the Prison Officers' Association (POA), Action for Prisoners' Families, CLINKS, the Prison Governors Association, the Shannon Trust, HM Inspectorate of Prisons, the Prisons and Probation Ombudsman, the National Network of Forensic Nurses and private sector prison organisations, for example Serco, Kalyx, the Prison Reform Trust and the Howard League for Penal Reform. Practitioners and academics with expertise were contacted through appropriate academic and practice mailing lists (public-health@jiscmail, health-services-research@jiscmail, health-promotionacademics@jiscmail and health-equity-network@jiscmail). A hand search of the reference lists of included papers was performed" p10.

Any search limits imposed (e.g. search dates, language restriction, etc.): The systematic review authors did not impose language restrictions. The search cut-off dates were 1985–August 2012. "Listener schemes were implemented in the early 1990s and so a cut-off date of 1985 was chosen to capture any preliminary studies, for example pilot schemes" p10.

Protocol prepared (yes/no)? Yes

- **If yes, was protocol published (yes/no)**? Yes. "A full study protocol was developed, and peer reviewed by the study steering and advisory groups prior to publication in the PROSPERO database (reference no. CRD42012002349)" p xxiii.

Search strategy/key words provided (yes/no, full search or example provided)? Yes

Screening completed in duplicate (yes/no)? Yes

	• If yes, how were disagreements resolved? “These papers were obtained in full, and two reviewers screened the full papers for inclusion, with any disagreements resolved by consensus with reference to the full papers and a third reviewer if necessary” p11. **Extraction completed in duplicate (yes/no)**? Partially (see below). • **If yes, how were disagreements resolved**? “Data were extracted by one reviewer and checked by a second reviewer, with disagreements resolved by consensus, with reference to the original papers and to a third reviewer and/or other experts as required” p12.
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 54 primary studies. • **Number of studies by study design**: RCT (4 studies), pre-post (8 studies), quantitative, non-specific (5 studies), qualitative (15 studies), mixed-methods or both quantitative and qualitative syntheses (17 studies), study design unclear (3 studies), review (1 study), ”Not applicable” (1 study). – Review questions 1: RCT (4 studies), pre-post (8 studies), quantitative, non-specific (4 studies), qualitative (13 studies), mixed-methods or both quantitative and qualitative syntheses (15 studies), study design unclear (3 studies), review (1 study). – Review question 3: RCT (3 studies), quantitative, non-specific (1 study), qualitative (3 studies), mixed-methods or both quantitative and qualitative syntheses (7 studies).
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 1991 (1 study), 1994 (2 studies), 1996 (2 studies), 1997 (1 study), 1998 (1 study), 1999 (1 study), 2000 (3 studies), 2001 (2 studies), 2002 (2 studies), 2004 (5 studies), 2005 (3 studies), 2006 (5 studies), 2007 (4 studies), 2008 (3 studies), 2009 (7 studies), 2010 (3 studies), 2011 (6 studies), 2012 (2 studies), (no date reported for 1 study). – Review questions 1: 1991 (1 study), 1994 (2 studies), 1996 (2 studies), 1997 (1 study), 1998 (1 study), 1999 (1 study), 2000 (3 studies), 2001 (2 studies), 2002 (1 study), 2004 (5 studies), 2005 (2 studies), 2006 (5 studies), 2007 (2 studies), 2008 (3 studies), 2009 (6 studies), 2010 (3 studies), 2011 (5 studies), 2012 (2 studies), (no date reported for 1 study). – Review question 3: 1997 (1 study), 1998 (1 study), 2000 (3 studies), 2004 (1 study), 2005 (1 study), 2007 (1 study), 2008 (1 study), 2009 (2 studies), 2011 (2 studies), 2012 (1 study).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: “Quantitative, qualitative and mixed-methods evaluations, with and without comparator groups, were eligible for inclusion in the review. […] For review question 3, a comparator group design was required” [comparison to ‘professional-led approaches’] p10.

	Reasons for including study design(s) provided (yes/no)? Not explicitly stated; any design that could answer the review questions were included. • **If yes, describe the justification(s)**: Not explicitly justified. The authors did state, "Included literature was limited to reports of evaluations; opinion pieces or raw data were excluded. Cross-sectional surveys were excluded unless there was no other evidence to answer a review question" p11. **List of excluded studies at full text provided (yes/no)**? Yes • **Reasons for exclusion provided (yes/no)**? Yes (Appendix 10).
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: There was no one overall assessment tool used. The authors state, "Appropriate validity assessment criteria were developed for each included study design. Checklists were updated based on National Institute for Health and Care Excellence (NICE) public health methods guidance for quantitative studies and Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) expertise for qualitative reviews (see Appendix 5). Unpublished data from grey literature were assessed using the same criteria as for published data" p12. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: Each assessment required the reviewer to make an overall assessment of internal validity and relevance, based on the responses to each form. These overall assessments were translated to a numerical score of 1–3 for internal validity, where: • 1 = Good internal validity/low risk of bias • 2 = Moderate internal validity/moderate risk of bias, and • 3 = Poor internal validity/high risk of bias. This was combined with an alphabetical scores for a-c for relevance, where: • a = High relevant • b = Of some relevance, and • c = Not very relevant. **Quality appraisal completed in duplicate (yes/no)**? Yes

- **If yes, how were disagreements resolved**? “Disagreements were resolved by consensus with reference to the original papers and a third reviewer if necessary” p12.

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality):
In relation to quantitative studies (studies):

- 1 = 0 studies.
- 2 = 7 studies:
  - 2a = 0 studies.
  - 2b = 6 studies.
  - 2c = 1 study.
- 3 = 10 studies:
  - 3a = 0 studies.
  - 3b = 5 studies.
  - 3c = 5 studies.

Appraisal rating

In relation to mixed methods studies (11 studies):

- 1 = 1 study:
  - 1a = 1 study.
  - 1b = 0 studies.
  - 1c = 0 study
- 2 = 4 studies:
  - 2a = 1 study.
  - 2b = 2 studies.

- 2c = 1 study.

- 3 = 6 studies:
  - 3a = 0 studies.
  - 3b = 1 study.
  - 3c = 5 studies.

In relation to studies that included both qualitative and quantitative data that were analysed separately (6 studies):

- 1 = 1 study:
  - 1a = 0 studies.
  - 1b = 0 studies.
  - 1c = 1 study (this rating was given to the qualitative component of one study that included both quantitative and qualitative analyses (Syed, 2000; quantitative component received a 3b)).
- 2 = 3 studies (1 study received 2 ratings of 2; see below):
  - 2a = 0 studies.
  - 2b = 3 studies (this rating was given to the qualitative component of 2 studies that included both quantitative and qualitative analyses (Levenson, 2002 (quantitative component received a 3b); Syed & Blanchette, 2000 (quantitative component received a 3b), and the quantitative component of 1 study that included both quantitative and qualitative analyse (Scott, 2004 (qualitative components received a 2c)).
  - 2c = 1 study (this rating was given to the qualitative component of 1 study that included both quantitative and qualitative analyses; Scott, 2004 (quantitative component received a 2b)).
- 3 = 4 studies (1 study received 2 ratings of 3; see below):
  - 3a = 0 studies.
  - 3b = 4 studies (this rating was given to the qualitative component of one study that included both quantitative and qualitative analyses (Correctional Service of Canada, 2009 (quantitative component received a 3c)), and the quantitative component of 3

studies that included both quantitative and qualitative analyses (Levenson, 2002 (qualitative component received a 2b); Syed, 2000 (qualitative component received a 1c); Syed & Blanchette, 2000 (qualitative component received a 2b)).

- 3c = 1 study (this rating was given to the quantitative component of one study that included both quantitative and qualitative analyses (Correctional Service of Canada, 2009 (qualitative component received a 3b)).

Note. 1 study was rated as Not applicable. Three study designs were unclear, and 1 study was a review. These were rated as:

- 2b = 1 study (unclear study design).
- 3c = 3 studies (2 unclear designs and 1 review).

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "Overall, the internal validity of included studies was quite poor, with only five studies judged to be of good quality. Nineteen were of moderate quality and 32 were of poor quality. In terms of relevance to the review context, five were judged to be highly relevant, with 27 being of some relevance and 22 being not very relevant. The main issues affecting internal validity were small sample size, lack of comparators and/or lack of adjustment for potential confounding factors, poor reporting of study methodology and poor reporting of results, which precluded meta-analysis of quantitative studies or meta-ethnography of qualitative studies" p19. This quote reflects the 57 studies included by the review authors (count for quality = 56, count for relevance = 54). However, we excluded three of these studies (n = 54) and query these numbers do not take account of our exclusions.

  "The included studies were, on the whole, of poor methodological quality, with < 10% judged to be of good internal validity or highly relevant to the review context, although a substantial proportion were carried out in the UK. The main problems with internal validity were small sample size, lack of comparators and/or lack of adjustment for potential confounding factors, poor reporting of study methodology and poor reporting of results. This could be due in part to space restrictions in journal articles, as full reports tended to score more highly in the validity assessment, but the small number of RCTs or ethnographically rich/thick qualitative studies suggests that there is much room for improvement in the quality of research in this area. Most studies did not report an underpinning theoretical model and only two defined what was meant by 'peer'. […] Selection bias may be affecting the results, as most studies were not randomised and there was much greater representation from peer deliverers than service recipients. This may be because peer deliverers pose fewer security risks than other prisoners and are therefore potentially more likely to be authorised by the institutional authorities to participate in research. This makes these individuals unlikely to be representative of the prison population as a whole" p92.

In relation to review question 1 specifically, the review authors noted that the contributing primary studies were of variable quality, “with only a small number of studies having a strong design, which limits the conclusions that can be drawn” p93. On peer education interventions in review question 1, the review authors stated, “Education is a social determinant of health that may be associated with other positive outcomes for the prison population. As the review identified only one poor-quality cross-sectional study on this initiative, there is insufficient evidence to draw conclusions and further research is recommended on this specific scheme” p95.

Overall, the authors stated that the poor methodological quality of the included primary studies “undoubtedly limits the extent to which evidence-based conclusions can be drawn” (p103) and “reduces their applicability for practice” p105.

Assessment of publication bias (yes/no): No. “The dominance of positive findings and lack of negative findings reported in the quantitative data strongly suggests publication bias, although it was not possible to generate a funnel plot because of wide variation in the outcomes measured” p92.

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? No

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Yes

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Of the 15 qualitative studies deemed relevant to this overview of reviews:

- 1 = 4 studies:
  - 1a = 3 studies.

  - 1b = 1 study.
  - 1c = 1 study.
- 2 = 6 studies:
  - 2a = 0 studies.
  - 2b = 5 studies.
  - 2c = 1 study.
- 3 = 5 studies:
  - 3a = 0 studies.
  - 3b = 1 study.
  - 3c = 4 studies.

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Yes

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: See comments above in quantitative section (these comments apply to all included studies; quantitative, qualitative, and mixed methods).

Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: "Synthesis of quantitative data was carried out by two reviewers and, after discussion with the advisory and steering groups, findings were presented combined in a narrative synthesis, grouped by review question and then by intervention mode. When data were suitable for statistical meta-analysis, studies were combined using a fixed-effect model to give relative risks with 95% confidence intervals (CIs) for binary outcomes and weighted or standardised mean differences (MDs) with 95% CIs for continuous outcomes. Statistical heterogeneity was examined using the chi-squared and I^2 statistics, with a chi-squared p-value of > 0.1 and a I2 value of > 50% indicating statistical heterogeneity, in which case reasons for the heterogeneity would be investigated and a random-effects model would be used to determine whether or not the findings were robust to the choice of model. When pooling was not appropriate because of clinical heterogeneity, it was still possible to display some quantitative results in forest plots to illustrate the spread of data" p12.

	"In relation to combining data from different study designs, "A mixed-methods systematic review design similar to that used by the EPPI-Centre112 was used to combine data from different study designs. Evidence was initially synthesised by study type into two streams: quantitative and qualitative (for studies that use mixed methods, qualitative and quantitative data were extracted and treated separately in the relevant streams). For review question 1, studies were grouped according to intervention mode to produce evidence statements summarising the effectiveness of interventions. Intervention modes were derived by checking the information recorded on data extraction sheets, which gave an initial categorisation of the intervention and any theoretical models as reported by the study. An intervention typology, developed as part of the review process, was then applied to categorised all of the included studies until a best fit with the reported intervention mode was achieved" p13-14. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: Yes. • **If appropriate, justification for combining data in meta-analysis (yes/no)**: See above. **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: "For review questions 1 and 3, qualitative themes on outcomes for peer deliverers and recipients were mapped to quantitative results grouped by intervention mode and then type of outcome" p14.
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: Any effects of peer-based interventions on prisoner health or determinants of health (e.g. changes in physical or mental health or health behaviours, or determinants of health within the prison setting, such as social support, (literacy) skills, education or service delivery); i.e. all reported health-related outcomes, including negative outcomes for peer support workers, peer support recipients, and prison staff (review questions 1 and 3). • **Primary outcome 2**: Organisational outcomes and views or perceptions of peer interventions (review question 3). **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable

Findings:	[See separate extraction tables below for each research question]
General comments	Note specific population samples described in the 'population' row.
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: **Review question 1: Peer education interventions**

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Knowledge: HIV-related (continuous scores)	Self-report (specific measures Not reported)	Ross (2006) Grinstead (1997) 1 pre-post study and 1 RCT	Statistically significant improvement in knowledge (vs. no intervention); MD = 0.46 (95% CI 0.36 to 0.56; 2 studies, n = 2494; $p < 0.05$; $I^2 = 94\%$). *Note*. There was substantial statistical heterogeneity in this result. Standard deviations were imputed for Grinstead (1997).	NR
Behaviour: Not using a condom at first intercourse after release from prison	Self-report (specific measures Not reported)	Grinstead (1999) Zack (2004) 2 RCTs	Statistically significant reduction in the behaviour (vs. unspecified control group); RR	NR

			= 0.73 (95% CI 0.61 to 0.88; 2 studies; n = 400; p < 0.0009; I^2 = 24%).	

Review question 1: Peer support interventions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Self-esteem	Rosenberg Self-Esteem Scale (3 studies)	Blanchette (1998) Delveaux (2000) Syed (2000) 3 mixed methods studies	No significant improvement in self-esteem (pre-post); weighted MD 1.51, 95% CI -0.84 to 3.86; 3 studies, n = 83; p = 0.21; I^2 = 81%). Note. The sample sizes were small and there was substantial statistical heterogeneity in this result.	NR
Perceptions of the prison environment	The Correctional Environment Status Inventory (3 studies); domains assessed were staff involvement, staff treatment, staff cohesion, orientation and offender relationships	Blanchette (1998) Delveaux (2000) Syed (2000) 3 mixed methods studies	No statistical results were provided. The authors only stated, "No statistically significant effect of the PST [peer-support intervention] was seen in the pooled results of the three studies across any of the 16 questions asked" p45.	NR

Review question 1: Listener interventions

- No meta-analysis

Review question 1: Prison hospice volunteer interventions

- No meta-analysis

Review question 1: Peer mentoring interventions

- No meta-analysis

Review question 1: Health trainer interventions

- No meta-analysis

Review question 1: Peer observers' interventions

- No meta-analysis

Review question 1: Peer training interventions

- No meta-analysis

Review question 1: Peer outreach interventions

- No meta-analysis

Review question 1: Peer advisor interventions

- No meta-analysis

Review question 1: Peer support and counselling interventions

- No meta-analysis

Review question 2: Comparison of peer-led and professionally led interventions

- No meta-analysis

Overall findings (meta-analyses, authors' secondary outcome(s))

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Yes

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. *Note*. It is sometimes not made explicit whether the results pertain to prisoners who deliver peer-based interventions or prisoners who receive the intervention, or both. Where this is made clear in the report, it is stated in the extracted results. The review authors noted, "Included studies reported outcomes for peer deliverers much more often than for service recipients" p92. Therefore, where it is not clear whether results pertain to peer intervention deliverers or recipients, it is more than likely deliverers.

Review question 1: Peer education interventions

Overall, 16 studies contained quantitative findings about the effects of peer education on prisoner health and related outcomes. Of these, 11 were on HIV/AIDS prevention, 1 study was on hepatitis C prevention, 1 study was on the prevention of infectious diseases in general, 1 study was on health and hygiene, 1 study was on general and mental health, 1 study was on parenting.

Knowledge

7 studies reported the effects of peer education on prisoner knowledge (Grinstead, 1997; Ross, 2006; Scott, 2004; Sifunda, 2008; Taylor, 1994; Vaz, 1996; Zucker, 2006). There was no standard outcome measure.

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Knowledge related to HIV/AIDS	Self-report, yes/no questions related to HIV/AIDs (43 in total)	Scott (2004) Zucker (2009) Taylor (1994) Vaz (1996) 4 pre-post studies	The studies recorded number or percentage of correct answers to a set of yes/no questions related to HIV/AIDs (different questions were asked in each study, with a total of 43 questions, only three of which were asked by more than one of the four studies). Statistically significant improvements favouring peer	NR

				education were seen in the number of correct answers to 22 of the 43 questions asked. Negative effects of peer education were seen in the answers to 1 of the 43 questions asked. Responses to the remaining 20 questions showed no evidence of effect of the intervention. Risk ratios ranged from 0.43 (95% CI: 0.33, 0.56, 1 study, n = 949; question = "HIV can be transmitted by bloody fights" (Taylor, 1994)) in favour of peer education, to 3.06 (95% CI: 1.91 to 4.91; 1 study; n = 200; question = "All forms of Hepatitis can be transmitted by sex" (Zucker, 2009)) against peer education.	
	Knowledge related to HIV/AIDS	Knowledge scores, self-report (measures unclear)	Ross (2006) Grinstead (1997) Taylor (1994) Sifunda (2008) 3 pre-post studies and 1 RCT	Positive results were seen in all 4 studies, indicating significant improvement in HIV-related knowledge scores in all 4 studies. However, data were imputed for 2 studies (SDs in Grinstead (1997) and numbers in groups in Sifunda (2008)), so these results should be interpreted with caution (see also meta-analysis on knowledge scores above).	NR
	Knowledge related to HIV/AIDS	Self-report, yes/no questions related to HIV/AIDs	Vaz (1996) Pre-post study	Prisoners with less than full primary school education were significantly less likely that those with more schooling to respond correctly to all HIV/AIDS-related knowledge	NR

			questions both before (43% vs. 69%, p < 0.00002) and after (84% vs. 94%) (p < 0.00001) the peer education intervention. However, the less educated group showed a greater improvement in the proportion of correct answers for all questions compared to the more educated group (41% vs. 24%, p < 0.00001) (n = Not reported).	

Intentions

3 studies reported the effects of peer education on prisoner intentions (Ross, 2006; Grinstead, 1997; Sifunda, 2008).

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Interest in taking HIV test for the first time – peer receivers	Self-report	Grinstead (1997) RCT	Significant positive difference between education intervention delivered by peer education compared to education intervention delivered by other professionals (RR 1.49, 95% CI: 1.12 to 1.97) (n = Not reported).	NR
Interest in taking HIV test now – peer receivers	Self-report	Grinstead (1997) RCT	Significant positive difference between education intervention delivered by peer education compared to education intervention delivered by other professionals (RR = 1.82, 95% CI: 1.33 to 2.49) (n = Not reported).	NR

	Condom use intention – peer receivers	Self-report	Grinstead (1997) RCT	Significant positive difference between education intervention delivered by peer education compared to education intervention delivered by other professionals (RR 1.15, 95% CI: 1.08 to 1.22) (n = Not reported).	NR
	Intention to never use a condom – peer receivers	Self-report	Grinstead (1997) RCT	Significant positive difference between education intervention delivered by peer education compared to education intervention delivered by other professionals (RR = 0.59, 95% CI: 0.48 to 0.72) (n = Not reported).	NR
	Intention to take a HIV test – peer receivers	Self-report	Ross (2006) Pre-post study	No improvements in intention to take a HIV test (presumed within-group analyses) (RR 1.24, 95% CI: 0.75 to 2.05).	NR
	Intention to take a HIV test – peer educators	Self-report	Ross (2006) Pre-post study	Negative effect on peer educators' intentions to take a HIV test (presumed within-group analyses) (RR 0.62, 95% CI: 0.41 to 0.95).	NR
	HIV intention (presumed intention to prevent HIV)	Self-report, measures unclear	Sifunda (2008) Pre-post study	Positive effects of the peer education programme on intentions in two of the three included prisons, both in the short term and 3-6 months after release: - HIV intention (presumed intention to prevent HIV) short-term prison 1: MD = -0.67 (95% CI: -0.99 to -0.35; n = 38). - HIV intention (presumed intention to prevent HIV) short-	"Short-term" (unknown length of time) and 3-6 months post-release

				term prison 2: MD = -0.05 (95% CI: -0.30 to 0.20; n = 38). - HIV intention (presumed intention to prevent HIV) short-term prison 3: MD = -0.55 (95% CI: -0.85 to -0.25; n = 38). - HIV intention (presumed intention to prevent HIV) longer-term (3-6 months post-release) prison 1: MD = -0.18 (95% CI: -0.34 to -0.02; n = 38). - HIV intention (presumed intention to prevent HIV) longer-term (3-6 months post-release) prison 2: MD = 0.10 (95% CI: -0.15 to 0.35; n = 38). - HIV intention (presumed intention to prevent HIV) longer-term (3-6 months post-release) prison 3: MD = -0.73 (95% CI: -1.12 to -0.34; n = 38).	
	Intention to ever use a condom	Self-report	Goldstein (2009) RCT	This RCT measured intentions by ethnicity and showed that peer education had the most effect on white prisoners: Intention to ever use condom, Latino men (intervention vs. unspecified control): RR = 1.25 (95% CI: 1.04 to 1.50); n = 234. Intention to ever use condom, African American men (intervention vs. unspecified control): RR = 1.07 (95% CI: 1.00 to 1.14); n = 480. Intention to ever use condom, white men (intervention vs.	NR

			unspecified control): RR = 1.28 (95% CI: 1.09 to 1.49); n = 459.	
Intention to always use a condom	Self-report	Goldstein (2009) RCT	This RCT measured intentions by ethnicity and showed that peer education had the most effect on white prisoners: Intention to always use condom, Latino men (intervention vs. unspecified control): RR = 1.12 (95% CI: 0.89 to 1.40); n = 234. Intention to always use condom, African American men (intervention vs. unspecified control): RR = 1.15 (95% CI: 1.02 to 1.31); n = 480. Intention to always use condom, white men (intervention vs. unspecified control): RR = 1.61 (95% CI: 1.28 to 2.04); n = 459.	NR

Attitudes/beliefs

4 studies reported the effects of peer education on prisoner attitudes/beliefs (Scott, 2004; Zucker, 2009; Taylor, 1994; Sifunda, 2008). *Note*. There was no information or results on attitudes/beliefs provided in relation to the fourth study identified under this outcome (Zucker, 2009).

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
HIV-related attitudes	Self-report, measure unclear	Scott (2004) Pre-post study	No changes in prisoner HIV-related attitudes after peer education (presumed within-	NR

			group analyses) (n = Not reported).	
HIV-related attitudes	Self-report	Taylor (1994) Pre-post study	Improvements in the number of prisoners agreeing to all three of the following statements: "HIV-positive inmates should be separated", RR = 2.25 (95% CI: 1.94 to 3.33; n = Not reported) "I feel safe in the same wing as an inmate who is HIV positive", RR = 0.74 (95% CI: 0.68 to 0.84; n = Not reported) "I know enough to protect myself from catching HIV/AIDS", RR = 0.54 (95% CI: 0.50 to 0.59; n = Not reported)	
Prisoner attitudes (unspecified)	Self-report, measure unclear	Sifunda (2008) Pre-post study	No changes in prisoner attitude after peer education (n = Not reported for this outcome, but n = 263 in entire study). *Note*. Attitudes towards what is not made explicit; Table 5 states that this study is about "HIV/AIDS and HCV (and other infectious diseases)".	NR

Behaviour

11 studies reported the effects of peer education on prisoner behaviour (Zack, 2004; Grinstead, 1999; Ross, 2006; Bryan, 2006; MacGowan, 2006; Martin, 2008; Penn State Erie, 2001; Zucker, 2009; Peek, 2011; Dolan, 2004; Sifunda, 2008).

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value,	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

			heterogeneity, direction of effect)	
Number having unprotected sex	Self-report	Martin (2008) RCT	There was a positive, albeit statistically not significant effect of peer education on this behaviour compared to an unspecified control (RR = 0.71; 95% CI: 0.50 to 1.02; p = 0.06; n = 200).	NR
Number of peer educators who reported never having had an HIV test	Self-report	Ross (2006) Pre-post study	There was a positive effect of being a peer educator on this behaviour compared to an unspecified control (RR = 0.31; 95% CI: 0.12 to 0.78; p = 0.01; n = 865).	NR
Number of peer educators who reported they knew their HIV status	Self-report	Ross (2006) Pre-post study	There was a positive effect of being a peer educator on this behaviour compared to an unspecified control (RR = 0.88; 95% CI: 0.79 to 0.99; p = 0.04; n = 865).	NR
Number of students (intervention receivers) who reported that they knew their HIV status	Self-report	Ross (2006) Pre-post study	There was no significant effect of peer education on the number of peer education students who reported that they knew their HIV status compared to an unspecified control (RR = 1.00; 95% CI: 0.70 to 1.42; p = 1.00; n = 200).	NR
Number not using a condom at first intercourse after release from prison	Self-report	Grinstead (1999) Zack (2004) 2 RCTs	See meta-analysis above in meta-analysis results section.	N/A
Having HIV test in prison	Self-report	Junker (2005) Study design unclear	Having HIV tests in prison was associated with having “attended a HIV prevention programme” while in the study prison (OR = 2.81; 95% CI: 1.09 to 7.24; n = Not reported). Importantly, the rate of HIV testing was significantly lower	NR

				in the prison in which HIV testing was offered after a peer-led health education programme at intake (peer led, voluntary 46%; medical, voluntary 86%; mandatory 78%, p = 0.05).	
	Engagement in peer education behaviour	Self-report, measure unspecified (it is made clear that participants reported on a scale, however) *Note*. It is unclear what is being measured exactly	Bryan (2006) Single group pre-post study	The text states "One study reported that older prisoners were more likely than younger prisoners to engage in peer education behaviour (p < 0.05)". However, Figure 9 (in South *et al.* (2014)) simply states "Peer education behaviour" as the outcome, alongside the following inferential statistics: MD = -0.38 (95% CI: -0.54 to -0.22; n = 196). *Note*. It is unclear Figure 9 (South *et al.* (2014)) provides the effect estimate for the difference between older and younger prisoners in relation to engagement, or if this is the effect estimate for overall engagement. These results may not be usable.	NR
	Hepatitis B behaviour	Hepatitis B behaviour subscale	Zucker (2008) Single group pre-post study	There was a statistically significant (within-group) effect on Hepatitis B behaviour (the types of behaviour are unclear; however, the text states that it was a positive effect) (MD = -1.00; 95% CI: -1.76 to -0.24; n = 25).	
	Sexual communication short-term	Self-report, measure unspecified (it is made clear	Sifunda (2008) Pre-post study	There was no significant (within-group) effect of peer education on sexual	"Short-term" (unknown length of time)

		that participants reported on a scale, however)		communication in the short-term (length of time unknown) in any of the 3 prisons: - Prison 1: MD = -0.23 (95% CI: -0.68 to 0.22; n = 38) - Prison 2: MD = 0.07 (95% CI: -0.24 to 0.38; n = 38) - Prison 3: MD = -0.08 (95% CI: -0.35 to 0.19; n = 38).	
	Sexual communication longer-term	Self-report, measure unspecified (it is made clear that participants reported on a scale, however)	Sifunda (2008) Pre-post study	There was no significant (within-group) effect of peer education on sexual communication in the longer-term in 1 of the 3 prisons: - Prison 1: MD = -0.08 (95% CI: -0.56 to 0.40; n = 38) However, the was a significant and positive (within-group) effect of peer education on sexual communication in the longer-term in 2 of the 3 prisons: - Prison 2: MD = -0.24 (95% CI: -0.45 to -0.03; n = 38) - Prison 3: MD = -0.61 (95% CI: -1.03 to -0.19; n = 38).	3-6 months post-release
	STD screening	Self-report	Peek (2011) Study design unclear	Following a peer education intervention, the number of under-25s being screened for chlamydia rose from 13 to 83 in the 6-month period after beginning a peer education intervention (n = Not reported). Additionally, the number being screened for hepatitis C increased from 9 to 46, and more participants were screened for HIV and	6 months

			underwent hepatitis B vaccination (these numbers were Not reported). Conversely, the number declining hepatitis C screening rose from 13 to 115 (n = Not reported).	

Self-efficacy

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Prisoner self-efficacy	Measure unspecified	Sifunda (2008) Pre-post study	No significant differences were seen in prisoner self-efficacy in the short or longer-term (3-6 months) in any of the 3 prisons involved in the study (n = Not reported). No statistics were provided.	"Short-term" (unknown length of time) and 3-6 months post-release

Mental health

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Anger and frustration	Measure unspecified	Penn State Erie (2011) Mixed methods study	There was no effect of a peer education intervention on anger and frustration, either immediately post intervention (MD = 0.20; 95% CI: -1.42 to 1.82) or at longer follow-up (MD = 1.40; 95% CI: -0.03 to 2.83) (length of time Not reported) (n = Not reported).	NR

Review question 1: Peer support interventions

Overall, 6 studies contained quantitative findings about the effects of peer education on prisoner health and related outcomes. These all reported on the Canadian peer support programme specifically targeted at women and used similar evaluation designs and outcome measures. Of these, 3 were on self-esteem, 3 were on perceptions of the prison environment, 2 were on satisfaction with the programme, 1 was on hours of support delivered per week, 1 was on time to respond to inmate calls for peer support, 1 was on the level of trust in peer support workers, and 3 were on effects on the recipients of the peer support intervention.

Self-esteem/confidence

See meta-analysis results above.

Perception of the prison environment

See meta-analysis results above.

Review question 1: Listener interventions

2 studies contained quantitative findings about the effects of listener interventions on prisoner health and related outcomes. Both studies reported on the Listener scheme, which is a UK-based prison suicide prevention intervention, and both studies used questionnaires to conduct a cross-sectional survey among listeners. These studies reported on the effects on listeners (i.e. prisoners delivering the intervention) and the perceived benefits for users of the intervention.

Note. While the prevention of suicide and self-harm are not a focus of the current overview, the findings presented on this intervention type in the systematic review (p48) are not exclusively related to the prevention of suicide as an outcome. Therefore, the findings were extracted.

Effects on listeners

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

Precise outcome (beyond "effects on listeners" unspecified	Self-report, measures unspecified	Richman (2004) Quantitative study (unspecified)	64% of 22 prisoners claimed that "by becoming a listener, friends and family had noticed a difference in their demeanour, finding them more relaxed, responsible and optimistic, able to speak more and more able to listen. In total, 73% agreed that their new responsibilities would allow them to 'adjust better' on release and 55% agreed that the 'prison authorities' appreciated their work. In addition, 77% said that there was a difference in how immediate staff interacted with them (being trusted more, staff talking more to them, staff being grateful for the work they do) and 86% said that fellow prisoners behaved differently towards them" p49.	NR

Perceived benefits for service users

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Perceived benefit for service users (intervention recipients)	Self-report, measures unspecified	Snow (2002) Quantitative study (unspecified)	44% of users of the Listener scheme (i.e. intervention recipients) reported that they always felt better after confiding in a listener and 52% felt better at least sometimes. In addition, 84% said that they had always found the experience helpful (data	NR

			collected from 28 users of the Listener scheme and 44 non-users).	

Review question 1: Prison hospice volunteer interventions

No studies presented quantitative evidence on prisoner hospice volunteers.

Review question 1: Peer mentoring interventions

Only 1 study reported quantitative findings relating to the effects of peer mentoring on prisoner health and related outcomes. This study used a one-group design and reported outcomes relating to employment and housing.

Employment

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Employment	Self-report	Goldstein (2009) Quantitative study (unspecified)	16/22 participants (73%) who had been released for at least 12 months were employed, were enrolled in an educational programme, or had completed the application process for disability benefits.	At least 12 months, but otherwise unspecified

Housing

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Housing	Self-report	Goldstein (2009) Quantitative study (unspecified)	18/22 participants (82%) who had been released for at least 12 months had secured	At least 12 months, but otherwise unspecified

			treatment, transitional housing, or a permanent place to live.	

Review question 1: Health trainer interventions

Only 1 study reported quantitative findings on the effect of health trainers on prisoner health and related outcomes. This was a multi-method evaluation, including interviews, questionnaires, focus groups, and analysis of monitoring data. The study reported on confidence, knowledge, attitudes, issues discussed with health trainers, and onward referrals.

Confidence in signposting

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Health trainers' confidence to signpost intervention receivers to other services	Self-report	Brooker (2007) Mixed methods study	health trainers seemed most confident in signposting to exercise, smoking cessation and drugs services and least confident in signposting to self-harm, immunisation and dental services (n = 17): - Exercise: 12/17 (71%) - Smoking cessation: 11/17 (65%) - Health eating/diet: 9/17 (53%) - Sexual health: 8/17 (47%) - Dental health: 4/17 (24%) - Immunisation: 3/17 (18%)	NR

Knowledge

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value,	Length of time between intervention delivery and

			heterogeneity, direction of effect)	outcome assessment (i.e. follow-up period)
Trainers' knowledge of health issues	Self-report	Brooker (2007) Mixed methods study	The study showed "improvements in mean knowledge scores in all areas [exercise, smoking cessation, health eating/diet, sexual health, dental health, immunisation] but it was not possible to ascertain whether or not these improvements were statistically significant as no measure of variance was given" p51. Table 4 indicates that the outcome pertains to health trainers themselves (rather than recipients of the interventions).	NR

Attitudes

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Health trainers' attitudes towards health issues	Self-report	Brooker (2007) Mixed methods study	This study reported that > 50% of health trainers stated that their attitude had changed in the areas of healthy eating/diet, sexual health, smoking cessation, and exercise. It was also reported that 75% of health trainers stated that they would like to get a job as a health trainer on release from prison.	NR

Issues discussed with health trainers

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Issues most likely to be discussed with health trainers	Self-report	Brooker (2007) Mixed methods study	The issues discussed with health trainers (from most to least likely) were: - Exercise (68%) - Weight (50%) - Healthy eating (50%) - Smoking cessation (23%) - Stress (11%) - Dental health (6%) - Poor sleep (4%) - Sexual health (2%) - Cancer (1%) - STIs (0%).	NR

Review question 1: Peer observer interventions

Only 1 study reported quantitative findings on the effect of peer observers. However, this study reported on outcomes related to suicide watch and so the data were not extracted.

Review question 1: Peer training interventions

Only 1 study reported quantitative findings on the effect of peer training on prisoner health and related outcomes. This study was a non-randomised before-and-after study that reported on effects on anger, self-esteem, optimism, and number of confrontations.

Anger

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

Anger	The Anger Expression Scale	Walrath (2011) Pre-post study	This study tested the effects of a peer training intervention known as the 'Alternatives to Violence Project' on anger and found no statistically significant effect of the intervention on anger (MD = -4.01; 95% CI: -9.40 to 1.38; n = Not reported).	NR

Self-esteem

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Self-esteem	The Rosenberg Self-Esteem Scale	Walrath (2011) Pre-post study	This study tested the effects of a peer training intervention known as the 'Alternatives to Violence Project' on self-esteem and found a small by statistically significant negative effect of the intervention on self-esteem (MD = -2.15; 95% CI: -4.20 to -0.10; n = Not reported).	NR

- The study by Walwrath (2011) tested the effects of the same peer training intervention on self-esteem (measured with the Rosenberg Self-Esteem Scale) and found a small by statistically significant negative effect of the intervention on self-esteem (MD = -2.15, 95% CI: -4.20 to -0.10).

Optimism

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

Optimism	The Life Orientation Test	Walrath (2011) Pre-post study	This study tested the effects of a peer training intervention known as the 'Alternatives to Violence Project' on optimism and found no significant effect of the intervention on optimism (MD = 1.30; 95% CI: -0.83 to 3.34; n = Not reported).	NR

Number of confrontations

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Number of prisoner confrontations	Measure unspecified	Walrath (2011) Pre-post study	This study tested the effects of a peer training intervention known as the 'Alternatives to Violence Project' on the number of confrontations post-intervention, controlling for the number of confrontations pre-interventions, and reported a statistically significant reductions (MD = 0.432; 95% CI: 0.319 to 0.583, p < 0.0005; n = Not reported).	

Review question 1: Peer outreach interventions

No studies presented quantitative evidence on peer outreach interventions.

Review question 1: Peer advisor interventions

No studies presented quantitative evidence on peer advisor interventions.

Review question 1: Peer support and counselling interventions

Only 1 study reported quantitative findings on the effect of peer support and counselling. However, this study looked at the effect of peer support and counselling in the form of Narcotics Anonymous meetings and the 12-step programme and so the data were not extracted.

Review question 2: Comparison of peer-led and professionally-led interventions

2 peer education RCTs on the prevention of HIV infection (Grinstead, 1997; Martin, 2008) compared peer-led and professionally led interventions. One was judged to be of low internal validity (Grinstead, 1999) and the other was judged to be of moderate internal validity (Martin, 2008).

Intentions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Intention to use a condom	Self-report	Grinstead (1997) RCT	No significant difference between peer education intervention and profession-led intervention (RR = 1.00; 95% CI: 0.96 to 1.04; n = 1817)	NR
Intention to never use a condom	Self-report	Grinstead (1997) RCT	No significant difference between peer education intervention and profession-led intervention (RR = 0.99; 95% CI: 0.79 to 1.24; n = 1817)	NR
Interest in taking a HIV test for the first time	Self-report	Grinstead (1997) RCT	No significant difference between peer education intervention and profession-led intervention (RR = 1.00; 95% CI: 0.80 to 1.25; n = 200)	NR
Interest in taking a HIV test now	Self-report	Grinstead (1997) RCT	No significant difference between peer education intervention and profession-led	NR

			intervention (RR = 1.02; 95% CI: 0.82 to 1.27; n = 200	

Behaviour

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Condom use	Self-report, measure unspecified	Martin (2008) RCT	This study compared a peer education intervention (DVD) and professional-led intervention (a 'standard practice' HIV education intervention) and reported that peer education had a positive effect on condom use but the effect was not statistically significant (RR = 0.71, 95% CI: 0.50 to 1.02; n = Not reported).	NR

Knowledge

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
HIV-related knowledge	Self-report, measures unspecified	Grinstead (1997) RCT	Mean scores for HIV knowledge were 8.1 in the peer-education group and 8.3 in the professional-led group. However, it was not possible to ascertain whether or not there was a statistically significant difference between groups as no measure of variance was provided (n = Not reported).	NR

			The study authors "did not report a statistically significant difference between the groups using the chi-squared test) p59.	

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)?

Review question 1: Peer education interventions

- Knowledge:
  - Qualitative evidence suggested that peer educators improved their own knowledge of health issues as a result of their training (Betts-Symonds, 2011; Collica, 2010; Scott, 2004) and information was diffused to those outside the prison, such as family members and children (Scott, 2004).
- Additional themes from qualitative evidence:
  - Qualitative evidence suggested that prisoners who delivered peer education interventions gained from the experience of being a peer deliverer and found the experience personally rewarding, giving their time in prison meaning and purpose (Collica, 2010; Scott, 2004). Collica (2010) suggested that "being a peer educator also enabled the difficulties of prison life to be offset

through the supportive network of other trained peer educators. There were indications that prisoners involved in the AIDS, Counselling & Education (ACE) programme saw other trained prisoners in the programme as a pseudo-family who could be utilised in time of crises" p44-45.

- 1 study (Penn State Erie, 2011) reported qualitative evidence of peer educators having improved listening and communication skills as a result of their participation in the programme.

Review question 1: Peer support interventions

- Self-esteem/confidence:
  - There was strong qualitative evidence in relation to improvements in self-esteem, self-worth, and confidence in the deliverers of peer support as a result of the role (Boothby, 2011; Blanchette, 1998; Correctional Service of Canada, 2009; Delveaux, 2000; Eamon, 2012; Syed & Blanchette, 2000). The sense of being trusted by the prison authorities to counsel and support prisoners in distress was reported to enable peer deliverers to regain their self-respect (Edgar, 2011; Correctional Service of Canada, 2009). The notion that peers became more empowered consequentially was alluded to (Blanchette, 1998; Correctional Service of Canada, 2009; Delveaux, 2000; Syed, 2000; Syed & Blanchette, 2000).
- Knowledge:
  - There were qualitative data from two studies (Blanchette, 1998; Deveaux, 2000) that showed reported increases in knowledge among prisoners trained to be peer support workers/counsellors. In 1 of these studies (Blanchette, 1998) a number of respondents noted that knowledge acquired from the training was applicable to improving relationships with their children, partners and others in the community.
- Effects on recipients:
  - 1 study (Blanchette, 1998) reported that peer support helped prisoners practically, emotionally, or both (no statistical results provided and so it is not clear if this is quantitative or qualitative evidence).
  - 1 study (Jacobson, 2008) demonstrated that peer support interventions could be particularly beneficial for prisoners during the early part of their sentence.
  - 3 studies (Blanchette, 1998; Correctional Service of Canada, 2009; Syed & Blanchette, 2000) noted that those who had used peer support reported using it as an avenue to vent and to overcome feelings of anxiety, loneliness, depression and self-injury

  - 1 study (Boothby, 2011) reported indications that peer support interventions may be potentially beneficial in preventing suicides in prison.

- Additional themes from qualitative evidence:
  - Qualitative evidence from 5 studies (Edgar, 2011; Blanchette, 1998; Correctional Service of Canada, 2009; Deveaux, 2000; Syed & Blanchette, 2000) indicated peer deliverers gaining a better self-awareness and perspective on their life as well as developing the skills to deal with their own health and offending issues.
  - According to 3 studies (Edgar, 2011; Boothby, 2011; Stewart, 2011), the demands placed on peer support workers/counsellors by other prisoners gave individuals a sense of purpose in prison and this was beneficial for combating boredom while service the prison sentence (Edgar, 2011; Boothby, 2011). One of these studies, however, reported that the role could be challenging and onerous for peer support deliverers, and the burden of care of supporting many prisoners could be problematic (Boothby, 2011).

Review question 1: Listener interventions

Note. While the prevention of suicide and self-harm (Listener scheme) is not a focus of the current overview, the findings presented on this intervention type in the systematic review (p48) are not exclusively related to the prevention of suicide as an outcome. Therefore, the findings were extracted.

- Effects on listeners:
  - There was strong qualitative evidence from 6 studies for individual health gains for those trained as listeners or befrienders. "Trained individuals reported that they were 'giving something back', doing something constructive with their time in prison and being of benefit to the system; this consequently had an effect on their self-esteem, self-worth and confidence (Edgar, 2011; Davies, 1994; Levenson, 2022; Hall, 2004; Dhaliwal, 2009; Foster, 2011). The study by Dhaliwal (2009) also demonstrated individual changes in those trained in the listener role. Being less judgemental and changing attitudes and behaviour towards help-seeking within the prison (i.e. from regarding it as a display of weakness to seeing it as a sensible coping strategy) were discussed. Moreover, having enhanced skills as a result of being a peer deliverer, such as better listening and communication skills, was mentioned by two studies (Dhaliwal, 2009; Foster, 2011) and there was evidence that prisoners felt able to put these skills into practice on release from the institution (Dhaliwal, 2009)" p48.

  - There was some qualitative evidence from 4 studies of negative health effects, which "related to the emotional burden of listening to other prisoners' problems and issues. Discussions relating to suicidal intentions and other distressing topics could be particularly burdensome for peer deliverers to manage (Davies, 1994; Dhaliwal, 2009; Foster, 2011; Richman, 2004). […] There were also reports of peer deliverers experiencing 'burnout' and mental exhaustion as a result of the demands placed on their time by other prisoners (Foster, 2011; Richman, 2004)" p48.

- Perceived benefits for service users:
  - 3 studies (Davies, 1994; Hall, 2004; Foster, 2011) spoke to the impact that trained peers have on reducing depression and anxiety in distressed prisoners and improving their mental health. In Foster (2011) interview prisoners noted that, through talking with a trained peer, "they had the opportunity to vent their frustration and anxieties, and this was reported to have a calming and uplifting effect, making it much less likely that they would become violent towards themselves. Health-care professionals also acknowledged the role of listeners in improving the emotional health of prisoners" p49.
  - 2 studies (Davies 1994; Foster, 2011) provided "anecdotal evidence that suicide and self-harm are reduced as a result of the support offered by peers acting in this role. A similar intervention model implemented [by Hall, 2004] also shows the importance of the service not only for addressing suicide but also for helping those who are depressed, who are feeling alone, who are suffering from a loss, who have received bad news from outside or who are having problems adjusting to the institution. Indeed, this study showed evidence that trained prisoners had increased their knowledge of suicide and depression and had become better able to identify suicide risk in other people" p49.

Review question 1: Prison hospice volunteer interventions

- Self-esteem and self-worth:
  - Qualitative evidence from 2 studies of prison hospice programmes (Wright, 2007a/2007b) in which trained prison volunteers form part of the workforce showed that volunteers experience increases in self-esteem and self-worth as a result of the service that they provide to other prisoners. Evidence from the same studies also suggested that prisoners gain an enhanced sense of compassion for others.
  - In 1 study (Cichowlas, 2010), being prison hospice volunteer allowed individuals 'to give something back'.

- In 1 study (Maull, 1991), “prison hospice volunteers described life enrichment, growth and coming to terms with their own mortality as a result of their involvement. Moreover, the recipients of one of the programmes suggested how the volunteers had supported them and enabled them to overcome states of depression” p50.

Review question 1: Peer mentoring interventions

No studies presented qualitative evidence on peer mentoring interventions.

Review question 1: Health trainer interventions

- Confidence:
  - Qualitative evidence from Booker (2007) showed that “training as a health trainer had been a huge boost to prisoners’ confidence, self-esteem and self-worth, although this was not specifically reported by prisoners themselves but by key staff involved in the programme. There was, however, evidence of health trainers bolstering other prisoners’ reported self-esteem and confidence through listening and supporting individuals” p51.
- Knowledge:
  - 2 studies (Booker, 2007; Sirdifield, 2006) provided qualitative evidence that the “health trainer training programme appeared to have successfully increased individuals’ knowledge on a variety of topics, including drugs, sexual health, nutrition, alcohol and mental health issues. Attitudinal change, often as a result of increased knowledge, was seen primarily in the area of smoking and diet and this resulted in behavioural changes. For example, health trainers reported eating more fruit and vegetables and one health trainer had given up smoking” p51.
- Additional themes from qualitative research:
  - 2 studies (Booker, 2007; Sirdifield, 2006) presented evidence of “increased health knowledge and attitudinal and behavioural change in prisoners, although this was more frequently reported for the health trainers than for the recipients of the programme” p53. In Booker (2007), “participants suggested that the skills developed in the health trainer role were applicable outside of the prison context and could be transferable to the community. Both health trainers and health trainer tutors reported that health trainers had developed effective communication and listening skills as well as fostering attributes essential for team working and future employment after release from prison. It was reported that, for those prisoners who

completed the health trainer course, the recognised qualification that they attained could support efforts to find employment as a health trainer post release" p52.

Review question 1: Peer observer interventions

No studies presented qualitative evidence on peer observers.

Review question 1: Peer training interventions

No studies presented qualitative evidence on peer training interventions.

Review question 1: Peer outreach interventions

- 1 study (Hoover, 2009) reported on a harm reduction programme in Moldovan prisons involved peer volunteers in distributing condoms, supplies for needle exchange and information booklets to fellow prisoners. The findings suggested that peer volunteers felt that their role was worthwhile and that they were making a difference to the health of the prison population.

Note. While this study is described under the findings for review question 1, it is not listed as one of the studies that contributed to review question 1 on p35.

Review question 1: Peer advisor interventions

- 2 studies (Boyce, 2009; Hunter, 2009) "presented qualitative data on a peer-delivered housing advice service to support prisoners in keeping their accommodation whilst imprisoned. The studies reported the difference that the intervention had made to the trained peer advisors with regard to increased self-esteem and self-confidence through activities such as talking on the telephone with housing agencies or liaising with staff from prison and probation teams. This was coupled with peer deliverers reporting that they were building a work ethic and a sense of control over their lives. The role was perceived by the volunteers to be worthwhile and purposeful as well as enabling social interaction with others and offering 'structure' to the prison day" p54. There was also qualitative evidence from the same studies to suggest that "the peer advisor role provided 'real-world' employment skills, and this was regarded as being beneficial for future employment opportunities. However, both studies alluded to the difficulties that trained peer advisors could face on release from prison as a result of their status as ex-offenders" p54.

Review question 1: Peer support and counselling interventions

No studies presented qualitative evidence on peer support and counselling interventions.

Review question 2: Comparison of peer-led and professionally-led interventions

- Strong qualitative evidence emerged from 12 studies (Edgar, 2011; Boyce, 2009; Booker, 2007; Foster, 2011; Hunter, 2009; Schinkel, 2012; Blanchette, 1998; Delveaux, 2000; Syed, 2000; Syed & Blanchette, 2000; Sirdifield, 2006; Munoz-Plaza, 2005) indicating that "peers were able to show a greater sense of empathy than staff. Many peers had experienced first-hand many of the problems faced by prisoners and could relate to the challenges that they faced. The value of 'lived experience', therefore, was a crucial attribute that peers held over staff" p59.
  - In 3 studies (Foster, 2011; Syed, 2000; Syed & Blanchette, 2000), prisoners reported that they preferred confiding in peer deliverers than in staff because they felt less judged for what they said.
  - In 4 studies (Boyce, 2009; Sirdifield, 2006; Blanchette, 1998; Delveaux, 2000) it was reported that prisoner felt more comfortable and at ease talking with peers that with staff. It was also reported in 3 studies (Blanchette, 1998; Syed, 2000; Syed & Blanchette, 2000) that prisoners had little trust in staff and were fearful that disclosures would be documented and noted on their file.
  - Other studies reported that prisoners were more comfortable talking to peers than staff because peers were perceived to be more approachable (Booker, 2007), credible (Munoz-Plaza, 2005), and had greater understanding (Schinkel, 2012).
- In comparison to staff, qualitative evidence showed that peers were perceived to be more accessible and could offer more time for discussion (Foster, 2011; Blanchette, 1998; Syed & Blanchette, 2000).
- 2 health trainer studies (Booker, 2007; Sirdifield, 2006) reported that peers may be better equipped than staff to recognise the early signs and symptoms of mental health problems in their peers and to offer advice regarding stress management techniques.

Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Some qualitative evidence spoke to intervention acceptability; see qualitative evidence above.

Some quantitative evidence spoke to intervention acceptability; this evidence was presented under research question 1 (effectiveness) in the review. Specifically, under peer support interventions and listener interventions:

Review question 1: Peer support interventions

Satisfaction

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Value and helpfulness of peer support intervention	Self-report, value measure not specified, and helpfulness measure (if not a proxy for value) was a 5-point scale	Correctional Service of Canada (2009) Mixed methods study	81% of 35 respondents valued the existence of the peer support, even if they had never used a peer counsellor in a crisis situation. In this study the average rating for helpfulness of peer support workers was 4 on a scale of 1–5 (n = Not reported).	NR
Satisfaction with quality of information delivered in peer support intervention	Measures not specified	Eamon (2012) Mixed methods study	Prisoners in the intake unit were very satisfied with the quality of the information delivered by peer support counsellors during their weekly visits (mean = 4.05 on a 5-point scale) and rated peer support counsellors highly in relation to their: - Listening skills (mean = 4.58) (n = Not reported) - Problem-solving skills (mean = 3.94) (n = Not reported) - Approachability (mean = 4.56) (n = Not reported)	NR

				- Communication skills (mean = 4.22) (n = Not reported). Expectations of the peer support counsellors were also well met (mean = 4.28) and those who had previously requested peer support reported that the sessions were very useful (mean = 4.43) in helping them deal with their issues (n = Not reported). Prison staff reported that peer support intervention deliverers (i.e. prisoners) were effective in handling crisis interventions (mean = 4.00), providing services to inmates (mean = 3.62) and serving as role models (mean = 3.73) (n = Not reported). Peer support programme training was seen as efficient in preparing support intervention deliverers for their duties (mean = 3.77) and in reinforcing the positive effects of other programmes for support intervention deliverers (mean = 3.62) and for other inmates (mean = 3.62) (n = Not reported). Staff were moderately satisfied with the sharing of PST procedures (mean = 3.62) and support intervention activities and schedules (mean = 3.58) with key institutional personnel (n = Not reported).	

Level of trust

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Level of trust among staff	5-point scale	Eamon (2012) Mixed methods study	This study reported a fairly high level of trust in peer support counsellors (mean = 3.79 on a 5-point scale) and that staff generally felt confident in referring an inmate to a peer support counsellor. However, 75% of staff surveyed in this study indicated that their trust level varied depending on individual peer support counsellor (n = Not reported).	NR

Review question 1: Listener interventions

Approachability and availability

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Approachability and availability of listeners	Measure unspecified	Snow (2001) Quantitative study (unspecified)	61% of intervention recipients surveyed said that they could talk to a listener about anything that was worrying them and 74% had no problems contacting a listener when they had requested help (n = Not reported).	NR

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? Not reported

Comparator(s) used in the interventions delivered in the included studies: For review question 3, included studies compared peer and professionally-led approaches to the same health or social problem. For all other review questions, the included studies compared peer-based interventions with any or no comparator (or usual care). Comparators are often not described throughout the report. Where they are, they are included in the extracted results above.

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Prisoners were deliverers of peer-based interventions in all studies.

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not made explicit.

Duration(s) of the intervention: Not reported

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies): Not reported

Overall direction of results

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.

QUANTITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews:

Review question 1: Peer education interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer education interventions, the evidence showed:
  - HIV Knowledge and literacy improved, although outcome measures need to be standardised.
  - Attitudes towards HIV improved in 1 out of the 3 peer education studies that reported this outcome (no improvement was observed in the other 2 studies).
  - Intentions to use condoms improved in one RCT but this effect was not reproduced in another study.
  - Positive effects on behaviour, including condom use, and screening for STIs. Although one quantitative study showed no effect on self-esteem, there was strong qualitative evidence reported that peer deliverers found the role rewarding, in that "it improved their skills, gave their time in prison meaning and purpose and provided a supportive network. In one study prisoners

preferred to be taught by a HIV-positive peer than a professional; in another, prisoners scored higher on knowledge tests with a HIV-negative peer educator than with a HIV-positive peer educator or a professional" p54.

- Overall, "There was moderate evidence from quantitative studies that peer education interventions can result in changes in HIV/hepatitis C virus knowledge, but equivocal results for effects on behaviour change intentions and health beliefs. For health behaviours there was consistent evidence of peer education resulting in the reduction of risky behaviours, for example […] not using a condom at first intercourse post release. Additionally, there was weak evidence indicating an association between the uptake of screening/HIV testing and peer health education programmes. These findings support rationales for peer education as a means of increasing social influence and positive social norms, but further research is needed to explore the relative importance of peer education as a factor in the uptake of these health services" p94.
- "Interpreting the findings within a harm reduction approach, the review provides evidence that peer education interventions are effective at reducing risky behaviours, which can be regarded as intermediate health outcomes" p95.

Review question 1: Peer support interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer support interventions, the evidence showed:
  - No effect of peer support on perceptions of the prison environment (domains assessed were staff involvement, staff treatment, staff cohesion, orientation and offender relationships).
  - Overall, "The review has confirmed that the focus of the intervention and the role of the peer support worker vary considerably between different interventions. […] Quantitative evidence on peer support was exclusively drawn from the Canadian PST model. All six included studies were based on a common model of peer support within women's prisons, which allows some tentative conclusions to be drawn. The PST programme had no demonstrable effects on prisoners or the prison environment, but the programme was rated highly in terms of satisfaction across a number of variables including the usefulness of peer support sessions, the approachability of PST members, levels of trust and handling crisis interventions. […] The review found that peer support was beneficial in terms of both practical assistance and helping prisoners overcome mental health problems such as anxiety, loneliness, depression" p95.
  - "On balance and taking into account some of the triangulation of the results, there is moderate evidence that peer support services can provide an acceptable source of help within the prison environment and can have a positive effect on recipients

and peer deliverers, but there is scope for more research to obtain definitive evidence of effectiveness in terms of mental health outcomes" p95.

Review question 1: Listener interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on listener interventions, the evidence showed:
  - Listeners had improved self-esteem, self-worth and confidence, as well as enhanced listening and communication skills, improved relationships with prison staff, and changing attitudes and behaviour towards help seeking in the prison.
  - Overall, "The review found consistent evidence from three qualitative studies and one quantitative study which strongly suggests that contact with a listener (or similar role) at a time of need was helpful in reducing anxiety, depressive thoughts and intention to self-harm, improving emotional health and helping with adjustment to the institution. There was evidence that the Listener scheme was acceptable and accessible to prisoners, from the perspective of both users and non-users" p96.

Review question 1: Prison hospice volunteer interventions

- No studies presented quantitative evidence on prisoner hospice volunteers.

Review question 1: Peer mentoring interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer mentoring interventions, the evidence showed:
  - Positive effects of peer mentoring on employment and housing.

Review question 1: Health trainer interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on health trainer interventions, the evidence showed:

  - Improvements in health trainers' confidence in relation to signposting recipients to prison services. Improvements in health trainers' knowledge and attitudes towards healthy behaviours were also observed.

Review question 1: Peer observers' interventions

- Only 1 study reported quantitative findings on the effect of peer observers. However, this study reported on suicide watch outcomes and so the data were not extracted.

Review question 1: Peer training interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer training interventions, the evidence showed:
  - No effect of peer training on anger levels, but small reductions were seen in self-esteem and optimism over the course of the evaluation.

Review question 1: Peer outreach interventions

- No studies presented quantitative evidence on peer outreach interventions.

Review question 1: Peer advisors' interventions

- No studies presented quantitative evidence on peer advisor interventions.

Review question 1: Peer support and counselling interventions

- Only 1 study reported quantitative findings on the effect of peer support and counselling. However, this study looked at the effect of peer support and counselling in the form of Narcotics Anonymous meetings and the 12-step programme and so the data were not extracted.

Review question 2: Comparison of peer-led and professionally-led interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 2 in which peer-led intervention were compared with professional-led interventions, the evidence showed:
  - Peer educators did not seem to be more effective than professional educators for most of the outcomes measured (intention to use a condom; intention to never use a condom; interest in taking a HIV test for the first time; interest in taking a HIV test now; condom use). However, "this could be expressed another way: that the peer educators were at least as effective as the professional educators for all of the outcomes measured and reported in the included studies" p60.
  - Overall, "Reported preferences for peers in some studies could not be linked to the four quantitative studies in which a direct comparison was made, as the intervention modes were different. There was consistent evidence from four quantitative studies that peer educators were as effective as (but not more effective than) professional educators in the prevention of HIV transmission for all of the outcomes measured. Although the peer observer intervention showed some positive effects for peers compared with professionals, this was only one study about a single intervention and there is therefore insufficient evidence to draw any conclusions" p99.

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

QUALITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews:

Review question 1: Peer education interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer education interventions, the qualitative evidence showed that:
  - Peer education deliverers found the role rewarding, in that "it improved their skills, gave their time in prison meaning and purpose and provided a supportive network. In one study prisoners preferred to be taught by a HIV-positive peer than a professional; in another, prisoners scored higher on knowledge tests with a HIV-negative peer educator than with a HIV-positive peer educator or a professional" p54.
  - Overall, "The development and empowerment of peer educators can be an important component in some peer education approaches, and there was moderate evidence from qualitative studies that peer educators benefited through rewarding experiences, the acquisition of skills, the development of supportive networks and improved mental health" p94.

Review question 1: Peer support interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer support interventions the qualitative evidence showed:
  - Peer support role led to increased self-esteem (although this was not seen when self-esteem was assessed quantitatively), increased knowledge, and improvements in prisoners' wider relationships.
  - Peer deliverers gained a more self-awareness and perspective on their lives, as well as a sense of purpose inside prison. They also developed skills to deal with their own health and offending issues. However, it was also acknowledged that the role could be challenging and burdensome.

Review question 1: Listener interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on listener interventions, the qualitative evidence showed:
  - Overall, "The review found consistent evidence from three qualitative studies and one quantitative study which strongly suggests that contact with a listener (or similar role) at a time of need was helpful in reducing anxiety, depressive thoughts and intention to self-harm, improving emotional health and helping with adjustment to the institution. There was evidence that the Listener scheme was acceptable and accessible to prisoners, from the perspective of both users and non-users" p96/
  - "There was consistent qualitative evidence from six studies on the benefits for the peer deliverer of becoming a listener; this was seen across a number of areas of well-being including relationships with staff, other prisoners and their families; self-esteem, self-worth and confidence; changing attitudes; social skills; and knowledge and awareness of mental health issues. There was some evidence of negative effects because of the emotional burden of care" p96.

Review question 1: Prison hospice volunteer interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on prison hospice volunteers, the qualitative evidence showed:

- Prison hospice volunteers experienced increases in self-esteem and self-worth, an enhanced sense of compassion for other people and a sense of 'giving something back'. Recipients of prison hospice peer support felt supported, and some had been enabled to overcome depression.

Review question 1: Peer mentoring interventions

- No studies presented qualitative evidence on peer mentoring interventions.

Review question 1: Health trainer interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on health trainer interventions, the qualitative evidence showed:
  - Improvements in health trainers' self-esteem, self-worth, and confidence were noted by staff, whereas recipients' self-esteem and confidence were boosted by being supported by health trainers. Improvements in knowledge and attitudes towards healthy behaviours were noted, although more frequently for the health trainers than for the recipients.
  - Health trainers developed their communication and listening skills, which were thought to be potentially transferable to future employment on release from prison.

Review question 1: Peer observer interventions

- No studies presented qualitative evidence on peer observers.

Review question 1: Peer training interventions

- No studies presented qualitative evidence on peer training interventions.

Review question 1: Peer outreach interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer outreach interventions, the qualitative evidence showed:

- Peer outreach volunteers felt that their role was worthwhile and that they were making a difference to the health of prisoners.

Review question 1: Peer advisor interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 1 on peer advisors' interventions, the qualitative evidence showed:
  - Peer advisors showed increased self-esteem and self-confidence and reported building a work ethic and sense of control over their lives. The peer advisor role was seen as worthwhile and purposeful and offering 'structure' to the prison day.

Review question 1: Peer support and counselling interventions

- No studies presented qualitative evidence on peer support and counselling interventions.

Review question 2: Comparison of peer-led and professionally-led interventions

- In relation to the outcomes on prisoner health and determinants of health for review question 2 in which peer-led intervention were compared with professional-led interventions, the qualitative evidence showed:
  - A strong preference among prisoners for peer educators over professional educators, for various reasons including that peer educators had increased empathy and understanding, did not judge, were approachable, credible and trustworthy and had more time for prisoners.
  - Overall, "there was consistent evidence across 10 qualitative studies that peer delivery was preferred to professional delivery, with cross-cutting themes including peer deliverers demonstrating empathy because of lived experiences, being non-judgemental, being trusted by prisoners and being able to offer more time than staff. Accessibility was also a theme, with prisoners feeling more at ease talking to peer deliverers. Results support the rationales advanced for lay involvement and peer support, which emphasise lay designation and the role of peers in connecting with the community of interest. The review findings were confirmed by prisoners attending the listening exercises" p98.

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

Outcome(s) relevant to this overview of reviews for which	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not reported

there was no useable evidence for the purposes of the overview	**List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not reported
Heterogeneity	QUANTITATIVE RESULTS **Causes of heterogeneity investigated (yes/no)**? Yes • **If yes, state methods of investigation**: "Statistical heterogeneity was examined using the chi-squared and I^2 statistics, with a chi-squared p-value of > 0.1 and a I^2 value of > 50% indicating statistical heterogeneity, in which case reasons for the heterogeneity would be investigated and a random-effects model would be used to determine whether or not the findings were robust to the choice of model" p12. • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: There was substantial clinical heterogeneity ("It was not possible to undertake much meta-analysis of the quantitative results because of clinical heterogeneity in the outcomes and interventions between the included studies" p91). In relation to heterogeneity in the result of the meta-analyses that were conducted, there was substantial heterogeneity in at least 2 of the 4 meta-analyses. **ALL RESULTS** • **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: "A diverse range of peer approaches was identified and this heterogeneity limited the ability to make comparisons. Interventions were often poorly described with little detail provided that might help replication. Most studies did not report an underpinning theoretical model and/or define what was meant by 'peer'. There needs to be better, more detailed reporting of peer interventions. The typology developed through this study provides a framework for mapping and categorising interventions, which may aid comparison. It is also essential that study reports include a full description of the intervention, including the recruitment, selection and training of peers" p103. "This study has confirmed that there is considerable heterogeneity in the range of peer-based interventions in the prison setting, in terms of both the health issues addressed and the mode of delivery" p93.

Parameter	Description
FINDINGS: Q3	QUANTITATIVE RESULTS

The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.

Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)? "Because of the lack of detail provided in the included studies, it was not possible to look at the modifying effects of type of institution, prisoner pathway or gender" p14. However, some results relevant to this question are listed below.

- **If yes, list and describe each factor according to the authors (include page number(s))**: See below.

Review question 1: Peer education interventions

Knowledge

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
HIV/AIDS-related knowledge	Self-report (yes/no questions)	Vaz (1996) Pre-post study	This study reported that prisoners with less than full primary school education were significantly less likely that those with more schooling to respond correctly to all questions both before (43% vs. 69%, $p < 0.00002$) and after (84% vs. 94%) ($p < 0.00001$) the peer education intervention. However, the less educated group showed a greater improvement in the proportion of correct answers for all questions compared to the more educated group (41% vs. 24%, $p < 0.00001$) (n = 600).	NR

Intentions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value,	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)

			heterogeneity, direction of effect)	
Condom use intention (to ever use, and to always use)	Self-report	Goldstein (2009) RCT	This study measured intentions by ethnicity and showed that peer education had the most effect on white prisoners: - Intention to *ever* use condom, Latino men (intervention vs. control): RR = 1.25 (95% CI: 1.04 to 1.50; n = 234) - Intention to *ever* use condom, African American men (intervention vs. control): RR = 1.07 (95% CI: 1.00 to 1.14; n = 480) - Intention to *ever* use condom, white men (intervention vs. control): RR = 1.28 (95% CI: 1.09 to 1.49; n = 459) - Intention to *always* use condom, Latino men (intervention vs. control): RR = 1.12 (95% CI: 0.89 to 1.40; n = 234) - Intention to *always* use condom, African American men (intervention vs. control): RR = 1.15 (95% CI: 1.02 to 1.31; n = 480) - Intention to *always* use condom, white men (intervention vs. control): RR = 1.61 (95% CI: 1.28 to 2.04; n = 459)	NR

Behaviour

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Engagement in peer education behaviour	Self-report, measure unspecified (it is made clear that participants reported on a scale, however) *Note*. It is unclear what is being measured exactly	Bryan (2006) Single group pre-post study	This study reported that older prisoners were more likely than younger prisoners to engage in peer education behaviour (no statistics were provided beyond the p value which was $p < 0.05$) (n = Not reported).	NR

Teacher preference

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Teacher preference	Appears to be measured using scores on other variables (e.g. knowledge scores, attitudes reported) as proxies for teacher preference	Sifunda (2008) Pre-post study	This study used both HIV-negative and HIV-positive peer educators (also prisoners). In the short term (presumed immediately post-intervention, but precise time Not reported), no statistically significant differences were found between the group taught by HIV-negative educators and the group taught by HIV-positive educators except for the knowledge variable in one prison ($p < 0.01$). In the longer term (3-6 months follow-up) the group with the HIV-negative peer educators had higher average scores than both the HIV-positive peer	"Short-term" (length of time unspecified) and 3-6 months' follow-up

			educator group and the control group for both attitudes towards condom use and sexual communication.	
Teacher preference	Self-report, measure unspecified	Grinstead (1997) RCT	This study reported a strong preference among inmates for being taught by a HIV-positive inmate rather than by an HIV/AIDS (professional) educator. This was most marked in the group who had received education from a peer (68% preferred to be taught by an inmate with HIV and 11% preferred to be taught by a HIV/AIDS educator) (n = Not reported).	NR

Review question 2: Comparison of peer-led and professionally-led interventions

Intentions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Condom use intention	Self-report	Grinstead (1997) RCT	This study no significant difference between peer-led (peer education) and professional-led groups for intention to use a condom (RR = 1.00, 95% CI: 0.96 to 1.04). When intention to use a condom was broken down by ethnicity, no significant differences were seen between groups taught by peers and groups taught by professionals except for African American	NR

			men's intention to always use a condom, which was statistically significantly greater in the peer-led than in the professional-led group (RR = 1.12, 95% CI: 1.01 to 1.24; n = Not reported).	

Preference for teacher

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Teacher preference	Self-report, measure unspecified	Grinstead (1997) RCT	This study on the topic of HIV/AIDS found a strong preference among prisoners for being taught by a HIV-positive prisoner rather than an HIV/AIDS (professional) educator. This was most marked in the group who had received education from a peer (68% preferred to be taught by a HIV-positive prisoner and 11% preferred to be taught by a HIV/AIDS educator) (n = Not reported).	NR

QUALITATIVE RESULTS

Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)? No.

- **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description

FINDINGS: Q4

The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.

Barriers

Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)? The review authors did not present findings on barriers explicitly; however, the following findings seemed relevant to this review question:

- **If yes, list and describe each barrier according to the authors (include page number(s))**:

Review question 1: Peer support interventions

- Qualitative evidence from 3 studies (Edgar, 2011; Boothby, 2011; Stewart, 2011) indicates that the demands placed on peer support workers/counsellors by other prisoners gave individuals a sense of purpose in prison and this was beneficial for combating boredom while service the prison sentence (Edgar, 2011; Boothby, 2011). One of these studies, however, reported that the role could be challenging and onerous for peer support deliverers, and the burden of care of supporting many prisoners could be problematic (Boothby, 2011).

Review question 1: Listener interventions

- There was some qualitative evidence from 4 studies of negative health effects, which "related to the emotional burden of listening to other prisoners' problems and issues. Discussions relating to suicidal intentions and other distressing topics could be particularly burdensome for peer deliverers to manage (Davies, 1994; Dhaliwal, 2009; Foster, 2011; Richman, 2004). […] There were also reports of peer deliverers experiencing 'burnout' and mental exhaustion as a result of the demands placed on their time by other prisoners (Foster, 2011; Richman, 2004)" p48.

Facilitators

Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)? No

- **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Some qualitative evidence spoke to features of the interventions that participants were attracted to; see qualitative evidence above.

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? No

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not made explicit. All peer support workers were provided training in the included studies; however, the details of the training (e.g. frequency, intensity, content, etc.) were not described in the review.

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description

FINDINGS: Q5

The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.

QUANTITATIVE RESULTS

Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)? Yes. The follow-up periods in many studies were not often made explicit; however, the following are noted:

- **If yes, state the follow-up period(s) and describe the findings at each one**:

Review question 5: Peer education interventions

Intentions

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
HIV intention (presumed intention to prevent HIV)	Self-report, measures unclear	Sifunda (2008) Pre-post study	Positive effects of the peer education programme on intentions in two of the three included prisons, both in the short term and 3-6 months after release: - HIV intention (presumed intention to prevent HIV) short-term prison 1: MD = -0.67 (95% CI: -0.99 to -0.35; n = 38). - HIV intention (presumed intention to prevent HIV) short-term prison 2: MD = -0.05 (95% CI: -0.30 to 0.20; n = 38). - HIV intention (presumed intention to prevent HIV) short-term prison 3: MD = -0.55 (95% CI: -0.85 to -0.25; n = 38). - HIV intention (presumed intention to prevent HIV) longer-term (3-6 months post-	"Short-term" (unknown length of time) and 3-6 months post-release

			release) prison 1: MD = -0.18 (95% CI: -0.34 to -0.02; n = 38). - HIV intention (presumed intention to prevent HIV) longer-term (3-6 months post-release) prison 2: MD = 0.10 (95% CI: -0.15 to 0.35; n = 38). - HIV intention (presumed intention to prevent HIV) longer-term (3-6 months post-release) prison 3: MD = -0.73 (95% CI: -1.12 to -0.34; n = 38).	

Behaviour

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Sexual communication short-term	Self-report, measure unspecified (it is made clear that participants reported on a scale, however)	Sifunda (2008) Pre-post study	There was no significant (within-group) effect of peer education on sexual communication in the short-term (length of time unknown) in any of the 3 prisons: - Prison 1: MD = -0.23 (95% CI: -0.68 to 0.22; n = 38) - Prison 2: MD = 0.07 (95% CI: -0.24 to 0.38; n = 38) - Prison 3: MD = -0.08 (95% CI: -0.35 to 0.19; n = 38).	"Short-term" (unknown length of time)
Sexual communication longer-term	Self-report, measure unspecified (it is made clear that participants reported on a scale, however)	Sifunda (2008) Pre-post study	There was no significant (within-group) effect of peer education on sexual communication in the longer-term in 1 of the 3 prisons:	3-6 months post-release

			- Prison 1: MD = -0.08 (95% CI: -0.56 to 0.40; n = 38) However, the was a significant and positive (within-group) effect of peer education on sexual communication in the longer-term in 2 of the 3 prisons: - Prison 2: MD = -0.24 (95% CI: -0.45 to -0.03; n = 38) - Prison 3: MD = -0.61 (95% CI: -1.03 to -0.19; n = 38).	

Self-efficacy

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Prisoner self-efficacy	Measure unspecified	Sifunda (2008) Pre-post study	No significant differences were seen in prisoner self-efficacy in the short or longer-term (3-6 months) in any of the 3 prisons involved in the study (n = Not reported). No statistics were provided.	"Short-term" (unknown length of time) and 3-6 months post-release

Mental health

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Anger and frustration	Measure unspecified	Penn State Erie (2011) Mixed methods study	This study focused on parenting skills among incarcerated fathers and	NR

			reported some prisoner outcomes not related to parenting. The study found no effect of a peer education intervention on anger and frustration, either immediately post intervention (MD = 0.20; 95% CI: -1.42 to 1.82) or at longer follow-up (MD = 1.40; 95% CI: -0.03 to 2.83) (length of time Not reported) (n = Not reported).	

Review question 1: Peer mentoring interventions

Employment

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Employment	Self-report	Goldstein (2009) Quantitative study (unspecified)	16/22 participants (73%) who had been released for at least 12 months were employed, were enrolled in an educational programme, or had completed the application process for disability benefits.	At least 12 months, but otherwise unspecified

Housing

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Housing	Self-report	Goldstein (2009)	18/22 participants (82%) who had been released for at least	At least 12 months, but otherwise unspecified

		Quantitative study (unspecified)	12 months had secured treatment, transitional housing, or a permanent place to live.	

QUALITATIVE RESULTS

Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)? Follow-up periods often not made explicit.

- **If yes, state the follow-up period(s) and describe the findings at each one**: Not reported

7.7.16 South *et al.* (2016)

Parameter	Description
Review title	"A qualitative synthesis of the positive and negative impacts related to delivery of peer-based health interventions in prison settings"
First author and year of publication	South *et al.* (2016)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Peer support-based interventions
Contributing primary studies	All 33 primary studies included in the systematic review were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). *Note*. The report makes available 'Additional file: Table S1' for download, which contains a table of characteristics of all 33 studies. One study in this table is not cited in the report itself ("The Learning Ladder Ltd. Mentoring for Progression: Peer Mentoring in a YOI. HMYOI Reading; 2010"). This study would not have been extracted for the purposes of this overview as it was conducted in a young offender institution. However, as it is not included in the report (only in Table S1), it was decided to continue with extraction from the main report, which reports on 33 studies.

Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "The aim of this paper is to report on a qualitative synthesis on positive and negative impacts relating to the delivery of peer interventions that was conducted as part of a systematic review of prison-based peer interventions" p2. *Note*. This report is part of a larger study (South *et al.* (2014)), which encompassed 4 research questions: "…three of these concerned the traditional assessment of effectiveness by examining the effects of peer-based interventions on prisoner health, comparison between peer and professional interventions, and cost effectiveness (results reported elsewhere [Bagnall *et al.* 2015]). This paper concerns the fourth review question (Review Question 2) which aimed to investigate the positive and negative impacts of delivering peer-based interventions on health services within prison settings. This review question concerned organisational and process issues, including prisoner views on peer delivery" p2. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: None explicitly stated in this paper; see extraction for larger main report by South *et al.* (2014).
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants was only reported for 3 of the 33 studies that inform this paper in 'Additional file 1: Table S1' that is available for download with the report (n = 700 in 1 study; n = 78 in 1 study; n = 56 in 1 study). *Note*. The larger report by South *et al.* (2014) notes, "Included studies reported outcomes for peer deliverers much more often than for service recipients" p92. It was often not clear in 'Additional file 1: Table S1' whether the participant characteristics being described pertained to the deliverers of peer-based intervention, the recipients, or both (all are prisoners). It may be assumed that the participant characteristics being described in the review pertain to both deliverers and recipients of peer-based interventions. In addition, for several included studies prison capacity was provided, which was not considered a valid proxy for sample size. **Age (mean and/or mode and/or range)**: Age range only was reported for 3 of the 33 studies that inform this paper in 'Additional file 1: Table S1' that is available for download with the report (modal age category = 18-29 years followed by 30-39 years in 1 study; age range = 20-50 years in 1 study; age range = 18-21 years in 1 study). **Sex**: Sex was only explicitly reported for 16 of the 33 studies that inform this paper in 'Additional file 1: Table S1' that is available for download with the report (all female in 8 studies; all male in 5 studies; explicitly stated mixed male and female sample in 3 studies; sex not stated but can be assumed mixed in 17 studies).

	Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour): In 'Additional file 1: Table S1', some descriptions of the participants in the studies included in the qualitative synthesis should be noted: • "A small (28-bed) minimum/medium security prison for Aboriginal women" (Ashton, 2010). • "Ill/dying prisoners at Dixon Hospice in Illinois" (Cichowlas, 2010). • "Aimed at women in prison with HIV/AIDS" (Collica, 2010). • "Women prisoners 'in distress'" (Correctional Service of Canada, 2009). • "Vulnerable or distressed prisoners or those at risk of suicide" (Dhaliwal, 2009). • "Ill prisoners at US Medical Centre for Federal Prisoners" (Maull, 1991). • "A state correctional facility in California. Drug treatment programme is located on a medium-security prison yard that houses male inmates" (Munoz-Plaza, 2005). • "3 UK prisons. Originally for older prisoners but including those with learning disabilities, mental health problems and physical and sensory disabilities" (Stewart, 2011). • "Dying prisoners in 14 prison hospices" (Wright, 2007a/2007b). *Note*. 3 studies included in the report on peer-based interventions being delivered in multiple prisons and 1 young offender institution/probation setting. As the results of these studies did not distinguish between participants in prisons and those in young offender institutions/probation settings and the majority of settings in which the intervention was delivered were adult prisons, the studies were included in this extraction. They are: • Boyce (2009): "Serving prisoners in three category B prisons (male) and one YOI (male)" • Brooker (2007): "Serving prisoners in 4 adult prison, one Young Offenders Institution and one probation setting", and • Hunter (2009): "Prisoners requiring housing advice in 5 prisons in South East England (Three Category B prisons (male), one young offender institution (male) and one female open prison.)".
Setting/context	**Countries (in alphabetic order)**: Australia (1 study), Canada (8 studies), Ireland (1 study), Moldova (1 study), UK (14 studies), USA (8 studies) (reported in 'Additional file 1: Table S1').

Details of the setting of interest or the community or a geographical location should be included.	**Specific setting(s) (include number of studies in each setting)**: All included studies were conducted in prison settings (with 3 studies also including 1 young offender institution, and 1 of those studies also including 1 probation setting; see note above). **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: "Peer workers, here defined as prisoners or ex-prisoners who deliver peer education or peer support in a voluntary or paid capacity in the prison, can act as mediators between professional services and prisoners" p2. [*Note*. See detailed extraction for South *et al.* (2014) for author definitions of different types of peer interventions]. Of the included studies, interventions were described as follows in 'Additional file: Table S1: • Peer education (6 studies). • Peer support (9 studies). • Listeners (4 studies). • Peer mentoring (2 studies). • Peer advisors (2 studies). • Peer support team (peer counselling) (1 study). • Peer outreach (1 study). • Peer education and counselling program (1 study). • Peer support/listeners (2 studies). • Health trainers (2 studies). • Prison hospice volunteers (2 studies). • Peer-led fathering program (1 study). *Note*. The description of the specific types of interventions in South (2016) varies slightly from the descriptions provided in South (2014), even though the South (2014) and South (2016) articles are reporting on the same overall review

	Any other relevant details related to the intervention of interest: Not reported
Databases and sources searched	**Number and names of databases searched**: "A range of 19 electronic databases were searched for publications since 1985, including those reporting clinical or health service research, e.g. MEDLINE, CINAHL; and social science research e.g. Sociological Abstracts, Campbell Collaboration Database" p3. *Note*. The methods in this extraction form were extracted from the paper, South *et al.* (2016). This paper focuses on qualitative synthesis methods, and a more detailed overview of the overall methodological approach (including eligibility criteria, appraisal process, and method of analysis) is provided in the larger man report by South *et al.* (2014). This means that for some additional relevant information pertaining to search strategy and other methods used in this review is reported in the detailed extraction for South *et al.* (2014). **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: "Strategies to identify relevant grey literature included scanning conference abstracts, website searches and requests to organisations related to offender health. An expert symposium held in 2012 helped gather specialist knowledge and a number of UK publications were identified through this route" p3. **Any search limits imposed (e.g. search dates, language restriction, etc.)**: The lower date bracket was 1985. **Protocol prepared (yes/no)**? Yes. • **If yes, was protocol published (yes/no)**? Yes. "A full systematic review protocol detailing search strategies and review methods was developed and published on PROSPERO (ref: CRD42012002349)" p2. **Search strategy/key words provided (yes/no, full search or example provided)**? No **Screening completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? "Two reviewers independently screened abstracts and then selected studies, with disagreements resolved initially by discussion between the researchers in relation to the inclusion/exclusion criteria. Where further clarification was needed, the study was discussed by the whole team and decisions were recorded" p3. **Extraction completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported

Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 33 primary studies • **Number of studies by study design**: Qualitative and mixed methods studies that included qualitative data were analysed for this paper. A breakdown of the number of qualitative and mixed methods studies is not provided.
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 1991 (1 study), 1994 (2 studies), 1998 (1 study), 2000 (3 studies), 2001 (1 study), 2002 (1 study), 2004 (2 studies), 2005 (1 study), 2006 (1 study), 2007 (3 studies), 2009 (6 studies), 2010 (4 studies), 2011 (4 studies), 2012 (3 studies).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: "It was anticipated that mainly qualitative evidence from process evaluations or studies reporting qualitative interview findings would be included for this question" p2. **Reasons for including study design(s) provided (yes/no)**? Not applicable • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? No
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: "Studies reporting qualitative data were assessed using the EPPI Centre framework for validity of qualitative research" p3. The process is not explained in the report or in 'Additional file: Table S1', but in order to interpret the results of the validity assessment reported in the additional file, we looked to the larger main report by South *et al.* (2014): "Each validity assessment form required the reviewer to make an overall assessment of internal validity and relevance, based on answers to the questions on the form. These were translated into a numerical score of 1–3 for internal validity (where 1 = good internal validity/low risk of bias, 2 = moderate internal validity/moderate risk of bias and 3 = poor internal validity/high risk of bias) combined with an alphabetical score of a–c for relevance (where a = highly relevant, b = of some relevance and c = not very relevant)" p12. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: Not reported **Quality appraisal completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported
Appraisal rating	**QUANTITATIVE COMPONENT**

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): Not applicable

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: Not applicable

Assessment of publication bias (yes/no): Not applicable

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? Not applicable

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? Not applicable

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Results are provided in 'Additional file: Table S1' (1 = good internal validity/low risk of bias; 2 = moderate internal validity/moderate risk of bias; 3 = poor internal validity/high risk of bias; a = highly relevant; b = of some relevance; c = not very relevant):

- 1 = 6 studies
  - 1a = 4 studies
  - 1b = 1 study
  - 1c = 1 study
- 2 = 14 studies
  - 2a = 1 study

- 2b = 10 studies
- 2c = 3 studies

- 3 = 13 studies
  - 3a = 0 studies
  - 3b = 4 studies
  - 3c = 9 studies

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): Yes

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: "There are limitations with both review methods and included studies which affect the strength of the conclusions. The choice of thematic analysis was made due to thin data and poor-quality reporting in many studies. By including methodologically weak studies relating to a number of interventions, it was possible to identify a wide range of themes pertaining to prison life, but the strength of evidence is limited. Use of meta-ethnography might have increased the strength of the conclusions, but only a small number of papers with thick descriptions of qualitative results could realistically have been included. A transparent and rigorous analysis method was used, with an additional process of quality review to check inter-rater reliability.

  "Although qualitative research is not validated through numbers, it was concerning that many included papers reported data from very small samples; for example two or three participants [Boothby, 2011; Sirdifield, 2006]. This reflects the constraints of undertaking research in a challenging environment, nevertheless it is difficult to be confident in those instances that data saturation has occurred. More high-quality studies are needed that examine prisoner and staff perspectives using rigorous qualitative sampling and analysis methods" p7.

Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: See below. • **GRADE assessment completed (yes/no)**? Not applicable – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT**

Justification for narrative synthesis or meta-analysis (yes/no): Not applicable

- **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable

QUALITATIVE COMPONENT

Specific data analysis technique and procedures used by review authors to analyse qualitative data: "A thematic synthesis of included studies reporting qualitative data (n = 33) was undertaken using methods described by Thomas and Harden. This method was chosen because the quality of reporting of qualitative results and the lack of thick descriptions in most included papers meant that meta-ethnography was unsuitable. An inductive approach to coding was used in preference to a pre-determined framework in order to capture the full range of impacts within the prison system. Familiarisation with a sample of papers preceded the development of an initial coding framework agreed by all qualitative review team members. For each study, the abstract and any sections of the publication reporting qualitative findings were included in the thematic analysis, as described by Thomas and Harden.

Two reviewers worked independently to free code textual data (both reports of qualitative findings and verbatim quotations from interview data), adding new codes as required until a complete set of descriptive codes was obtained. The next stage involved grouping the descriptive codes (n = 99) into organising codes and finally into thematic categories using an iterative process to obtain the best fit to explain the data. It was only at this stage that themes were mapped back to review questions. Finally, a thematic narrative synthesis was written for each review question checking back to the coded text to avoid de-contextualising data" p3.

The authors also described the steps they took to ensure rigour and reliability of the analysis:

- QSR NVIVO software was used for data management and to aid transparency of analysis
- Inter-rater reliability was achieved by two primary reviewers, who met throughout the process to review codes and to check coded text
- A third reviewer independently read and made memos on a varied sample of studies (just under a third of studies included in the qualitative synthesis), and then checked codes as displayed on NVIVO to ensure that there was consistency in the coding process between reviews and between studies, and
- The team used a reflexive team blog and had frequent meetings to discuss analysis.

"The choice of thematic analysis was made due to thin data and poor-quality reporting in many studies. […] Due to time constraints, and in line with the methods adopted, it was decided at protocol stage that only the abstract and findings sections would be included

	in the analysis. Given scientific reporting conventions, this should be sufficient, but some themes may have been missed if reported in discussion sections" p6.
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.	**List of authors' primary outcomes assessed relevant to this overview of reviews**: Authors reported, "Outcomes had to relate to prisoner health and determinants of health, process outcomes or views of prison populations" p3. The HRB consider this review to have explored the delivery process of peer support in prisons. **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	The report makes available 'Additional file: Table S1' for download, which contains a table of characteristics of all 33 studies. One study in this table is not cited in the report itself ("The Learning Ladder Ltd. Mentoring for Progression: Peer Mentoring in a YOI. HMYOI Reading; 2010"). This study would not be extracted for the purposes of this overview as it was conducted in a young offender institution. However, as it is not included in the report (only in Table S1), it was decided to continue with extraction from the main report, which reports on 33 studies. Peer-support interventions are slightly more complex than the other intervention families of interest to this overview of reviews in that the people who delivered and receive the intervention are prisoners. Therefore, factors such as engagement, attrition, etc. pertain to both peer support workers (prisoners) and recipients (prisoners). This systematic review predominantly refers to these factors in relation to peer support workers, while South *et al.* (2014) addresses effectiveness of peer support for recipients.
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs,	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))**

measures of heterogeneity should also be extracted.

For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented).

For qualitative syntheses, the key synthesised findings should be extracted.

- **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Overall findings (meta-analyses, authors' secondary outcome(s))

- **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable

Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)? Not applicable

QUANTITATIVE RESULTS – NARRATIVE

Provide the overall findings for each primary outcome via a statement indicating the following, where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? Not applicable

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)? "Two thematic categories encompassed themes on the delivery of peer interventions; these were (1) peer recruitment, training & support and (2) organisational support. The other two categories encompassed themes relating to the social context of the prison; these were (3) prisoner relationships and (4) prison life" p3. The themes are summarised below and elaborated on in the extracted findings for Q4.

- **Theme 1**: Peer recruitment, training and support/supervision (14 studies): Betts-Symond (2011), Blanchette (1998), Boothby (2011), Boyce (2009), Brooker (2007), Collica (2010), Davies (1994), Delveaux (2000), Edgar (2011), Foster (2011), Jacobson (2008), Syed and Blanchette (2000) (Joliette Institution), Syed (2000) (Grand Valley Institution), Stewart (2011).
  - **Recruitment methods** were rarely reported, but data on selection criteria for peer workers were consistent (i.e. security factors (e.g. excluding prisoners at risk of security breaches), voluntary drugs testing, system knowledge, basic literacy skills, sentence length of prisoner delivering intervention, interpersonal skills, commitment, and maturity).
  - **Motivation to take on a health role** was considered in some of the included studies (altruistic motivation, increased opportunity for parole, allocation to a single cell).
  - **Attrition and difficulties retaining peer support workers** due to sudden movements between institutions was a cross cutting theme.
  - **Training of peer workers** varied in content, duration, frequency and intensity across interventions, but overall little qualitative evidence evaluating modes of delivery. There is a need for more comprehensive training in mental health issues and the benefits of accredited training in providing prisoners with qualifications post-release.
  - **Supervision** typically provided within intervention by prison staff through one-to-one/group meetings. Little evaluation of support systems, but prisoners valued support overall.
- **Theme 2**: Organisational support (12 studies): Betts-Symond (2011), Blanchette (1998), Boothby (2011), Boyce (2009), Brooker (2007), Davies (1994), Delveaux (2000), Eamon (2012), Edgar (2011), Foster (2011), Hoover (2009), Jacobson (2008), Syed and Blanchette (2000).
  - **The importance of broader managerial support** within the prison in order to peer support scheme to operate successful was a major theme, as were supportive relationships with other external agencies such as third sector organisations.

  - **The importance of identified members of prison staff having responsibility** for peer interventions as a means by which to embed these interventions within the prisons was highlighted.
  - **The Importance of staff support at other levels** within the prison, including assisting movement of prisoners around the institution, was also emphasised.
  - **Lack of funding and staff resources** negatively impacted staff support for peer interventions.
- **Theme 3**: Prisoner relationships (13 studies): Boothby (2011), Boyce (2009), Blanchette (1998), Delveaux (2000), Dhaliwal (2009), Eamon (2012), Edgar (2011), Foster (2011), Schinkel (2012), Scott (2004), Sirdifield (2006), Syed and Blanchette (2000), Syed (2000).
  - **Recognition of the boundary between peer worker and intervention recipient** was important; several studies showed that peer workers knew when to communicate issues to health professionals or prison staff. Boundary issues (e.g. prisoner dependency on peer worker) are also important to consider.
  - **Reasons why prisoners did not utilise peer interventions**: lack of awareness, no personal need, concerns about confidentiality, preference for trained prison staff/cell mates/family, language barriers, and reluctance to demonstrate weakness to other prisoners.
  - **A lack of awareness and understanding of peer interventions** was a challenge for staff.
  - However, **regular communication and increasing familiarity** of the intervention among staff over time were facilitating factors.
- **Theme 4**: Prison life (20 studies): Blanchette (1998), Boothby (2011), Boyce (2009), Brooker (2007), Davies (1994), Delveaux (2000), Dhaliwal (2009), Edgar (2011), Foster (2011), Hall (2004), Hoover (2009), Hunter (2009), Jacobson (2008), Munoz-Plaza (2005), Scott (2004), Sirdifield (2006), Syed and Blanchette (2000), Syed (2000), Wright (2007a; 'Organizational analysis of prison hospice'), Wright (2007b; 'Creating decent prisons').
  - **Staff resistance** was identified as a significant barrier to the integration of peer interventions in prisons, which receded as recognition of the value of such interventions grew among staff.
  - **Placing prisoners in position of relative power and trust** brought challenges (e.g. being subject to abuse from other prisoners, or increased freedom leadings to prisoners in peer worker roles abusing their power). However, peer workers often acted as mediators between prisoners and staff, creating cohesion and a more effective communication process.

- **Wider impacts on the prisoner system**: Peer interventions may fill a gap in service provision by helping prisoners with stress management and improving self-esteem (Brooker, 2007). Peer support interventions provided opportunities to engage in fulfilling work and gain skills and qualifications (Edgar, 2011; Boyce, 2009; Brooker, 2007). There were benefits of peer support workers in relation to increasing the availability of staff availability for other duties (Edgar, 2011; Boyce, 2009; Davies, 1994; Foster, 2011; Syed & Blanchette, 2000; Jacobson, 2008; Syed, 2000; Boothby, 2011; Hunter, 2009; Munoz-Plaza, 2005). There was evidence of a positive impact on prison culture, ranging from peer support workers being able to diffuse volatile situations and more cohesion between staff and prisoners (Edgar, 2011; Davies, 1994; Foster, 2011; Syed & Blanchette, 2000; Blanchette, 1998; Wright 2007a; Wright 2007b). This qualitative evidence was not consistent; two studies reported very little impact of peer interventions on the prison regime (Delveaux, 2000; Brooker, 2007).

  Note. The results above in relation to wider impact on the prisoner system are more detailed as these findings are not relevant to Q4 on barriers and facilitators. All other findings are elaborated on below under Q4.

Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Acceptability and feasibility are a focus of this qualitative review; therefore, findings in relation to these factors are distributed throughout the results described above.

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? The only reference to attrition was that attribution and difficulties retaining peer workers due to sudden movements of prisoners between institutions was a cross-cutting theme (Edgar, 2011; Boyce, 2009; Syed & Blanchette, 2000; Delveaux, 2000; Brooker, 2007; Betts-Symond, 2011; Collica, 2010; Syed, 2000).

Comparator(s) used in the interventions delivered in the included studies: Not reported

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): The deliverers of the interventions are also prisoners and ex-prisoners.

	If relevant, characteristics of individuals who delivered the intervention (e.g. gender): The total number of participants was only reported for 3 of the 33 studies that inform this paper in 'Additional file 1: Table S1' that is available for download with the report (n = 700 in 1 study; n = 78 in 1 study; n = 56 in 1 study). *Note*. The larger report by South *et al.* (2014) notes, "Included studies reported outcomes for peer deliverers much more often than for service recipients" p92. It was often not clear in 'Additional file 1: Table S1' whether the participant characteristics being described pertained to the deliverers of peer-based intervention, the recipients, or both (all are prisoners). It may be assumed that the participant characteristics being described in the review pertain to both deliverers and recipients of peer-based interventions. In addition, for several included studies prison capacity was provided, which was not considered a valid proxy for sample size. **Duration(s) of the intervention**: Not reported **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**: Not reported
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	**QUANTITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: Not applicable **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable **QUALITATIVE RESULTS** **Author's primary outcome(s) relevant to this overview of reviews**: The 4 main themes are summarised above. "The overall conclusion is that peer interventions to improve health cannot be considered stand-alone interventions. Health services therefore need to consider service delivery in terms of levels within the prison system from individual prisoner through to prison culture. Rather than a linear implementation process, **the results suggest that a capacity building process is needed, both developing capacity in the offender population to provide advice, information and support, and in the organisation to enable smooth service delivery**" p7. **Author's secondary outcome(s) relevant to this overview of reviews**: Not applicable
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Although qualitative data related to the role of gender was not a focus of the review, the review authors note the following evidence gap: "Across all studies in the review, there were limited qualitative data exploring the distinctive needs of women prisoners in comparison to men, or on gender issues more broadly" p5 **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable

Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? Not applicable • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: "Due to variation in the quality of data reported within the original studies, the results range from descriptive themes which lack depth through to cross cutting themes which are supported by rich data drawn from a number of studies" p3. Notably, the authors indicated where there are strong/consistent data to support their themes and where the data are particularly thin. "While there were risks in synthesising results from heterogeneous studies, using NVIVO to label and retrieve full text helped avoid de-contextualising data" p6.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No – **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4	**Barriers**

The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.

Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)? The paper does not report on all of the following factors as barriers per se (some are identified as barriers); however, for the purposes of this overview of reviews, the relevant aspects of each theme have been categorised as barriers or facilitators (barriers are underlined below).

- **If yes, list and describe each barrier according to the authors (include page number(s))**:
  - Theme: Peer recruitment, training and support
    - Attrition and the difficulties retaining peer workers due to sudden movements of prisoners between institutions" was identified as a cross cutting theme (Edgar, 2011; Boyce, 2009; Syed & Blanchette, 2000; Delveaux, 2000; Brooker, 2007; Betts-Symond, 2011; Collica, 2010; Syed, 2000).
  - Theme: Organisational support
    - Lack of funding and staff resources in prisons negatively impacts on staff support for peer support interventions (Delveaux, 2000; Brooker, 2007), and staff support is a recognised as an important mechanism for successful operation of peer support schemes (see below).
  - Theme: Prisoner relationships
    - Boundary issues were highlighted as a challenge; for example, studies of 'Listeners' reported prisoner dependency on certain individuals (Foster, 2011) and peer workers having concerns over maintaining appropriate boundaries for their role (Dhaliwal, 2009).
    - Reasons why prisoners did not utilise peer interventions included:
      - Lack of awareness within the prisoner population (Schinkel, 2012; Syed & Blanchette, 2000; Delveaux, 2000; Syed, 2000)
      - No personal need (Syed & Blanchette, 2000; Delveaux, 2000)
      - Concerns with confidentiality (Syed & Blanchette, 2000; Delveaux, 2000; Blanchette, 1998)
      - Preference to discuss issues with trained staff, cell mates or family members (Foster, 2011; Delveaux, 2000)
      - Language barriers (Syed & Blanchette, 2000; Syed, 2000), and

    - Not demonstrating weakness to other prisoners (Edgar, 2011; Foster, 2011).
  - Staff-specific challenges to the operation of peer support schemes in prisons were lack of awareness and understanding of peer interventions among staff (Boyce, 2009; Delveaux 2000; Boothby, 2011; Eamon, 2012).
- Theme: Prison life
  - Staff resistance was reported as a significant barrier to the integration of peer support interventions in prisons (Boyce, 2009; Davies, 1994; Syed & Blanchette, 2000; Syed, 2000; Hoover, 2009; Scott, 2004; Wright, 2007a), which was in one study described as being underpinned by security concerns (Edgar, 2011). Some studies reported that staff resistance to peer support schemes receded as recognition of the value of these schemes grew (Boyse, 2009; Davies, 1994; Scott, 2004).
  - Peer workers are more susceptible to criticism and abuse from other prisoners as due to their alignment with staff; that is, when some prisoners (peer support workers) are placed in positions of relative power and trust, this may affect their place in the prison negatively (Blanchette, 1998).
  - Increased security risks: enhanced freedom and access to other prisoners could lead to greater security risk, influencing how peer support interventions were delivered (Boyce, 2009; Boothby, 2011; Hall, 2004).
  - Peer support workers were either perceived to, or reported to, abuse their position of trust in 11 studies; distribution of contraband such as tobacco or mobile telephones was a primary concern (Edgar, 2011; Boyce, 2009; Davies, 1994; Foster, 2011; Syed & Blanchette, 2000; Delveaux, 2000; Brooker, 2007; Blanchette, 1998; Syed, 2000; Sirdifield, 2006; Hall, 2004).

Facilitators

Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)? The paper does not report on all of the following factors as facilitators per se (albeit some are identified as facilitators); however, for the purposes of this overview of reviews, the relevant aspects of each theme have been categorised as barriers or facilitators (facilitators are underlined below).

- **If yes, list and describe each facilitator according to the authors (include page number(s))**:
  - Theme: Peer recruitment, training and support
    - Selection criteria for recruiting peer support workers in prison were consistent in the literature:

  - Security factors (i.e. excluding prisoners perceived to be at risk of security breaches, such as distribution of contraband) (Edgar, 2011; Boyce, 2009; Davies, 1994; Foster, 2011; Syed & Blanchette, 2000).
  - Providing a voluntary drug test (Boyce, 2009).
  - Having knowledge of the system and 'jail craft' (Davies, 1994).
  - Basic literacy skills (Boyce, 2009).
  - The period of time the prisoner was likely to be staying in the prison (Boyce, 2009; Syed & Blanchette, 2000; Delveaux, 2000).
  - Interpersonal skills and commitment (Edgar, 1022; Boyce, 2009; Brooker, 2007; Jacobson, 2008).
  - A level of maturity (Davies, 1994; Foster, 2011).
- Motivation of prisoners to take on a health role was described and included:
  - An altruistic desire to support others (Edgar, 2011; Boyce, 2009; Foster, 2011).
  - Perceived personal benefits such as increase opportunity for parole (Foster, 2011; Brooker, 2007; Blanchette, 1998)
- Training for peer support workers in prison is mentioned as an important aspect of the delivery of effective peer support interventions; however, the review authors note that there was "very little qualitative evidence evaluating modes of delivery" and that the training of peer support workers in the included studies that reported on training "varied in content, duration, frequency and intensity across interventions" p4.
- Supervision of peer workers could be considered as either a barrier or a facilitator. Supervision was provided within interventions by prison staff, either through one-to-one or group meetings (Edgar, 2011; Boyce, 2009; Brooker, 2007) or by external agencies (Boyce, 2009; Davies, 1994; Collica, 2010). However, the review authors note that there was little in-depth evaluation of support systems, but that most studies reported that prisoners valued support. One study reported inadequate support for participants in their peer role (Stewart, 2011).

- Theme: Organisational support

- Broader managerial support within the prison was consistently emphasised in order to ensure that peer support schemes operate effectively (Edgar, 2011; Boyce, 2009; Davies, 1994; Foster, 2011; Syed & Blanchette, 2000; Jacobson, 2008; Blanchette, 1998; Betts-Symond 2011; Eamon, 2012).
- Supportive relationships with external agencies such as third sector organisations was reported as useful to the operation of peer support schemes in prison (Edgar, 2011; Davies, 1994; Foster, 2011).
- Staff involvement and support, both in relation to identified members of staff having responsibility for the implementation of peer interventions (Edgar, 2011; Syed & Blanchette, 2000; Hoover, 2009) and staff support at other levels within the prison (e.g. assisting movement of prisoners around the institution) (Boyce, 2009; Betts-Symond, 2011) was identified as an important mechanism to embed peer interventions within the prison.

– Theme: Prisoner relationships

- Recognition of the boundary between peer support workers and recipients was considered important, with number of studies reporting that peer workers knew when to 'pass-on' issues to healthcare professionals or prison staff (Foster, 2011; Blanchette, 1998; Boothby, 2011; Eamon, 2012; Sirdifield, 2006).
- Staff-specific facilitators to the operation of peer support schemes were regular communication (Boyce 2009; Eamon, 2012) [unclear with whom; other staff, peer support workers, or peer support recipients?] and increased familiarity of the intervention over time (Scott, 2004)

– Theme: Prison life

- Effective communication emerged as peer support workers acted as mediators between the prison population and staff (Syed & Blanchette, 2000; Syed, 2000; Boothby, 2011; Dhaliwal, 2009).

Engagement

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? The paper does not report on factors related to engagement per se; however, for the purposes of this overview of reviews, a relevant aspects of one theme can be seen to be related to prisoner engagement:

- Theme: Peer recruitment, training and support

- The review authors described an aspect of this theme that related to “the benefits of accredited training in providing prisoners with qualifications of use after release” (Edgar, 2011; Boyce, 2009; Brooker, 2007), although this is not explicitly described as a means by which to motivate prisoners to become peer-support workers in prison and no additional information was provided.

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? The results describe selection criteria for peer support workers, which speak to the kinds of prisoners that are optimal to engagement peer support work. These are described above under the findings for theme 1.

- **If so, why were they preferred**? See above.

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? Not applicable

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not reported

Review authors’ comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors’ overall conclusions from qualitative evidence: The intervention communication process was not a focus of this systematic review. The review authors report on qualitative findings in relation to improved communication between staff and prisoners with the implementation of peer support schemes, but this is a finding of these studies rather than an aspect of intervention implementation.

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable **QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.17 Villafaina-Domínguez *et al.* (2020)

Parameter	Description
Review title	"Effects of Dog-Based Animal-Assisted Interventions in Prison Population: A Systematic Review"
First author and year of publication	Villafaina-Domínguez *et al.* (2020)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative	Animal-based interventions

interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	
Contributing primary studies	The information presented in this extraction form applies only to the 15/20 primary studies included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to 5 studies included in the systematic review was not extracted as 2 of the studies were conducted in psychiatric prisons and 3 of the studies were conducted in young offender institutions. *Note*. Overall, the results of this review lacked clarity. The results were therefore not extracted as they cannot be used in the synthesis.
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "…the aim of the present review was to provide an up-to-date analysis of the studies, published in scientific journals indexed in well-known databases, on the effects of dog-based AAI in female and male inmates, independently of their age (young or adults inmates), as well as to provide future directions" p2. **Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.**: The following exclusion criteria were applied: • The study was not written in English, French, Italian, Portuguese, or Spanish. • The article was presented as a summary at a conference or seminar. • The paper was a dissertation or thesis. • The paper outlined a professional experience.
Participants The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.	**Number of participants in the included primary studies**: The total number of participants included in the 15 primary studies relevant to this overview of review was 1030. **Age (mean and/or mode and/or range)**: Mean (SD) age or age range was reported for each individual study but not for all included studies. All studies included adult participants, with mean ages (or age ranges) from 20s to 60s, with the exception of 1 study (Cooke, 2015) in which participants were both adult in males and young inmates; as the study was set in a prison, it was considered relevant to the current overview of reviews.

	Sex: • Male only prisoners: 5 studies. • Female only prisoners: 6 studies. • Mixed male and female sample: 3 studies. • Sex unspecified: 1 study. **Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour)**: Some notable characteristics of participants in the included studies are (Table 2): • "Drug-addicted male inmates" (1 study; Contalbringo, 2017). • "Female inmates (adults and young) with problems in psychological and emotional health (1 study; Cooke, 2015). • "Female inmates with mental illness" (1 study; Jasperson, 2010). • "Male inmates with developmental disorders" (1 study; Koda, 2015). • "Male inmates with psychiatric or/and developmental disorders" (1 study; Kida, 2016).
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Not reported **Specific setting(s) (include number of studies in each setting)**: All included studies deemed relevant to this overview of reviews were set in prisons. **Other features of the setting(s) relevant to the analysis**: Not applicable
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: "The AAI [Animal Assisted Interventions] is the umbrella term that refers to the deliberate and meaningful inclusion of animals into human health, wellbeing, or educational interventions [16]. Therefore, animal-assisted activities (AAA) and animal-assisted therapies (AAT) fall under this umbrella term. On the one hand, the AAA are less-formal interventions that aim to provide opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance quality of life but are not necessarily individualized or documented [17]. On the other hand, the AAT are defined as a goal oriented, planned, structured, and documented therapeutic intervention directed by health and human service providers in which an animal that meets specific criteria is an integral part of the treatment process. […] Different Animal Assisted Interventions AAI approaches in terms of scope, aim, eligibility, or animal species involved have been described. In this regard, dogs

intervention, the frequency, and/or intensity of the intervention.	and horses are the most common therapy animal, but equine-assisted activities or therapies usually requires that the participant go to a specific facility where the horses are, thus the applicability in the prison context is reduced. The dog-based AAI consists of providing care and training for dogs, and sometimes, it includes vocational or educational components to enhance employability" p2. "Among the activities included in these programs were dog walking, dog training, taking care of dogs or rescue dogs as well as using the dog as emotional support during the therapy" p7. Table 3 provides detailed descriptions of each dog-based animal-assisted interventions evaluated in the primary studies. **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: PubMed and Web of Science (including Current contents connect, Derwent innovations index, Korean journal database, Medline, Russian science citation index, SciELO citation index). **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: Google scholar **Any search limits imposed (e.g. search dates, language restriction, etc.)**: Not reported **Protocol prepared (yes/no)**? Not reported • **If yes, was protocol published (yes/no)**? Not applicable **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, search terms provided. **Screening completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported **Extraction completed in duplicate (yes/no)**? Not reported • **If yes, how were disagreements resolved**? Not reported
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 15 primary studies. • **Number of studies by study design**: The designs of the included studies were described as follows: – Observational (quantitative): 5 studies. – Observational (qualitative): 6 studies.

	– Non-randomised trial (quantitative): 2 studies. – Qualitative : 1 study. – RCT (quantitative): 1 study.
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 2010 (1 study), 2013 (1 study), 2015 (3 studies), 2016 (1 study), 2017 (3 studies), 2018 (1 study), 2019 (4 studies), 2020 (1 study). *Note*. Several studies have a different publication date (by 1 year) in the bibliography compared to in-text.
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: "The studies were included if they met the following inclusion criteria: (a) quantitative or qualitative randomized controlled trial or observational design, focused on dog's assisted therapy" p3. **Reasons for including study design(s) provided (yes/no)**? No • **If yes, describe the justification(s)**: Not applicable **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes, in Figure 1 (in Villafaina-Domínguez *et al.* 2020). Reports were excluded if: – It was describing an experience. – It was a study protocol. – It was not focused on inmates. – No full text was available.
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: The Evidence Project risk-of-bias tool. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: The tool includes eight items that are rated as yes, no, not applicable, or not reported: 22. Cohort. 23. Control or comparison group. 24. Pre-post intervention data.

25. Random assignment of participants to the intervention.

26. Random selection of participants for assessment.

27. Follow-up rate of 80% or more.

28. Comparison groups equivalent on sociodemographics.

29. Comparison groups equivalent at baseline on outcome measures.

Note. It appears that studies did not receive an overall risk of bias rating.

Quality appraisal completed in duplicate (yes/no)? Not reported

- **If yes, how were disagreements resolved**? Not reported

Appraisal rating

QUANTITATIVE COMPONENT

Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality): All studies were assessed as being at a high risk of bias; although this is not explicitly stated. It is evidence from the illustration of the assessment results.

- **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: "…results must be taken with caution, since the risk of bias and quality assessment showed critical issues in the vast majority of the articles" p16

Assessment of publication bias (yes/no): No

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

	If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? No **QUALITATIVE COMPONENT** **Description of the results of the quality assessment of qualitative data**: Not applicable **Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no)**: Not applicable • **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not applicable
Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported.	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: The review authors do not explicitly outline a method of analysis. The results section provides a descriptive overview of the findings of each included primary studies in a Table. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: No • **If appropriate, justification for combining data in meta-analysis (yes/no)**: Not applicable **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: Not applicable
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research	**List of authors' primary outcomes assessed relevant to this overview of reviews**: Outcomes are not stated a priori; rather, the outcomes reported in each included study are reported throughout the results section. These were primarily anxiety and depression, with other outcomes such as tension, irritation, vigor fatigue, distraction, perspective taking, social role, symptom distress, interpersonal relationship, empathic concern, emotional state, cortisol level, and emotional stability, among others.

synthesis, i.e. the names or labels of the outcomes. Not recidivism, substance use, or mental illness treatment metrics	*Note*. The review authors distinguished between outcomes reported from quantitative studies (Table 4) and outcomes reported from qualitative studies (Table 5). However, some of the studied reported on in Table 5 reported outcomes based on survey data collected using psychometric measures. **List of authors' secondary outcomes relevant to this overview of reviews**: Not applicable
Findings:	[See separate extraction tables below for each research question]
General comments	
References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	QUANTITATIVE RESULTS – META-ANALYSES **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable QUANTITATIVE RESULTS – NARRATIVE **Provide the overall findings for each primary outcome via a statement indicating the following, where reported:**

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**.
  - The review authors state that results from quantitative and qualitative studies are presented in Tables 4 and 5. However, Table 4 does not report the results of pre-post or intervention vs. control group comparisons (i.e. no effect estimates, p values, confidence estimates, or indications of the direction of effects. The table does provide an indication as to the comparison reported on in each primary study (i.e. between group or within group), but not the results of these comparisons are not provided. Table 5 presents some results; however, the measures used are often not clear (e.g. 'motherhood', 'security', 'serving time') and in the case of one study, only outcomes for the control group, and not the experimental group, are reported. Therefore, none of these results have been extracted.

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported: Not applicable

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. Not applicable

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)?

Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)?

Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

	Intervention acceptability and feasibility: Not reported **Fidelity monitoring**: Not reported **Other characteristics of intervention planning, delivery, and evaluation**: Not reported **What was stated regarding participant attrition**? Not reported **Comparator(s) used in the interventions delivered in the included studies**: 11 studies [Antonio, 2017; Cooke, 2015; Jasperson, 2010; Koda, 2015; Koda, 2016; Kunz-Lomelin, 2020; Minke, 2017; Minton, 2015; Smith & Smith, 2019; Smith, 2019; Stetina, 2020] did not include a control group, while the design of remaining 4 studies [Flynn, 2019; Contalbrigo, 2017; Jasperson, 2013; Collica-Cox, 2019] did. In this regard, treatment as usual or activities without dog presence were the most usual protocols for control groups. Only 1 study of those which presented a control group included a passive control group (where participants did not participate in any therapy or activity) [Flynn, 2020]. Control groups used were: • Parenting, prison, and pups' program without animal-assisted intervention (Collica-Cox, 2018). • Standard rehabilitation program (Contalbrigo, 2017). • Passive control group that did not participate in the program (Flynn, 2019). • Psycho-education and therapeutic intervention without dog (Jasperson, 2013). **Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.)**: Not reported • **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported **Duration(s) of the intervention**: The duration of the interventions lasted from 4 weeks to 208 weeks (NR for 5 studies). **Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies)**: The intervention frequencies ranged from 1 day per week to 3 days per week (NR for 9 studies), with sessions lasting from 30 minutes to 120 minutes (NR for 9 studies).
Overall direction of results MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.	QUANTITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: "Dog-based AAI could be a useful tool to improve many different variables including mental health, emotional control, empathy, or academic skills in male and female inmates. However, the methodological quality of the included studies was not optimal, and the heterogeneity of the participants and outcomes was large.

Thus, further studies with higher methodological quality are required and subgroups are encouraged to enable the extraction of strong recommendations and conclusions" p16.

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

QUALITATIVE RESULTS

Author's primary outcome(s) relevant to this overview of reviews: Not applicable

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not reported **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not reported
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: There was no formal investigation of heterogeneity reported in this review. However, the authors draw attention to what they perceive to be notable levels of heterogeneity among the samples included in the primary studies: "The large heterogeneity of the people in prison in terms of sex, gender, age, educational background, mental disorders, drug addiction, etc., must be considered." p16. In addition, the authors draw attention to the hybrid mix of outcomes reported in the primary studies: "The heterogeneity of participants and outcomes mean that the conclusions of the systematic review must be taken with caution" p16. **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: "The complexity of the target population leads to a great heterogeneity of the studies and a poor methodological quality of many of them. This makes it difficult for this systematic review to draw conclusions in relation to the different mechanisms and specific strategies used in AAI [animal-assisted interventions]" p15.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? Not applicable • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable **Engagement** **How were prisoners attracted to taking part in the intervention**? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not reported

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? Not reported

- **If so, why were they preferred**? Not reported

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? No

- **If so, were certain features of behaviour change found to be more attractive for participants**? **Not applicable**
- **If so, how and why were these features more attractive**? Not applicable

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? No

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not applicable

Review authors' overall conclusions from qualitative evidence: Not applicable

Parameter	Description
FINDINGS: Q5 The relevant findings or results presented by the included reviews in relation to the	**QUANTITATIVE RESULTS** **Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)**? No • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

longevity of the impact of effects of intervention.	**QUALITATIVE RESULTS** **Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)**? Not applicable • **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

7.7.18 Woods *et al.* (2017)

Parameter	Description
Review title	"A systematic review of the impact of sport-based interventions on the psychological well-being of people in prison"
First author and year of publication	Woods *et al.* (2017)
Intervention family that the review speaks to List one or more of the following (wording used in our protocol): Sports- and exercise-based interventions; Horticultural interventions; Yoga, meditation, and mindfulness-based interventions; Art and creative interventions; Animal-based interventions; Peer support-based interventions; Smoking cessation interventions; Healthy eating and nutrition interventions	Sports- and exercise-based interventions
Contributing primary studies	The information presented in this extraction form applies only to 12/17 primary studies (9 reports; one report contains 4 individual intervention studies) included in the systematic review that were deemed relevant to the purposes of the current overview of reviews (i.e. those studies in which a non-pharmacological intervention of interest to this overview was delivered to individuals in adult prisons). Information pertaining to 5 studies included in the systematic review was not extracted as these studies were conducted in young offender institutions.
Review objectives	**Review research question(s) and/or objective(s) (include page number(s))**: "…the primary purpose of this systematic review was to determine the impact of sport-based interventions on the psychological well-being of people in prison. A second aim was to review the intervention studies to determine what theory of behaviour change is included within the design and evaluation of sport-based

interventions within prison. Finally, the review will examine the extent to which sport is provided as a stand-alone intervention or augmented with additional components in line with the sport-plus model, such as peer mentoring, life-skills classes etc" p52.

Exclusion criteria (if any) related to population, intervention, outcome, setting, etc.: Table 1 outlines the following exclusion criteria:

- People with chronic physical or mental illness.
- People with physical disabilities.
- People aged below 15 years of age.
- Individuals not serving a prison sentence at time of intervention.

In addition, foreign language studies and "non-peer reviewed articles or grey literature including non-peer reviewed reports, editorials, and Masters or PhD dissertations were excluded" p52.

Participants

The defining characteristics of the participants in studies included in the research syntheses/review should be detailed.

Number of participants in the included primary studies: The total number of participants included in the 12 primary studies (9 reports) relevant to this overview of review was 454.

Age (mean and/or mode and/or range): Information pertaining to age was provided in Table 5 for participants in each individual study.

- Mean age was provided in 2 studies: 38.4 years and 17.2 years.
- Age range was provided in 4 studies: 18-50 years (2 studies), 20-60 years, and 18-48 years.
- Lower age bracket was provided in 2 studies: 36+ years and 18+ years.
- No information pertaining to participants' age was reported 4 studies (3 of these studies with no information pertaining to age were presented in the same publication which presented the findings of 4 individual intervention studies).

Sex: Information pertaining to sex was provided in Table 5 for participants in each individual study.

- All male participants in 6 studies.
- All female participants in 4 studies.
- Mixed; both male and female participants in 2 studies (93% male in 1 study with 100 participants in total and 43% male in another study with 7 participants in total).

	Details of any additional participant characteristics (e.g. ethnicity, physical/mental health diagnoses, length of sentence, severity of criminal behaviour): Not reported
Setting/context Details of the setting of interest or the community or a geographical location should be included.	**Countries (in alphabetic order)**: Australia (4 studies (1 publication)), Canada (1 study), Italy (1 study), USA (4 studies). The country in which the research was conducted was Not reported for the remaining 2 studies. **Specific setting(s) (include number of studies in each setting)**: All 11 primary studies (8 reports) relevant to this overview of review were conducted in prisons with varying levels of security. 6 studies were excluded as they were in young offenders' institutes. *Note*. In one of the included studies (Bilderbeck *et al.* 2013), the intervention was delivered in 6 prisons and 1 young offender institution. This study was nevertheless deemed relevant to the current overview of reviews as the majority (6/7) of intervention settings were adult prisons and the results of the study did not distinguish between outcomes among participants residing in one of the 6 prisons and participants residing in the young offender institution. **Other features of the setting(s) relevant to the analysis**: Not reported
Description of interventions/phenomena of interest to this overview of reviews Clear, succinct details of the interventions or phenomena of interest should be presented as described by systematic review author(s), including the type of intervention, the frequency, and/or intensity of the intervention.	**Authors' definition of the intervention(s) (typically in introduction, include page number(s))**: The systematic review authors describe sports-based interventions in line with Coalter's (2007) definition of "sport plus": "Coalter differentiates between: (a) Traditional forms of sport provision, which would for example include, independent exercise in the prison gym, with an implicit assumption or explicit affirmation that the exercise has inherent developmental properties; and (b) Sport Plus in which sports are adapted and/or augmented with parallel programmes to overtly maximise development objectives, A third classification of Plus Sport is also defined by Coalter, in which sport's popularity is used to attract participants to programmes of education and training, where the systematic development of sport is rarely an aim" p52. "The interventions consisted of either sport only, or sport as part of a broader multi-component intervention, using additional educational or counselling components, in line with Coalter's definition of "sport plus"" p54. • Six studies detailed sport or yoga only interventions (Battaglia *et al.* 2014; Bilderbeck *et al.* 2013; Gallant *et al.* 2015 (4 individual interventions in 1 publication); Harner *et al.* 2010; Libbus *et al.* 1994; Munson, 1988). • One study included sport alongside goal-setting and weekly nutritional seminars (combined intervention) (Martin *et al.* 2013). • One study focused on an intervention which included sport alongside cognitive behavioural techniques and psychotherapy (combined intervention) (Nelson *et al.* 2006).

	• One study detailed an intervention based on outdoor adventure activities, alongside social, creative and reflective activities (combined intervention) (Leberman, 2007). Woods *et al.* (2017) examined sports-based interventions using 11 studies (8 papers). The interventions consisted of either sport only (including yoga), or sport as part of a broader multi-component intervention, using additional educational or counselling components, in line with Coalter's definition of 'sport plus'. Five of the studies detailed sport only interventions (Battaglia *et al.*, 2014; Bilderbeck *et al.*, 2013; Gallant *et al.*, 2015 [four studies in 1 paper]; Harner *et al.*, 2010; Libbus *et al.*, 1994). One of the studies included sport alongside goalsetting and weekly nutritional seminars (Martin *et al.*, 2013). One study focused on an intervention which included sport alongside cognitive behavioural techniques and psychotherapy (Nelson *et al.*, 2006). One study detailed an intervention based on outdoor adventure activities, alongside social, creative and reflective activities (Leberman, 2007). **Any other relevant details related to the intervention of interest**: Not reported
Databases and sources searched	**Number and names of databases searched**: "A systematic search was conducted in April 2016 in six databases: 1) Criminal Justice Abstracts by EBSCO; 2) National Criminal Justice Reference Service (NCJRS) Abstracts; 3) Scopus; 4) SPORTDiscus; 5) Ovid PsycINFO; and 6) Web of Science" p52. **Other searches undertaken (including grey literature, supplementary searches, hand searching/reference chasing, expert consultation, etc.)**: The review authors conducted hand searching of the reference lists of retrieved studies (p53). **Any search limits imposed (e.g. search dates, language restriction, etc.)**: "Each database was searched from the year of their inception until April 2016" p52. **Protocol prepared (yes/no)**? Yes • **If yes, was protocol published (yes/no)**? Yes. "A review protocol detailing the main objectives, key design features and planned analyses was registered with PROSPERO (ID number: CRD42016040005)" p52. **Search strategy/key words provided (yes/no, full search or example provided)**? Yes, the key words used are provided in Table 1 (p52): Prison; Criminal; Offender; Remand; Probation; Felon; Inmate; Convict; Sport; Exercise; Physical activity; Outdoor activity. **Screening completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? Not reported **Extraction completed in duplicate (yes/no)**? Yes

	• **If yes, how were disagreements resolved**? "In the case of continued disagreement, a third reviewer was available" p53.
Number and types of primary studies included in the systematic review	**Number of studies relevant to this overview of review**: 12 primary studies (9 publication; 1 publication included 4 individual intervention studies). • **Number of studies by study design**: The designs of the included primary studies relevant to this overview of reviews were (p53-54): – Quantitative: 7 studies • RCT (3 studies) • Pre-post intervention design with a non-randomised control group (1 study) • Within-group repeated measures design (1 study) • Cross-sectional design (2 studies) – Qualitative: 5 studies, predominantly interview based • 4 studies involved interviews with participants at post intervention only (cross-sectional) (these 4 studies were all presented in 1 publication) • 1 study conducted interviews post the intervention and again at 3 months follow-up.
Date range (years) of included studies	**Exact years of publication of studies relevant to this overview of review**: 1988 (1 study), 1994 (1 study), 2006 (1 study), 2007 (1 study), 2010 (1 study), 2013 (2 studies), 2014 (1 study), 2015 (4 studies; 1 publication).
Justification and description of primary studies included/excluded in the systematic review	**Planned study design(s) to be included**: No restrictions placed on study design due to the setting. **Reasons for including study design(s) provided (yes/no)**? Yes • **If yes, describe the justification(s)**: "Due to the anticipated paucity of experimental studies available within the complex environment of prison settings, study design was left open to all qualitative and quantitative designs" (Table 1, p53) **List of excluded studies at full text provided (yes/no)**? No • **Reasons for exclusion provided (yes/no)**? Yes. "Of the 65 articles reviewed a further 51 were excluded based on the following criteria: six were not peer reviewed; one was a non-prison-based population; five detailed a population including participants

	under 15 years of age; four examined populations specifically suffering from chronic physical and/or mental illness; 29 did not examine a specific sports-based intervention; and six did not include a psychological well-being outcome measure" p53.
Appraisal instrument(s) The instrument or tool used to assess risk of bias, rigour or study quality should be reported.	**The full name of the quality assessment tool(s) used**: "The quality assessment tool 'QUALSYST' from the "Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields" (Kmet, Lee, & Cook, 2004), was chosen to assess the risk of bias" p52. **Description of the tool(s) and appraisal procedure(s) (e.g. scoring process)**: "This pragmatic tool enables the assimilation of both quantitative and qualitative studies, with an overall assessment score ranging from 0 to 1 assigned on the basis of 14 individual criteria (quantitative studies) or 10 individual criteria (qualitative studies). Specific criteria were scored ("yes" = 2, "partial" = 1, "no" = 0), and items not applicable to a particular study design were marked "n/a" and were excluded from the calculation of the summary score. An overall score ranging from 0 to 1 was then calculated for each paper by dividing the total sum score obtained across rated items by the total possible score, with a resulting rating of weak (0.00-0.49), moderate (0.50-0.74), or strong (0.75-1.00)" p52. "It should be noted that QualSyst allows for 'n/a' on some criteria, where a condition is not possible to assess. Therefore, when assessing sports-based interventions within prison, if conditions such as intervention type and blinding of subjects was not possible in a randomised control trial (RCT), it was classified as 'n/a', rather than having a negative impact on the quality assessment" p53. **Quality appraisal completed in duplicate (yes/no)**? Yes • **If yes, how were disagreements resolved**? "Following independent review, the researchers discussed findings and reached agreement. In the case of continued disagreement, a third reviewer was available" p53.
Appraisal rating	QUANTITATIVE COMPONENT **Number of studies by high risk of bias (low quality), uncertain/moderate risk of bias (low quality), and low risk of bias (high quality)**: Ratings for quantitative studies: • Low risk of bias: 4 studies • Moderate risk of bias: 3 studies • High risk of bias: 0 studies • **Authors' comments on risk of bias and how it affected the synthesis/analysis and certainty of evidence (include page number(s))**: Not reported

Assessment of publication bias (yes/no): No

- **If yes, how was publication bias assessed**? Not applicable
- **If yes, authors comment of likelihood and magnitude of publication bias (include page number(s))**: Not applicable
- **If present, how was publication bias dealt with**? Not applicable

Only low risk of bias studies included in the review synthesis (yes/no)? No

- **If a meta-analysis was conducted, were only low risk of bias studies included in meta-analysis (yes/no)**? Not applicable

If studies with high or uncertain/moderate risk of bias or non-randomised studies of interventions were included in the synthesis, was there sufficient discussion of likely impact of risk of bias on results and certainty of evidence in the summary/discussion/conclusions (yes/no)? No

QUALITATIVE COMPONENT

Description of the results of the quality assessment of qualitative data: Ratings for 4 qualitative studies:

- Low risk of bias: 1 study
- Moderate risk of bias: 4 studies (all of which were presented in 1 publication)
- High risk of bias: 0 studies

Discussion of how the results of the quality assessment of qualitative data impact on the overall findings of the review (yes/no): No

- **Authors' comments on how the results of the quality assessment of qualitative data affected the overall findings of the review (include page number(s))**: Not reported

Method of analysis The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by	**Description of method of analysis as per authors (include page number(s) and distinction between approaches to analysing quantitative and qualitative data, if relevant)**: "The outcome measurements retrieved were indicators of psychological well-being (or ill-being), the measurement tool used and whether or not the intervention had a significant positive or negative effect ($p < 0.05$). Cohen's d effect size was calculated for each intervention where the mean and standard deviation score was available. Outputs from the data extraction were assessed by a second researcher (GB), and following discussion, information was clarified or added to as required" p53.

the included research synthesis should be reported.	"Due to inclusion of both qualitative and quantitate studies within the systematic review, a textual narrative approach was adopted to synthesize the data extracted. Barnett-Page and Thomas (2009), in their critical review of methods for the synthesis of qualitative research highlight the appropriateness of a textual narrative approach for synthesizing evidence of different types (e.g. qualitative, quantitative, economic etc) and identifying heterogeneity and issues of quality appraisal. It was therefore considered that this data synthesis approach best suited the study aims" p53. • **GRADE assessment completed (yes/no)**? No – **If yes, review authors' approach to GRADE assessment**: Not applicable **QUANTITATIVE COMPONENT** **Justification for narrative synthesis or meta-analysis (yes/no)**: Yes • **If appropriate, justification for combining data in meta-analysis (yes/no)**: See above. **QUALITATIVE COMPONENT** **Specific data analysis technique and procedures used by review authors to analyse qualitative data**: See above.
Outcome(s) assessed Included here should be the outcomes of interest to the overview of reviews question reported on by the research synthesis, i.e. the names or labels of the outcomes.	**List of authors' primary outcomes assessed relevant to this overview of reviews**: • **Primary outcome 1**: Psychological well-being (all included studies reported on at least 1 measure pf psychological well-being). **List of authors' secondary outcomes relevant to this overview of reviews**: The following were identified as aims of the review, rather than primary outcomes. Therefore, they have been included as secondary outcomes: • **Secondary outcome 1**: Theories of behaviour change included within the design and evaluation of sport-based interventions in prison. • **Secondary outcome 2**: The extent to which sport is provided as a stand-alone intervention or augmented with additional components in line with the sport-plus model, such as peer mentoring, life-skills, classes etc.
Findings:	[See separate extraction tables below for each research question]
General comments	

References to previously published versions of systematic review	N/A

Parameter	Description
FINDINGS: Q1 and Q2 For quantitative results – meta-analyses, include the effect estimate with 95% CIs, measures of heterogeneity should also be extracted. For quantitative results – narratively reported, include a statement indicating the key results relevant to each outcome (include statistics where they are presented). For qualitative syntheses, the key synthesised findings should be extracted.	**QUANTITATIVE RESULTS – META-ANALYSES** **Overall findings (meta-analyses, author's primary outcome(s))** • **In the table below, name the primary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Overall findings (meta-analyses, authors' secondary outcome(s))** • **In the table below, name the secondary outcome(s), describe how each outcome was assessed/measured, include first author (year) of each primary study that contributed to each outcome, present the statistical results, and indicate the timeframe if provided**: Not applicable **Was an appropriate weighting technique used in meta-analyses, with adjustment for heterogeneity where necessary (yes/no)**? Not applicable **QUANTITATIVE RESULTS – NARRATIVE** **Provide the overall findings for each primary outcome via a statement indicating the following, where reported:** • **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome**. **Primary outcome: Psychological wellbeing** • Outcomes measures used: Across the 7 relevant quantitative studies, 10 different assessment tools were detailed measuring items related to psychological well-being or ill-being (no studies incorporated questionnaires directly measuring psychological well-being, such as The Warwick Edinburgh Mental Well-being Scale): – The Beck Depression Inventory (Harner *et al.* 2010; Libbus *et al.* 1994).

- The Beck Anxiety Inventory (Harner *et al.* 2010).
- The Self-esteem Inventory (Form B: Munson (1988).
- The Perceived Stress Scale (Bilderbeck *et al.* 2013; Harner *et al.* 2010).
- The Symptom-90 Checklist Revised (Battaglia *et al.* 2014).
- The Positive and Negative Affect Scale (Bilderbeck *et al.* 2013).
- The Brief Symptom Inventory (Bilderbeck *et al.* 2013).
- A single item measure of self-esteem, with a reported concurrent validity of 0.93 with the Rosenberg Self-Esteem Scale (1965) (Williams *et al.* 2015).
- Two additional measures were non-validated questions incorporated into custom questionnaires measuring several different factors in 2 studies:
  - Martin *et al.* (2013) measured self-reported change at end of programme on Energy Level, Sleep Quality and Stress, and
  - Nelson *et al.* (2006) asked participants 1 question, "Does the exercise help you in moments of depression, stress and anxiety?".

- Four of the five quantitative studies which incorporated pre and post measures related to either psychological well-being (e.g. self-esteem) or ill-being (e.g. depression, anxiety) reported significant improvements ("Of note was the diverse definitions and measurements the studies associated with the concept of psychological well-being" p56):

Depression

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Depression	Symptom-90 Checklist Revised	Battaglia (2014) RCT	Significant decreases for both intervention groups (Cardio and Resistance Training and High Intensity Strength Training) in comparison with the usual care control group (p	NR (Intervention lasted for 9 months)

			< 0.05, d = -0,75), and (p < 0.01, d = -0.82) respectively (total n = 64 male prisoners). Significant increase in depression in the usual care group (p < 0.05).	
Depression	Beck Depression Inventory-II	Harner (2010) Within-group repeated measures study	Significant (within-group) decrease in BDI scores (p < 0.01) following Iyengar yoga intervention (n = 21 female prisoners).	NR (Intervention lasted for 12 weeks)
Depression	Beck Depression Inventory	Libbus (1994) Pre-post study, non-randomised control group	Significant (within-group) decrease in BDI mean scores following aerobic exercise intervention (decrease of 18.76, p = 0.0001) (n (total including control group) = 45 male prisoners). Significantly lower scores in the aerobic exercise intervention group compares to the usual care control group control (p = 0.0001) (n = 45 male prisoners).	NR (Intervention lasted for 12 weeks)

Psychological distress

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Overall psychological distress (Global Severity Index (GSI))	Symptom-90 Checklist Revised	Battaglia (2014) RCT	Significant (within-group) decrease in scores on the Global Severity Index (GSI) for the Cardio and Resistance Training group (p < 0.01) (total n = 64 male prisoners).	NR (Intervention lasted for 9 months)

Psychological distress	The Brief Symptom Inventory	Bilderbeck (2013) RCT	Significant (within-group) decrease in psychological distress ($p < 0.01$) in hatha yoga intervention group (total (including control group) n = 93 male and 7 female prisoners). Significant decrease in perceived stress in hatha yoga group compared to usual care control group ($p < 0.05$) (total n = 93 male and 7 female prisoners).	NR (Intervention lasted for 10 weeks)

Anxiety

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Anxiety	Symptom-90 Checklist Revised	Battaglia (2014) RCT	Significant (within-group) decrease in anxiety for the High Intensity Training group ($p < 0.05$) (total n = 64 male prisoners).	NR (Intervention lasted for 9 months)
Phobic anxiety	Symptom-90 Checklist Revised	Battaglia (2014) RCT	Significant (within-group) decrease in phobic anxiety for the High Intensity Training group ($p < 0.05$) (total n = 64 male prisoners).	NR (Intervention lasted for 9 months)
Anxiety	Beck Anxiety Inventory	Harner (2010) Within-group repeated measures study	Anxiety scores decreased ($p = 0.06$) but not significantly following Iyengar yoga intervention (n = 21 female prisoners).	NR (Intervention lasted for 12 weeks)

Stress

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Perceived stress	The Perceived Stress Scale	Bilderbeck (2013) RCT	Significant (within-group) decrease in perceived stress ($p < 0.001$) in hatha yoga intervention group (total (including control group) n = 93 male and 7 female prisoners). Significant (within-group) decrease in perceived stress ($p < 0.05$) in usual care control group (total n = 93 male and 7 female prisoners). Significant decrease in perceived stress in hatha yoga group compared to usual care control group ($p < 0.05$) (total n = 93 male and 7 female prisoners).	NR (Intervention lasted for 10 weeks)
Perceived stress	The Perceived Stress Scale	Harner (2010) Within-group repeated measures study	Stress scores initially dropped but returned to baseline by end of 12 weeks following Iyengar yoga intervention (n = 21 female prisoners).	NR (Intervention lasted for 12 weeks)
Stress levels	Self-reported change in stress levels at the end of programme	Martin (2013) Cross-sectional survey	A strong majority (94%) of participants reported a positive impact of intervention (exercise (circuit stations and aerobic routine) plus nutrition programme) on stress levels post-intervention (intervention n = 16 female prisoners)	NR (Intervention lasted for 6 weeks)
Stress, depression and anxiety	Single question: "Does the exercise help you in moments of depression, stress and	Nelson (2006) Cross-sectional survey	A majority (75%) of participants reported a positive impact the combined intervention (physical activity aimed at	NR

	anxiety?"		improving upper, lower, and midsections of the body plus cognitive behavioural techniques, psychotherapy, transactional analysis, and moral reconation therapy) on stress, depression, and anxiety (n = 105 male prisoners).	

Miscellaneous

Systematic review primary outcome(s)	How the outcome was assessed (e.g. self-report, observation, etc.)	First author (year) of all primary studies that measured the outcome	Results (no. participants/studies, effect estimate, CIs, p value, heterogeneity, direction of effect)	Length of time between intervention delivery and outcome assessment (i.e. follow-up period)
Interpersonal Sensitivity (I-S)	Symptom-90 Checklist Revised	Battaglia (2014) RCT	Significant (within-group) decrease in Interpersonal Sensitivity (I-S) for the Cardio and Resistance Training group ($p < 0.01$) (total n = 64 male prisoners).	NR (Intervention lasted for 9 months)
Positive affect	The Positive and Negative Affect Scale	Bilderbeck (2013) RCT	Significant (within-group) increase in positive affect ($p < 0.05$) in hatha yoga intervention group (total (including control group) n = 93 male and 7 female prisoners). Significantly higher positive affect in hatha yoga group compared to usual care control group ($p < 0.05$) (total n = 93 male and 7 female prisoners).	NR (Intervention lasted for 10 weeks)
Energy levels	Self-reported change in energy levels at the end of programme	Martin (2013) Cross-sectional survey	All participants reported a positive impact of intervention (exercise (circuit stations and aerobic routine) plus nutrition programme) on energy levels	NR (Intervention lasted for 6 weeks)

			(intervention n = 16 female prisoners).	
Sleep quality	Self-reported change in sleep quality at the end of programme	Martin (2013) Cross-sectional survey	A strong majority (81%) of participants reported a positive impact of combined intervention (exercise (circuit stations and aerobic routine) plus nutrition programme) on sleep quality post-intervention (intervention n = 16 female prisoners)	NR (Intervention lasted for 6 weeks)
Self-esteem	The Self-Esteem Inventory (Form B)	Munson (1988) RCT	No significant (within-group) changes in self-esteem across time-points for any group (physical activity group, leisure education group, informal discussion) (n = 39 male prisoners).	NR (Intervention lasted for 10 weeks)

Provide the overall findings for each secondary outcome via a statement indicating the following key results where reported:

- **The no. participants and/or studies that contributed to the outcome, effect estimates, CIs, p values/statement about statistical significance, directions of effect), and the first author (year) of all primary studies that contributed to each outcome.**

Secondary outcome 1: Theories of behaviour change included within the design and evaluation of sport-based interventions in prison

No behaviour change theory was presented in association with the sport or physical activity element within included studies. “This is not to suggest all programmes referenced within the studies exist in isolation from suitable theories or behavioural frameworks, which might affect the desired outcomes. Rather, the studies examined, purposefully or otherwise, have not included descriptions of them” p56.

- Two studies provided an explicit reference to an underpinning theory of change or philosophy for the impact of the sport-based intervention on psychological well-being (Harner *et al.* 2010; Liberman, 2007).
  - Liberman (2007) identified Kurt Hahn's philosophy, centring on personal and social development through challenging adventure experiences, with real consequences.

- Harner *et al.* (2010) designed their intervention around a gender-responsive programming framework developed by Bloom, Owen, and Covington (2003), which identifies six guiding design principles (Gender, Environment, Relationships, Services, Socio-economic status and Community).

- One study cited the inclusion of psychotherapy techniques, Kohlberg's moral reconation therapy (MRT) (Nelson *et al.* 2006).

Secondary outcome 2: The extent to which sport is provided as a stand-alone intervention or augmented with additional components in line with the sport-plus model

This aim (which has been identified as a secondary outcome for the purposes of this overview of reviews) is not described in the Results section of the report; instead, it is discussed in the Discussion section. The review authors note that the majority of all included studies incorporated sport as part of a multi-component intervention. They provide "additional goal setting and motivation sessions" from Amtmann and Kukay (2016) as an example.

- The review authors note, "Two key questions arise from this: i) does one approach increase the potential for impact on psychological well-being? and ii) within the multi-component approaches, what portion of any subsequent impact can be attributed to the use of sport? The latter mirrors previous concerns regarding the attribution of causality in sport for development programmes targeting at-risk populations" p57-59.

Separate summaries reported for RCTs and non-randomised studies when included in the same review (yes/no)? No

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Certainty of evidence (if reported) Not applicable

QUALITATIVE RESULTS

Which key themes are stated to have emerged from the qualitative research studies (include, where reported, the no. participants/studies first author (year) of primary studies that contributed to each theme)?

One study of female offenders and outward-bound activities, also reporting increased confidence and self-esteem (Leberman, 2007).

- Table 6 reports the following qualitative findings for Leberman (2007): "Development of personal skills, e.g. increased self-confidence and self-esteem. Development of interpersonal skills, e.g., teamwork and communication. Also, participants reported the programme provided a good environment to apply learning from different courses".

Note. The fifth study to report qualitative data is that of Gallant *et al.* (2015) (4 reports). The results are only reported on Table 6, as follows:

- Gallant *et al.* (2015) Study 1: "Positive mental (increased happiness, reduced stress, anxiety, tension) and physical health outcomes; diversionary service; privilege, which also modified behaviour in prison; learn new skills; model appropriate social behaviours (fostered sense of pride/achievement)".
- Gallant *et al.* (2015) Study 2: "Positive mental (reduced stress and anxiety) and physical health outcomes; improved social interactions; diversion from daily monotony; constructive outlet to vent frustration and anger; participation a privilege - incentive for improved behaviour".
- Gallant *et al.* (2015) Study 3: "Pass time and alleviate boredom and resultant impact (arguments); positive impact on physical and mental health (stress and anxiety); personal challenge; something to connect with outside of prison away from 'old crew'".
- Gallant *et al.* (2015) Study 4: ""A few" reported increase in physical health and one reported positive impact on mental health (reduced stress and anxiety related to family issues). Effective diversion; model behaviour on release; create harmony amongst various indigenous inmate groups".

Descriptive account of intervention

Intervention tailoring and modification: Not reported

Intervention planning: Not reported

Intervention acceptability and feasibility: Not reported

Fidelity monitoring: Not reported

Other characteristics of intervention planning, delivery, and evaluation: Not reported

What was stated regarding participant attrition? Not reported

Comparator(s) used in the interventions delivered in the included studies: Comparators were not described sufficiently in order to easily determine. Table 6 outlines the following:

- 2/7 quantitative studies reported on 3 groups:

  - Battaglia *et al.* (2014) included i) a cardiovascular plus resistance training (CRT) group, ii) a high intensity training (HIST) group, and iii) a usual care group.
  - Munson (1988) included i) a leisure education group, ii) a physical activity, group, and iii) an informal discussion group.
- 3/7 quantitative studies reported on 2 groups:
  - Bilderbeck *et al.* (2013) included i) a yoga classes group (hatha yoga postures, stretches, breathing exercises), and ii) a usual care group.
  - Libbus *et al.* (1994) included i) an aerobic exercise group and ii) a usual care group.
  - Martin *et al.* (2013) included i) an exercise (circuit stations and aerobic routine) and nutrition programme group and ii) a usual care group.
- 2/7 quantitative studies did not include a comparison group:
  - Harner *et al.* (2010) used a within group repeated measure design.
  - Nelson *et al.* (2006) used a cross-sectional design with no comparator group described by the review authors.

Mode(s) of delivery (e.g. prison officers, health care professionals, peer support workers, etc.): Not reported

- **If relevant, characteristics of individuals who delivered the intervention (e.g. gender)**: Not reported

Duration(s) of the intervention: Table 5 reports the following for each study in relation to intervention and frequency:

- Battaglia *et al.* (2014): 9 months, supervised training protocols, 1 hr, 2 x week (cardiovascular plus resistance training group and high intensity training group).
- Bilderbeck *et al.* (2013): 2hr 1 x week for 10 weeks (Hatha yoga group).
- Harner *et al.* (2010): 2hr, 2 x week for 12 weeks (Iyengar yoga group).
- Libbus *et al.* (1994): 12 weeks, 1hr, 3 x week (aerobic exercise group).
- Martin *et al.* (2013): 6 weeks, minimum commitment, 3 x week (exercise (circuit stations and aerobic routine) and nutrition programme).
- Munson (1988): 10 weeks, 1 x week (leisure education group, physical activity group, informal discussion group).

- Nelson *et al.* (2006): 30min, 3 x week (physical activity, delivered alongside cognitive behavioural techniques, Gestalt psychotherapy, transactional analysis and moral reconation therapy (MRT)).
- Gallant *et al.* (2015) Study 1: "Weekly soccer program, established in partnership with not-for-profit organisation. Involved follow inmates and visiting teams. Additional information on intensity and duration of program not detailed".
- Gallant *et al.* (2015) Study 2: "Softball program, delivered twice each week. Overall duration of program and session length not detailed".
- Gallant *et al.* (2015) Study 3: "Physical exercise program, including soccer, football, softball and a bootcamp. Run on rotating weekly basis with different cohorts. Overall duration of program and session length not detailed".
- Gallant *et al.* (2015) Study 4: "Australian rules football competition. Local teams brought into prisons to play bi-weekly. Inmates participate in finals at off-site location. Overall duration of program and session length not detailed".
- Leberman (2007): A 20 day residential of outdoor adventure activities course, which included ropes course, sailing, and hiking, as well as social, creative, and reflective activities.

Frequencies of intervention exposure: (e.g. weekly in 5 studies, monthly in 2 studies): See above.

QUANTITATIVE RESULTS

Overall direction of results

MK/LM to describe the overall conclusion made by the systematic review authors in relation to each outcome in plain English.

Author's primary outcome(s) relevant to this overview of reviews: "A positive trend was observed in the use of sport-based interventions to make a positive contribution to the psychological well-being of people in prison. However, the heterogeneity of interventions and outcomes, alongside the methodological weaknesses outlined, prevent any firm conclusions" p60.

In relation to combined interventions, the authors note, "Two key questions arise from this: i) does one approach increase the potential for impact on psychological well-being? and ii) within the multi-component approaches, what portion of any subsequent impact can be attributed to the use of sport?" …" Considering the first question, results from the nine quantitative studies provide no clear answer regarding the ability of one intervention design to produce the greater impact. Five of these nine studies were sport only interventions, with four reporting significant positive impact on psychological well-being. Of the remaining four 'sport-plus' interventions, three reported a positive impact on psychological well-being, although two of these were based on a single non-validated item within a post-intervention survey. The multicomponent "Get Onside" rugby intervention reported no significant positive or negative impact on self-esteem" p57/59.

Author's secondary outcome(s) relevant to this overview of reviews: Not applicable

	QUALITATIVE RESULTS **Author's primary outcome(s) relevant to this overview of reviews**: "Although seven from nine of the quantitative studies reported a positive impact on psychological well-being (or ill-being), results from the qualitative studies were less equivocal with all five reporting positive impact on psychological well-being. Qualitative studies also reported a mix of perceived impacts on psychological well-being and ill-being. In contrast to the quantitative studies, impact on psychological well-being, however described, was never explicitly identified at the outset as an aim in any of the qualitative studies, which renders the pathway from intervention design to well-being outcome more difficult to clearly identify and duplicate" p57. *Note*. While the authors reported that the findings of qualitative studies highlighted "a positive impact on psychological well-being and ill-being for all programmes, with improvements in self-concept, self-confidence, self-esteem, positive thinking, stress, and anxiety" (p55), 3 of the qualitative studies were deemed not relevant to this overview of reviews as they were conducted in young offender institutions. The review authors' conclusion related to qualitative evidence takes these studies into account In relation to combined interventions, the authors note that one highlighted adverse effects (Leberman, 2007; see results for Q5 below). **Author's secondary outcome(s) relevant to this overview of reviews**: Not reported
Outcome(s) relevant to this overview of reviews for which there was no useable evidence for the purposes of the overview	**List any of the review authors' primary outcomes of interest for which there was no evidence**: Not applicable **List any of the review authors' secondary outcomes of interest for which there was no evidence**: Not applicable
Heterogeneity	**QUANTITATIVE RESULTS** **Causes of heterogeneity investigated (yes/no)**? No • **If yes, state methods of investigation**: Not applicable • **If yes, provide a brief indication of the extent of heterogeneity in the relevant results**: Not applicable **ALL RESULTS** **Authors' comment on potential impact of heterogeneity on results and/or certainty of evidence**: "The heterogeneity of interventions and outcomes, alongside the methodological weaknesses outlined, prevent any firm conclusions" p60.

The authors also state, "…of note was the diverse definitions and measurements the studies associated with the concept of psychological well-being" p56.

Parameter	Description
FINDINGS: Q3 The relevant findings or results presented by the included reviews in relation to the identified factors that impacted the effectiveness of the interventions.	**QUANTITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable **QUALITATIVE RESULTS** **Did the review identify any specific factors that impacted the effectiveness of the intervention (yes/no)**? No • **If yes, list and describe each factor according to the authors (include page number(s))**: Not applicable

Parameter	Description
FINDINGS: Q4 The relevant findings or results presented by the included reviews in relation to the barrier and facilitators of success.	**Barriers** **Did the review identify any explicit barriers to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each barrier according to the authors (include page number(s))**: Not applicable **Facilitators** **Did the review identify any explicit facilitators to the success of the intervention and/or successful delivery of the intervention (yes/no)**? No • **If yes, list and describe each facilitator according to the authors (include page number(s))**: Not applicable **Engagement**

How were prisoners attracted to taking part in the intervention? Not reported

How were prisoners motivated to aim to achieve outcomes related to the intervention? Not reported

Intervention

Were certain features of the interventions found to be more attractive for participants? How and why are these features more attractive? Not reported

If relevant, what efforts were made to help participants continue with the programme? Not applicable

Did the review authors comment on who participants believed to be the best person/persons to deliver the intervention? Not reported

- **If so, why were they preferred**? Not applicable

Intervention communication process

Was there any specific training provided as part of the intervention (e.g. psychological behaviour change techniques)? One of the studies deemed relevant to this overview of reviews involved sport/exercise related training; specifically, supervised cardio and resistance training and high intensity training protocols (Battaglia *et al.* 2014).

- **If so, were certain features of behaviour change found to be more attractive for participants**? Not reported
- **If so, how and why were these features more attractive**? Not reported

Was fidelity to implementation protocol mentioned by review authors in relation to qualitative studies? Not reported

Review authors' comments on participants perceptions of the communication process in qualitative studies: Not reported

Review authors' overall conclusions from qualitative evidence: See findings from Q1; no additional qualitive conclusions related to the planning and implementation of, or communication processes related to, the intervention(s).

Parameter	Description

FINDINGS: Q5

The relevant findings or results presented by the included reviews in relation to the longevity of the impact of effects of intervention.

QUANTITATIVE RESULTS

Did the review authors examine longer lasting effects of the interventions (beyond the first follow-up period) (yes/no)? No

- **If yes, state the follow-up period(s) and describe the findings at each one**: Not applicable

QUALITATIVE RESULTS

Did the review authors examine longer lasting impacts of the interventions (beyond the first follow-up period) (yes/no)? Yes

- **If yes, state the follow-up period(s) and describe the findings at each one**: "Leberman (2007) [qualitative study] interviewed 14 of the original 27 participants at three months post-course attendance. […] Although there is no specific detail on the interim time lapsed prior to follow-up interviews" p55.
- "Only Leberman (2007), reported the presence of adverse effects. These were identified by participants in the three-month follow-up study. […] Six from 14 of those interviewed at follow-up by Leberman, reported a perceived negative effect on mood due to a lack of purposeful activities to engage with on return to the prison environment following intervention. There was a feeling that the intervention had therefore been a waste of time as nothing they learnt had been put to good use, and that they had been "let down" (Leberman, 2007, p. 121)" p55-56.
- "Only eight [of all studies included in the review] collected pre and post intervention data and only two included a medium to long-term follow-up, as a result of which Leberman (2007), identified adverse impacts. Results therefore highlight a need for longitudinal assessment for impact on psychological well-being" p60.

7.8 Appendix 8 Outcomes by intervention and by outcome measures

Table 60 Health promotion interventions by mental, psychological and emotional well-being outcomes and outcome measures in prisoners

Review	Intervention	Mental wellbeing or wellness	Mental and emotional distress (e.g. depression, anxiety)
Sports and exercise-based intervention			
Canada *et al.* 2020	Sports and exercise-based interventions reported as BE-ACTIV i.e. (Behavioural Activities Intervention)	Affect positive [affect or mood change] Pleasant events Functioning	Depression
Martinez Merino *et al.* (2017)	Sports- and exercise-based interventions	Effectiveness not measured	Effectiveness not measured
Mohan *et al.* (2018)	Sports- and exercise-based interventions reported as structured mixed physical activity interventions combined with health education	Not measured	Not measured
Perry *et al.* (2023)	Sports- and exercise-based interventions reported as exercise combined with education	Not measured	Symptoms of anxiety Symptoms of depression (no results)
Sanchez-Lastra *et al.* 2019	Sports- and exercise-based interventions reported as aerobic exercise programmes	Not measured	General mental health
Sanchez-Lastra *et al.* 2019	Sports- and exercise-based interventions reported as combined exercise programmes	Health-related quality of life Total positive symptoms Positive symptoms distress index	Psychological distress Interpersonal sensitivity Depression Global severity index Anxiety Phobic anxiety Somatization Obsessive compulsive disorder Hostility Psychoticism Paranoid ideation Sleep disorders
Sanchez-Lastra *et al.* 2019	Sports- and exercise-based interventions reported as other exercise programmes	Self-esteem Leisure performance Attitude Participation and satisfaction during free time Positive affect Executive function, particularly attentional capacity, and behavioural response inhibitors	Perceived stress Psychological anguish Impulsiveness
Woods *et al.* 2017	Sports- and exercise-based interventions reported as sports-based interventions including sport-only and sport-plus	Positive affect Energy levels Sleep quality Self-esteem	Depression Psychological distress Overall psychological distress (Global Severity Index)

Review	Intervention	Mental wellbeing or wellness	Mental and emotional distress (e.g. depression, anxiety)
			Anxiety Phobic anxiety Stress Perceived stress Stress levels Stress, depression and anxiety Interpersonal sensitivity
Horticultural interventions			
Harrison (2020)	Horticultural intervention titled as agricultural therapy	Effectiveness not measured	Effectiveness not measured
Yoga, meditation, and mindfulness-based interventions			
Han 2022	Yoga, meditation, and mindfulness-based interventions titled mindfulness-based interventions	Mindfulness	Depressive symptoms Anxiety Stress Overall psychological stress
Perry *et al.* 2023	Yoga, meditation, and mindfulness-based interventions titled yoga-based interventions	Not measured	Symptoms of anxiety Symptoms of depression
Perry *et al.* 2023	Yoga, meditation, and mindfulness-based interventions titled positive psychology or mindfulness-based interventions	Not measured	Symptoms of anxiety Symptoms of depression
Shonin *et al.* 2013	Yoga, meditation, and mindfulness-based interventions titled mindfulness-based interventions	Self-esteem and optimism Mindfulness and relaxation capacity	Negative affective states Mood disturbance Depression Negative outcome expectancies Anger and hostility
Shonin *et al.* 2013	Yoga, meditation, and mindfulness-based interventions titled Vipassana meditation	Self-esteem and optimism Optimism Mindfulness and relaxation capacity Mindfulness Emotional intelligence	Negative affective states Mood disturbance Thought suppression
Shonin *et al.* 2013	Yoga, meditation, and mindfulness-based interventions titled other Buddhist-derived interventions	Mindfulness and relaxation capacity	Psychological distress Sleeping difficulties Negative affective states
Art and creative interventions			
Canada *et al.* 2020	Art and creative interventions reported as art therapy workshop and music-based combined intervention titled Good vibrations	Affect positive [affect or mood change] Pleasant events Functioning Trauma-related coping skills	Depression Trauma experience in prison Note: Reported a thematic analysis based on quantitative data

Review	Intervention	Mental wellbeing or wellness	Mental and emotional distress (e.g. depression, anxiety)
		Note: Reported a thematic analysis based on quantitative data	
Chen *et al.* 2016	Art and creative interventions titled music therapy to improve health	Not measured	Anxiety Depression
Perry *et al.* 2023	Art and creative interventions titled creative arts-based interventions	Not measured	Symptoms of anxiety Symptoms of depression
Animal-based intervention titled prison-based dog programmes			
Duindam *et al.* 2020	Animal-based intervention titled prison-based dog programmes	Not measured	Social-emotional functioning (e.g. self-esteem, depression, anxiety, aggression)
Harrison (2020)	Animal-based intervention	Effectiveness not measured	Effectiveness not measured
Perry *et al.* (2023)	Animal-based intervention titled animal assisted therapy	Not measured	Symptoms of anxiety Symptoms of depression (no results)
Villafaina- Domínguez *et al.* (2020)	Animal-based intervention titled dog-based animal-assisted interventions	Unclear measurement	Unclear measurement
Review	Intervention	Mental wellbeing or wellness	Mental and emotional distress (e.g. depression, anxiety)
Peer-based interventions			
See separate table	See separate table	See separate table	See separate table
Smoking cessation interventions	See separate table	See separate table	See separate table
See separate table	See separate table	See separate table	See separate table
Healthy eating and nutrition interventions			
Mohan *et al.* (2018)	Healthy eating and nutrition interventions titled nutrition interventions	Not measured	Not measured

Table 61 Peer-based interventions by outcomes and outcome measures in prisoners and ex-prisoners

Review	Intervention	Mental wellbeing or wellness	Mental and emotional distress (e.g. depression, anxiety)	Knowledge and empowerment
Peer-based interventions				
South *et al.* (2014)	Peer-based intervention reported as health trainer interventions	Confidence in signposting Issues discussed with health trainers	Not measured	Knowledge Attitudes
South *et al.* (2014)	Peer-based intervention reported as peer education interventions	Self-efficacy Mental health	Not measured	Health-related knowledge Health-related intention Health-related attitudes/beliefs Health-related behaviour
South *et al.* (2014)	Peer-based intervention reported as two peer education RCTs on the prevention of HIV infection compared peer-led and professionally led interventions.		Not measured	Health-related knowledge Health-related intentions Health-related behaviour
South *et al.* (2014)	Peer-based intervention reported as peer listener intervention	Perceived benefit for service users	Not measured	Effects on listeners
South *et al.* (2014)	Peer-based intervention	Self-esteem/confidence Perception of the prison environment	Not measured	
South *et al.* (2014)	Peer-based intervention reported as peer trainer interventions	Self-esteem Optimism	Anger Number of confrontations	
South *et al.* (2014)	Peer-based intervention reported as peer mentoring interventions	Employment Housing	Not measured	
South *et al.* 2016	Experience of peer-based interventions	Effectiveness not measured	Effectiveness not measured	Effectiveness not measured

Table 62 Smoking cessation interventions by outcomes and outcome measures in prisoners and ex-prisoners

Review	Smoking cessation interventions	Physical wellbeing	Smoking abstinence	Smoking behaviour-related outcomes	Environment-related outcomes
de Andrade and Kinner 2017	Smoking cessation interventions described as smoking cessation programmes. Seven of the eight studies included combined interventions		Quit smoking (smoking cessation) Quit attempts Fagerstrom Test for Nicotine Dependence Continuous abstinence Point prevalence abstinence (self-reported) Point prevalence abstinence validated using expired carbon monoxide readings proxy for smoking behaviour the last 12–24 hours	Cigarettes smoked per day proxy for change in smoking behaviour Cigarettes smoked per week proxy for change in smoking behaviour Expired carbon monoxide readings proxy for smoking behaviour the last 12–24 hours	
de Andrade and Kinner 2017	Smoking cessation interventions described as indoor smoking bans. Three of the four studies combined interventions involving pharmaceutical aids with their partial smoking ban	Medical attention		Cigarettes smoked per day Other smoking behaviours	Perceptions of air quality Perceived exposure to second hand smoke – prisoners and staff
de Andrade and Kinner 2017	Smoking cessation interventions described as complete smoking bans. One of these smoking ban studies was a combined intervention also offering nicotine replacement therapy for purchase	Perceived improvement in health	1-month-abstinence post-release Point prevalence abstinence	Fagerstrom Test for Nicotine Dependence Nicotine dependence post-release	
de Andrade and Kinner 2017	Smoking cessation interventions described as indoor smoking ban. Three of the four studies combined interventions involving pharmaceutical aids with their partial smoking ban	Perceived health improvements		Continued smoking despite indoor smoking ban	
de Andrade and	Smoking cessation interventions described as complete smoking ban. One of these	Number of prison staff sick days taken before and		Continued smoking despite complete smoking ban	**Security outcomes** Prisoner-on-prisoner

Review	Smoking cessation interventions	Physical wellbeing	Smoking abstinence	Smoking behaviour-related outcomes	Environment-related outcomes
Kinner 2017	smoking ban studies was a combined intervention also offering nicotine replacement therapy for purchase	after complete smoking ban			assaults without injury Prisoner-on-staff assaults without injury Number of prisoners moved to segregation Tobacco used as currency
Frazer *et al.* 2016	Smoking cessation interventions described as partial or complete bans or smoke-free policies in prisons may be combined with nicotine replacement therapy	Health-related outcomes Smoking-related mortality Receipt of medical help to quit smoking Prisoner perceptions of staff help	Relapse from abstinence	Active prisoner smoking rate Active prison staff smoking rate Other smoking-related outcomes Quit attempts	Passive smoke exposure Passive smoking rate
Lindson *et al.* 2019	Smoking cessation interventions described as motivational interviewing for smoking cessation intervention		Abstinence measured as incidence of smoking cessation		
Mohan *et al.* 2018	Smoking cessation interventions described as combined interventions for smoking cessation		Continuous smoking abstinence Point prevalence smoking abstinence		
Sourry *et al.* 2022	Smoking cessation interventions described as smoking bans and in two of the four studies, researchers tested the effects of combined interventions		7-day point prevalence abstinence Smoking abstinence at post-release follow-up Smoking abstinence at 3-months post-release follow-up Smoking relapse Smoking relapse on first day of release Smoking relapse post release Time to smoking relapse		

7.9 Appendix 9 Tables of characteristics for each systematic review by intervention

Table 63 Population and study characteristics

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
Sports- and exercise-based interventions										
Canada *et al.* (2020)	Research questions: 4. What interventions designed to improve the health or mental health of older adults living in jail or prison have been empirically tested? 30. What are the effects of the respective interventions on inmates' physical or mental health?	All studies in the review were set in prisons	6/7 studies (1 sports- and exercise-based intervention study) *Note*. The excluded study tested a method for examining health needs or prisoners	Combined intervention tailored for prison setting, known as BE-ACTIV (1 study): 10-week behavioural therapy programme involving weekly individual therapy sessions, collaboration between therapists and activity staff in prisons, a plan for increasing 'pleasant' activities and events, assessment of increased activity level, and removal of barriers that may be interfering with activity levels	1 case study	2008	USA	n = 4 prisoners	Age range = 47–81 years	Male only
Martinez Merino *et al.* (2017)	Aims: To identify and assess the quality of studies on women's participation in	Prisons (29 studies)	33 studies *Note*. Although 4 studies were set in young offender	Sport and physical activities (33 studies).	Qualitative studies (17 studies)	1974–2015	Australia (3 studies) Canada (3 studies)	n = 12,304 (33 studies; Not reported in 1 study and 1	Not reported	Female only (22/33 studies), mixed male and female sample (10/29 studies),

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	sport and physical activities in prison, to ascertain the methodological characteristics – type of research, sampling, data collection and data analysis techniques – of the selected research studies, as well as their central themes	Young offender institutions (4 studies)	institutions, this systematic review speaks to Q4 (barriers and facilitators to implementing interventions in a prison setting) (as well as Q1 and Q2), and so the findings from all studies were extracted	*Note*. Additional information pertaining to the specific interventions being evaluated was not provided	Quantitative studies (7 studies) Mixed methods studies (5 studies) *Note*. Additional information pertaining to the specific study designs was not provided; only information pertaining to how data were collected across all 33 included studies, which was most commonly by interview, followed by questionnaires, surveys, observation, body measurements, and ethnography		France (2 studies) Italy (1 study) Mexico (1 study) New Zealand (1 study) Poland (1 study) Spain (2 studies) UK (7 studies) USA (12 studies)	study used 144 reports)		1 study used 144 reports
Mohan *et al.* (2018)	Aim: To identify interventions used to improve health factors or behaviours of the cardiovascular health of prisoners during incarceration and	All 12 articles (11 primary studies) included in the review were set in prisons, including the 6 studies that focused on physical activity interventions	All 12 articles (11 primary studies, 6 of which focused on physical activity interventions)	Physical activity (only) interventions (4 studies): Evaluated the effects of supervised structured physical activity interventions (2	Physical activity (only) interventions: 3 RCTs and 1 non-randomised trial Physical activity combined with education interventions: 1	1976–2013	Australia (1 study) Canada (1 study) Italy (1 study) Spain (1 study)	Physical activity (only) interventions: n = 300 prisoners (4 studies) Physical activity combined with education interventions: n	Physical activity (only) interventions: Aged ≤ 50 years (1 study); aged ≤ 40 years (1 study); age range = 20–35 years (1 study);	Physical activity (only) interventions: male only (4 studies) Physical activity combined with education interventions: Male only (1

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	to assess their effectiveness			studies compared a single exercise intervention group with a control group and 2 studies compared 2 or more exercise intervention groups with a control group) Physical activity combined with education interventions (2 studies): Evaluated interventions that combined physical activity and educational sessions (1 study evaluated the effect of supervised physical activity combined with health education classes on the health of prisoners with chronic illness or risk factors for a chronic illness, and 1 study evaluated the	RCT and 1 before-and-after study		USA (2 studies)	= 48 prisoners (2 studies) *Note*. Participants in 1 of the Physical activity (only) interventions were co-infected with HIV/HCV co-infected but not immune-compromised and had an opioid addiction, and participants in 1 of the combined interventions either had chronic illness or ≥ 2 risk factors for chronic illness	Not reported (1 study) Physical activity combined with education interventions: Aged ≤ 18 years (1 study); aged ≤ 40 years (1 study)	study), female only (1 study)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				effect of a nutrition and fitness programme on the health and well-being of female prisoners; both studies used a prisoner or prisoners to lead part or all of the intervention)						
Perry *et al.* (2023)	Aims: To identify and examine RCTs of interventions for older people (aged ≥50 years) involved in the criminal justice system that focused on outcomes of depression or anxiety (or both) in people with the physical health needs of either obesity, COPD, or diabetes (or a combination), and to assess the feasibility and acceptability of these interventions	All 26 articles (24 primary studies) included in the review were set in prisons, including the 1 study that focused on a sports- and exercise-based intervention	15/24 studies (1 sports- and exercise-based intervention study) *Note*. The excluded studies did not cover the interventions of interest to this overview of reviews; four on psychotherapy and five on a variety of other interventions	Combined exercise-based intervention (1 study): Evaluated a health education and exercise programme *Note*. No further information was provided in relation to the nature of intervention	1 RCT	2008	Australia	n = 20 prisoners	Mean age = 51 years	Male only

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
Sanchez-Lastra *et al.* (2019)	Research questions: 1. To conduct a systematic review of the methodological quality and the main results of the RCTs published to date that analysed the effects of physical education programmes performed by incarcerated people 2. To provide detailed information on the characteristics and types of physical education programmes carried out, to facilitate its implementation by health professionals in the penitentiary field	All studies included in the review were set in prisons	All 11 studies	Exercise training programmes (11 studies): Interventions based on aerobic exercise (4 studies), interventions evaluating combined forms of exercise (aerobic or anaerobic plus resistance training; 5 studies), a yoga programme (1 study), and a mixed sports activities intervention (1 study) *Note*. The yoga-based programme is included in the systematic review under the umbrella of exercise training programmes; while yoga-based interventions are a separate family of interest for the purposes of this overview of	11 RCTs	1976–2015	Not reported	n = 697 (11 studies)	Mean age = 24.25 years (range = 17-65 years) (11 studies)	Male only (9 studies), mixed male and female sample (1 study), Not reported (1 study)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				reviews, it was decided to adhere to systematic review authors' classification of this kind of intervention as an exercise training programme, as defined in their systematic reviews						
Woods *et al.* (2017)	Aims: To determine the impact of sport-based interventions on the psychological well-being of people in prison, to review the intervention studies to determine what theory of behaviour change is included within the design and evaluation of sport-based interventions within prison, and to examine the extent to which sport is provided as a stand-alone intervention or	Prisons (12 studies) Young offender institutions (5studies)	12/17 studies *Note*. The excluded studies were those not set in prisons	Sports-based interventions (12 studies): Sport only interventions (9 studies (6 papers); 2 of which are yoga-based interventions, and combined sports-based interventions (3 studies; 1 study included weekly nutritional seminars, 1 study included cognitive behavioural techniques and psychotherapy, and 1 study evaluated an intervention based on outdoor adventure	Quantitative (7 studies): 3 RCTs, 1 pre-post study with a non-randomised control group, 1 within-group repeated measures study, and 1 cross-sectional design Qualitative (5 studies): 4 studies involved interviews with participants post-intervention only (cross-sectional; these 4 studies were all presented in 1 publication), and 1 study conducted	1988–2015	Australia (4 studies; 1 publication) Canada (1 study) Italy (1 study) USA (4 studies) Not reported (2 studies)	n = 454 (12 studies)	Mean age (2 studies) = 38.4 years and 17.2 years; age range (4 studies) = 18–60; lower age bracket (2 studies) = 18+ and 36+; Not reported (4 studies)	Male only (6 studies), female only (4 studies), mixed male and female sample (2 studies)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	augmented with additional components in line with the sport-plus model, such as peer mentoring, life-skills classes			activities, alongside social, creative and reflective activities *Note*. The 2 'sport-only' studies that evaluated a yoga-based intervention were included in the systematic review under the umbrella of sports-based interventions; while yoga-based interventions are a separate family of interest for the purposes of this overview of reviews, it was decided to adhere to systematic review authors' classification of this kind of intervention as an exercise training programme, as defined in their systematic reviews	interview post-intervention and again 3 months later				
Horticultural interventions										

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
Harrison (2020)	Aim: To synthesise the qualitative literature exploring the experiences of individuals in prison and custodial environments and their experiences of accessing and engaging in mental health support whilst in custody	All 9 studies included in the review were set in prisons, including the 1 study focusing on prisoners who participated in an agricultural intervention	All 9 studies *Note*. Although only 3 studies focused on interventions of interest to this overview of reviews, this systematic review speaks predominantly to Q4 (barriers and facilitators to implementing interventions in a prison setting), and so the qualitative findings from all studies were extracted	Agricultural intervention (1 study of 9 studies; however, qualitative findings from all studies were extracted for Q4)	All included studies were qualitative studies, with various analytic approaches	2001–2019 *Note*. The study focusing on prisoners who participated in an agricultural intervention was conducted in 2019	Australia (1 study) Canada (1 study) Ireland (1 study) UK (4 studies) USA (2 studies) *Note*. The study focusing on prisoners who participated in an agricultural intervention was conducted in Canada	n = 202 prisoners (9 studies) *Note*. n = 10 prisoners in the study focusing on prisoners who participated in an agricultural intervention	Not reported *Note*. It is assumed that all participants were adult prisoners	Only reported for 5 studies (3 female only and 2 male only samples; Not reported for the remaining 4 studies) *Note*. The study focusing on prisoners who participated in an agricultural intervention was conducted on a male only sample
Yoga, meditation, and mindfulness-based interventions										
Han (2022)	Aim: To assess effects of Mindfulness-Based Interventions on psychological distress, including depressive symptoms, anxiety, stress, and overall psychological	Prisons (11 studies) Juvenile incarceration facilities (2 studies)	11/13 studies *Note*. The excluded studies were those not set in prisons	Mindfulness-based interventions involving: - Acceptance and Commitment Therapy (3 studies) - Mindfulness-Based Cognitive Therapy (1 study)	11 RCTs	2003–2020	China (2 studies) Hungary (1 study) Spain (2 studies) Taiwan (1 study) USA (5 studies)	n = 772 prisoners (11 studies) *Note*. Prisoners in 2 studies had been diagnosed with moderate depression or exhibited depressive symptoms, and prisoners in 4	Mean age in the 11 relevant studies ranged from 26.47 years to 44.5 years	Male only (6 studies), female only (5 studies)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	distress, and mindfulness in incarcerated populations with subgroup analyses according to the type of control groups			- Mindfulness meditation (2 studies) - Dialectical Behaviour Therapy (1 study) - Combined Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy for relapse prevention (2 studies) - Mindfulness-Based Cognitive Therapy combined with some elements of Mindfulness-Based Stress Reduction (1 study) - Combined Acceptance and Commitment Therapy, Dialectical Behaviour Therapy, Mindfulness-Based Stress Reduction, and				studies had a history or (or current) drug abuse/dependence		

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				Mindfulness-Based Cognitive Therapy (1 study)						
Perry *et al.* (2023)	Aims: To identify and examine RCTs of interventions for older people (aged ≥50 years) involved in the criminal justice system that focused on outcomes of depression or anxiety (or both) in people with the physical health needs of either obesity, COPD, or diabetes (or a combination), and to assess the feasibility and acceptability of these interventions	All 26 articles (24 primary studies) included in the review were set in prisons, including the 9 studies that focused on yoga, meditation, and mindfulness-based interventions	15/24 studies (9 yoga, meditation, and mindfulness-based interventions) *Note*. The excluded studies did not cover the interventions of interest to this overview of reviews; four on psychotherapy and five on a variety of other interventions. In addition, the authors reported on distinct categories of interventions, including a 'Yoga-based interventions' category and a 'Positive psychology or mindfulness-based interventions' category. For the purposes of this overview of	Yoga-based interventions (5 studies) Positive psychology or mindfulness-based interventions (4 studies) *Note*. No further information was provided in relation to the nature of interventions	Yoga-based interventions: 4 RCTs and 1 crossover trial Positive psychology or mindfulness-based interventions: 3 RCTs and 1 cluster trial	Yoga-based interventions: 2009–2021 Positive psychology or mindfulness-based interventions: 2018–2021	China (1 study) India (1 study) Norway (1 study) Sweden (1 study) UK (1 study) USA (4 studies)	Yoga-based interventions: n = 580 prisoners (5 studies) Positive psychology or mindfulness-based interventions: n = 326 prisoners (4 studies)	Yoga-based interventions: Mean ages across the studies ranged from 36.08 years to 37.92 years, age range = 19–70 years (5 studies; Not reported in 1 study) Positive psychology or mindfulness-based interventions: Mean ages across the studies ranged from 34.8 years to 42.2 years, age range = 19–60 years (4 studies)	Yoga-based interventions: Male only (1 study), female only (2 studies), mixed males and female samples (1 study), Not reported (1 study) Positive psychology or mindfulness-based interventions: Male only (4 studies)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
			reviews, these categories fall under a single 'Yoga, meditation, and mindfulness-based interventions' family							
Shonin *et al.* (2013)	Aim: To systematically review the evidence for Buddhist-derived interventions (BDIs) in correctional settings	All studies in the review were set in prisons	7/8 studies *Note*. The excluded study reanalysed data from another included study to assess interactions of Post-Traumatic Stress Disorder symptom severity on course participation and treatment outcomes; psychiatric illness severity is beyond the scope of this overview of reviews	Mindfulness-based intervention studies: 2 studies Vipassana meditation studies: 3 studies Other Buddhist-derived interventions: 2 studies (both involved meditation programmes; 1 programme followed Tibetan, Zen, and other Buddhist and non-Buddhist meditation approaches, and the other study was not affiliated to any particular meditation tradition, but was included as it significantly	Mindfulness-based intervention studies: 1 RCT and 1 trial (specific design unspecified) Vipassana meditation studies: 3 trials (specific designs unspecified) Other Buddhist-derived interventions: 1 RCT and 1 trial (specific design unspecified)	1983–2012	Taiwan (1 study) USA (6 studies)	n = 2,753 (all 11 studies) Mindfulness-based intervention studies: n = 2,104 prisoners (2 studies) Vipassana meditation studies: n = 605 prisoners (3 studies) Other Buddhist-derived interventions: n = 44 (2 studies)	Not reported *Note*. All participants were reported to be adult prisoners	Mindfulness-based intervention studies: Male only (2 studies) Vipassana meditation studies: Male only (1 study), mixed male and female sample (2 studies) Other Buddhist-derived interventions: Male only (1 study), female only (1 study)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				resembled Buddhist-based mindfulness meditation)						
Art and creative interventions										
Canada *et al.* (2020)	Research questions: 1. What interventions designed to improve the health or mental health of older adults living in jail or prison have been empirically tested? 2. What are the effects of the respective interventions on inmates' physical or mental health?	All studies in the review were set in prisons	6/7 studies (2 art and creative intervention studies) *Note*. The excluded study tested a method for examining health needs or prisoners	Combined intervention known as Good Vibrations (1 study; music): 1-week, prison-based Gamelan inspired music workshop involving education on musical pieces, learning how to improvise, composing an original piece of music, learning about Javanese culture and art, and a final performance Intervention known as art expression (1 study; art): Six art expression workshops over six weeks, involving a short exercise to promote sharing	2 non-experimental studies	2015–2017	UK (1 study; music) USA (1 study; art)	n = 13 prisoners (music study) n = 4 prisoners in a prison-based nursing home (art study)	Age range = 53–76 years (2 studies)	Male only (1 study; music), female only (1 study; art)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				and a planned art expression activity						
Chen *et al.* (2016)	Aim: To summarize the overall evidence of music therapy for improving the mental health of offenders in correctional settings	Prisons (2 studies) Forensic hospitals (2 studies) Treatment-oriented detention centre for juvenile offenders (1 study)	2/5 studies *Note*. The excluded studies were those not set in prisons	Music therapy involving improvisation, composition, singing, etc.: Group music therapy (1 study) and individual and group music therapy (1 study)	2 RCTs	2014–2015	China (1 study) Norway (1 study)	n = 313 prisoners (intervention groups in 2 studies)	Mean age = 35.5 years (1 study), 31.38 years (1 study)	Male only (2 studies)
Harrison (2020)	Aim: To synthesise the qualitative literature exploring the experiences of individuals in prison and custodial environments and their experiences of accessing and engaging in mental health support whilst in custody	All 9 studies in the review were set in prisons, including the 1 study focusing on prisoners who participated in a music therapy intervention	All 9 studies *Note*. Although only 3 studies focused on interventions of interest to this overview of reviews, this systematic this review speaks predominantly to Q4 (barriers and facilitators to implementing interventions in a prison setting), and so the qualitative findings from all studies were extracted	Art and creative intervention; music therapy (1 study of 9 studies; however, qualitative findings from all studies were extracted for Q4)	All included studies were qualitative studies, with various analytic approaches	2001–2019 *Note*. The study focusing on prisoners who participated in an agricultural intervention was conducted in 2001	Australia (1 study) Canada (1 study) Ireland (1 study) UK (4 studies) USA (2 studies) *Note*. The study focusing on prisoners who participated in a music therapy intervention was conducted in Australia	n = 202 prisoners (9 studies) *Note*. n = 5 prisoners in the study focusing on prisoners who participated in a music therapy intervention	Not reported	Only reported for 5 studies (3 female only and 2 male only samples; Not reported for the remaining 4 studies) *Note*. The study focusing on prisoners who participated in a music therapy intervention was conducted on a female only sample

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
Perry *et al.* (2023)	Aims: To identify and examine RCTs of interventions for older people (aged ≥50 years) involved in the criminal justice system that focused on outcomes of depression or anxiety (or both) in people with the physical health needs of either obesity, COPD, or diabetes (or a combination), and to assess the feasibility and acceptability of these interventions	All 26 articles (24 primary studies) included in the review were set in prisons, including the 4 studies that focused on art and creative interventions	15/24 studies (4 art and creative interventions) *Note*. The excluded studies did not cover the interventions of interest to this overview of reviews; four on psychotherapy and five on a variety of other interventions	Art and creative interventions (4 studies): All evaluated creative arts interventions *Note*. No further information was provided in relation to the nature of interventions	2 RCTs and 2 pilot RCTs	2006–2016	China (3 studies) USA (1 study)	n = 357+ prisoners (4 studies)	Mean ages were reported in 2 studies (31.38 years to 35.5 years), age range was reported in 3 studies (18–59 years) (4 studies)	Male only (3 studies), mixed male and female sample (1 study)
Animal-based interventions										
Duindam *et al.* (2020)	Aim: To examine the effectiveness of prison-based dog programmes in reducing criminal recidivism and improving social-emotional functioning of people convicted of a crime, while testing to what	Prisons (8 studies) Juvenile justice centres (3 studies)	8/11 studies *Note*. The excluded studies were those not set in prisons	Dog training programmes (1 study) and animal-assisted interventions (2 studies)	1 RCT and 7 quasi-experimental studies (4 prospective, 2 retrospective, 1 prospective and retrospective)	2001–2018	Not reported	n = 2,421 prisoners (8 studies)	Not reported for individual studies; however, the range of mean ages across all 11 included studies was reported, and ranged from 15.7 years to 39.1 years	Male only (6 studies), female only (2 studies)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	extent study, programme, and sample characteristics moderate the outcome of the program									
Harrison (2020)	Aim: To synthesise the qualitative literature exploring the experiences of individuals in prison and custodial environments and their experiences of accessing and engaging in mental health support whilst in custody	All 9 studies in the review were set in prisons, including the 1 study focusing on prisoners who participated in an animal-based intervention	All 9 studies *Note*. Although only 3 studies focused on interventions of interest to this overview of reviews, this systematic this review speaks predominantly to Q4 (barriers and facilitators to implementing interventions in a prison setting), and so the qualitative findings from all studies were extracted	Animal-based intervention (1 study of 9 studies; however, qualitative findings from all studies were extracted for Q4)	All included studies were qualitative studies, with various analytic approaches	2001–2019 *Note*. The study focusing on prisoners who participated in an animal-based intervention was conducted in 2019	Australia (1 study) Canada (1 study) Ireland (1 study) UK (4 studies) USA (2 studies) *Note*. The study focusing on prisoners who participated in an animal-based intervention was conducted in the USA	n = 202 prisoners (9 studies) *Note*. n = 31 prisoners in the study focusing on prisoners who participated in an animal-based intervention	Not reported	Only reported for 5 studies (3 female only and 2 male only samples; Not reported for the remaining 4 studies) *Note*. The study focusing on prisoners who participated in an animal-based intervention was conducted on a male only sample
Perry *et al.* (2023)	Aims: To identify and examine RCTs of interventions for older people (aged ≥50 years) involved in the	All 26 articles (24 primary studies) included in the review were set in prisons, including the 1 study that	15/24 studies (1 animal-based intervention) *Note*. The excluded studies did not cover the	Animal assisted therapy intervention *Note*. No further information was provided in	1 RCT	2013	USA	n = 81 prisoners	Mean age = 36 years, range = 19–58 years	Female only

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	criminal justice system that focused on outcomes of depression or anxiety (or both) in people with the physical health needs of either obesity, COPD, or diabetes (or a combination), and to assess the feasibility and acceptability of these interventions	focused on an animal-based intervention	interventions of interest to this overview of reviews; four on psychotherapy and five on a variety of other interventions	relation to the nature of intervention						
Villafaina-Domínguez *et al.* (2020)	Aim: To provide an up-to-date analysis of the studies, published in scientific journals indexed in well-known databases, on the effects of dog-based animal-assisted interventions in female and male inmates, independently of their age (young or adults inmates), as well as to provide future directions	Prisons (15 studies) Psychiatric prisons (2 studies) Young offender institutions (3 studies)	15/20 studies *Note*. The excluded studies were those not set in prisons	Dog-based animal-assisted interventions (15 studies): Among the activities included in these programs were dog walking, dog training, taking care of dogs or rescue dogs, and using the dog as emotional support during therapy	1 RCT, 5 quantitative observational studies, 6 qualitative observational studies, 2 quantitative studies, 1 qualitative study	2010–2020	Not reported	n = 1,030 (15 studies) *Note*. Some notable sample characteristics in 5/15 of the studies were reported: Studies of prisoners with psychological/emotion health issues, mental illness, and/or developmental disorders (4 studies), prisoners with drug	Mean (SD) age or age range was reported for each individual study but not for all included studies. *Note*. All studies included adult participants, with mean ages (or age ranges) from 20s to 60s, with the exception of 1 study in which participants	Male only (5 studies), female only (6 studies), mixed male and female sample (3 studies), Not reported (1 study)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
								dependency issues (1 study)	were both adult and young inmates; as the study was set in a prison, it was considered relevant to the current overview	
Peer-based interventions										
South *et al.* (2014)	Research questions: 1. Review question 1: What are the effects of peer-based interventions on prisoner health and the determinants of prisoner health? 2. Review question 3: How do the effects of peer-based approaches compare with those of professionally led approaches	Prisons (54 studies) Young offender institutions (3 studies) *Note*. 3 studies included in the report on peer-based interventions being delivered in multiple prisons and 1 young offender institution/probation setting. As the results of these studies did not distinguish between participants in prisons and those in young offender institutions/probation settings and	54/57 studies *Note*. The excluded studies were those not set in prisons	Peer-based interventions (54 studies: - Peer education (19 studies) - Peer support (14 studies) - Listeners (6 studies) - Peer mentoring (3 studies) - Prison hospice volunteers (3 studies) - Peer advisors (2 studies) - Health trainers (2 studies) - Peer counselling (2 studies)	4 RCTs, 8 pre-post studies, 5 quantitative studies (design not specified), 15 qualitative studies, 17 studies were mixed-methods or contained both quantitative and qualitative data, 3 studies had an unclear design, 1 review study, 1 study design was described as "not applicable"	1991–2012 *Note*. No date was reported for 1 study	Australia (2 studies) Canada (9 studies) Ireland (1 study) Israel (1 study) Moldova (1 study) Mozambique (1 study) Russia (1 study) South Africa (1 study) UK (18 studies) USA (19 studies)	Only reported for 10/54 studies (prison capacity, not sample size, was reported for some studies) *Note*. Some notable sample characteristics in 16/54 of the studies were reported: Studies of prisoners that were seriously ill/dying (4 studies), prisoners with substance abuse/dependency issues (5 studies), prisoners	Only reported for 15/54 studies; age range = 17–59 years across these studies	Only reported for 31/54 studies; males only (16 studies), female only (9 studies), mixed male and female sample (6 studies) *Note*. It may be assumed that the remaining 23 studies used a mixed male and female sample

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	Note. Review questions 1 and 3 are addressed above in South (2014); review question 2 is addressed in South (2016)	the majority of settings in which the intervention was delivered were adult prisons, the studies were included in the extraction		- Peer outreach (1 study) - Peer observers (1 study) - Peer training (1 study)				deemed to be at risk/in distress/suicidal (4 studies), prisoners with mental health problems and/or disabilities (e.g. learning or sensory disabilities) (2 studies), and Aboriginal female prisoners (1 study)		
South *et al.* (2016)	Aim: To report on a qualitative synthesis on positive and negative impacts relating to the delivery of peer interventions that was conducted as part of a systematic review of prison-based peer interventions	All studies in the review were set in prisons *Note*. 3 studies also included 1 young offender institution (in addition to multiple prisons), and 1 of those studies also included 1 probation setting; as the results of these studies did not distinguish between participants in prisons and those	All 33 studies	Peer-based interventions (33 studies: - Peer education (6 studies) - Peer support (9 studies) - Listeners (4 studies) - Peer mentoring (2 studies) - Peer advisors (2 studies) - Peer support team (peer)	33 qualitative studies and mixed methods studies that included qualitative data	1991–2012	Australia (1 study) Canada (8 studies) Ireland (1 study) Moldova (1 study) UK (14 studies) USA (8 studies)	Only reported for 3/33 studies (prison capacity, not sample size, was reported for some studies) *Note*. Some notable sample characteristics in 9/33 of the studies were reported: Studies of prisoners that were seriously ill/dying (4 studies),	Only reported for 3/33 studies; age range = 18–50 years across these studies	Only reported for 16/33 studies; male only (5 studies), female only (8 studies), mixed male and female sample (3 studies) *Note*. It may be assumed that the remaining 17 studies used a mixed male and female sample

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
		in young offender institutions/probation settings and the majority of settings in which the intervention was delivered were adult prisons, the studies were included in the extraction		counselling) (1 study) - Peer outreach (1 study) - Peer education and counselling program (1 study) - Peer support/listeners (2 studies) - Health trainers (2 studies) - Prison hospice volunteers (2 studies) - Peer-led fathering programme (1 study) *Note*. The description of the specific types of interventions in South (2016) varies slightly from the descriptions provided in South (2014), even though the South (2014) and South (2016) articles are reporting on the				prisoners with substance abuse/dependency issues (1 study), prisoners deemed to be at risk/in distress/suicidal (2 studies), prisoners with mental health problems and/or disabilities (e.g. learning or sensory disabilities) (1 study), and Aboriginal female prisoners (1 study)		

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				same overall review						
Smoking cessation interventions										
de Andrade and Kinner (2017)	Aim: To examine cessation and behavioural outcomes of prison smoking cessation interventions for prisoners and prison staff, and to identify gaps in the literature and consider implications for research, policy and practice	All studies in the review were set in prisons	19/20 studies (all smoking cessation-related interventions) *Note*. The excluded study tested the effectiveness of a pharmaceutical aid only with no other intervention components	Smoking cessation programmes (8 studies): Evaluated a range of methods, e.g. motivational interviewing, Cognitive Behavioural Therapy, support groups, pilot tobacco control initiative (7 of these were combined interventions, some involved pharmaceutical aids like Nicotine Replacement Therapy) Partial smoking bans (4 studies): Evaluated indoor smoking bans in which smoking was limited to outdoor areas (3 of these were combined interventions involving pharmaceutical	Smoking cessation programmes: 5 RCTs (1 was a double-blinded RCT) and 3 pre-post studies Partial smoking bans: 4 pre-post studies (1 involved different participant samples at pre and post measures) Complete smoking bans: 6 pre-post studies (1 involved different participant samples at pre and post measures) and 1 cross-sectional survey	1994–2016	Australia (3 studies) Canada (2 studies) India (1 study) Iran (1 study) Switzerland (1 study) Turkey (1 study) UK (1 study) USA (9 studies)	Total n = 4,684 (19 studies) Smoking cessation programmes: n = 2,237 (8 studies) Partial smoking bans: n = 1,137 (4 studies) Complete smoking bans: n = 1,310 (7 studies) *Note*. All participants, with the exception of those in 1 study testing a partial smoking ban, reported a desire to quit	Not reported	Smoking cessation programmes: 5/8 studies were male only; 1/8 studies were female only; 2/8 studies were mixed male and female samples (65% male in 1 study; 63% male in 1 study) Partial smoking bans: 2/4 studies were male only; 2/4 had mixed male and female samples (93% male in 1 study; % male/female Not reported in 1 study) Complete smoking bans: 5/7 studies were male only; sex was Not reported in 2 studies

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				aids (1 study), Nicotine Replacement Therapy (1 study), and Nicotine Replacement Therapy and self-help booklets (1 study)) Complete smoking bans (7 studies): Evaluated complete prisoner smoking bans, prohibiting smoking within the facility grounds for prisoners (1 of these was a combined intervention offering Nicotine Replacement Therapy for purchase)						
Frazer *et al.* (2016)	Aim: To assess the extent to which institutional smoking bans may reduce passive smoke exposure and active smoking, and affect other	Prisons (3 studies) Hospitals (12 studies) Universities (2 studies)	3/17 studies *Note*. The excluded studies were those not set in prisons	Smoking ban policies: Impact of smoke-free policies in prison, either partial or complete (1 study), impact of a tobacco-free policy in a prison banning the sale	1 controlled before-and-after study and 1 uncontrolled before-and-after study	2012–2015	Switzerland (1 study) USA (2 studies)	n = 41,155 at baseline (including 204 prison staff that participated in 1 study) and n = 37,045 at follow-up (including 72 staff that	Only reported in 1/3 studies (median age = 34 years)	Only reported in 1/3 studies that measured outcomes in 3 prisons (male only in 2 prisons and mixed male and female, but predominantly

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	health-related outcomes			and use of tobacco products (1 study), and impact of effect of increased smoke-free zones (1 study) *Note*. Nicotine Replacement Therapy may have been available in some prisons				participated at follow-up in the same study)		male, sample in 1 prison) (sex of the staff was Not reported)
Lindson *et al.* (2019)	Aims: To evaluate the efficacy of motivational interviewing for smoking cessation compared with no treatment, in addition to another form of smoking cessation treatment, and compared with other types of smoking cessation treatment; to investigate whether more intensive motivational interviewing is more efficacy than less intensive motivational interviewing for	Prisons (1 study) Home/community (11 studies) Community service settings (11 studies) Hospitals (10 studies) Drug treatment services (3 studies) Homeless shelter (1 study)	1/37 studies *Note*. The excluded studies were those not set in prisons	Motivational interviewing, covering topics such as introduction to tobacco, prevalence of tobacco use, effects of tobacco use on general health and dental health, psychosocial factors influencing tobacco use, healthy diet and behavioural intervention for prevention of tobacco use	1 RCT	2014	India	n = >600 prisoners (all smokers)	Modal age = 21 to 30 years	Male only

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
	smoking cessation; to explore whether motivational interviewing for smoking cessation could enhance well-being									
Mohan *et al.* (2018)	Aim: To identify interventions used to improve health factors or behaviours of the cardiovascular health of prisoners during incarceration and to assess their effectiveness	All 12 articles (11 primary studies) included in the review were set in prisons, including the 2 studies that focused on smoking cessation interventions	All 12 articles (11 primary studies, 2 of which focused on smoking cessation interventions)	Smoking combined cessation interventions (2 studies): Both studies used Nicotine Replacement Therapy along with behavioural therapy; 1 study delivered the intervention in a group setting, focusing on mood management training to prevent smoking relapse, and 1 study delivered 2 face-to-face brief Cognitive Behavioural Therapy sessions and had support systems in place in the form of a telephone counselling	2 RCTs (3 articles)	2008–2012	Australia (1 study) USA (1 study)	n = 785 prisoners (2 studies) *Note*. Participants in 1 of the studies had moderate/high nicotine dependence and expressed a readiness to quit smoking, and participants in the other study smoked at least 5 cigarettes per day and expressed interest in smoking cessation	Aged > 18 years (1 study); mean age = 33.8 years (1 study)	Male only (1 study), female only (1 study)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				service and self-help materials						
Sourry *et al.* (2022)	Aim: To examine the effectiveness of complete facility-based smoking bans with a specific focus on these three high-risk sub-populations together (i.e. prisons, mental health, and substance use treatment settings)	Prisons (4 studies) Mental health and/or substance use treatment settings (9 studies)	4/13 studies *Note*. The excluded studies were those not set in prisons	Complete facility-based smoking bans and other smoking cessation interventions (4 studies): All 4 studies were conducted on people previously in prison were smoke-free prisons, and in 2 studies, researchers tested the effects of combined interventions; 1 study evaluated incarceration in a smoke-free prison combined with 6 weekly motivational interviewing and cognitive behavioural therapy sessions (pre-release) followed by 2 follow-up phone call sessions 1 day and 1 week post-release), and 1 study evaluated incarceration in a	2 RCTs, 1 prospective cohort study, and 1 observational study	2013–2021	Australia (1 study) USA (2 studies)	Total n = 1,061 (4 studies) Smoke-free prison only: n = 257 prisoners (2 studies) Combined interventions: n = 804 prisoners (2 studies)	Not reported *Note*. All participants were reported to be adult prisoners	Mixed male and female sample (4 studies)

Author (year)	Research aim(s)/question(s)	Settings (whole review)	No. relevant primary studies	Intervention(s)	Primary study design(s)	Primary study years	Primary study countries	Sample size(s)	Participant's ages	Participant's sex
				smoke-free prison combined with1 face-to-face motivational intervention session						
Healthy eating and nutrition interventions										
Mohan *et al.* (2018)	Aim: To identify interventions used to improve health factors or behaviours of the cardiovascular health of prisoners during incarceration and to assess their effectiveness	All 12 articles (11 primary studies) included in the review were set in prisons, including the 3 studies that focused on nutrition interventions	All 12 articles (11 primary studies, 3 of which focused on nutrition interventions)	Nutrition interventions (3 studies): 2 studies evaluated interventions in which the diet of prisoners was modified and 1 study evaluated the impact of education and behavioural workshops on the nutrition practices of prisoners	2 cohort studies and 1 case-control study	2009–2013	Belgium (1 study) Spain (1 study) USA (1 study)	n = 265 prisoners (3 studies) *Note*. Participants in 1 of the studies were enrolled in a behavioural substance abuse programme, and participants in the other study either had potential cardiovascular risk factors, cachexia due to HCV/HIV or needed special diet	Mean age = 35.2 years for intervention group and 34.4 years for control group (1 study); mean age = 44.7 years (1 study); age range = 22–65 years (1 study)	Male only (2 studies), mixed male and female sample (1 study)

Table 64 Intervention, comparator, and contribution to outcomes

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
Sports- and exercise-based interventions						
Canada *et al.* (2020)	Combined intervention tailored for prison setting, known as BE-ACTIV (1 study): 10-week behavioural therapy programme involving weekly individual therapy sessions, collaboration between therapists and activity staff in prisons, a plan for increasing 'pleasant' activities and events, assessment of increased activity level, and removal of barriers that may be interfering with activity levels	No comparator groups	Yes, as benefits	No	Yes	No
Martinez Merino *et al.* (2017)	Sport and physical activities (29 studies). *Note*. Additional information pertaining to the specific interventions being evaluated was not provided	No comparator groups (qualitative data)	Yes, as benefits	No	Yes	No
Mohan *et al.* (2018)	Physical activity (only) interventions (4 studies): Evaluated the effects of supervised structured physical activity interventions (2 studies compared a single exercise intervention group with a control group and 2 studies compared 2 or more exercise intervention groups with a control group)	Physical activity (only) interventions: No intervention/usual activities/lifestyle (3 studies) and non-endurance exercise (1 study) Physical activity combined with education interventions: Continued with usual exercise regimen (1 study). The other study was a before-and-after study	Yes	No	No	Yes

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	Physical activity combined with education interventions (2 studies): Evaluated interventions that combined physical activity and educational sessions (1 study evaluated the effect of supervised physical activity combined with health education classes on the health of prisoners with chronic illness or risk factors for a chronic illness, and 1 study evaluated the effect of a nutrition and fitness programme on the health and well-being of female prisoners; both studies used a prisoner or prisoners to lead part or all of the intervention)					
Perry *et al.* (2023)	Combined exercise-based intervention (1 study): Evaluated a health education and exercise programme	Waiting list comparator (1 study)	Yes	No	No	No
Sanchez-Lastra *et al.* (2019)	Exercise training programmes (11 studies): Interventions based on aerobic exercise (4 studies), interventions evaluating combined forms of exercise (aerobic or anaerobic plus resistance training; 5 studies), a yoga programme (1 study), and a mixed sports activities intervention (1 study)	Interventions based on aerobic exercise: Normal activity comparator (3 studies), Not reported (1 study) Interventions evaluating combined forms of exercise (aerobic or anaerobic plus resistance training): Normal activity comparator (4 studies)	Yes	Yes	Yes	No

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	Note. The yoga-based programme is included in this systematic review under the umbrella of exercise training programmes; while yoga-based interventions are a separate family of interest for the purposes of this overview of reviews, it was decided to adhere to systematic review authors' classification of this kind of intervention as an exercise training programme, as defined in their systematic reviews	Yoga programme: Normal activity comparator (1 study) Mixed sports activities intervention: Comparator group talked about interesting topics (1 study)				
Woods *et al.* (2017)	Sports-based interventions (12 studies): Sport only interventions (6 studies; 2 of which are yoga-based interventions), and combined sports-based interventions (3 studies; 1 study included weekly nutritional seminars, 1 study included cognitive behavioural techniques and psychotherapy, and 1 study evaluated an intervention based on outdoor adventure activities, alongside social, creative and reflective activities *Note*. The 2 'sport-only' studies that evaluated a yoga-based intervention were included in the systematic review under the umbrella of	Comparator groups were only described for the 7 quantitative studies: No comparator group (2 studies) Usual care comparator group (4 studies; 1 of which had 2 interventions groups) Informal discussion comparator group (1 study, which also had 2 interventions groups)	Yes	No	No	Yes

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	sports-based interventions; while yoga-based interventions are a separate family of interest for the purposes of this overview of reviews, it was decided to adhere to systematic review authors' classification of this kind of intervention as an exercise training programme, as defined in their systematic reviews					
Horticultural interventions						
Harrison *et al.* (2020)	Agricultural intervention (1 study of 9 studies; however, qualitative findings from all studies were extracted for Q4)	No comparator groups (qualitative data)	No	No	Yes	No
Yoga, meditation, and mindfulness-based interventions						
Han (2022)	Mindfulness-based interventions involving: - Acceptance and Commitment Therapy (3 studies) - Mindfulness-Based Cognitive Therapy (1 study) - Mindfulness meditation (2 studies) - Dialectical Behaviour Therapy (1 study) - Combined Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy for relapse prevention (2 studies) - Mindfulness-Based Cognitive Therapy combined with some elements of Mindfulness-	Active control groups (4 studies with varying interventions but all involving weekly group sessions of Cognitive Behavioural Therapy) Waiting list or treatment as usual control groups (4 studies) *Note*. 1 study included both an active control group and a waitlist control group	Yes	No	No	No

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	Based Stress Reduction (1 study) - Combined Acceptance and Commitment Therapy, Dialectical Behaviour Therapy, Mindfulness-Based Stress Reduction, and Mindfulness-Based Cognitive Therapy (1 study)					
Perry *et al.* (2023)	Yoga-based interventions (5 studies) Positive psychology or mindfulness-based interventions (4 studies) *Note*. No further information was provided in relation to the nature of interventions	Yoga-based interventions: No intervention comparator (1 study), treatment as usual comparator (1 study), waiting list comparator (3 studies) Positive psychology or mindfulness-based interventions: Waiting list comparator (1 study), treatment as usual comparator (2 studies), 'Carey Guides' comparator (1 study)	Yes	No	No	No
Shonin *et al.* (2013)	Mindfulness-based intervention studies: 2 studies Vipassana meditation studies: 3 studies Other Buddhist-derived interventions: 2 studies (both involved meditation programmes; 1 programme followed Tibetan, Zen, and other Buddhist and non-Buddhist meditation approaches, and the other study was not affiliated to any particular meditation	The nature of the comparator groups was Not reported *Note*. An inclusion criterion for the systematic review was that studies had to employ an active (e.g. comparative intervention or treatment as usual) or passive (e.g. wait list) control	Yes	Yes	No	Yes

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	tradition, but was included as it significantly resembled Buddhist-based mindfulness meditation)					
Art and creative interventions						
Canada *et al.* (2020)	Combined intervention known as Good Vibrations (1 study; music): 1-week, prison-based Gamelan inspired music workshop involving education on musical pieces, learning how to improvise, composing an original piece of music, learning about Javanese culture and art, and a final performance Intervention known as Art expression (1 study; art): Six art expression workshops over six weeks, involving a short exercise to promote sharing and a planned art expression activity	No comparator groups	Yes, as benefits	No	Yes	No
Chen *et al.* (2016)	Music therapy involving improvisation, composition, singing, etc.: Group music therapy (1 study) and individual and group music therapy (1 study)	Standard care with no music therapy (2 studies)	Yes	Yes	No	No
Harrison *et al.* (2020)	Art and creative intervention; music therapy (1 study of 9 studies; however, qualitative findings from all studies were extracted for Q4)	No comparator groups (qualitative data)	No	No	Yes	No

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
Perry *et al.* (2023)	Art and creative interventions (4 studies): All evaluated creative arts interventions *Note*. No further information was provided in relation to the nature of interventions	Standard care control (2 studies) Treatment as usual control (2 studies)	Yes	No	No	No
Animal-based interventions						
Duindam *et al.* (2020)	Dog training programmes (1 study) and animal-assisted interventions (2 studies)	The nature of the comparator groups was Not reported for individual studies; however, the type of control group assessed as a moderator, with the following categories: - Treatment as usual (3/11 studies) - Waiting list (1/11 studies) - Alternative intervention (1/11 studies)	Yes, but results not usable	Yes	No	No
Harrison *et al.* (2020)	Animal-based intervention (1 study of 9 studies; however, qualitative findings from all studies were extracted for Q4)	No comparator groups (qualitative data)	No	No	Yes	No
Perry *et al.* (2023)	Animal assisted therapy intervention (1 study) *Note*. No further information was provided in relation to the nature of intervention	Waiting list comparator (1 study)	No, as did not find any studies	No	No	No
Villafaina-Domínguez *et al.* (2020)	Dog-based animal-assisted interventions (15 studies): Among the activities included in these programs were dog walking, dog training, taking care of dogs or rescue dogs, and using the dog as	No comparator groups in 11 studies Parenting, prison, and pups' program without animal-assisted intervention comparator group (1 study)	Yes, but results not usable	No	No	No

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	emotional support during therapy	Standard rehabilitation programme comparator group (1 study) Passive comparator group that did not participate in any programme (1 study) Psych-education and therapeutic intervention without a dog comparator group (1 study)				
Peer-based interventions						
South *et al.* (2014)	Peer-based interventions (54 studies: - Peer education (19 studies) - Peer support (14 studies) - Listeners (6 studies) - Peer mentoring (3 studies) - Prison hospice volunteers (3 studies) - Peer advisors (2 studies) - Health trainers (2 studies) - Peer counselling (2 studies) - Peer outreach (1 study) - Peer observers (1 study) - Peer training (1 study)	For all review question 1 (see characteristics of South (2014) in previous Table), the included studies compared peer-based interventions with any or no comparator (or usual care). However, comparators were often not described throughout the report For review question 3, included studies compared peer and professionally-led approaches to the same health or social problem	Yes	Yes	Yes	Yes
South *et al.* (2016)	Peer-based interventions (33 studies: - Peer education (6 studies) - Peer support (9 studies)	No comparator groups (qualitative data)	No	Yes	Yes	No

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	- Listeners (4 studies) - Peer mentoring (2 studies) - Peer advisors (2 studies) - Peer support team (peer) counselling) (1 study) - Peer outreach (1 study) - Peer education and counselling program (1 study) - Peer support/listeners (2 studies) - Health trainers (2 studies) - Prison hospice volunteers (2 studies) - Peer-led fathering programme (1 study) *Note*. The description of the specific types of interventions in South (2016) varies slightly from the descriptions provided in South (2014), even though the South (2014) and South (2016) articles are reporting on the same overall review					
Smoking cessation interventions						
de Andrade *et al.* (2017)	Smoking cessation programmes (8 studies): Evaluated a range of methods, e.g. motivational interviewing, Cognitive Behavioural Therapy, support groups, pilot tobacco control initiative (7 of	Smoking cessation programmes: 3/8 studies were pre-post studies (no ref groups), 5/8 studies had a control group: - Not specified (2 studies) - No intervention (2 studies)	Yes	No	Yes	Yes

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	these were combined interventions, some involved pharmaceutical aids like Nicotine Replacement Therapy and nortriptyline) Partial smoking bans (4 studies): Evaluated indoor smoking bans in which smoking was limited to outdoor areas (3 of these were combined interventions involving pharmaceutical aids (1 study), Nicotine Replacement Therapy (1 study), and Nicotine Replacement Therapy and self-help booklets (1 study)) Complete smoking bans (7 studies): Evaluated complete prisoner smoking bans, prohibiting smoking within the facility grounds for prisoners (1of these was a combined intervention offering Nicotine Replacement Therapy for purchase)	- 2 brief CBT sessions, nicotine replacement therapy, and placebo in place of nortriptyline (1 study) Partial smoking bans: all 4 studies were pre-post studies (no comparator groups) Complete smoking bans: 6 studies were pre-post studies and 1 was a cross-sectional survey (no comparator group)				
Frazer *et al.* (2016)	Smoking ban policies: Impact of smoke-free policies in prison, either partial or complete (1 study), impact of a tobacco-free policy in a prison banning the sale and use of tobacco products (1 study), and impact of effect of	1 study was an uncontrolled before-and-after study with no comparator group 2 studies included control reference areas for comparison: - 2 comparator prisons (1 study)	Yes	No	No	No

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	increased smoke-free zones (1 study) *Note*. Nicotine Replacement Therapy may have been available in some prisons	- US States without prison smoking bans (1 study)				
Lindson *et al.* (2019)	Motivational interviewing, covering topics such as introduction to tobacco, prevalence of tobacco use, effects of tobacco use on general health and dental health, psychosocial factors influencing tobacco use, healthy diet and behavioural intervention for prevention of tobacco use	Waiting-list comparator (1 study)	Yes	No	No	No
Mohan *et al.* (2018)	Smoking combined cessation interventions (2 studies): Both studies used Nicotine Replacement Therapy along with behavioural therapy; 1 study delivered the intervention in a group setting, focusing on mood management training to prevent smoking relapse, and 1 study delivered 2 face-to-face brief Cognitive Behavioural Therapy sessions and had support systems in place in the form of a telephone counselling service and self-help materials	Prisoners that received the same smoking cessation intervention with the exception of a placebo in the place of Nicotine Replacement Therapy (1 study) Waiting list comparator (1 study)	Yes	No	No	Yes
Sourry *et al.* (2022)	Complete facility-based smoking bans and other smoking cessation	Smoke-free prison only: The prospective cohort study and observational study compared	Yes	No	No	Yes

Author (year)	Intervention(s)	Comparator (s)	Contributed to **research Q1 & Q2 (effectiveness outcomes)**	Contributed to **research Q3 (success factors)**	Contributed to **research Q4 (barriers & facilitators)**	Contributed to **research Q5 (long-term effects)**
	interventions (4 studies): All 4 studies were conducted on people previously in prison were smoke-free prisons, and in 2 studies, researchers tested the effects of combined interventions; 1 study evaluated incarceration in a smoke-free prison combined with 6 weekly motivational interviewing and cognitive behavioural therapy sessions (pre-release) followed by 2 follow-up phone call sessions 1 day and 1 week post-release), and 1 study evaluated incarceration in a smoke-free prison combined with1 face-to-face motivational intervention session	participants to their own pre-prison smoking rates post-release from a smoke free prison (2 studies) Combined interventions: Comparator group were incarcerated in a smoke-free prison combined with 6 weekly sessions of watch educational videos (1 study), and participants incarcerated in a smoke-free prison with no additional intervention component (1 study)				
Healthy eating and nutrition interventions						
Mohan *et al.* (2018)	Nutrition interventions (2 studies): 2 studies evaluated interventions in which the diet of prisoners was modified and 1 study evaluated the impact of education and behavioural workshops on the nutrition practices of prisoners	2 cohort studies with no comparator group No intervention comparator (1 study)	Yes	No	No	Yes

7.10 Appendix 10 Quality assessment results for each systematic review by intervention

Author (year)	Item 1. Focused research question?	Item 2. Appropriate study design?	Item 3. Reproducible search strategy?	Item 4. Adequate search years?	Item 5. Description of level of evidence?	Item 6. Quality assessed and reported?	Item 7. Quality assessment methods?	Item 8. Appropriate methods of analysis?	Item 9. Quality considered when interpreting results?	Item 10. Conclusions supported by methods and results?	Total
Sports- and exercise-based interventions											
Canada *et al.* (2020)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9 (strong)
Martinez Merino *et al.* (2017)	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No	5 (moderate)
Mohan *et al.* (2018)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	7 (moderate)
Perry *et al.* (2023)	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	6 (moderate)
Sanchez-Lastra *et al.* (2019)	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	6 (moderate)
Woods *et al.* (2017)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	7 (moderate)
Horticultural interventions											
Harrison *et al.* (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	8 (strong)
Yoga, meditation, and mindfulness-based interventions											
Han (2022)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	6 (moderate)
Perry *et al.* (2023)	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	6 (moderate)
Shonin *et al.* (2013)	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	7 (moderate)
Art and creative interventions											
Canada *et al.* (2020)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9 (strong)
Chen *et al.* (2016)	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	5 (moderate)
Harrison *et al.* (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	8 (strong)
Perry *et al.* (2023)	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	6 (moderate)
Animal-based interventions											
Duindam *et al.* (2020)	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	7 (moderate)
Harrison *et al.* (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	8 (strong)
Perry *et al.* (2023)	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	6 (moderate)
Villafaina-Domínguez *et al.* (2020)	No	No	No	No	No	Yes	No	No	No	No	1 (weak)
Peer-based interventions											
South *et al.* (2014)	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	7 (moderate)
South *et al.* (2016)	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No	5 (moderate)
Smoking cessation interventions											
de Andrade *et al.* (2017)	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	6 (moderate)
Frazer *et al.* (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	8 (strong)
Lindson *et al.* (2019)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10 (strong)
Mohan *et al.* (2018)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	7 (moderate)
Sourry *et al.* (2022)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9 (strong)

Author (year)	Item 1. Focused research question?	Item 2. Appropriate study design?	Item 3. Reproducible search strategy?	Item 4. Adequate search years?	Item 5. Description of level of evidence?	Item 6. Quality assessed and reported?	Item 7. Quality assessment methods?	Item 8. Appropriate methods of analysis?	Item 9. Quality considered when interpreting results?	Item 10. Conclusions supported by methods and results?	Total
Healthy eating and nutrition interventions											
Mohan *et al.* (2018)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	7 (moderate)

7.11 Appendix 11 GRADE assessment results for outcomes across included systematic reviews by intervention

Author (year)	Primary study design(s) included	Overall quality rating of review	1. Study design	2. Imprecision (based on sample size)	3. Risk of bias / quality assessment of primary studies	4. Analysis heterogeneity	5. Review methodological quality rating	GRADE score (considering of downgrades)	Overall GRADE or certainty of evidence
Sports- and exercise-based interventions									
Single interventions									
Physical well-being: Physical strength and fitness									
Mohan *et al.* (2018)	3 RCTs 1 non-randomised trial	Moderate	-1	-2	-2	NA	-1	-6	Very low
Sanchez-Lastra *et al.* (2019)	2 RCTs	Moderate	0	-0	-1	NA	-1	-2	Moderate
Physical well-being: Body and blood composition									
Mohan *et al.* (2018)	2 RCTs 1 non-randomised trial	Moderate	-1	-1	-2	NA	-1	-5	Low
Sanchez-Lastra *et al.* (2019)	2 RCTs	Moderate	0	-1	-1	NA	-1	-3	Moderate
Mental, psychological, and emotional well-being: Wellness									
Sanchez-Lastra *et al.* (2019)	1 RCTs	Moderate	0	-1	-1	NA	-1	-3	Moderate
Mental, psychological, and emotional well-being: Mental and emotional distress									
Sanchez-Lastra *et al.* (2019)	2 RCTs	Moderate	0	-1	-1	NA	-1	-3	Moderate
Woods *et al.* (2017)	2 RCTs 2 pre-post studies 1 cross-sectional survey	Moderate	-2	0	-1	NA	-1	-4	Low
Combined interventions									
Physical well-being: Physical strength and fitness									
Sanchez-Lastra *et al.* (2019)	3 RCTs	Moderate	0	-1	-1	NA	-1	-3	Moderate
Mohan *et al.* (2018)	1 RCT	Moderate	0	-2	-2	NA	-1	-5	Low

Author (year)	Primary study design(s) included	Overall quality rating of review	1. Study design	2. Imprecision (based on sample size)	3. Risk of bias / quality assessment of primary studies	4. Analysis heterogeneity	5. Review methodological quality rating	GRADE score (considering of downgrades)	Overall GRADE or certainty of evidence
Physical well-being: Body and blood composition									
Sanchez-Lastra *et al.* (2019)	4 RCTs	Moderate	0	-1	-1	NA	-1	-3	Moderate
Mohan *et al.* (2018)	1 pre-post study	Moderate	-2	-2	-2	NA	-1	-7	Very low
Mental, psychological, and emotional well-being: Wellness									
Woods *et al.* (2017)	1 pre-post study	Moderate	-2	-2	-1	NA	-1	-6	Very low
Sanchez-Lastra *et al.* (2019)	3 RCTs	Moderate	0	-2	-1	NA	-1	-4	Low
Mental, psychological, and emotional well-being: Mental and emotional distress									
Sanchez-Lastra *et al.* (2019)	2 RCTs	Moderate	0	-2	-1	NA	-1	-4	Low
Horticultural interventions									
No effectiveness studies									
Yoga, meditation, and mindfulness-based interventions									
Single interventions									
Mental, psychological, and emotional well-being: Wellness									
Mindfulness									
Shonin *et al.* (2013)	1 RCT	Moderate	0	0	-2	NA	-1	-3	Moderate
Meditation									
Shonin *et al.* (2013)	2 non-randomised trial	Moderate	-1	-1	-2	NA	-1	-5	Low
Mental, psychological, and emotional well-being: Mental and emotional distress									
Mindfulness									
Han (2022)	9 RCTs	Moderate	0	0	-2	0	-1	-3	Moderate
Perry *et al.* (2023)	3 RCTs 1 cluster RCT	Moderate	-1	-2	-2	NA	-1	-6	Very low
Shonin *et al.* (2013)	2 RCTs	Moderate	0	0	-2	NA	-1	-3	Moderate
Meditation									

Author (year)	Primary study design(s) included	Overall quality rating of review	1. Study design	2. Imprecision (based on sample size)	3. Risk of bias / quality assessment of primary studies	4. Analysis heterogeneity	5. Review methodological quality rating	GRADE score (considering of downgrades)	Overall GRADE or certainty of evidence
Shonin *et al.* (2013)	1 RCT 3 non-randomised trials	Moderate	-1	-1	-2	NA	-1	-5	Low
Yoga									
Perry *et al.* (2023)	4RCTs 1 cross over trail	Moderate	-1	-2	-2	NA	-1	-6	Very low
Art and creative interventions									
Single interventions									
Mental, psychological, and emotional well-being: Mental and emotional distress									
Chen *et al.* (2016)	RCTs (2)	Moderate	0	0	0	-1	-1	-2	Moderate
Perry *et al.* (2023)	RCTs (2), pilot RCT (2)	Moderate	0	0	-2	NA	-1	-3	Moderate
Animal-based interventions									
No useable effectiveness outcomes									
Peer-based interventions									
Combined interventions									
Mental, psychological, and emotional well-being: Wellness									
South *et al.* (2014)	Mixed methods studies (4), quantitative studies (unspecified) (3), pre-post studies (2)	Moderate	-2	-1	-2	NA	-1	-6	Very low
Mental, psychological, and emotional well-being: Mental and emotional distress									
South *et al.* (2014)	Pre-post study (1), mixed methods study (1)	Moderate	-2	-2	-2	NA	-1	-7	Very low
Mental, psychological, and emotional well-being: Knowledge and empowerment (peer workers)									

Author (year)	Primary study design(s) included	Overall quality rating of review	1. Study design	2. Imprecision (based on sample size)	3. Risk of bias / quality assessment of primary studies	4. Analysis heterogeneity	5. Review methodological quality rating	GRADE score (considering of downgrades)	Overall GRADE or certainty of evidence
South *et al.* (2014)	Pre-post study (1), mixed methods study (1)	Moderate	-2	0	-1	NA	-1	-4	Low
Mental, psychological, and emotional well-being: Knowledge and empowerment (prisoners)									
South *et al.* (2014)	RCTs (3), pre-post studies (7), study design unclear (2)	Moderate	-2	0	-2	NA	-1	-5	Low
Smoking cessation interventions									
Single interventions									
Physical wellbeing									
Frazer *et al.* (2016)	2 observational studies (2)	Strong	-2	0	-2	NA	0	-4	Low
de Andrade and Kinner (2017)	Pre-post studies (2)	Moderate	-2	-2	-2	NA	-1	-7	Very low
Abstinence									
de Andrade and Kinner (2017)	Pre-post studies (2) and cross-sectional survey (1)	Moderate	-2	0	-2	NA	-1	-5	Low
Lindson *et al.* (2019)	RCT (1)	Strong	0	0	-2	NA	0	-2	Moderate
Smoking behaviours of smokers									
Sourry *et al.* (2022)	Prospective cohort study (1) and cross-sectional survey (1)	Strong	-2	0	-2	NA	0	-4	Low
de Andrade and Kinner (2017)	Pre-post studies (5) and RCT (1)	Moderate	-2	0	-2	NA	-1	-5	Low
Environmental cigarette smoking factors									

Author (year)	Primary study design(s) included	Overall quality rating of review	1. Study design	2. Imprecision (based on sample size)	3. Risk of bias / quality assessment of primary studies	4. Analysis heterogeneity	5. Review methodological quality rating	GRADE score (considering of downgrades)	Overall GRADE or certainty of evidence
de Andrade and Kinner (2017)	Pre-post studies (2)	Moderate	-2	0	-2	NA	-1	-5	Low
Combined interventions									
Physical wellbeing									
Frazer *et al.* (2016)	Pre-post study (1)	Strong	-2	-2	-2	NA	0	-6	Very low
Andrade and Kinner (2017)	Pre-post study (1)	Moderate	-2	-2	-2	NA	-1	-7	Very low
Abstinence									
Sourry *et al.* (2022)	RCT (2)	Strong	0	0	0	NA	0	0	High
de Andrade and Kinner (2017)	Pre-post studies (3) and RCT (2)	Moderate	-2	0	-2	NA	-1	-5	Low
Mohan *et al.* (2018)	RCT (2)	Moderate	-2	0	-1	NA	-1	-4	Low
Smoking behaviours of smokers									
de Andrade and Kinner (2017	Pre-post studies (5) and RCT (1)	Moderate	-2	0	-2	NA	-1	-5	Low
Sourry *et al.* (2022)	RCT (2)	Strong	0	0	0	NA	0	0	High
Frazer *et al.* (2016)	Pre-post studies (1)	Strong	-2	-1	-2	NA	0	-5	Low
Environmental cigarette smoking factors									
Frazer *et al.* (2016)	Pre-post studies (1)	Strong	-2	-1	-2	NA	0	-5	Low
de Andrade and Kinner (2017)	Pre-post studies (1)	Moderate	-2	-1	-2	NA	-1	-6	Very low
Healthy eating and nutrition interventions									
Single interventions									
Physical well-being: Physical strength and fitness									
Mohan *et al.* (2018)	Cohort studies (2)	Moderate	-2	0	0	NA	-1	-3	Low

Author (year)	Primary study design(s) included	Overall quality rating of review	1. Study design	2. Imprecision (based on sample size)	3. Risk of bias / quality assessment of primary studies	4. Analysis heterogeneity	5. Review methodological quality rating	GRADE score (considering of downgrades)	Overall GRADE or certainty of evidence
Physical wellbeing: Body and blood composition									
Mohan *et al.* (2018)	Cohort studies (2)	Moderate	-2	0	0	NA	-1	-3	Low
Combined interventions									
Physical wellbeing: Body and blood composition									
Mohan *et al.* (2018)	Case-control study (1)	Moderate	-2	-2	-2	NA	-1	-7	Very low