Effect of artificial community water fluoridation on dental health

Appendices

8 May 2025

Research. Evidence. Action.

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6 Appendices Question 1

6.1 Appendix A Overview of literature search results for Question 1

An initial systematic search was carried out in Medline, LILACS and Embase on the 13 July 2021. Databases such as Cochrane Library and Epistemonikos, and registers such as PROSPERO systematic review register and the Cochrane Trail Registry, were also searched for relevant material. The initial Medline and Embase searches only covered the years 1990-2021. In December 2021, on the advice of an external expert, the review team extended the date range of the review to include historical relevant material. An additional search was carried out to cover 1946–1990 using the same search strategies for the Medline and Embase databases. All material from both searches was deduplicated into Endnote, then imported into Eppi Reviewer where it was further deduplicated. This body of evidence was screened on title and abstract and then in full text. An updated search of the two main databases, using the same search strategies, was conducted on 24 February 2022, and on 28 March 2023, to capture recent evidence. The summary table below gives an overview of this complex search process (

Table 1). Search strategies for the database searches follow below.

Table 1 Overview of literature search for Q1

Database	Date of search	Date range	No. of results
Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions	13 July 2021	1990- 09 July 2021	1,535
Embase (Embase.com)	13 July 2021	1990- 09 July 2021	2,096
Cochrane Library (John Wiley & Sons Inc)	03 Aug 2021	November, 1946-03 Aug 2021	33
Cochrane Trial Register (John Wiley & Sons Inc)	03 Aug 2021	November, 1946-03 Aug 2021	218
Latin American and Caribbean Health Sciences Literature (LILACS)	23 Aug 2021	1998-23 Aug 2021	23
PROSPERO Trial Register	02 Nov 2021	Inception-02 Nov 2021	4
Epistemonikos database of systematic reviews	13 July 2021	Inception-13 July 2021	24
Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions	06 Dec 2021	1946- 1990	440
Embase	06 Dec 2021	1974- 1990	480
Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions	24 Feb 2022	01 Dec 2021-24 Feb 2022	142
Embase	24 Feb 2022	01 Dec 2021-24 Feb 2022	119
Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions	28 March 2032	01 Dec 2021-28 March 2023	136
Embase	28 March 2023	01 Dec 2021-28 March 2023	139
Total before deduplication			5,389
Total after deduplication			3,846
Total retained for analysis after screening			73
Total added from reference chasing			24
Total included on full study and following extraction			97

6.1.1 Medline (1990-2021)

Database(s): Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions(R) 1990 to July 09, 2021

Search Strategy:

#	Searches	Results
1	exp Fluoridation/	5876
2	Fluorides/ or Fluorine/	34009
3	(fluorid* or fluorin* or flourid* or flourin* or flurid* or flurin or florid* or florin*).tw,kf,sh. and water.tw,kf,sh. /freq=5	1951
4	(Hexafluorsilicic acid or Hydrofluosilicic acid or HFSA or "H2SiF6" or "CaF2" or fluorospar or fluorosilicic acid or sodium fluorosilicate$ or silicofluorid$).mp.	1196
5	or/1-4	39800
6	Water Supply/ or Water/ or (drinking water or drinking suppl$ or potable water or water suppl$ or suppl$ of water or public water or community water or water treatment or waterworks or water fluorid$).mp.	251438
7	5 and 6	6005
8	Oral Health/	17919
9	oral health.mp. and quality of life.ab,ti,hw,kw.	5166
10	Quality of Life/	216188
11	Dental health/	0
12	"Quality of Life"/ and dental health.mp.	482
13	(Life Quality or Health-Related Quality Of Life or Health Related Quality Of Life).mp.	57202
14	(Life Quality or Health-Related Quality Of Life or Health Related Quality Of Life).mp. or HRQOL.ab,ti,kw.	57836
15	exp Periodontal Diseases/	90182
16	Dental Caries.mp. or exp Dental Caries/	53852
17	carie$.mp.	62346
18	Dental enamel/	20060
19	exp Tooth demineralization/	49211
20	((teeth or tooth or dental or enamel or dentin or root$) adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	86447
21	((teeth or tooth or dental or enamel or dentin) and plaque).mp.	27298
22	Tooth loss/ or tooth loss.ti,ab,hw,kw.	7070
23	DMF Index/ or ("DMF Index" or "Dental Plaque Index").mp.	14647
24	Fluorosis, dental/ or (fluorosis or fluorosed or tooth discolouration).mp.	4311
25	or/8-24	440423
26	7 and 25	2876
27	blind*.mp. or Case-Control Studies/ or case-control.mp. or ("case series" or "time series" or "before and after").mp. or Cohort Studies/ or cohort analysis/ or cohort*.mp. or control*.mp. or clinical trial/ or Cohort Studies/ or Cross-Over Studies/ or cross over.mp. or crossover.mp. or cross sectional.mp. or double-blind method/ or doubl*.mp. or exp clinical trial/ or comparative study/ or comparative stud*.mp. or controlled clinical trial/ or Correlation study/ or cross sectional study/ or Ecological study/ or ecological stud*.mp. or ecological study.mp. or evaluation study/ or evaluation stud*.mp. or Follow-Up Studies/ or followup.mp. or follow-up.mp. or (health* adj2 survey*).mp. or Incidence/ or incidence.mp. or mask*.mp. or Mortality/ or mortality.tw. or observational study/ or Placebos/ or placebo*.mp. or predict*.mp. or Prevalence/ or prevalence.mp. or prognos*.mp. or random*.mp. or Randomized Controlled Trial/ or random allocation/ or risk.mp. or exp Research Design/ or Single-Blind Method/ or singl*.mp. or trebl*.mp. or tripl*.mp. or volunteer*.mp.	13954657
28	26 and 27	2260
29	limit 28 to yr="1990-Current"	1535

6.1.2 Embase (1990-2021)

Database(s): Embase 1990 to 2021 July 09
Search Strategy

#	Searches	Results
1	Fluorides/ or Fluorine/	38059
2	exp Fluoridation/	4376
3	water.ti,ab,kw,sh. /freq=5 and (fluorid$ or fluorin$ or flourid$ or flourin$ or flurid$ or flurin$ or florid$ or florin$).ti,ab,kw,sh.	2793
4	(Hexafluorsilicic acid or Hydrofluosilicic acid or HFSA or "H2SiF6" or "CaF2" or fluorospar or fluorosilicic acid or sodium fluorosilicate$ or silicofluorid$).mp.	1233
5	or/1-4 FLUORIDE	42694
6	Water Supply/ or Water/ or (drinking water or drinking suppl$ or potable water or water suppl$ or suppl$ of water or public water or community water or water treatment or waterworks or water fluorid$).mp.	426890
7	5 and 6 FLUORIDE AND WATER	7651
8	Oral Health/	161736
9	oral health.mp. and quality of life.ab,ti,hw,kw.	5379
10	Dental health/	4218
11	"Quality of Life"/ and dental health.mp.	646
12	Quality of Life/	513727
13	(Life Quality or Health-Related Quality Of Life or Health Related Quality Of Life).mp.	88186
14	(Life Quality or Health-Related Quality Of Life or Health Related Quality Of Life).mp. or HRQOL.ab,ti,kw.	90417
15	exp Periodontal Diseases/ or periodontal disease$.mp.	108216
16	exp Dental Caries/	49907
17	(carie$ or carie*).mp.	60481
18	((teeth or tooth or dental or enamel or dentin or root$) adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	71786
19	((teeth or tooth or dental or enamel or dentin) and plaque).mp.	27798
20	exp Tooth demineralization/	224166
21	Fluorosis, dental/ or (fluorosis or fluorosed or tooth discolouration).mp.	5437
22	Dental enamel/	19708
23	DMF Index/	961
24	("DMF Index" or "Dental Plaque Index").mp.	1347
25	Tooth loss/ or tooth loss.ti,ab,hw,kw.	34448
26	or/8-25	927462
27	7 and 26 ORAL HEALTH	3443
28	blind*.mp. or Case-Control Studies/ or case-control.mp. or ("case series" or "time series" or "before and after").mp. or Cohort Studies/ or cohort analysis/ or cohort*.mp. or control*.mp. or clinical trial/ or Cohort Studies/ or Cross-Over Studies/ or cross over.mp. or crossover.mp. or cross sectional.mp. or double-blind method/ or doubl*.mp. or exp clinical trial/ or comparative study/ or comparative stud*.mp. or controlled clinical trial/ or Correlation study/ or cross sectional study/ or Ecological study/ or ecological stud*.mp. or ecological study.mp. or evaluation study/ or evaluation stud*.mp. or Follow-Up Studies/ or followup.mp. or follow-up.mp. or (health* adj2 survey*).mp. or Incidence/ or incidence.mp. or mask*.mp. or Mortality/ or mortality.tw. or observational study/ or Placebos/ or placebo*.mp. or predict*.mp. or Prevalence/ or prevalence.mp. or prognos*.mp. or random*.mp. or Randomized Controlled Trial/ or random allocation/ or risk.mp. or exp Research Design/ or Single-Blind Method/ or singl*.mp. or trebl*.mp. or tripl*.mp. or volunteer*.mp.	21777714
29	27 and 28 FLUROIDE + WATER + ORAL HEALTH	2508
30	limit 29 to yr="1990-Current"	2096

6.1.3 Cochrane Central (1946-03 August 2021)

#	Searches	Results
#1	MeSH descriptor: [Fluorides] explode all trees	2686
#2	MeSH descriptor: [Fluorine] explode all trees	85
#3	MeSH descriptor: [Fluoridation] explode all trees	38
#4	((fluorid* or fluorin* or flurin* or flurid* or flourid* or flourin*))	6295
#5	#1 or #2 or #3 or #4	6375
#6	MeSH descriptor: [Water Supply] explode all trees	180
#7	MeSH descriptor: [Water] explode all trees	2429
#8	("water treatment")	320
#9	water near fluorid*	255
#10	("community water" OR "community-based water" OR "community supply" OR "community fluoridation")	28
#11	#6 OR #7 OR #8 OR #9 OR #10	3044
#12	#5 and #11	306
#13	MeSH descriptor: [Oral Health] explode all trees	451
#14	MeSH descriptor: [Tooth Diseases] explode all trees	11401
#15	MeSH descriptor: [DMF Index] explode all trees	518
#16	MeSH descriptor: [Dental Enamel] explode all trees	1168
#17	#13 OR #14 OR #15 OR #16	12063
#18	("oral health" OR "dental health"):ti,ab,kw	3921
#19	(caries OR carious OR cavit* OR decay* OR demineral* OR remineral* OR "dental plaque index")	22874
#20	(fluorosis or fluorosed OR ((tooth OR teeth) NEXT (discolour* OR discolor*)))	784
#21	(enamel OR root OR dentin OR tooth OR teeth OR oral OR dental):ti,ab,kw	209510
#22	("quality of life" OR "life quality" OR QoL OR HRQoL):ti,ab,kw	124121
#23	#21 and #22	13571
#24	#17 OR #18 OR #19 OR #20 OR #23	43597
#25	#12 and #24	251
Cochrane Reviews		22
Cochrane Protocols		2

#	Searches	Results
Trials		218
Clinical Answers		9

6.1.4 Latin American and Caribbean Health Sciences Literature Database (LILACS) (1998-23 August 2021)

#	Searches	Result
#1	(fluoride OR fluorine OR fluori$ OR fluoruro OR fluoreto) AND	
#2	((teeth OR tooth OR dental OR dentin$ OR enamel OR root$) OR (Cavit$ OR caries OR carious OR decay*)) AND	
Total:		23

6.1.5 Epistemonikos (2009-13 August 2021)

#	Searches	Result
	(title:((title:(fluoride AND water fluoridation AND review) OR abstract:(fluoride AND water fluoridation AND review)) AND (teeth OR tooth OR dental OR dentin* OR enamel OR root*) OR (cavit* OR caries OR carious OR decay*)) OR abstract:((title:(fluoride AND water fluoridation AND review) OR abstract:(fluoride AND water fluoridation AND review)) AND (teeth OR tooth OR dental OR dentin* OR enamel OR root*) OR (cavit* OR caries OR carious OR decay*)))	
Total:		24

6.1.6 Supplementary grey literature table

General scoping searches for Question 1 were carried out in the search engine *Google.com* to gain an initial idea of terminology and likely key terms. Reviewing literature and systematic reviews in the area (retrieved in the Epistemonikos and Cochrane databases) also helped build up our search vocabulary. Search terms used included combinations of water, fluoridated water, fluoride, oral health, dental health; For Questions 2A and 2B, vocabulary around children and topical fluoride(s) was added. Broad terms were used, in structured searches, to capture as much relevant material as possible. Further searches were carried out using the websites of relevant bodies. Results were pre-screened by the information specialist (AF) and screened using different screening codes for questions 1, 2A and 2B (OC). Updated searches of these resources was undertaken in March, 2023, as well as the search engine, *DuckDuckGo.* A full list of grey literature resources is available at Table 2.

Table 2 Structured grey literature search

Country	Body	Link	Date	Search string	Limit	#
Australia						
	Australian Dental Association (ADA)	https://www.ada.org.au/Dental-Professionals	09-Feb-22	fluoride and water and "oral health"	Publications	21
				fluoride and water and "oral health" and children	Publications	22
	Fluoride Reference Group	https://www.nhmrc.gov.au/about-us/leadership-and-governance/committees/fluoride-reference-group	09-Feb-22			3
	National Health and Medical Research Council (NHMRC)	https://www.nhmrc.gov.au/	09-Feb-22	fluoride and water and "oral health"		10
				fluoride and children		12
Canada						
	Canadian Dental Association	https://www.cda-adc.ca/en/index.asp	09-Feb-22	fluoride and water and "oral health" and children		3
	Canadian Institute for Health Information	https://www.cihi.ca/en	09-Feb-22	fluoride and water and "oral health"		0
				fluoride and water and "oral health” and children		0
	Health Canada	https://www.canada.ca/en/health-canada.html	09-Feb-22	Fluorosis		0
				Flu*		0
				Fluoride and water and	Terms in title	26

Country	Body	Link	Date	Search string	Limit	#
				"oral health"		
Ireland						
	Dental Council (Ireland)	http://www.dentalcouncil.ie	09-Feb-22	No search function on website. Nothing relevant retrieved via browsing.		0
	Department of Health	https://www.health.gov.ie	28-Feb-22	fluoride and water and "oral health"	Policies/Policy Information / Publications / Reports/	15
	Irish Expert Body on Fluorides and Health	https://www.fluoridesandhealth.ie/	28-Feb-22	fluoride and		9
				water fluoridation and "oral health" and "topical fluorides" and children		45
				water fluoridation and "oral health" and topical		19
	Irish Dental Association	https://www.dentist.ie/	28-Feb-22	water fluoridation and "oral health" and topical		19
				fluoride and water and "oral health" and children		0
				fluoride and water		0
				Fluoride		11
New Zealand						
	Environmental Health Intelligence New Zealand (EHINZ)	https://www.ehinz.ac.nz/	28-Feb-22	water + fluoride + children		1

Country	Body	Link	Date	Search string	Limit	#
	Ministry of Health	https://www.health.gov.nz/				
			28-Feb-22	fluoride and water and "oral health"		54
				fluoride and water and "oral health" and topical and children	Publication type: strategies and plans; evaluation and review; statistical publications ; guides and standards	5
	New Zealand Dental Association (NZDA)	https://www.nzda.org.nz/	09-Feb-22	fluoride and water and "oral health"		31
UK						
	British Dental Association (BDA)	https://www.bda.org/	09-Feb-22	fluoride and water and "oral health"		31
	Department of Health	https://www.gov.uk/government/organisations/department-of-health-and-social-care	22 March 22	fluoride and water and "oral health"	"Guidance and regulation" AND Limiter: “Research and statistics" AND "policy papers and consultations" AND Topic: "Health and Social Care"	82
				fluoride and water and "oral health" and children and topical	"Guidance and regulation" AND Limiter: “Research and statistics" AND "policy papers and	70

Country	Body	Link	Date	Search string	Limit	#
					consultations" AND Topic: "Health and Social Care"	
	National Institute for Health and Care Excellence (NICE)	https://www.nice.org.uk/	28-Feb-22	water+fluoride		4
				children+fluoride		13
	Scottish Dental Clinical Effectiveness Programme	https://www.sdcep.org.uk/?s=fluoridation+or+flouride	28-Feb-22	children+fluoride		17
USA						
	American Dental Association (ADA)	https://www.ada.org/	09-Feb-22	fluoride and water and "oral health"	article+ JADA+ Clinical Research+ Fluoride+ Regulatory+ Science & Technology	42
	American Association of Pediatric Dentistry (AAPD)	https://www.aapd.org/	28-Feb-22	Fluoride and water and “oral health” and topical	Educational resources (no access to any other material)	27
	American Academy of Oral Medicine	https://www.aaom.com	28-Feb-22	Fluoride		31
	Centers for Disease Control (CDC)	https://www.cdc.gov/fluoridation/	28-Feb-2022	“Water fluoridation” and “oral health” and “topical fluoride”		53
	Centers for Disease Control (CDC) Community Water Fluorisis	https://www.cdc.gov/fluoridation/faqs/dental_fluorosis/	28-Feb-2022			1
	Centers for Disease Control (CDC)	https://www.cdc.gov/fluoridation/basics/fluoride-	28-Feb-2022			1

Country	Body	Link	Date	Search string	Limit	#
	Fluoride Products	products.html				
	Dept of Health and Human Services (HHS)	https://www.hhs.gov/	28-Feb-22	fluoride and water and "oral health" and children and topical		0
International						
	Canada's Drug & Health Technology Agency (CADTH)	https://www.cadth.ca/grey-matters-practical-tool-searching-health-related-grey-literature-0	28-Feb-22			10
	Centre for Evidence-based Dentistry	https://www.cebd.org/	28-Feb-22	Fluoride and water		
	Core.Ac.uk	https://core.ac.uk/	28-Feb-22	children and fluoride		
	Council of European Dentists (CED)	https://www.eudental.eu/	28-Feb-22	Fluoride and oral health	research	124
	European Food Safety Authority	https://www.efsa.europa.eu/en	28-Feb-22	fluoridated water and "oral health" and "topical fluoride" and children	research	31
	Health Systems Evidence	https://www.healthsystemsevidence.org/	28-Feb-22	water and fluoride and oral health		0
	International Association for Dental Research (IADR)	https://www.iadr.org/	28-Feb-22			
	International Network of Agencies for Health	https://database.inahta.org/about#about-inahta	28-Feb-22	water fluoridation and dental and children		2

Country	Body	Link	Date	Search string	Limit	#
	Technology Assessment (INAHTA)					
	Med Archives	https://www.medrxiv.org/	28-Feb-22	"water and fluoride and dental"		14
	World Dental Federation (FDI)	https://www.fdiworlddental.org/	28-Feb-22	carious OR caries Or Cari* + fluoridation (condition) AND fluoridation OR fluoride (intervention)	All Phases + Children trials	0
	Total:					1,013

6.1.7 Overview of updated database search (23 Feb 2023)

An updated database search was performed in the main databases (Medline, Embase) to capture recent relevant data using the same search strategy as the original search to the current date. See

Table 1.

6.2 Appendix B PRISMA checklist and PRISMA-S for Question 1

6.2.1 PRISMA checklist for Question 1

Topic	Item	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title page
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Executive summary
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Section 1.1.4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Section 1.2
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Sections 2.3.1
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Sections 2.4
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix A of Section 6
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Section 2.6**Error! Reference source not found.**
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Section 2.7

Topic	Item	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Sections 2.3.1, Table 2, Section 2.7.1.1 and 2.7.1.2
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Section 2.7, 2.7.1.1 and 2.7.1.2
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Section 2.8
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Section 2.9.1
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Section 2.9.2
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Section 2.9.3
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Section 2.9.2 and 2.9.3
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Section 2.9.3
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Section 2.9.3
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Section 2.9.3
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Section 2.9.2 and 2.9.3

Topic	Item	Checklist item	Location where item is reported
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Section 2.10
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Section 3.1.1, Appendix F of Section 6
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Section 3.1.4.1, Tables 11 and 12, Section 3.1.4.2, Tables 13 and 14 Appendix C of Section 6
Study characteristics	17	Cite each included study and present its characteristics.	Section 3.1.2, Table 8, Section 3.1.5, Table 36
Risk of bias in studies	18	Present assessments of risk of bias [quality assessment] for each included study.	Appendix H of Section 6
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Section 3.1.4.3, Tables 15–35, Section 3.1.7, Section 3.1.7.4, Tables 38 – 44, Appendix J of Section 6
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Sections 3.1.3, Table 9 and 10, Section 3.1.6, Table 37, Appendix H of Section 6
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Section 3.1.4.4, Figures 4 -8, Section 3.1.7

Topic	Item	Checklist item	Location where item is reported
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	3.1.4.4
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Appendix K of Section 6
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Not applicable as mainly cross section surveys
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Appendix L of Section 6
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Sections 4.1 and 4.2
	23b	Discuss any limitations of the evidence included in the review.	Section 4.3
	23c	Discuss any limitations of the review processes used.	Section 4.3
	23d	Discuss implications of the results for practice, policy, and future research.	Sections 4.4 and 4.5
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Section 2.3.2
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Section 2.3.2
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Section 2.3.2
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Not applicable as all authors are salaried public servants who are funded from the DOH public funding and are obliged to be objective
Competing interests	26	Declare any competing interests of review authors.	None

Topic	Item	Checklist item	Location where item is reported
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Appendix D, E and J of Section 6

Source: Page *et al.* (2021)[28]

6.2.2 PRISMA-S for Question 1

Section/topic	#	Checklist item	Location(s) Reported
INFORMATION SOURCES AND METHODS			
Database name	1	Name each individual database searched, stating the platform for each.	Sections 2.4.4 and 2.5
Multi-database searching	2	If databases were searched simultaneously on a single platform, state the name of the platform, listing all of the databases searched.	n/a
Study registries	3	List any study registries searched.	Sections 2.4 and 2.5
Online resources and browsing	4	Describe any online or print source purposefully searched or browsed (e.g., tables of contents, print conference proceedings, web sites), and how this was done.	Sections 2.4.5 and 2.4.6
Citation searching	5	Indicate whether cited references or citing references were examined, and describe any methods used for locating cited/citing references (e.g., browsing reference lists, using a citation index, setting up email alerts for references citing included studies).	Section 2.4.5
Contacts	6	Indicate whether additional studies or data were sought by contacting authors, experts, manufacturers, or others.	n/a
Other methods	7	Describe any additional information sources or search methods used.	n/a
SEARCH STRATEGIES			
Full search strategies	8	Include the search strategies for each database and information source, copied and pasted exactly as run.	Appendix A of Section 6
Limits and restrictions	9	Specify that no limits were used, or describe any limits or restrictions applied to a search (e.g., date or time period, language, study design) and provide justification for their use.	Sections 2.5 and Appendix A of Section 6
Search filters	10	Indicate whether published search filters were used (as originally designed or modified), and if so, cite the filter(s) used.	n/a
Prior work	11	Indicate when search strategies from other literature reviews were adapted or reused for a substantive part or all of the search, citing the previous review(s).	n/a

Updates	12	Report the methods used to update the search(es) (e.g., rerunning searches, email alerts).	Appendix A of Section 6
Dates of searches	13	For each search strategy, provide the date when the last search occurred.	Appendix A of Section 6
PEER REVIEW			
Peer review	14	Describe any search peer review process.	Section 2.4.3
MANAGING RECORDS			
Total Records	15	Document the total number of records identified from each database and other information sources.	Appendix A of Section 6
Deduplication	16	Describe the processes and any software used to deduplicate records from multiple database searches and other information sources.	Section 2.4.4

PRISMA-S: An Extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews

Rethlefsen ML, Kirtley S, Waffenschmidt S, Ayala AP, Moher D, Page MJ, Koffel JB, PRISMA-S Group.

Last updated February 27, 2020.

6.3 Appendix C Studies excluded at full text and extraction screening stages by reason for exclusion

6.3.1 Exclude on population

Exclude on population (n=4)
Hobbs M, Wade A, Jones P, *et al.* Area-level deprivation, childhood dental ambulatory sensitive hospitalizations and community water fluoridation: evidence from New Zealand. *Int J Epidemiol* 2020;49:908–16. https://doi.org/10.1093/ije/dyaa043
Nunn JH, Ekanayake L, Rugg-Gunn AJ, *et al.* Assessment of enamel opacities in children in Sri Lanka and England using a photographic method. *Community Dent Health* 1993;10:175–88.
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6.3.2 Exclude on intervention

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Bomfim Rafael Aiello, Frazao Paulo. Impact of water fluoridation on dental caries decline across racial and income subgroups of Brazilian adolescents. *Epidemiol Health* 2022;44:e2022007. doi:10.4178/epih.e2022007
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6.3.7 Exclude on duplicate

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6.3.8 Exclude unobtainable

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6.4 Appendix D Extraction forms

Table 3 General information form

Study ID *From Eppi*	Author *First author*	Year *Of publication*	Location *Country*	Area *State/County/City/Town*	Objective *Aim of study*	Secondary publication *Data will not be extracted unless additional endpoints*	Associated papers *Same overall project different analysis*	Study design *HRB decision*	Participant age *Mean or ranges described in study*	Artificial fluoridation *Confirm if explicitly stated (Y/N)*	Fluoride interventions	Outcome *Oral health outcome assessed*	Outcome details *Including method of measurement*	Extracted	Validated

Table 4 Study design and implementation form

Study ID	Author	Year	Study design (Author allocated)	Study design (HRB allocated)	Justification	Length of study	Length of exposure to CWF	Details of exposure	Details of comparator	Eligibility criteria	Sample size calculation	Response rate	Blinding of assessors to exposure	% Lost to follow-up	Method for handling missing data	Data collection	Confounders	Control for confounding	Identification of effect modification	Effect modifiers	Notes
From Epi	*First author*	*Of publication*	*As stated in the study*	*As agreed by research team*			*Length of time exposed to community water fluoridation*	*Inlcuding dose*	*Including dose*		*expected prevalence, power to detect a difference and allowed variance, results CIs calculated*			*For main analysis*	*e.g. last observation carried forward*	*Brief description*			*Yes or not reported*		

Table 5 Study participants characteristics form

Study ID	Author	Year	Group for characteristics	N	Mean age/Age range	% Female	N included in final analysis
From Eppi	*First author*	*Of publication*		*Enrolled*			

Table 6 Study measurement and outcomes form

Of publication	Outcome of interest: Caries	% caries primary teeth	% caries free primary teeth	% caries permanent teeth	% caries free permanent teeth	dmft/deft	dmfs/defs	DMFT	DMFS	Method of caries identification	Clinical examination criteria	Outcome of interest: Fluorosis	Fluorosis (Dean's index)	Fluorosis (Thylstrup-Fejerskov index)	Tooth Surfaces Index of Fluorosis	Type of teeth examined for fluorosis	Hypomineralisation by photographs

Table 7 Caries outcome data form using example of primary dentition dmft

Country	Author	Year	Age in years	CWF ppm	Baseline dmft CWF	Baseline CWF SD	Baseline CWF Total	Final dmft CWF	Final dmft SD CWF	Final CWF Total	Fluoride deficient ppm	Baseline mean dmft No F	Baseline SD No F	Baseline CWF Total	Final dmft No F	Final SD No F	Final No F Total	Difference in % point or dmft

This table was repeated for dmfs, % with CDC, and % without CDC for primary dentition. The table was also repeated for DMFT, DFMS, % with CDC, and % without CDC for permanent dentition

Table 8 Fluorosis outcome data form

Country	Author	Year	Age in years	CWF ppm	Baseline % fluorosis	Baseline 95% CI	Baseline CWF affected number	Baseline CWF Total	Final % fluorosis	Final 95 % CI	Final CWF affected number	Final CWF Total	Baseline 5 fluorosis No F	Baseline 95% CI No F	Baseline affected number No F	Baseline CWF Total	Final % No F	Final 95% CI No F	Final affected number No F	Final No F Total	Difference in % point or dmft

6.5 Appendix E Quality assessment tool

Table 9 National Heart, Lung, and Blood Institute's (NHLBI's) quality assessment tool for observational cohort studies and cross-sectional surveys

Number	NHLBI's quality assessment tool for observational cohort studies and cross-sectional surveys		Critical or non-critical
1	**Was the research question or objective in this paper clearly stated (PECO)?** Did the authors describe their research objective? Is it easy to understand what they were seeking to find? This issue is important for any scientific paper of any type. Higher quality scientific research explicitly defines a research question. (Population Exposure Comparator and Outcome for cohort and cross-sectional study designs, Population, Case, Controls and Exposure for case control, population, and outcome)		
2	**Was the study population clearly specified and defined?** Did the authors describe the group of people from which the study participants were selected or recruited, using demographics, location, and time-period? If you were to conduct this study again, would you know who to recruit, from where, and from what time-period? Is the cohort population free of the outcomes of interest at the time they were recruited? An example would be men over 40 years old with type 2 diabetes who began seeking medical care at Phoenix Good Samaritan Hospital between January 1, 1990 and December 31, 1994. In this example, the population is clearly described as: (1) who (men over 40 years old with type 2 diabetes); (2) where (Phoenix Good Samaritan Hospital); and (3) when (between January 1, 1990 and December 31, 1994). Another example is women ages 34 to 59 years of age in 1980 who were in the nursing profession and had no known coronary disease, stroke, cancer, hypercholesterolemia, or diabetes, and were recruited from the 11 most populous States, with contact information obtained from State nursing boards. In cohort studies, it is crucial that the population at baseline is free of the outcome of interest. For example, the nurses' population above would be an appropriate group in which to study incident coronary disease. This information is usually found either in descriptions of population recruitment, definitions of variables, or inclusion/exclusion criteria. You may need to look at prior papers on methods to make the assessment for this question. Those papers are usually in the reference list. For cross-sectional studies, a representative and adequately sized sample is required. The sample must be selected using randomisation or quasi randomised techniques (sequential or cluster sampling). A census of the population is also acceptable. The respondents must be similar to non-respondents, and this should be tested statistically. For case-control studies, a validated case (disease) definition is required, and the cases must meet the case definition and be representative of other cases; generally, community-based controls are considered the best comparators. The controls must have the same profile as the cases but without the disease of interest. The control number can exceed the case numbers by 4:1.		
3	**Was the participation (response rate) of eligible persons at least 50%?** If fewer than 50% of eligible persons participated in the study, then there is concern that the study population does not adequately represent the target population. This increases the risk of bias. This applies to three study designs.		**Critical flaw**
4	**Were all the subjects selected or recruited from the same or similar populations (including the same time-period)? or Were inclusion and**		**Critical flaw**

Number	NHLBI's quality assessment tool for observational cohort studies and cross-sectional surveys		Critical or non-critical
	exclusion criteria for being in the study prespecified and applied uniformly to all participants? Were the inclusion and exclusion criteria developed prior to recruitment or selection of the study population? Were the same underlying criteria used for all the subjects involved? This issue is related to the description of the study population, above, and you may find the information for both questions in the same section of the paper. Most cohort studies begin with the selection of the cohort; participants in this cohort are then measured or evaluated to determine their exposure status. However, some cohort studies may recruit or select exposed participants in a different time or place than unexposed participants, especially retrospective cohort studies–which is when data are obtained from the past (retrospectively), but the analysis examines exposures prior to outcomes. For example, one research question could be whether diabetic men with clinical depression are at higher risk for cardiovascular disease than those without clinical depression. So, diabetic men with depression might be selected from a mental health clinic, while diabetic men without depression might be selected from an internal medicine or endocrinology clinic. This study recruit's groups from different clinic populations, so this example would get a 'no'. However, the women nurses described in the question above were selected based on the same inclusion/exclusion criteria, so that example would get a 'yes'. For cross-sectional studies, a representative and adequately sized sample is required. The sample must be selected using randomisation or quasi randomised techniques (sequential or cluster sampling). A census of the population is also acceptable. The respondents must be like non-respondents, and this should be tested statistically. For case-control studies, a validated case (disease) definition is required, and the cases must meet the case definition and be representative of other cases; generally, community-based controls are considered the best comparators. The controls must have the same profile as the cases but without the disease of interest. The control number can exceed the case numbers by 4:1.		
5	**Was a sample size justification, power description, or variance (confidence intervals) and effect estimates (difference in effect between intervention and outcome) provided?** *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 95% degree of confidence), that is, the range of values will include the true value 95% of the time. It is an adjustment of the sample size calculation and demonstrates variance between the study sample and study population. Did the authors present their reasons for selecting or recruiting the number of people included or analysed (sample size calculator taking account of precision and effect size required sample size adjusted for response rate and loss to follow-up)? Do they note or discuss the statistical power of the study (effect size)? This question is about whether the study had enough participants to detect an association if one truly existed. This applies to cohort and cross-sectional studies. A paragraph in the methods section of the article may explain the sample size needed to detect a hypothesized difference in outcomes. You may also find a discussion of power in the discussion section (such as the study had 85% power to detect a 20% increase in the rate of an outcome of interest,		**Critical flaw**

Number	NHLBI's quality assessment tool for observational cohort studies and cross-sectional surveys		Critical or non-critical
	with a 2-sided alpha of 0.05). Sometimes estimates of variance and/or estimates of effect size are given, instead of sample size calculations. In any of these cases, the answer would be 'yes'. However, observational cohort studies often do not report anything about power or sample sizes because the analyses are exploratory in nature. In this case, the answer would be 'no'. This is not a 'fatal flaw'. It just may indicate that attention was not paid to whether the study was sufficiently sized to answer a prespecified question–i.e., it may have been an exploratory, hypothesis-generating study.		
6	**For the analyses of cohort studies, were the exposure(s) of interest measured prior to the outcome(s) being measured (temporal sequence, causality criteria)?** This question is important because, to determine whether an exposure causes an outcome, the exposure must come before the outcome. For some prospective cohort studies, the investigator enrols the cohort and then determines the exposure status of various members of the cohort (large epidemiological studies like Framingham used this approach). However, for other cohort studies, the cohort is selected based on its exposure status, as in the example above of depressed diabetic men (the exposure being depression). Other examples include a cohort identified by its exposure to fluoridated drinking water and then compared to a cohort living in an area without fluoridated water, or a cohort of military personnel exposed to combat in the Gulf War compared to a cohort of military personnel not deployed in a combat zone. With either of these types of cohort studies, the cohort is followed forward in time (i.e., prospectively) to assess the outcomes that occurred in the exposed members compared to nonexposed members of the cohort. Therefore, you begin the study in the present by looking at groups that were exposed (or not) to some biological or behavioural factor, intervention, etc., and then you follow them forward in time to examine outcomes. If a cohort study is conducted properly, the answer to this question should be 'yes', since the exposure status of members of the cohort was determined at the beginning of the study before the outcomes occurred. For retrospective cohort studies, the same principal applies. The difference is that, rather than identifying a cohort in the present and following them forward in time, the investigators go back in time (i.e., retrospectively) and select a cohort based on their exposure status in the past and then follow them forward to assess the outcomes that occurred in the exposed and nonexposed cohort members. Because in retrospective cohort studies the exposure and outcomes may have already occurred (it depends on how long they follow the cohort), it is important to make sure that the exposure preceded the outcome. Sometimes cross-sectional studies are conducted (or cross-sectional analyses of cohort-study data), where the exposures and outcomes are measured during the same timeframe. As a result, cross-sectional analyses provide weaker evidence than regular cohort studies regarding a potential causal relationship between exposures and outcomes. For cross-sectional analyses, the answer to Question 6 should be 'no'. For cross-sectional studies, the exposure status and outcome status are measured at the same time. Validated and in if possible objective measures should be used to assess the exposures and outcomes for all respondents. Attempts should be made to date the exposure and the outcome. For case-control studies, a validated case (disease) definition is required, and the cases must meet the case definition and be representative of other		

Number	NHLBI's quality assessment tool for observational cohort studies and cross-sectional surveys		Critical or non-critical
	cases; generally, community-based controls are considered the best comparators. The controls must have the same profile as the cases but without the disease of interest. The control number can exceed the case numbers by 4:1. Validated and in if possible objective measures should be used to assess the exposures and outcomes for cases and controls. In addition, the exposure status should be validated in existing records, dated, and ideally through objective testing.		
7	**Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?** Did the study allow enough time for sufficient outcomes to occur or be observed, or enough time for an exposure to have a biological effect on an outcome? In the examples given above, if clinical depression has a biological effect on increasing risk for cardiovascular disease, such an effect may take years. In the other example, if higher dietary sodium increases blood pressure, a short timeframe may be sufficient to assess its association with blood pressure, but a longer timeframe would be needed to examine its association with heart attacks. The issue of timeframe is important to enable meaningful analysis of the relationships between exposures and outcomes to be conducted. This often requires at least several years, especially when looking at health outcomes, but it depends on the research question and outcomes being examined. Cross-sectional analyses allow no time to see an effect, since the exposures and outcomes are assessed at the same time, so those would get a 'no' response. The time frame also applies to case-control studies.		
8	**For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable to determine dose response rate, causality criteria)?** Levels of exposure applies to cross-sectional and cohort studies. If the exposure can be defined as a range (examples: drug dosage, amount of physical activity, amount of sodium consumed), were multiple categories of that exposure assessed? (for example, for drugs: not on the medication, on a low dose, medium dose, high dose; for dietary sodium, higher than average consumption in the United States of America, lower than recommended consumption, between the two). Sometimes discrete categories of exposure are not used, but instead exposures are measured as continuous variables (for example, mg/day of dietary sodium or blood pressure values). In any case, studying different levels of exposure (where possible) enables investigators to assess trends or dose-response relationships between exposures and outcomes–e.g., the higher the exposure, the greater the rate of the health outcome. The presence of trends or dose-response relationships lends credibility to the hypothesis of causality between exposure and outcome. For some exposures, however, this question may not be applicable (e.g., the exposure may be a dichotomous variable like living in a rural setting versus an urban setting, or vaccinated versus not vaccinated with a single dose and time vaccine). If there are only two possible exposures (yes/no), then this question should be given an 'not applicable' and it should not count negatively towards the quality rating.		
9	**Were the (different) exposure measures (independent variables that may cause the outcome) clearly defined, valid, reliable, and implemented consistently across all study participants?**		

Number	NHLBI's quality assessment tool for observational cohort studies and cross-sectional surveys		Critical or non-critical
	Were the exposure measures defined in detail? Were the tools or methods used to measure exposure accurate and reliable–for example, have they been validated or are they objective? This issue is important as it influences confidence in the reported exposures. When exposures are measured with less accuracy or validity, it is harder to see an association between exposure and outcome even if one exists. Also as important is whether the exposures were assessed in the same manner within groups and between groups; if not, bias may result. For example, retrospective self-report of dietary salt intake is not as valid and reliable as prospectively using a standardized dietary log plus testing participants' urine for sodium content. Another example is measurement of blood pressure, where there may be quite a difference between usual care, where clinicians measure blood pressure however it is done in their practice setting (which can vary considerably), and use of trained blood pressure assessors using standardized equipment (e.g., the same blood pressure device which has been tested and calibrated) and a standardized protocol (e.g., patient is seated for 5 minutes with feet flat on the floor, blood pressure is taken twice in each arm, and all four measurements are averaged). In each of these cases, the former would get a 'no' and the latter a 'yes.' Here is a final example that illustrates the point about why it is important to assess exposures consistently across all groups: If people with higher blood pressure (exposed cohort) are seen by their providers more frequently than those without elevated blood pressure (nonexposed group), it also increases the chances of detecting and documenting changes in health outcomes, including cardiovascular disease-related events. Therefore, it may lead to the conclusion that higher blood pressure leads to more cardiovascular disease events. This may be true, but it could also be because the subjects with higher blood pressure were seen more often; thus, more cardiovascular disease-related events were detected and documented simply because they had more encounters with the health care system. Thus, it could bias the results and lead to an erroneous conclusion. Different exposure measures apply to both cross-sectional and case-control studies.		
10	**Was the exposure(s) assessed more than once over time (causality, consistency)?**		
	Was the exposure for each person measured more than once during the study period? Multiple measurements with the same result increase our confidence that the exposure status was correctly classified. Also, multiple measurements enable investigators to look at changes in exposure over time, for example, people who ate high dietary sodium throughout the follow-up period, compared to those who started out high then reduced their intake, compared to those who ate low sodium throughout. Once again, this may not be applicable in all cases. In many older studies, exposure was measured only at baseline. However, multiple exposure measurements do result in a stronger study design.		
11	**Were the (different) outcome measures (dependent variables such as a disease) clearly defined, valid, reliable, and implemented consistently across all study participants?**		
	Were the outcomes defined in detail? Were the tools or methods for measuring outcomes accurate and reliable, for example, have they been validated or are they objective (laboratory test)? This issue is important because it influences confidence in the validity of study results. Also		

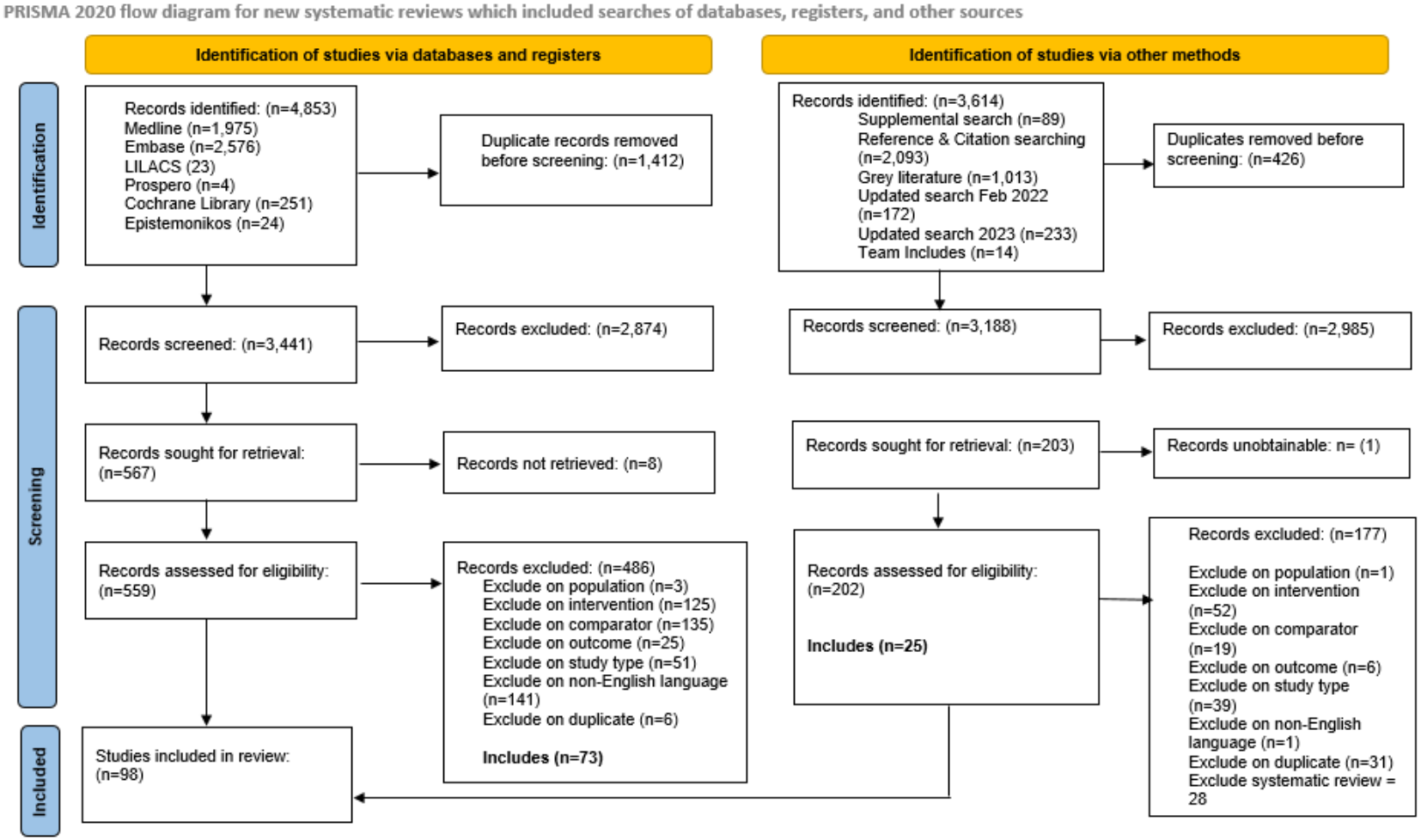
Number	NHLBI's quality assessment tool for observational cohort studies and cross-sectional surveys		Critical or non-critical
	important is whether the outcomes were assessed in the same manner within groups and between groups. An example of an outcome measure that is objective, accurate, and reliable is death–the outcome measured with more accuracy than any other. But even with a measure as objective as death, there can be differences in the accuracy and reliability of how death was assessed by the investigators. Did they base it on an autopsy report, death certificate, death registry, or report from a family member? Another example is a study of whether dietary fat intake is related to blood cholesterol level (cholesterol level being the outcome), and the cholesterol level is measured from fasting blood samples that are all sent to the same laboratory. These examples would get a 'yes'. An example of a 'no' would be self-report by subjects that they had a heart attack, or self-report of how much they weigh (if body weight is the outcome of interest). Like the example in Question 9, results may be biased if one group (e.g., people with high blood pressure) is seen more frequently than another group (people with normal blood pressure) because more frequent encounters with the health care system increases the chances of outcomes being detected and documented.		
12	**Were the outcome assessors blinded to the exposure status of participants?** Blinding means that outcome assessors did not know whether the participant was exposed or unexposed. It is also sometimes called 'masking'. The objective is to look for evidence in the article that the person(s) assessing the outcome(s) for the study (for example, examining medical records to determine the outcomes that occurred in the exposed and comparison groups) is masked to the exposure status of the participant. Sometimes the person measuring the exposure is the same person conducting the outcome assessment. In this case, the outcome assessor would most likely not be blinded to exposure status because they also took measurements of exposures. If so, make a note of that in the comments section. As you assess this criterion, think about whether it is likely that the person(s) doing the outcome assessment would know (or be able to figure out) the exposure status of the study participants. If the answer is no, then blinding is adequate. An example of adequate blinding of the outcome assessors is to create a separate committee, whose members were not involved in the care of the patient and had no information about the study participants' exposure status. The committee would then be provided with copies of participants' medical records, which had been stripped of any potential exposure information or personally identifiable information. The committee would then review the records for prespecified outcomes according to the study protocol. If blinding was not possible, which is sometimes the case, mark 'not applicable' and explain the potential for bias.		
13	**Was loss to follow-up after baseline 20% or less?** Higher overall follow-up rates are always better than lower follow-up rates, even though higher rates are expected in shorter studies, whereas lower overall follow-up rates are often seen in studies of longer duration. Usually, an acceptable overall participant follow-up rate is considered 80% or more of participants whose exposures were measured at baseline are follow-up at each data collection point. However, this is just a general guideline. For example, a 6-month cohort study examining the relationship between dietary sodium intake and blood pressure level may have over 90% follow-		**Critical flaw**

Number	NHLBI's quality assessment tool for observational cohort studies and cross-sectional surveys		Critical or non-critical
	up, but a 20-year cohort study examining effects of sodium intake on stroke may have only a 65% follow-up rate. Not applicable to case-control or cross-sectional studies		
14	**Were key potential confounding variables considered in the design (restriction or matching), measured during the study, and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s) (by either stratification or regression analysis)** ***Confounding** is when a factor has an association with the exposure and can independently cause the outcome or disease. It can over or underestimate an effect of interest or association. A **confounding variable** (also confounding factor or confounder) is a variable that has a relationship with both the exposure and outcome variable. Were key potential confounding variables measured and adjusted for, such as by statistical adjustment for baseline differences? Logistic regression or other regression methods are often used to account for the influence of variables not of interest. This is a key issue in cohort studies because statistical analyses need to control for potential confounders, in contrast to a randomised controlled trial, where the randomisation process controls for potential confounders. All key factors that may be associated both with the exposure of interest and the outcome–that are not of interest to the research question–should be controlled for in the analyses. For example, in a study of the relationship between cardiorespiratory fitness and cardiovascular disease events (heart attacks and strokes), the study should control for age, blood pressure, blood cholesterol, and body weight, because all these factors are associated both with low fitness and with cardiovascular disease events. Well-done cohort studies control for multiple potential confounders. For cohort studies, restriction, stratification, and regression are appropriate to control for confounding and these studies can calculate incidence. For case-control studies, matching, restriction, and conditional logistic regression are appropriate to control for confounding and odds ratios should be employed as these studies cannot calculate incidence. For cross-sectional studies, restriction, stratification, and regression are appropriate to control for confounding and proportions and odds ratios should be employed as these studies cannot calculate incidence.		**Critical flaw**

Five questions were given more weight that the other questions; A negative scoring for one these questions could be considered one critical flaw and a study with 3 or more critical flaws could be considered to contain evidence that the reader cannot trust:

1. Was the participation rate of eligible persons at least 50% (Question 3)?
2. Were all subjects selected or recruited from the same or similar populations (including same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants (Question 4)?
3. Was a sample size justification, power description, or variance and effect estimates provided (Question 5)?
4. Was loss to follow-up 20% or less (Question 13) (cohort only)?
5. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s) (Question 14)?

6.6 Appendix F PRISMA flow diagram for Question 1



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

6.7 Appendix G Periodontal health results

We identified seven papers [117,127, 144-147,153] that examined periodontal disease published between 1972 and 1996. The studies were cross-sectional surveys. Three papers used Löe and Silness Gingival Index to assess aspects of periodontal health, two papers employed the Gingival Bleeding (sulcus) Index, one paper employed the periodontal index, and one did not report use of an index but presented the mean percentage of 6 index teeth with gingival bleeding.

- The Löe and Silness Gingival Index may be used for the assessment of prevalence and severity of gingivitis in populations, groups, and individuals. A score of zero indicates no inflammation. Scores of 0.1–1.0 signify mild inflammation, 1.1–2.0 signify moderate inflammation, and 2.1–3.0 signify severe inflammation.
- The Gingival Bleeding Index may be used for the assessment of prevalence and severity of gingivitis. There are two scores, 0 or 1, depending on whether or not bleeding occurs after a probe is gently run around the gingival sulcus. A percentage score is obtained by dividing by the number of teeth examined and multiplying the result by 100.
- The Periodontal Disease Index was created in 1978 by the World Health Organization to provide a global standard for screening periodontal disease in populations. The total of the scores for each tooth divided by the number of teeth examined: the higher the score, the more severe the periodontal disease.

In 1988, Clovis *et al.* reported that when all children were considered, regardless of length of residency in either non-fluoridated or fluoridated communities, there were no significant difference between the non-fluoridated and fluoridated communities in the severity of gingivitis using the Loe and Silness Gingival Index (mean index score ± standard deviation for gingivitis in the CWF area was 0.58 ±0.28, n= 89, compared with the mean index score in fluoride deficient area which was 0.69 ± 0.34, n=115) [117]. The study was judged low quality with respect to design and implementation.

Hsieh *et al.* reported that the prevalence of gingivitis was very high among 6–12-year-old children living in two villages in Taiwan in 1971/2 prior to the introduction of CWF and the percentage range varied by age 96.4%–99.2%, the average periodontal index score was 0.4–0.5, and the average gingival unit with inflammation was 7.9–11.0 [127]. The study was judged moderate quality with respect to design and implementation.

Rugg-Gunn *et al.,* in 1977, reported that gingival inflammation in children living in the fluoride deficient area was more severe than in children living in CWF areas in both urban ($p<0.01$) and rural communities ($p<0.001$) using the Löe and Silness Gingival Index [147]. The mean gingival inflammation scores were higher in socially deprived urban areas with CWF at 0.85 than in the more affluent urban areas with CWF at 0.8 and rural CWF areas at 0.63. The mean gingival inflammation scores were also higher in more affluent urban and rural areas without CWF at 0.92 and 0.96, respectively, than in the socially deprived urban areas with CWF. The study was judged low quality with respect to design and implementation.

Rugg-Gunn *et al.,* in 1988, reported that gingival inflammation in children living in the nonfluoridated area was more severe than in children in the fluoridated area [146]. The earlier of the two studies use the same intervention areas but different comparator areas.The mean Löe and Silness Gingival Index scores were: fluoridated area 0.45 and non-fluoridated area 0.78 ($p < 0.001$). For social class III (more deprived) children only, the corresponding figures were 0.49 and 0.78 ($p <0.001$). Of note, the gingival inflammation scores in the CWF area had fallen over the interevening 11 years, but according to the study authors the

decrease may reflect increased use of fluoridated toothpaste alongside CWF. The study was judged moderate quality with respect to design and implementation.

Parviainen *et al.* reported that the mean Gingival Bleeding Index score for the total sample in their study was 40% in 1973 [145]. The boys had more gingivitis than the girls ($p < 0.001$) and the mean Gingival Bleeding Index scores were 44% and 36%, respectively. No statistically significant linear shift in the Gingival Bleeding Index scores was observed with advancing age. There was more gingivitis in Hamina (2.5 ppm) than in Jyvaskyla (0.2 ppm) or Kuopio (CWF 1.0 ppm). Parviainen *et al.*, in a follow-up survey in 1982, reported that the overall mean Gingival Bleeding Index score for the total study population in 1982 was 32% (compared with 40% in 1973). The bulk of this improvement was due to the improved gingival health among the boys. The significant difference in 1973 between total mean Gingival Bleeding Index score for boys and girls had disappeared in 1982 [144]. The decrease in the scores in the high-fluoride area (2.5ppm) to 31% (compared with 50% in 1973) was highly significant ($p<0.001$). A corresponding improvement was also observed in the optimal fluoride area (1.0 ppm), whereas in the low-fluoride area (0.2 ppm), the gingival conditions remained practically the same from 1973 to 1982. Because of these changes, the highly significant difference between the high-fluoride area and the two other areas in 1973 had disappeared in 1982. The study was judged low quality with respect to design and implementation.

Seppa *et al.* (1996) examined 12-year-old children for gingival bleeding after gentle probing of 6 index teeth (16, 11, 26, 36. 41 and 46) prior to their caries examination at baseline [153]. For each tooth, bleeding was considered present if found on any tooth surface. The results are presented as mean percentages of index teeth with gingival bleeding. Percentages of teeth with gingival bleeding were statistically significantly higher at 55% (±24%) in the CWF area compared with 39% (±24%) in the nonfluoridated area, $p<0.0001$. The study design was a cross-sectional survey, and the quality assessment judged it to be low quality with respect to design and implementation.

6.8 Appendix H Complete quality assessment scores

Table 10 National Heart, Lung, and Blood Institute's (NHLBI's) quality assessment scores for observational cohort and cross-sectional studies for Question 1

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Medcalf	1975	Australia	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Not reported	Not applicable	Some
Carr	1976	Australia	Cross-sectional survey	Yes	Yes	Cannot determine	No	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some
Riordan	1991	Australia	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	No	Not applicable	Partial
Riordan and Banks	1991	Australia	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not reported	Not applicable	Partial
Cortes et al.	1996	Brazil	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Cannot determine	Yes	Yes	Cannot determine	No	Yes	Partial	Not applicable	Some
Heintze et al.	1998	Brazil	Cross-sectional survey	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not reported	Not applicable	Some
Tiano et al.	2009	Brazil	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Cannot determine	Cannot determine	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Extensive
Tiano et al.	2009	Brazil	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Cannot determine	Cannot determine	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Extensive
Silva et al	2021	Brazil	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	No	Yes	Not reported	Not applicable	Extensive
Brown	1951	Canada	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	No	No	Not reported	Not applicable	Some
Connor	1963	Canada	Cross-sectional survey	No	Yes	Yes	No	Not applicable as census	Yes	Yes	Yes	Yes	Cannot determine	No	No	Not reported	Not applicable	Some
Clovis et al.	1988	Canada	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Ismail et al.	1990	Canada	Cross-sectional survey	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Partial	Not applicable	Partial
Ismail et al.	1993	Canada	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Not reported	Not applicable	Some

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Clark et al.	1994	Canada	Cross-sectional survey	No	Yes	No	Yes	No	Yes	Cannot determine	Yes	Yes	Cannot determine	Not applicable	Yes	Not reported	Not applicable	Some
Maupomé et al.	2003	Canada	Cross-sectional survey	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	No	Not applicable	Partial?
Clark et al.	2006	Canada	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not reported	Not applicable	Some
McLaren et al.	2017	Canada	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Partial	Not applicable	Some
Maupomé et al.	2001	Canada	Retrospective/prospective cohort study	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	No	Partial
Brown et al.	1960	Canada	Cross-sectional survey	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	No	No	Not reported	Not applicable	Some
Brown and Poplove	1965	Canada	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	No	No	Not reported	Not applicable	Some
Clark et al.	1993	Canada	Cross-sectional survey	Yes	Yes	No	Yes	No	Cannot determine	Cannot determine	Yes	Yes	Cannot determine	Not applicable	Yes	Not reported	Not applicable	Some
Clark et al.	1995	Canada	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Cannot determine	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
McLaren et al.	2021	Canada	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Partial	Not applicable	Extensive
Villa et al.	1998	Chile	Cross-sectional survey	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Yes	Not applicable	Partial
Kunzel	1982	Cuba	Cross-sectional survey	No	Yes	Not reported	Yes	No	Cannot determine	Yes	Yes	Yes	Yes	Yes	Yes	No	Not applicable	Some
Kunzel and Fischer	2000	Cuba	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Beal and James	1971	England, UK	Cross-sectional survey	No	Yes	Not reported	Yes	No	Cannot determine	No	Yes	Not reported	Not reported	Yes	Not applicable	No	Not applicable	Some
Jackson et al.	1975b	England	Cross-sectional survey	Yes	Yes	Yes	Yes	Not applicable	yes	Yes	Yes	Not reported	Not reported	Yes	Not applicable	Yes	Not applicable	Some

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Rugg-Gunn et al.	1977	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Jackson et al.	1980	England, UK	Cross-sectional survey	Yes	Yes	Not reported	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Beal and Clayton	1981	England, UK	Cross-sectional survey	Yes	Yes	Not reported	Yes	No	No	No	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Rugg-Gunn et al.	1981	England, UK	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Hardwick et al	1982	England, UK	Retrospective/prospective cohort study as 4 year follow-up for the same children	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes	No	Some
French et al.	1984	England, UK	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Mitropoulos et al.	1988	England, UK	Cross-sectional survey	Yes	Yes	Not reported	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Rugg-Gunn et al.	1988	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Murray et al.	1991	England, UK	Cross-sectional survey	Yes	Yes	Not reported	Yes	No	Yes	Yes	Yes	Not reported	Not reported	Yes	Not applicable	No	Not applicable	Some
Booth et al.	1992	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Evans et al.	1995	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Evans et al.	1996	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Tabari et al.	2000	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Not applicable	Some

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Gray and Davies-Slowik	2001	England, UK	Cross-sectional survey	No	Yes	Not reported	Yes	No	Yes	Yes	Yes	Not reported	Not reported	Yes	Not applicable	No	Not applicable	Some
Goodwin et al.	2022	England, UK	Retrospective/prospective cohort study	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	No	Some
Ellwood and O'Mullane	1995	England, Wales, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Ellwood and O'Mullane	1996	England, Wales, UK	Cross-sectional survey	No	Yes	Not reported	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	None
Parviainen et al.	1977	Finland	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Hausen et al.	1981	Finland	Retrospective/prospective cohort study	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Partial
Parviainen et al.	1985	Finland	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Partial
Linkosalo	1986	Finland	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some
Seppa et al.	1996	Finland	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Partial
Seppa et al.	1998	Finland	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Partial
Seppa et al.	2000	Finland	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	No	Not applicable	Partial
Seppa et al.	2000	Finland	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	No	Not applicable	Partial
Seppa et al.	2002	Finland	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Kunzel	1968	Germany	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some
Kunzel	1980	Germany	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some
Kunzel and Fischer	1997	Germany	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Kunzel et al.	2000	Germany	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Lemasney et al.	1984	Ireland	Cross-sectional survey	No	Yes	Not reported	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
O'Mullane et al.	1986	Ireland	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not reported	Not applicable	Some
O'Mullane et al.	1988	Ireland	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Cannot determine	sources to the public principally through fluoridation of water supplies	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
Clarkson and O'Mullane	1992	Ireland	Cross-sectional survey	No	Yes	Not reported	Yes	No	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes		Not applicable	Some
Whelton et al.	2004	Ireland	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Not applicable	Some
Mullen et al.	2012	Ireland	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Some
James et al.	2021	Ireland	Cross-sectional survey/cohort	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Partial
Mohd Nor et al.	2018	Malaysia	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Partial	Not applicable	Partial

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Mohd Nor et al.	2021	Malaysia	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Partial	Not applicable	Partial
Backer Dirks et al.	1961	Netherlands	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Yes	Not applicable	Some
Groeneveld	1985	Netherlands	Retrospective/prospective cohort study	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Cannot determine	Some
Kalsbeek et al.	1993	Netherlands	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some
Weerheijm et al.	1997	Netherlands	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
de Liefde and Herbison	1985	New Zealand	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Not reported	Not applicable	Some
Treasure and Dever	1992	New Zealand	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Treasure and Dever	1994	New Zealand	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Cannot determine	Cannot determine	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Ministry of Health	2010	New Zealand	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Not reported	Not applicable	Some
Stephen et al.	1987	Scotland, UK	Cross-sectional survey	Yes	Yes	Not reported	No	Not applicable	Yes	Yes	Yes	Cannot determine	Not reported	Yes	Not applicable	No	Not applicable	None
Wong et al.	1970	Singapore	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	No	Not reported	Not applicable	Some
Hsieh et al.	1972	Taiwan	Cross-sectional survey	Yes	Yes	Yes	Yes	Not applicable	Not applicable	Not applicable	Not applicable	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Hsieh et al.	1979	Taiwan	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Guo et al.	1984	Taiwan	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Hsieh et al.	1986	Taiwan	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Hong et al.	1990	Taiwan	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not reported	Not applicable	Some
Ast et al.	1951	USA	Cross-sectional survey series	Yes	Yes	Cannot determine	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Partial	Not applicable	Some
Ast and Chase	1953	USA	Cross-sectional survey	No	Yes	Cannot determine	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Cannot determine	Some
Szpunar and Burt	1988	USA	Cross-sectional survey	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Not applicable	Some
Gillcrist et al.	2001	USA	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	Not reported	Not applicable	Some
Ast et al.	1950	USA	Cross-sectional survey	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Cannot determine	Some
Arnold et al.	1953	USA	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some
Ast et al.	1955	USA	Cross-sectional survey	No	Yes	Cannot determine	Cannot determine	No	Yes	Yes	Yes	Yes	Cannot determine	No	Not applicable	Not reported	Not applicable	Some
Arnold et al.	1956	USA	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	No	Yes	Not reported	Not applicable	Some
Kumar et al.	1989	USA	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Partial	Not applicable	Some
Kumar et al.	1998	USA	Cross-sectional survey	No	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Not reported	Not applicable	Some
Kumar et al.	2000	USA	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes		Not applicable	Extensive
Jackson et al.	1975a	Wales, UK	Cross-sectional survey	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Yes	Not applicable	None
Jackson et al.	1985	Wales, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Yes	Not applicable	None

Author	Year	Location	Study design	1*	2	3	4	5	6.	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Seaman et al.	1989	Wales, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Cannot determine	Yes	Not applicable	No	Not applicable	None

*1. Research question stated

2. Study population clearly specified

3. Participation rate at least 50%

4.Subjects selected from the same population and inclusion and exclusion criteria prespecified

5. Sample size justification, power description, or variance and effect estimates provided

6. Exposure(s) of interest measured prior to outcome(s) measure

7.Timeframe sufficient to see an association between exposure and outcome

8. For exposures, study examine different levels of the exposure as related to the outcome

9. Exposure measures defined, valid, reliable, and consistently applied

10. Exposure(s) assessed more than once

11. Outcome measures defined, valid, reliable, and consistently applied: Caries

11. Outcome measures defined, valid, reliable, and consistently applied: Fluorosis

12.Outcome assessors blinded to the exposure status

13.Loss to follow-up 20% or less

14. Potential confounding exposures measured and adjusted statistically in outcomes

For each paper reporting on a longitudinal cohort study, cross-sectional survey, or case-control study, the scores were summed (for a total score ranging from 0.0 to 5.0). Papers scoring less than 3.0 were rated ‘low quality’, papers scoring 3.0 were rated ‘moderate quality’, and papers scoring 3.5 or more were rated ‘high quality’. As many studies were cross-sectional in nature (point-in-time surveys) and scored 0.0 on item 13 (loss to follow-up not applicable), the maximum possible score for papers reporting on these types of studies was effectively capped at 4.0; for this reason, the threshold for ‘high quality’ was set at 3.5, rather than 4.0, in order to allow more effective differentiation of papers at the upper end of the range of scores. We also report the quality deficiencies by low-, moderate- and high-quality papers.

6.9 Appendix I Feasibility assessment results

Table 11 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, dmft

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Silva et al. 2021, Brazil	Cross-sectional survey	5	0.5 to 0.6 ppm	<0.05 ppm	dmft (0.92)	Mean and SD	Logistic regression analysis	Age, gender, lifetime exposure, socio-economic status, mother's level of education Snacks (sugar ingestion), CWF, fluoride toothpaste and toothbrushing Assess visits to dentist.	High	Yes
Tiano et al. 2009a, Brazil	Cross-sectional survey	1-2	0.60–0.75ppm	<0.40 ppm	dmft	Mean and SD	No	Not applicable	Moderate	No, exclude on age, below 5 years old
McLaren et al. 2021, Canada	Cross-sectional survey and adjusted for cluster sampling but design effect not reported	7	0.6 to 0.8 ppm	0.07–0.30 ppm	dmft (≥ 0.80 most of the time)	Mean and SD	Poisson and logistic regression	Child's oral health, tooth brushing twice/day, floss once/day, visit dentist, last time visit dentist, dental insurance, fruit and vegetables at least once/day, Sugary drinks, fluoride supplements at home, fluoride treatments at the dentist's office, fluoride treatments in school programme, use of fluoride toothpaste, and/or fluoride mouth wash, household education, home ownership, and ethnocultural background	High	Yes
Villa et al. 1998, Chile	Cross-sectional survey and adjusted for cluster sampling but design effect not reported	7	0.93ppm	0.07 ppm	dmft	Mean and SD	No	Age, social economic status	Moderate	Yes
Jackson et al. 1975b, England UK	Cross-sectional survey	5	1.0 ppm	<0.1 ppm	dmft	Mean and SD	No	Not applicable	Low	Yes
Rugg-Gunn et al. 1977, England, UK	Cross-sectional survey	5	1.0ppm	<0.1 ppm	dmft	Mean and SD	No	Not applicable	Low	Yes
Jackson et al. 1980, England, UK	Cross-sectional survey	5	0.9ppm	<0.1 ppm	dmft	Mean and SD	No	Not applicable	Low	Yes
Beal and Clayton 1981, England, UK	Cross-sectional survey	5	0.85–0.90ppm	<0.35 ppm	dmft	Mean and SD	No	Not applicable	Low	Yes

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Rugg-Gunn et al. 1981, England, UK	Cross-sectional survey	5	1.0ppm	<0.1ppm	dmft	Mean and SD	No	Not applicable	Low	Yes
French et al. 1984, England, UK	Cross-sectional survey	**5**	1.0ppm	0.1 ppm	dmft	Mean and SD	No	Not applicable	Low	Yes
Rugg-Gunn et al. 1988, England, UK	Cross-sectional survey	5	1.0ppm	<0.1ppm	dmft	Mean and SD	No	Not applicable	Moderate	Yes
Booth et al. 1992, England, UK	Cross-sectional survey	3	1.0ppm	<0.1ppm	dmft	Mean and SD	No	Not applicable	Moderate	No, exclude on age, below 5 years
Evans et al. 1995, England, UK	Cross-sectional survey	5	1.0 ppm	< 0.1 ppm	dmft	Mean, variance not required as census	No	Not applicable	Moderate	Yes
Goodwin et al. 2022, England, UK	Retrospective/prospective cohort study	5	0.9ppm	<0.2ppm	dmft (0.75 - 1.0)	Mean and SD	Negative binomial regression	Age, sex, and deprivation	Moderate	Yes
Lemasney et al. 1984, Ireland	Cross-sectional survey	5	0.8–1.0 ppm	≤3 ppm	dmft (Inter 0.96 - 0.98 Intra 0.98 - 1.0)	Mean and SD	No	Not applicable	Low	Yes
O'Mullane et al. 1986, Ireland	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	5	0.8–1.0 ppm	≤3 ppm	dmft (>0.95 correlation coefficients)	Mean and SD	No	Not applicable	Moderate	Yes
Whelton et al. 2004, Ireland	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	5	0.8–1.0 ppm	≤3 ppm	dmft	Mean and SD	No	Not applicable	Moderate	Yes
James et al. 2021, Ireland	Cross-sectional survey	8	0.8–1.0 ppm	≤3 ppm	dmft (Intra 0.86 to 1.00 in 2002, 0.77 to 1.00 in 2017)	Mean and SD	Multivariate regression	age, gender, age first used toothpaste, amount of toothpaste, frequency of toothbrushing, age first visited dentist, rinse method after toothbrushing, and sweet snacks between meals.	High	Yes
Treasure and Dever 1992, New Zealand	Cross-sectional survey, description indicate that authors have adjusted	5	1.0 ppm	0.08 ppm	dmft	Mean and SD	No	Not applicable	Moderate	Yes

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
	for cluster sampling but not reported									
Ministry of Health 2010, New Zealand	Cross-sectional survey and adjusted for cluster sampling using a design effect of ≥2	5	0.8–0.9 ppm	0.15 ppm	dmft (≥0.78 ICC)	Mean and SD	No	Not applicable	Moderate	No, exclude on population, numbers not reported
Guo et al. 1984, Taiwan	Cross-sectional census survey	5	0.6ppm	0.08 ppm	dmft	Mean, variance not required as census	No	Not applicable	Moderate	Yes
Hsieh et al. 1986, Taiwan	Cross-sectional census survey	5	0.6ppm	0.08 ppm	dmft	Mean, variance not required as census	No	Not applicable	Moderate	Yes
Jackson et al. 1985, Wales, UK	Cross-sectional survey	5	0.99 ppm	<0.1ppm	dmft	Mean and SD	No	Not applicable	Moderate	Yes
Seaman et al. 1989, Wales, UK	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	5	0.8 ppm	<0.1ppm	dmft (0.86)	Mean and SD	No	Not applicable	Low	Yes

Table 12 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, dmfs

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Tiano et al. 2009a, Brazil	Cross-sectional survey	8-36 months	0.60–0.75ppm	0.4 ppm	dmfs	Mean and SD	No	Not applicable	Moderate	Yes
Rugg-Gunn et al. 1977, England, UK	Cross-sectional survey	5	1.0ppm	<0.1 ppm	dmfs	Mean and SD	No	Not applicable	Low	Yes
Rugg-Gunn et al. 1981, England, UK	Cross-sectional survey	5	1.0ppm	<0.1 ppm	dmfs	Mean and SD	No	Not applicable	Low	Yes
French et al. 1984, England, UK	Cross-sectional survey	5	1.0ppm	<0.1 ppm	dmfs	Mean and SD	No	Not applicable	Low	Yes
Rugg-Gunn et al. 1988, England, UK	Cross-sectional survey	5	1.0ppm	<0.1 ppm	dmfs	Mean and SD	No	Not applicable	Moderate	Yes
Evans et al. 1995, England, UK	Cross-sectional survey	5	1.0 ppm	< 0.1 ppm	dmfs	Mean, variance not required as census	No	Not applicable	Moderate	Yes
Seppa et al. 2000b, Finland	Cross-sectional survey	6	1.0ppm	<0.1 ppm	dmfs + radiographs (Inter 0.86 - 0.94, Intra 0.88 - 0.91, different years)	Mean and SD	No	Not applicable	Low	Yes
Treasure and Dever 1992, New Zealand	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	5	1.0 ppm	Not reported	dmfs	Mean and SD	No	Not applicable	Moderate	Yes

Table 13 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, per cent without cavitated dental caries in the primary dentition

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Brown et al. 1960, Canada	Cross-sectional survey	9-11	1.0–1.2ppm	Not fluoridated	% primary teeth without CDC	%, 95% CI	No	Not applicable	Moderate	Yes
Gray and Davies-Slowik 2001, England	Cross-sectional survey	5	1.0ppm	<0.3 ppm	% primary teeth without CDC	%, 95% CI	No	Not applicable	Low	Yes
Gillcrist et al. 2001, USA	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	5-11	1.0ppm	<0.3 ppm	% primary teeth without CDC	%, 95% CI	No	Not applicable	Low	Yes

Table 14 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, per cent with cavitated dental caries in the primary dentition

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
McLaren et al. 2021, Canada	Cross-sectional survey and adjusted for cluster sampling but design effect not reported	~7	0.6 to 0.8	0.07–0.30 ppm	% primary teeth with CDC (≥ 0.80 most of the time)	%, 95% CI	Poisson and logistic regression	Child's oral health, tooth brushing twice/day, floss once/day, visit dentist, last time visit dentist, dental insurance, fruit and vegetables at least once/day, Sugary drinks, fluoride supplements at home, fluoride treatments at the dentist's office, fluoride treatments in school programme, use of fluoride toothpaste, and/or fluoride mouth wash, household education, home ownership, and ethnocultural background	High	Yes
Evans et al. 1995, England, UK	Cross-sectional survey	5	1.0 ppm	< 0.1 ppm	% primary teeth with CDC	%, variance not required as census	No	Not applicable	Moderate	Yes
Guo et al. 1984, Taiwan	Cross-sectional census survey	5	0.6 ppm	0.08 ppm	% primary teeth with CDC	%, variance not required as census	No	Not applicable	Moderate	Yes
Hsieh et al. 1986, Taiwan	Cross-sectional census survey	5	0.6 -0.7 ppm	0.08 ppm	% primary teeth with CDC	%, variance not required as census	No	Not applicable	Moderate	Yes

Table 15 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, DMFT

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure (proportion agreement where reported)	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Silva et al. 2021, Brazil	Cross-sectional survey and adjusted for cluster sampling using a design effect of 1.7	12	0.5 to 0.6 ppm	<0.05 ppm	DMFT (0.92)	Mean and SD	Logistic regression analysis	Age, gender, lifetime exposure, socio-economic status, mother's level of education Snacks (sugar ingestion), CWF, fluoride toothpaste and toothbrushing Assess visits to dentist.	High	Yes
Clovis et al. 1988, Canada	Cross-sectional survey	11-12	1.08 ppm	0.23 ppm	DMFT	Mean and SD	No	Not applicable	Low	Yes
Brown and Poplove 1965, Canada	Cross-sectional survey	16-17	1.0–1.2 ppm	NF	DMFT	Mean and SD	No	Not applicable	Low	Yes
Brown et al. 1960, Canada	Cross-sectional survey	9-11	1.0–1.2ppm	NF	DMFT	Mean and SD	No	Not applicable	Moderate	Yes
McLaren et al. 2021, Canada	Cross-sectional survey and adjusted for cluster sampling but design effect not reported	7	0.59–0.89 ppm	≤3 ppm	DMFT (≥ 0.80 most of the time)	Mean and SD	Poisson and logistic regression	Child's oral health, tooth brushing twice/day, floss once/day, visit dentist, last time visit dentist, dental insurance, fruit and vegetables at least once/day, Sugary drinks, fluoride supplements at home, fluoride treatments at the dentist's office, fluoride treatments in school programme, use of fluoride toothpaste, and/or fluoride mouth wash, household education, home ownership, and ethnocultural background	High	Yes
Villa et al. 1998, Chile	Cross-sectional survey and adjusted for cluster sampling but design effect not reported	12	0.93ppm	≤3 ppm	DMFT (≥0.91)	Mean and SD	No	Age, socio-economic status	Moderate	Yes
Kunzel and Fischer 2000, Cuba	Cross-sectional survey	10-11	0.8ppm	<0.3ppm	DMFT	Mean and SD	No	Not applicable	Moderate	Yes
Mitropoulos et al. 1988, England, UK	Cross-sectional survey	14	1.0ppm	Not fluoridated	DMFT	Mean and SD	No	Not applicable	Low	Yes

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure (proportion agreement where reported)	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Murray et al. 1991, England, UK	Cross-sectional survey	15-16	1.0ppm	0.07–0.30 ppm	DMFT	Mean and SD	No	Not applicable	Low	Yes
Kunzel 1980, Germany	Cross-sectional survey	10	1.0ppm	0.07 ppm	DMFT	Mean and SD	No	Not applicable	Low	Yes
Kunzel et al. 2000, Germany	Cross-sectional survey	12	0.8–1.0ppm	0.05-0.1 ppm	DMFT (Inter 0.95, Intra 0.89 - 92.7)	Mean and SD	No	Not applicable	Low	Yes
Lemasney et al.	Cross-sectional survey	11	0.8–1.0 ppm	<0.1 ppm	DMFT (Inter 0.96 - 0.98 Intra 0.98 - 1.0)	Mean and SD	No	Not applicable	Low	Yes
O'Mullane et al. 1986, Ireland	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	12	0.8–1.0 ppm	0 ppm	DMFT (>0.95 correlation coefficients)	Mean and SD	No	Not applicable	Moderate	Yes
Whelton et al. 2004, Ireland	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	12	0.8–1.0 ppm	0.1ppm	DMFT	Mean and SD	No	Not applicable	Moderate	Yes
Mullen et al. 2012, Ireland	Cross-sectional survey	16	0.7ppm	0.2ppm	DMFT (>0.80)	Mean and SD	No	Not applicable	Moderate	Yes
Mohd Nor et al. 2018, Malaysia	Cross-sectional survey	12	0.5ppm	Not fluoridated	DMFT	Mean and SD	No	Not applicable	Moderate	Yes
Kalsbeek et al. 1993, Netherlands	Cross-sectional survey	15	1.1ppm	<0.1ppm	DMFT + radiographs (0.89,0.99,0.99 and 0.91 for DS, FS, DFS,	Mean and SD	No	Not applicable	Low	Yes

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure (proportion agreement where reported)	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
					total dental caries lesions, respectively)					
de Liefde and Herbison 1985, New Zealand	Cross-sectional survey	9	1.0ppm	0.2 ppm	DMFT	Mean and SD	No	Not applicable	Low	Yes
Treasure and Dever 1994, New Zealand	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	14	1.0ppm	0.08 ppm	DMFT	Mean and SD	No	Not applicable	Moderate	Yes
Hsieh et al. 1979, Taiwan	Cross-sectional census survey	6	0.6ppm and then 0.7ppm	0.08 ppm	DMFT	Mean, variance not required as census	No	Not applicable	Moderate	Yes
Guo et al. 1984, Taiwan	Cross-sectional census survey	10	0.6ppm	0.08 ppm	DMFT	Mean, variance not required as census	No	Not applicable	Moderate	Yes
Hsieh et al. 1986, Taiwan	Cross-sectional census survey	12	0.6ppm and then 0.7ppm	<0.1 ppm	DMFT	Mean, variance not required as census	No	Not applicable	Moderate	Yes
Jackson et al. 1975a, Wales, UK	Cross-sectional survey	15	0.9ppm	0.12 - 0.19 ppm	DMFT	Mean and SD	No	Not applicable	Low	Yes
Jackson et al. 1985, Wales, UK	Cross-sectional survey	15	0.99ppm	<0.1 ppm	DMFT	Mean and SD	No	Not applicable	Moderate	Yes
Thomas and Kassab 1992, Wales, UK	Cross-sectional survey	18-30	0.8ppm	<0.1 ppm	DMFT	Mean and SD	No	Not applicable	Moderate	Yes

Table 16 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, DMFS

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Kunzel and Fischer 2000, Cuba	Cross-sectional survey	10-11	0.8 ppm	0.05-0.1 ppm	DMFS	Mean and SD	No	Not applicable	Moderate	Yes
Murray et al. 1991, England, UK	Cross-sectional survey	15-16	1.0 ppm	<0.1 ppm	DMFS	Mean and SD	No	Not applicable	Low	Yes
Ellwood and O'Mullane 1995, England, Wales, UK	Cross-sectional survey	14	0.7 ppm	<0.1ppm	DMFS (>0.81)	Mean and SD	Multiple linear regression	SES	Low	Yes
Kalsbeek et al. 1993, Netherlands	Cross-sectional survey	15	1.1 ppm	0.1 ppm	DMFS + radiographs (0.89,0.99,0.99 and 0.91 for DS, FS, DFS, total dental caries lesions, respectively)	Mean and SD	No	Not applicable	Low	Yes
Treasure and Dever 1994, New Zealand	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	14	1.0 ppm	0.08 ppm	DMFS	Mean and SD	No	Not applicable	Moderate	Yes
Gillcrist et al. 2001, USA	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	5-11	1.0 ppm	<0.3 ppm	DMFS	Mean and SD	No	Not applicable	Low	Yes

Table 17 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, per cent without cavitated dental caries in the permanent teeth

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Brown et al. 1960, Canada	Cross-sectional survey	12–14	1.0–1.2 ppm	Not fluoridated	% permanent teeth without CDC	%, 95% CI	No	Not applicable	Moderate	Yes
Brown and Poplove 1965, Canada	Cross-sectional survey	16–17	1.0–1.2 ppm	Not fluoridated	% permanent teeth without CDC	%, 95% CI	No	Not applicable	Low	Yes
Gillcrist et al. 2001, USA	Cross-sectional survey, description indicate that authors have adjusted for cluster sampling but not reported	5–11	1.0 ppm	<0.3 ppm	% permanent teeth without CDC	%, 95% CI	No	Not applicable	Low	Yes

Table 18 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on dental caries, per cent with cavitated dental caries in the permanent teeth

Author, year country	Study design and census/cluster sample adjustment where reported	Study population (age)	CWF lifetime exposure (ppm)	Comparator lifetime exposure (ppm)	Dental caries outcome measure and proportion agreement where reported	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
McLaren et al. 2021, Canada	Cross-sectional survey and adjusted for cluster sampling but design effect not reported	7	0.61–0.82 ppm	0.07–0.30 ppm	% with CDC (≥ 0.80 most of the time)	%, 95% CI	Poisson and logistic regression	Child's oral health, tooth brushing twice/day, floss once/day, visit dentist, last time visit dentist, dental insurance, fruits and vegetables at least once/day, Sugary drinks, fluoride supplements at home, fluoride treatments at the dentist's office, fluoride treatments in school programme, use of fluoride toothpaste, and/or fluoride mouth wash, household education, home ownership, and ethnocultural background	High	Yes
Guo et al. 1984, Taiwan	Cross-sectional census survey	10	0.6 ppm	0.08 ppm	% with CDC	%, variance not required as census	No	Not applicable	Moderate	Yes
Hsieh et al. 1986, Taiwan	Cross-sectional census survey	12	0.6 ppm	0.08 ppm	% with CDC	%, variance not required as census	No	Not applicable	Moderate	Yes
Ast and Chase, 1953, USA	Cross-sectional census survey	6	1.2 ppm	0.1 ppm	% with CDC	%, variance not required as census	No	Not applicable	Low	Yes

Table 19 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF on the prevalence of mild to severe dental fluorosis

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Medcalf 1975, Australia	Cross-sectional survey	Samples of school children (6–8yrs) were examined pre and 6 years post fluoridation. None of the 1973 group has had lifetime exposure to fluoridation	0.7–0.9 ppm	Pre-fluoridation in the goldfields (0.1–0.2 milligrams of fluoride per litre)	Dean's Index of fluorosis	No 95% CI for prevalence estimate	No	Not applicable	Low	Yes
Riordan and Banks 1991, Australia	Cross-sectional survey	School children aged born in 1978 Percentage lifetime exposure calculated	0.8 ppm	Bunbury region fluoride <0.2 ppm	Thylstrup-Fejerskov index 0.78	No 95% CI for prevalence estimate Yes 95% CI for ORs derived from regression analysis	Logistic regression analysis	Socio-economic status, areas of residence, type of regular water supply, and dates of changes since birth; periods and duration of use of fluoride supplements; use of fluoride toothpaste, including age commenced; and parent's recollection of whether the child liked and/or swallowed toothpaste	Low	Yes
Cortes *et al.* 1996, Brazil	Cross-sectional survey	School children 6–12-year-old lifetime residents using local drinking water sources from	0.7 ppm	Maceio Alagoas <than 0.1 ppm of natural fluoride	Thylstrup-Fejerskov index	No prevalence calculation	No	Not applicable	Low	Yes

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
		three economically deprived groups								
Heintze *et al.* 1998, Brazil	Cross-sectional survey	Participants aged 5–50 years were examined in health centres, schools, and factories	0.75–1.2 ppm	Itapolis 0.02 ppm natural fluoridation	Thylstrup-Fejerskov index 0.85	No 95% CI for prevalence estimate	No	Not applicable	Low	No, exclude on quality
Silva et al 2021, Brazil	Cross-sectional survey and adjusted for cluster sampling using a design effect of 1.7	Children aged 5 years (daycare) and 12 years (school)	0.5–0.6 ppm	Areas of Teresina not connected to piped water supply (< 0.05 ppm)	Thylstrup-Fejerskov index 0.90	No 95% CI for prevalence estimate, but have design effect Yes 95% CI for ORs derived from regression analysis	Logistic regression analysis	Age, gender, lifetime exposure, socio-economic status, mother's level of education Snacks (sugar ingestion), CWF, fluoride toothpaste and toothbrushing Assess visits to dentist.	High	Consider for prevalence estimate Consider for independent contribution Divided into two groups very mild and mild and moderate so cannot use regression data
Brown 1951, Canada	Cross-sectional survey	School children at least 6 but not more than 14 years of age, not absent from the city concerned, for 'holidays or other reason, for more than six weeks at any one time	1.0–1.2 ppm	Sarnia is fluorine-free, Stratford contains 1.3 ppm of fluorine from a natural source	Unidentified fluorosis index	No 95% CI for prevalence estimate	No	Not applicable	Low	No, exclude on quality
Brown 1960, Canada	Cross-sectional survey	Aged 9-11 and 12-14 years, 'continuous' residence, defined as	1.0–1.2 ppm	Sarnia (fluorine-free, negligible amount of fluoride) and Stratford (1.3 ppm.	Unidentified fluorosis index	No prevalence calculation	No	Not applicable	Moderate	No, no prevalence calculation

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
		including absences, since birth, of six weeks or less. Residence eligibility is determined from information supplied by the parents. All schools of each city are canvassed		of fluorine from a natural source)						
Brown and Poplove 1965, Canada	Cross-sectional survey	All 16- and 17-year-old school children continuously resident in each city	1.0–1.2 ppm	Sarnia (fluorine-free, negligible amount of fluoride) and Stratford (1.3 ppm. of fluorine from a natural source)	Unidentified fluorosis index	No prevalence calculation	No	Not applicable	Low	No, exclude on quality
Connor 1963, Canada	Cross-sectional census survey	Age groups 6, 7, 8; 9, 10, 11; and 12, 13, 14-year-old school children, continuous residents in each area	1.0 ppm	Fluoride deficient survey in 1955 no baseline ppm reported but say water was fluoride free	Unidentified fluorosis index	Variance not required No prevalence calculation	No	Not applicable	Low	No, exclude on quality
Ismail *et al.* 1990, Canada	Cross-sectional survey and adjusted for cluster sampling but design effect unknown	Representative sample of public and private school students 11–17 years of age residing in Sherbrooke and Trois Rivieres, Canada, who were born and lived at least the	0.6 – 1.3 ppm	Sherbrooke, Quebec 0.1 ppm	Tooth Surface Index of Fluorosis 0.85	Prevalence estimate with 95% CIs Yes 95% CI for ORs derived from regression analysis	Logistic regression analysis	Age, sex, residence, use of fluoridation supplement, type of school	Moderate	Consider for prevalence estimate Consider for independent contribution

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
		first 6 years of their life in their respective city								
Clark *et al.* 1993, Canada	Cross-sectional survey	Primary school-aged children, stratified by socio-economic status, residing in the respective cities, and had questionnaires completed	1.2 ppm	Vernon fluoride deficient < 0.1 ppm	Tooth Surface Index of Fluorosis 0.44	No 95% CI for prevalence estimate	No	Not applicable	Low	No, exclude on quality
Clark et al. 1994, Canada	Cross-sectional survey	All children aged 6–14 years [in selected schools] were asked to participate and randomly selected for inclusion, stratified by socio-economic status	1.11 ppm	Vernon fluoride deficient <0.1 ppm	Tooth Surface Index of Fluorosis 0.44	No 95% CI for ORs derived from regression analysis	Logistic regression	Fluoridated water, infant formula, use of fluoride supplementation and fluoride toothpaste during their first 6 years of life	Low	No, exclude on quality
Ismail *et al.* 1993, Canada	Cross-sectional census survey	School children in grades 5 and 6 in the two towns were included. Age not reported but children were over 6 years old maybe 10 to 12 years old).	1.1 ppm	Truro, Nova Scotia, fluoride deficient <0.1 ppm	Tooth Surface Index of Fluorosis 0.90	Variance not required for prevalence estimates No ORs for results of regression analysis	Stepwise multiple regression analysis	Sources of drinking water used since birth, residence history, gender, parents' education, use of fluoride supplements, toothpaste, and other fluoride products during their first 6 years of life	Moderate	No, exclude as numeric data were not provided for regression analysis

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Maupomé *et al.* 2003, Canada	Cross-sectional census survey	All of the school children examined who were lifelong residents in these communities	0.88 ± 0.28 ppm - 0.92 ± 0.21 ppm	Comox/Courtenay and Campbell River stopped CWF in 1992 [fluoridation-ended (FE) communities] (FE 0.0 ppm) 14 to 19 months earlier	Thylstrup-Fejerskov index >0.75	Variance not required for prevalence or regression as census survey	See **Clark *et al.*** 2006	**See Clark *et al.*** 2006	High	**See Clark *et al.*** 2006
Clark *et al.* 2006, **Canada**	Cross-sectional census survey	Schoolchildren in 2nd and 3rd grades in 1993–94, 1996–97 and 2002–03, who were permanent residents	0.88 ± 0.28 ppm - 0.92 ± 0.21 ppm	2002–03 none of the children in had exposure to CWF (0.0 ppm)	Thylstrup-Fejerskov index 0.63	Variance not required for prevalence or regression as census survey	Multivariate Poisson regression model	Residence history, parents' level of education, use of bottled water, consumption of breastmilk, infant formula, cow's milk and solid food, existence of home filtration devices, use and frequency of fluoride supplements, and/or mouth rinses. age brushing started, amount of toothpaste used, and brushing frequency	Moderate	No, exclude as numeric data were not provided for regression analysis
McLaren *et al.* 2021, Canada	Cross-sectional survey and adjusted for cluster sampling but design effect unknown	Grade 2 schoolchildren (~ age 7 years) enrolled in Public or Separate school systems in cities of Calgary and Edmonton	0.59–0.89 ppm	Calgary CWF ceased in 2011 when levels of fluoride declined to 0.07–0.30 ppm	Tooth Surface Index of Fluorosis ≥ 0.80	Prevalence estimate with 95% Cis Yes 95% CI for ORs derived from regression analysis	Poisson and logistic regression	Child's oral health, tooth brushing twice/day, floss once/day, visit dentist, last time visit dentist, dental insurance, fruits and vegetables at least once/day, Sugary drinks, fluoride	High	No, exclude as numeric data were not provided for regression analysis

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
								supplements at home, fluoride treatments at the dentist's office, fluoride treatments in school programme, use of fluoride toothpaste, and/or fluoride mouth wash, household education, home ownership, and ethnocultural background		
Villa *et al.* 1998a, Chile	Cross-sectional survey	7-, 12-, and 15-year-old public or private schoolchildren who were lifelong residents of 5 areas	0.93 ppm	Rancagua (0.7 ppm), Santiago (0.21 ppm natural), La Serena (0.55 ppm natural), and Iquique (1.10 ppm natural)	Dean's Index of fluorosis	No 95% CI for prevalence estimate	No	Age, social economic status	Moderate	No, as 95% CI data for prevalence estimate were not reported
Kunzel 1982, **Cuba**	Cross-sectional census survey	Children resident in study area	0.7±0.1 ppm	The natural content of 0.05–0.1 ppm	Dean's Index of fluorosis	Variance not required for prevalence as census	No	Not applicable	Low	No, exclude on quality
Tabari *et al.* 2000, England, UK	Cross-sectional survey	8–9-year-old school children who were lifetime residents in the area	1.0 ppm	South Northumberland < 0.1 ppm	Thylstrup-Fejerskov index 0.70	No 95% CI for prevalence estimate, but have design effect Yes 95% CI for ORs derived from regression analysis	Logistic regression analysis	Age started brushing, brushing frequency, type of toothpaste, amount of toothpaste, toothpaste weight, and socioeconomic class	Moderate	Consider for independent contribution

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Ellwood and O'Mullane 1996, England, Wales, UK	Cross-sectional survey Census for intervention group	School children in the third year of their secondary school education, who were lifetime residents of the areas	0.7 ppm	Chester (England) and Bala (North Wales) < 0.1 ppm	Thylstrup-Fejerskov index 0.73	No 95% CI for comparator prevalence estimate	No	Not applicable	Low	No, based on quality and 95% CI data for prevalence estimate were not reported
Clarkson and O'Mullane 1992, Ireland	Cross-sectional survey	8-year-old school children	0.8–1.0 ppm	Fluoride deficient water in Ireland is ≤0.3 ppm	Dean's Index of fluorosis	No 95% CI for prevalence estimates	No	Not applicable	Low	No, based on quality and 95% CI data for prevalence estimate were not reported
Whelton *et al.* 2004, Ireland	Cross-sectional survey and description indicate that authors have adjusted for cluster sampling but not stated it	5-, 8-, 12- and 15-year-old school children living in the Republic of Ireland	0.8–1.0 ppm	Not reported (fluoride deficient parts of Ireland are ≤0.3 ppm)	Dean's Index of fluorosis	No 95% CI for prevalence estimates	No	Not applicable	Moderate	No, as 95% CI data for prevalence estimate were not reported
James *et al.* 2021, Ireland	Cross-sectional survey and description indicate that authors have adjusted for cluster sampling but not stated it	Random sample of 5-year-old schoolchildren in Dublin & Cork-Kerry in 2014, follow up at age 8 years in 2017	0.8–1.0 ppm	Fluoride deficient County Cork and Kerry ≤0.3 ppm	Dean's Index of fluorosis 0.74	No 95% CI for prevalence estimates Yes 95% CI for ORs derived from regression analysis	Multivariate regression with a negative binomial Hurdle model for caries only Logistic regression for fluorosis. Both comparing the difference in two time points	Age, gender, age first used toothpaste, amount of toothpaste, frequency of toothbrushing, age first visited dentist, rinse method after toothbrushing, and sweet snacks between meals	High	No, as 95% CI data for prevalence estimate were not reported and do not provide individual contributions and are tests of difference
Mohd Nor *et al.* 2018, Malaysia	Cross-sectional survey and description indicate that	School children aged 9 (born 2006) and 12 (born 2003),	0.7 ppm and then 0.5 ppm	Kelantan described as fluoride deficient (0 ppm) confirmed	Dean's Index of fluorosis 0.72–0.90	Prevalence estimate with 95% CIs	See Mohd Nor et al. 2021	See Mohd Nor et al. 2021	Moderate	No as not sure if adjusted for cluster

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
	authors have adjusted for cluster sampling but not stated it	lifelong residents were included in the final analysis				Query on adjustment for cluster sampling				sampling for 95% CIs
Mohd Nor et al. 2021, Malaysia	Cross-sectional survey (as above)	School children aged 9 (born 2006) and 12 (born 2003), lifelong residents were estimated for this study	0.7 ppm and then 0.5 ppm	Kelantan described as fluoride deficient (0 ppm) confirmed	Dean's Index of fluorosis 0.72–0.90	Yes 95% CI for ORs derived from regression analysis	Multiple binary logistic regression	CWF, filter, and bottled water use, infant feeding patterns (breast and formula feeding), oral hygiene practices at age less than 6 years (age at which the child started toothbrushing with toothpaste, toothbrushing supervision, frequency of brushing, behaviour after brushing, habits of eating and licking toothpaste, amount and the type of toothpaste used), socioeconomic, and demographic background	Moderate	Consider for independent contribution
Ministry of Health 2010, New Zealand	Cross-sectional survey and adjusted for cluster sampling using a design effect of ≥2	In households, one adult aged ≥15 years, and one child aged from birth to 14 years old, if any, were randomly selected for the survey	0.8–0.9 ppm	Circa 0.15 ppm in fluoride deficient areas	Dean's Index of fluorosis 0.78	Prevalence estimate with 95% CIs Query control for lifetime exposure as estimate higher in	No	Not applicable	Moderate	Consider for prevalence estimate

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
						fluoride deficient area				
Wong *et al.* 1970, Singapore	Cross-sectional survey	Chinese and Malay children in two age groups, 7–8 years and 8–9 years of age were selected by random sampling from primary schools in various parts of the island	0.7 ppm	Before fluoridation was 0.2 ppm	No index used. Dental fluorosis observed	No 95% CI for prevalence estimates	No	Not applicable	Low	No, based on quality and 95% CI data for prevalence estimate were not reported
Hong *et al.* 1990, Taiwan	Cross-sectional census survey	Children aged 6–15 years who were born in or continuous residents of the respective areas	0.6 ppm and then 0.7 ppm	Tsao-tun (0.08 ppm)	Dean's Index of fluorosis	Variance not required for prevalence as census	No	Not applicable	Moderate	Consider for prevalence estimate
Arnold *et al.* 1956, USA	Cross-sectional survey	Kindergarten and school children aged 4-16 years who had used city water supplies continuously since birth	0.9–1.1 ppm	Muskegon, <0.2 ppm of fluoride until July 1951, 1952 - 1954 1.0 ppm, Aurora Natural F 1.2 ppm	No index used. Proportion with dental fluorosis observed	No 95% CI for prevalence estimates	No	Not applicable	Low	No, based on quality and 95% CI data for prevalence estimate were not reported
Szpunar and Burt 1988, USA	Cross-sectional survey	6–12-year-old school children	1.0 ppm	Natural fluoride: Richmond 1.2 ppm, Cadillac 0.0 ppm, Hudson 0.8 ppm, fluoride mouth rinses	Tooth Surface Index of Fluorosis 0.85	No 95% CI for prevalence estimates Yes, 95% CI for ORs derived from regression analysis	Logistic regression analysis	Demographic information, residence history, details of fluoride exposure, information about the use of dental services, and infant nutrition	Low	No, based on quality and as 95% CI data for prevalence estimate were not reported

Author, year country	Study design and census/cluster sample adjustment where reported	Study population and lifetime exposure	CWF exposure (ppm)	Details of comparator	Fluorosis outcome measure and proportion agreement where reported cut offs	Statistical measure and variance	Regression to adjust for confounding	Confounders	Study quality	Consider for meta-analysis
Kumar *et al.* 1989, USA	Cross-sectional survey and adjusted for cluster sampling but design effect unknown	7–14-year-old school children. Children with orthodontic bands, only deciduous teeth, not lifetime residents of respective cities were excluded	1.0 ppm	Kingston < 0.3 ppm	Dean's Index of fluorosis	No 95% CI for prevalence estimates	No	Not applicable	Low	No, based on quality and 95% CI data for prevalence estimate were not reported
Kumar et al. 1998, USA	Cross-sectional survey and adjusted for cluster sampling but design effect unknown	School children in grades 1 through 8, children aged 7 to 14 years, who had been lifelong residents of respective cities.	1 ± 0.2 ppm	Kingston < 0.3 ppm	Dean's Index of fluorosis 0.65, 0.76, and 1.0 for 3 of the examiners relative to the fourth	No 95% CI for prevalence estimates	No	Not applicable	Low	No, based on quality and 95% CI data for prevalence estimate were not reported
Kumar et al. 2000, USA	Cross-sectional survey and adjusted for cluster sampling but design effect unknown	School children who were 7–14-year-old lifelong residents	1 ± 0.2 ppm	Kingston, New Windsor, Town of Ulster < 0.3 ppm	Dean's Index of fluorosis 0.65, 0.76, and 1.0 for 3 of the examiners relative to the fourth	Yes, 95% CI for ORs derived from regression analysis	Logistic regression	Age, sex, ethnic group, socioeconomic status, use of fluoride tablets/drops during the first eight years of life	Low	No, based on quality

6.10 Appendix J Tables used for the meta-analyses presented in the main report

Table 20 Primary dentition: dental caries measured using dmft in CWF areas compared with fluoride-deficient areas (sensitivity analysis with three outlier papers removed)

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF Mean	CWF SD	Fluoride deficient participants	Fluoride deficient Mean	Fluoride deficient SD
French et al.	1984	England	5	1.0	3	0.1	Low	Backer-Dirks et al.	533	1.41	2.21	536	3.37	3.65
Jackson et al.	1975b	England	5	1.0	3	<0.1	Low	Jackson et al.	106	2.38	0.3 04 SE‡	130	4.4	0.349 SE†
Lemasney et al.	1984	Ireland	5	0.8 – 1.0	3	≤0.3	Low	Whittle and Downer	169	2.46	3.27	98	3.83	3.75
Rugg-Gunn et al.	1977	England	5	1.0	3	<0.1	Low	Backer-Dirks et al.	212	2.4	2.73	132	6.1	4.03
Rugg-Gunn et al.	1981	England	5	1.0	3	<0.1	Low	Backer-Dirks et al.	438	2.5	2.79	132	6.1	4.03
Seaman et al	1989	Wales	5	0.8	2	<0.1	Low	Palmer et al.	260	0.8	1.43	546	2.26	3.17
Guo et al. 1984	1984	Taiwan	5	0.6	2	0.08	Moderate	WHO	345	5.5	4.3	387	8.5	4.6
Hsieh et al. 1986	1986	Taiwan	5	0.6	2	0.08	Moderate	WHO	226	5.1	3.8	319	8.6	4
O'Mullane et al. 1986	1986	England	5	0.8–1.0	3	≤3	Moderate	WHO	869	1.8	2.8	836	3	3.7
Rugg-Gunn et al. 1988	1988	England	5	1	3	<0.1	Moderate	Backer-Dirks	457	1.81	2.56	370	3.9	4.22
Treasure and Dever 1992	1992	New Zealand	5	1	3	0.08	Moderate	Palmer	107	1.06	1.75	67	2.91	3.82
Evans et al. 1995	1995	England	5	1	3	< 0.1	Moderate	BASCD	496	1.33	0.57	436	2.41	0.53
Villa et al. 1998	1998	Chile	7	0.93	3	0.07	Moderate	WHO	129	1.72	2.33	158	3.67	3.54

Whelton et al. 2004	2004	Ireland	5	0.8–1.0	3	≤0.3	Moderate	WHO	3616	1	2.1	2160	1.7	2.1
James et al. 2021	2021	Ireland	8	0.8–1.0-0.6–0.8	3	≤0.3	High	WHO	704	1.9	2.4	770	2.7	2.8
McLaren et al. 2021	2021	Canada	7	0.6-0.8	2	0.07 – 0.30	High	WHO	799	2	4.33	918	3.2	3.86
Silva et al. 2021	2021	Brazil	5	0.5-0.6	2	<0.05	High	Not reported	161	1.53	2.47	169	3.54	4.1
Goodwin et al. 2022	2022	England	5	0.9	3	<0.2	Moderate	Public Health England	699	1.06	2.16	911	1.18	2.41

Table 21 Primary dentition: dental caries measured using dmfs in CWF areas compared with fluoride-deficient areas (sensitivity analysis with one outlier paper removed)

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF Mean	CWF SD	Fluoride deficient participants	Fluoride deficient Mean	Fluoride deficient SD
Rugg-Gunn et al.	1977	England	5	1	3	<0.1	Low	Baker-Dirks et al.	212	3.6	4.98	132	11.6	9.54
Rugg-Gunn et al.	1981	England	5	1	3	<0.1	Low	Baker-Dirks et al.	438	4.1	5.76	132	11.6	9.54
French et al.	1984	England	5	1	3	<0.1	Low	Baker-Dirks et al.	533	2.14	4.13	536	5.7	7.19
Seppa et al.	2000b	Finland	6	1	3	<0.1	Low	Moller & Poulsen	49	2.53	3.1	66	1.32	2.51
Rugg-Gunn et al. 1988	1988	England	5	1	3	<0.1	Moderate	Baker-Dirks	457	2.8	4.77	370	7	9.28
Treasure and Dever 1992	1992	New Zealand	5	1	3	NR	Moderate	Palmer	107	1.52	2.65	67	4.69	7.03

Table 22 Primary dentition: Percent with non cavitated dental caries measured using dmft in CWF areas compared with fluoride-deficient areas

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF % with CDC	CWF 95% CI	Fluoride deficient participants	Fluoride deficient % with CDC	Fluoride deficient 95% CI	% Difference
Brown et al.	1960	Canada	9-11	1.0–1.2	3	NF	Moderate	Not reported	502	41.83	2.202SE	521	**34.36**	2.081 SE	7.47
Gray and Davies-Slowik	2001	England	5	1	3	<0.3	Low	British Association for the Study of Community Dentistry	379	79.8	79.4–82.0	273	65.2	64.6–67.5	14.6
Gray and Davies-Slowik	2001	England						British Association for the Study of Community Dentistry	413	69.5	69.1–71.7	273	65.2	64.6–67.5	4.3
Gray and Davies-Slowik	2001	England						British Association for the Study of Community Dentistry	660	74.1	73.8–76.2	273	65.2	64.6–67.5	8.9
Gray and Davies-Slowik	2001	England						British Association for the Study of Community Dentistry	451	80	79.6–82.2	273	65.2	64.6–67.5	14.8
Gillcrist et al.	2001	USA	5-11	1	3	<0.3	Low	ADA	10,495	42	39–44	6,761	35	32–37	7

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF % with CDC	CWF 95% CI	Fluoride deficient participants	Fluoride deficient % with CDC	Fluoride deficient 95% CI	% Difference
Astand Chase	1953	USA	5	1.2	3	<0.1	Low	WHO	217	56.2	0.01	140	26.4	0.01	29.8

Table 23 Primary dentition: Percent with cavitated dental caries measured using dmft in CWF areas compared with fluoride-deficient areas

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF participants with CDC	CWF % with CDC	CWF lower CI	CWF upper CI	Fluoride deficient participants	Fluoride deficient participants with CDC	Fluoride deficient % with CDC	Fluoride deficient lower CI	Fluoride deficient upper CI	% Difference
Guo et al. 1984	1984	Taiwan	5	0.6	2	0.08	Moderate	WHO	345	298	86.4	0.1	0.1	387	368	95.1	0.1	0.1	8.7
Hsieh et al. 1986	1986	Taiwan	5	0.6-0.7	2	0.08	Moderate	WHO	226	225	99.6	0.1	0.1	319	318	99.7	0.1	0.1	0.1
Evans et al. 1995	1995	England	5	1	3	< 0.1	Moderate	BASCD	496	193	39	0.1	0.1	436	240	55	0.1	0.1	16
McLaren et al. 2021	2021	Canada	7	0.6-0.8	2	0.07–0.30 ppm	High	WHO	799	356	44.5	44.5	49.2	918	558	60.8	57	64.5	16.3

Table 24 Permanent dentition DMFT in CWF areas compared with fluoride-deficient areas (sensitivity analysis with 4 outlier papers removed)

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF Mean	CWF SD	Fluoride deficient participants	Fluoride deficient Mean	Fluoride deficient SD
de Liefde and Herbison	1985	New Zealand	9	1.0	3	0.	Low	WHO	191	1.7	1.6	237	2.4	1.9
Kunzel	1980	Germany	10	1.0	3	0.07	Low	Not reported	164	1.3	1.41	272	3.1	1.95
Lemasney et al.	1984	Ireland	11	0.8–1.0	3	<0.1	Low	Whittle and Downer	182	2.12	1.97	126	3.63	2.79
Kunzel et al.,	2000	Germany	12	0.8–1.0	3	0.05-0.1	Low	WHO	337	2.47	2.06	472	4.65	1.77
Mitropoulos et al.	1988	England	14	1.0	3	NF	Low	Downer et al.	234	2.26	2.46	275	3.79	3.22
Kalsbeek et al.,	1993	Netherlands	15	1.1	3	<0.1	Low	Modified Backer Dirks	285	7.4	4	261	14.1	5.7
Clovis et al.	1988	Canada	11-12	1.08	3	0.23	Low	WHO	53	2.26	2.43	77	2.43	2.11
Murray et al.	1991	England	15-16	1.0	3	0.07–0.30	Low	Palmer et al.	349	2.7	0.13	347	3.4	0.16
Hsieh et al. 1979	1979	Taiwan	6	0.6-0.7	2	0.08	Moderate	WHO	312	0.1	0.4	238	0.3	0.7
Guo et al. 1984	1984	Taiwan	10	0.6	2	0.08	Moderate	WHO	310	1.1	1.5	436	2.4	2
Hsieh et al. 1986	1986	Taiwan	12	0.6-0.7	2	<0.1	Moderate	WHO	329	1.9	2.4	458	4.3	3.6
O'Mullane et al. 1986	1986	Ireland	12	0.8–1.0	3	0	Moderate	Index	749	2.6	2.3	755	3.3	2.5
Thomas and Kassab 1992	1992	Wales	18-30	0.8	2	<0.1	Moderate	WHO	170	9.48	4.04	479	13.62	4.6

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF Mean	CWF SD	Fluoride deficient participants	Fluoride deficient Mean	Fluoride deficient SD
Treasure and Dever 1994	1994	New Zealand	14	1	3	0.08	Moderate	WHO	134	2.33	2.16	48	4.52	3.7
Villa et al. 1998	1998	Chile	12	0.93	3	≤3	Moderate	WHO	152	1.28	1.65	155	3.1	2.65
Kunzel and Fischer 2000	2000	Cuba	10-11	0.8	2	<0.3	Moderate	Index	126	1.1	1.51	85	3.1	1.79
Whelton et al. 2004	2004	Ireland	12	0.8 – 1.0	3	0.1	Moderate	WHO	2090	1.1	1.4	747	1.3	1.7
Mullen et al. 2012	2012	Ireland	16	0.7	2	0.2	Moderate	WHO	823	2.42	4.46	253	3.61	2.03
Mohd Nor et al. 2018	2018	Malaysia	12	0.5	1	0	Moderate	WHO	294	0.47	0.97	301	1.31	1.81
McLaren et al. 2021	2021	Canada	7	0.6 - 0.8	2	≤0.3	High	Index	791	0.19	0.78	912	0.26	1
Silva et al. 2021	2021	Brazil	12	0.6	2	<0.05	High	WHO	178	1.53	1.81	184	2.63	3.02

Table 25 Permanent dentition DMFT in CWF areas compared with fluoride-deficient areas (sensitivity analysis with 1 outlier paper removed)

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF Mean	CWF SD	Fluoride deficient participants	Fluoride deficient Mean	Fluoride deficient SD
Ellwood and O'Mullane	1995	England Wales	14	0.7	2	<0.1	Low	Stephen et al.	196	3.18	3.92	267	4.18	4.56
Kalsbeek et al.	1993	Netherlands	15	1.1	3	0.1	Low	Modified Backer Dirks	285	10.8	7.7	261	27.7	14.6
Gillcrist et al.,	2001	USA	5-11	1.0	3	<0.3	Low	ADA	10,495	0.77	0.65,0.88 (95% CI)	6,761	1.02	0.90,1.13 (95% CI)

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF Mean	CWF SD	Fluoride deficient participants	Fluoride deficient Mean	Fluoride deficient SD
Kunzel and Fischer	2000	Cuba	10-11	0.8	2	0.05-0.1	Moderate	WHO	126	1.5	2.21	85	4.8	3.76
Treasure and Dever	1994	New Zealand	14	1.0	3	0.08	Moderate	Palmer et al.	134	2.97	3.08	48	6.19	6.41

Table 26 Permanent dentition: Percent with non cavitated dental caries measured using dmft in CWF areas compared with fluoride-deficient areas

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants	CWF % with CDC	CWF 95% CI	Fluoride deficient participants	Fluoride deficient % with CDC	Fluoride deficient 95% CI	% Difference
Brown et al.	1960	Canada	12–14	1.0–1.2	3	NF	Moderate	NR	503	18.69	1.738	485	2.27	0.676	16.42
Brown and Poplove,	1965	Canada	16–17	1.0–1.2	3	NF	Low	NR	356	11.8	1.71	482	0.41	0.291	11.39
Gillcrist et al.,	2001	USA	5–11	1.0	3	<0.3	Low	ADA	10,495	78	76, 80	6,761	74	72, 76	4.0

Table 27 Permanent dentition: percent with cavitated dental caries measured using DMFT in CWF areas compared with fluoride-deficient areas

Author	Year	Country	Age in years	CWF ppm	CWF exposure category	Fluoride deficient ppm	Quality	Index	CWF participants with CDC	CWF % with CDC	CWF % with CDC	CWF lower CI	CWF upper CI	Fluoride deficient participants	Fluoride deficient participants with CDC	Fluoride deficient % with CDC	Fluoride deficient lower CI	Fluoride deficient upper CI	% Difference
Guo et al. 1984	1984	Taiwan	10	0.6	2	0.08	Moderate	WHO	310	149	48.1	0.01	0.01	436	352	80 .7	0.01	0.01	0.326
Hsieh et al. 1986	1986	Taiwan	12	0.6	2	0.08	Moderate	WHO	329	197	59.9	0.01	0.01	458	381	83.2	0.01	0.01	0.232
McLaren et al. 2021	2021	Canada	7	0.6 - 0.8	2	0.07 – 0.30	High	WHO	791	98	12.4	9.6	15 .9	912	141	15.4	12.4	18.9	0.03

7 Appendices Question 2A

7.1 Appendix A Overview of literature search results for Question 2 A and B

Table 28 Overview of literature search for Question 2A and 2B

Database	Date of search	Date range	No. of results
Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions	07 Dec 2021	1946-2021	1866
Embase	07 Dec 2021	1974-2021	481
Cochrane Library (John Wiley & Sons Inc)	07 Dec 2021	1946-2021	51
Cochrane Trial Register	07 Dec 2021	1946-2021	
LILACS	27 July 2021	Inception-2021	96
Scoping search			70
Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions (1946-1990)	28 Feb 2023	2021-2023	93
Embase	28 Feb 2023	2021-2023	39
Total before deduplication			2696
Total after deduplication			2,223
Total retained for analysis after screening Q2A			16
Total retained for analysis after screening Q2B			4
Total added from reference chasing Q2A			3
Total added from reference chasing Q2B			3

7.1.1 Medline (1946-06 December 2021)

Database(s): Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions(R) (1946 to December 06, 2021)

#	Searches	Results
1	exp Fluoride/	38309
2	(fluorid* or fluorin* or flurid* or florin*).ti. or (fluorid* or fluorin* or flurid* or florin*).ab. or (fluorid* or fluorin* or flurid* or florin*).sh,kf,kw.	97770
3	1 or 2	102195
4	Water/ or water.mp.	1052918

5	Water Supply/	33625
6	4 or 5	1052918
7	3 and 6	15053
8	exp adolescent/ or exp child/ or exp infant/ or (infant disease* or childhood disease*).ti,ab,kf. or (adolescen* or babies or baby or boy? or boyfriend or boyhood or child* or girl? or infant* or juvenil* or kid? or minors or minors* or neonat* or neonat* or newborn* or new-born* or paediatric* or peadiatric* or pediatric* or perinat* or preschool* or puber* or pubescen* or school* or teen* or toddler? or underage? or under-age? or youth*).ti,ab,kf.	4712855
9	exp Child Health/ or Child Health Services/ or exp Pediatrics/	84603
10	8 or 9	4718792
11	exp Dental Caries/	48277
12	carie$.mp.	63352
13	(caries or early childhood caries).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	63235
14	exp Periodontal Diseases/	91326
15	exp tooth demineralization/	49853
16	(teeth adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	12198
17	(tooth adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	10220
18	(dental adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	73817
19	(enamel adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	5802
20	(dentin$ adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	7488
21	Dental Enamel/	20238
22	(root$ adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	6089
23	((teeth or tooth or dental or enamel or dentin) and plaque).mp.	27678
24	Oral Health/	18506
25	(Life Quality or Health-Related Quality Of Life or Health Related Quality Of Life).mp. or HRQOL.ab,ti,kw.	60264
26	("DMF Index" or "Dental Plaque Index").mp.	14771
27	or/11-26	266603
28	exp Fluorides, Topical/	4744

29	exp Fluorides/	38309
30	Fluor$.mp.	1164236
31	monofluor$.mp.	1599
32	exp Cariostatic Agents/	36787
33	(fluoride varnish or bifluorid or cavityshield or duraflur or duraphat or fluorniz or fluor protector or prevident varnish or thera-flur or clinpro white varnish).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	1299
34	(varnish* or lacquer* or laquer* or paint*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	29115
35	exp Dentifrices/	7096
36	(Mouth Bath or Mouth Wash or Mouth Rinse).ab,ti,kf.	970
37	(toothpaste$ or paste$ or dentrifice$).mp.	42569
38	(varnish adj5 tooth).mp.	79
39	28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38	1230993
40	7 and 10 and 27 and 39	1911
41	exp animals/ not humans.sh.	4924363
42	40 not 41	1901
43	limit 42 to (comment or editorial or letter or newspaper article)	36
44	42 not 43	1866

7.1.2 Embase (1974-06 December 2021)

#	Searches	Results
1	Fluorides/ or Fluorine/	38765
2	exp Fluoridation/	4411
3	water.mp. /freq=5 and (fluorid$ or fluorin$ or flourid$ or flourin$ or flurid$ or flurin$ or florid$ or florin$).mp.	4890
4	(Hexafluorsilicic acid or Hydrofluosilicic acid or HFSA or "H2SiF6" or "CaF2" or fluorospar or fluorosilicic acid or sodium fluorosilicate$ or silicofluorid$).mp.	1267
5	or/1-4	44530
6	Water Supply/ or Water/ or (drinking water or drinking suppl$ or potable water or water suppl$ or suppl$ of water or public water or community water or water treatment or waterworks or water fluorid$).mp.	437124
7	5 and 6	8511
8	(topical$ adj5 fluor$).mp.	3365

#	Searches	Results
9	(Fluorides/ or Fluorine/) and Cariostatic agents/	2500
10	exp Dentifrices/ or Mouthwashes/ or Toothpastes/	12520
11	(toothpaste$ or paste$ or dentrifice$).mp.	53731
12	fluoride prophylaxis toothpaste/ or fluoride varnish/	3457
13	((varnish$ or gel or gels or rinsing or rinse) adj5 (dental or tooth or fluorid$)).mp.	5554
14	(Mouth bath or mouthbath or mouth wash$ or mouthwash$ or Mouth Rinse$ or mouthrinse$).mp.	8557
15	((Fluor$ or AMF or APF or "Amine F" or SNF2 or "Stannous F" or NAF or "Sodium F" or SMFP or MFP or monofluor$ or "PPM F" or PPMF or "phosphat$ F" or "acidulat$ Fluor$" or "phosphat$ fluor$" or fluorphosphat$ or "amin$ fluor$" or "sodium fluor$") and (topical$ or paste$ or gel or gels or varnish$ or administration route$)).mp.	74543
16	or/8-15	133338
17	exp adolescent/ or exp child/ or exp infant/ or (infant disease* or childhood disease* or adolescen* or babies or baby or boy? or boyfriend or boyhood or child* or girl? or infant* or juvenil* or kid? or minors or minors* or neonat* or neonat* or newborn* or new-born* or paediatric* or peadiatric* or pediatric* or perinat* or preschool* or puber* or pubescen* or school* or teen* or toddler? or underage? or under-age? or youth* or "aged 0-6 years" or "aged 0-5 years" or "aged 0-4 years" or "aged 0-3 years" or "aged 0-2 years" or "aged 0-1 years" or "aged < 6 years" or "aged < 5 years" or "aged < 4 years" or "aged < 3 years" or "aged < 2 years" or "aged < 1 years" or "aged 18 months" or "aged 12 months").mp.	4912654
18	Oral Health/	162383
19	(Life Quality or Health-Related Quality Of Life or Health Related Quality Of Life).mp. or HRQOL.ab,ti,kw.	93736
20	Dental health/	4335
21	exp Periodontal Diseases/ or periodontal disease$.mp.	110425
22	exp Dental Caries/	50853
23	(carie$ or carie*).mp.	61639
24	((teeth or tooth or dental or enamel or dentin or root$) adj5 (cavit$ or caries$ or carious or decay$ or lesion$ or demineral$ or remineral$)).mp.	73327
25	((teeth or tooth or dental or enamel or dentin) and plaque).mp.	28386
26	exp Tooth demineralization/	228225
27	Fluorosis, dental/ or (fluorosis or fluorosed or tooth discolouration).mp.	5521
28	Dental enamel/	19979
29	("DMF Index" or "Dental Plaque Index").mp.	1402
30	Tooth loss/ or tooth loss.ti,ab,hw,kw.	35312
31	or/18-30	510083
32	7 and 16 and 17 and 31	498

#	Searches	Results
33	32 not ((exp animal/ or nonhuman/) not exp human/)	492
34	33 not (letter or comment or editorial or newspaper article).pt.	481

7.1.3 Cochrane Central (1946-07 December 2021)

ID	Search	Hits
#1	MeSH descriptor: [Fluorides] explode all trees	2718
#2	MeSH descriptor: [Fluorine] explode all trees	85
#3	MeSH descriptor: [Fluoridation] explode all trees	39
#4	((fluorid* or fluorin* or flurin* or flurid* or flourid* or flourin*))	6410
#5	#1 or #2 or #3 or #4	6490
#6	MeSH descriptor: [Water Supply] explode all trees	181
#7	MeSH descriptor: [Water] explode all trees	2473
#8	("water treatment")	330
#9	water NEAR fluorid*	257
#10	("community water" OR "community-based water" OR "community supply" OR "community fluoridation")	30
#11	#6 OR #7 OR #8 OR #9 OR #10	3103
#12	#5 and #11	308
#13	MeSH descriptor: [Oral Health] explode all trees	487
#14	MeSH descriptor: [Tooth Diseases] explode all trees	11605
#15	MeSH descriptor: [DMF Index] explode all trees	519
#16	MeSH descriptor: [Dental Enamel] explode all trees	1182

#17	("oral health" OR "dental health"):ti,ab,kw	4084
#18	(caries OR carious OR cavit* OR decay* OR demineral* OR remineral* OR "dental plaque index")	23464
#19	(fluorosis or fluorosed OR ((tooth OR teeth) NEXT (discolour* OR discolor*)))	797
#20	(enamel OR root OR dentin OR tooth OR teeth OR oral OR dental):ti,ab,kw	214033
#21	(demineral* in All Text or remineral* in All Text)	84
#22	("quality of life" OR "life quality" OR QoL OR HRQoL):ti,ab,kw	128184
#23	#13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22	336679
#24	MeSH descriptor: [Child] explode all trees	59662
#25	MeSH descriptor: [Pediatrics] explode all trees	713
#26	("early childhood")	2568
#27	#24 or #25 or #26	61708
#28	MeSH descriptor: [Fluorides, Topical] explode all trees	645
#29	(toothpaste* or tooth-paste* or mouthrins* or mouth-rins* or mouthwash* or mouth-wash*	
or gel* or varnish* or seal* or paste* or dentifrice* or gum* or lozenge* or drop* or rins*):ti,ab,kw	78987	
#30	(cariostatic or fluorid$ or fluor or "PPM F" or PPMF or APF or NAF or "Sodium F" or "Amine F" or SNF2 or "Stannous F" or "phosphate$ F" or "acidulate$ F" or "phosphat$ fluor$" or	2226

	fluorphosphat$ or SMFP or MFP or monofluor$):ti,ab,kw	
#31	MeSH descriptor: [Toothpastes] explode all trees	849
#32	#28 #29 or #30 or #31	2943
#33	#12 AND #23 and #27 and #32	51

7.1.4 Latin American and Caribbean Health Sciences Literature Database (LILACS) (1998-27 July 2021)

#	Searches	Result
#1	(fluoride OR fluorine OR fluori$ OR fluoruro OR fluoreto) AND (water OR public water OR community water)	
#2	((teeth OR tooth OR dental OR dentin$ OR enamel OR root$) OR (Cavit$ OR caries OR carious OR decay*)) AND	
#3	(child* OR infant OR baby OR babies OR adolescent OR girl* OR boy* OR paediatric* OR pediatric*) AND (topical OR varnish OR paste OR toothpaste OR gel OR dentifice OR bath OR rinse)	
#4	type_of_study:("prevalence_studies" OR "evaluation_studies" OR "clinical_trials" OR "prognostic_studies" OR "observational_studies" OR "incidence_studies"))	
Total:		96

7.1.5 Supplementary grey literature table

Scoping searches for Question 2A and 2B were carried out in the search engine *Google.com* to gain an initial idea of terminology and likely key terms relating to the search concepts. Literature and systematic reviews in the area were reviewed to develop search langauge. Search terms used included combinations of water, fluoridated water, fluoride, oral health, dental health, plus children, and topical fluoride(s). See

Table 2 for the language used in this structured search. Broad terms were used to capture as much relevant material as possible. Further searches were carried out using the websites of relevant bodies. Updated searches of these resources was undertaken in March, 2023, as well as the search engine, *DuckDuckGo*.

Table 29 Grey literature resources for Q 1, 2A and 2B

Organisation	Website
America	
American Academy of Oral Medicine (AAOM)	https://www.aaom.com/
American Association of Pediatric Dentistry (AAPD)	https://www.aapd.org/
American Dental Association (ADA)	https://www.ada.org/en
Centers for Disease Control (CDC)	https://www.cdc.gov/fluoridation/index.html
Department of Health and Human Services	https://www.hhs.gov/
Environmental Protection Agency (EPA)	https://www.epa.gov/
Australia	
Australian Dental Association	https://www.ada.org.au/about
Department of Health	https://www.health.gov.au/
National Health and Medical Research Council (NHMRC)	https://www.nhmrc.gov.au/
Canada	
Canadian Dental Association (CDA)	https://www.cda-adc.ca/en/index.asp
Canadian Institute for Health Information (CIHI)	https://www.cihi.ca/en
Health Canada	https://www.canada.ca/en/health-canada.html
University of Toronto LibGuide (Dentistry/conference proceedings)	https://guides.library.utoronto.ca/c.php?g=250649&p=5001577
Ireland	
Dental Council	http://www.dentalcouncil.ie
Department of Health	https://www.gov.ie/en/organisation/department-of-health/
Environmental Protection Agency (EPA)	https://www.epa.ie/
Health Service Executive (HSE)	https://www.hse.ie/eng/
Irish Dental Association	https://www.dentist.ie/
Irish Expert Body on Fluorides and Health	https://tinyurl.com/yntxxdhz
New Zealand	
Environmental Health Intelligence New Zealand (EHINZ)	https://www.ehinz.ac.nz/
Fluoride Reference Group	https://www.nhmrc.gov.au/about-us/leadership-and-governance/committees/fluoride-reference-group
Ministry of Health	https://www.health.govt.nz/
United Kingdom	
British Dental Association (BDA)	https://www.bda.org/
Department of Health & Social Care	https://www.gov.uk/government/organisations/department-of-health-and-social-care
National Health Service (NHS)	https://www.nhs.uk/

Organisation	Website
National Institute for health and care excellence (NICE)	https://www.nice.org.uk/
Scottish dental clinical effectiveness programme	https://www.sdcep.org.uk
International Bodies	
Centre for Evidence-based Dentistry	https://www.cebd.org/
Council of European Dentists (CED)	https://cedentists.eu/
European Food Safety Authority	https://www.efsa.europa.eu/en
International Association for Dental Research (IADR)	https://www.iadr.org/
International Network of Agencies for Health Technology Assessment (INAHTA)	https://database.inahta.org/about#about-inahta
World Dental Federation (FDI)	https://www.fdiworlddental.org/
WHO Oral Health Observatory	https://www.who.int/health-topics/oral-health/#tab=tab_1
Search Engines	
Google	https://www.google.com/
DuckDuckGo	https://duckduckgo.com/DuckDuckGo?ia=web
Research Repositories	
Canada's Drug and Health Technology Agency (CADTH)	https://www.cadth.ca/grey-matters-practical-tool-searching-health-related-grey-literature-0
CORE (COnnecting REpositories) open-source repository	https://core.ac.uk/
Health Systems Evidence	https://www.healthsystemsevidence.org/
International Network of Agencies for Health Technology Assessment (INAHTA)	https://database.inahta.org/about#about-inahta
Latin American and Caribbean Health Sciences Literature (LILACS)	https://lilacs.bvsalud.org/en/
medRxiv	https://www.medrxiv.org/
RAND	https://www.rand.org/help/search.html
Trail Registries	
EU Clinical Trials Register	https://www.clinicaltrialsregister.eu/ctr-search/search?query=fluoride+and+oral+health
International Clinical Trials Registry Platform (ICTRP)	https://www.who.int/clinical-trials-registry-platform
Oral Health Data Portal (World Health Organization)	https://www.who.int/data/gho/data/themes/oral-health-data-portal

7.2 Appendix B PRISMA checklist and PRISMA-S for Question 2A

7.2.1 PRISMA checklist for Question 2A

Topic	Item	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title page
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Executive summary
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Section 1.1.4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Section 1.2
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Section 2.3.2
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Section 2.4
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix A of Section 7,
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Section 2.6**Error! Reference source not found.**
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Section 2.7

Topic	Item	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Section 2.3.2, Table 3, Section 2.7.1.3
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Section 2.7.1.3
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Section 2.8
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Section 2.9.1
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Section 2.9.2
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Section 2.9.3
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Section 2.9.2 and 2.9.3
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Section 2.9.3
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Section 2.9.3
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Section 2.9.3
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Section 2.9.2 and 2.9.3

Topic	Item	Checklist item	Location where item is reported
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Section 2.10
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Section 3.2.1, Appendix F of Section 7
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Appendix C of Section 7.3
Study characteristics	17	Cite each included study and present its characteristics.	Section 3.2.2, Table 45
Risk of bias in studies	18	Present assessments of risk of bias [and/or quality assessment] for each included study.	Appendix H of Section 7
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Sections 3.2.4
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Sections 3.2.3, Table 46, Appendix H of Section 7
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Section 3.2.4.2.18
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Not applicable
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Not applicable
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Not applicable as mainly cross section surveys

Topic	Item	Checklist item	Location where item is reported
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Section 3.2.4.2.20
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Sections 4.1 and 4.2
	23b	Discuss any limitations of the evidence included in the review.	Section 4.3
	23c	Discuss any limitations of the review processes used.	Section 4.3
	23d	Discuss implications of the results for practice, policy, and future research.	Sections 4.4 and 4.5
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Section 2.3.2
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Section 2.3.2
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Section 2.3.2
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Not applicable as all authors are salaried public servants who are funded from the DOH public funding and are obliged to be objective
Competing interests	26	Declare any competing interests of review authors.	None
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Appendix D and E of Section 7

Source: Page *et al.* (2021)[1]

7.2.2 PRISMA-S Question 2A

Section/ topic	#	Checklist item	Location(s) Reported
INFORMATION SOURCES AND METHODS			
Database name	1	Name each individual database searched, stating the platform for each.	Sections 2.4.4 and 2.5
Multi-database searching	2	If databases were searched simultaneously on a single platform, state the name of the platform, listing all of the databases searched.	n/a
Study registries	3	List any study registries searched.	Sections 2.4 and 2.5
Online resources and browsing	4	Describe any online or print source purposefully searched or browsed (e.g., tables of contents, print conference proceedings, web sites), and how this was done.	Sections 2.4.5 and 2.4.6
Citation searching	5	Indicate whether cited references or citing references were examined, and describe any methods used for locating cited/citing references (e.g., browsing reference lists, using a citation index, setting up email alerts for references citing included studies).	Section 2.4.5
Contacts	6	Indicate whether additional studies or data were sought by contacting authors, experts, manufacturers, or others.	n/a
Other methods	7	Describe any additional information sources or search methods used.	n/a
SEARCH STRATEGIES			
Full search strategies	8	Include the search strategies for each database and information source, copied and pasted exactly as run.	Appendix A of Section 7
Limits and restrictions	9	Specify that no limits were used, or describe any limits or restrictions applied to a search (e.g., date or time period, language, study design) and provide justification for their use.	Sections 2.5 and Appendix A of Section 7
Search filters	10	Indicate whether published search filters were used (as originally designed or modified), and if so, cite the filter(s) used.	n/a
Prior work	11	Indicate when search strategies from other literature reviews were adapted or reused for a substantive part or all of the search, citing the previous review(s).	n/a

Updates	12	Report the methods used to update the search(es) (e.g., rerunning searches, email alerts).	Appendix A of Section 7
Dates of searches	13	For each search strategy, provide the date when the last search occurred.	Appendix A of Section 7
PEER REVIEW			
Peer review	14	Describe any search peer review process.	Section 2.4.3
MANAGING RECORDS			
Total Records	15	Document the total number of records identified from each database and other information sources.	Appendix A of Section 7
Deduplication	16	Describe the processes and any software used to deduplicate records from multiple database searches and other information sources.	Section 2.4.4

PRISMA-S: An Extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews

Rethlefsen ML, Kirtley S, Waffenschmidt S, Ayala AP, Moher D, Page MJ, Koffel JB, PRISMA-S Group.

Last updated February 27, 2020.

7.3 Appendix C Studies excluded at full text and extraction screening stages

7.3.1 Exclude on population

Exclude on population n= 8
Aimee NR, van Wijk AJ, Maltz M, *et al.* Dental caries, fluorosis, oral health determinants, and quality of life in adolescents. *Clin Oral Investig* 2017;21:1811–20. doi:10.1007/s00784-016-1964-3
Cabral RN, Leal SC, Bernardino Í de M, *et al.* Caries lesion transition patterns of schoolchildren in a fluoridated community in Brazil. *Clin Oral Investig* 2022;26:689–95. doi:10.1007/s00784-021-04046-9
Chattopadhyay A, Arevalo O, Cecil JC. Kentucky's oral health indicators and progress towards Healthy People 2010 objectives. *J Ky Med Assoc* 2008;106:165–74.
Devoto FC, Bordoni NE, De Manfredi CF. Dental caries in deciduous teeth of nineteenth century Araucanians. *J Dent Res* 1968;47:571–4.
Hausen H, Heinonen OP, Paunio I. Fluoride exposure combinations and caries in permanent dentition among Finnish children. *Community Dent Oral Epidemiol* 1981;9:108–11. doi:10.1111/j.1600-0528.1981.tb01039.x
Lawrence H P, Sheiham A. Caries progression in 12- to 16-year-old schoolchildren in fluoridated and fluoride-deficient areas in Brazil. *Community Dent Oral Epidemiol* 1997;25:402–11.
Maupome G, Shulman JD, Clark DC, *et al.* Socio-demographic features and fluoride technologies contributing to higher fluorosis scores in permanent teeth of Canadian children. *Caries Res* 2003;37:327–34. doi:10.1159/000072163
Peterson JK. A supervised brushing trial of sodium monofluorophosphate dentrifices in a fluoridated area. *Caries Res* 1979;13:68–72. doi:10.1159/000260385

7.3.2 Exclude on intervention

Exclude on intervention (n=149)
Adair SM, Hanes CM, Russell CM, *et al.* Dental caries and fluorosis among children in a rural Georgia area. *Pediatr Dent* 1999;21:81–5.
Agus HM, Schamschula RG, Barmes DE, *et al.* Associations between the total fluoride content of dental plaque and individual caries experience in Australian children. *Community Dent Oral Epidemiol* 1976;4:210–4. doi:10.1111/j.1600-0528.1976.tb00986.x
Ahmed AT, Soto-Rojas A, Dean J, *et al.* Demarcated Primary Second Molar Hypomineralization: Prevalence Data and Associated Sociodemographic Determinants from Indiana. *Pediatr Dent* 2021;43:443–50.
Ahmed NAM, Astrøm AN, Skaug N, *et al.* Dental caries prevalence and risk factors among 12-year old schoolchildren from Baghdad, Iraq: a post-war survey. *Int Dent J* 2007;57:36–44. doi:10.1111/j.1875-595x.2007.tb00116.x
Ainamo J, Parviainen K. Occurrence of plaque, gingivitis and caries as related to self reported frequency of toothbrushing in fluoride areas in Finland. *Community Dent Oral Epidemiol* 1979;7:142–6. doi:10.1111/j.1600-0528.1979.tb01202.x
Ainamo J, Parvianinen K. Influence of increased toothbrushing frequency on dental health in low, optimal, and high fluoride areas in Finland. *Community Dent Oral Epidemiol* 1989;17:296–9. doi:10.1111/j.1600-0528.1989.tb00640.x
Aleksejuniene J, Arneberg P, Eriksen HM. Caries prevalence and oral hygiene in Lithuanian children and adolescents. *Acta Odontol Scand* 1996;54:75–80. doi:10.3109/00016359609003513

Exclude on intervention (n=149)
Armfield JM, Spencer AJ, Roberts-Thomson KF, *et al.* Water fluoridation and the association of sugar-sweetened beverage consumption and dental caries in Australian children. *Am J Public Health* 2013;103:494–500. doi:10.2105/AJPH.2012.300889
Arra MC, Lemke C. EFFECTS OF ADJUSTED FLUORIDATED WATER ON DENTAL CARIES IN SCHOOL CHILDREN OF AMERY, WIS. *J Am Dent Assoc* 1964;69:460–4. doi:10.14219/jada.archive.1964.0317
Arra MC, Lemke C. REDUCTION OF DENTAL CARIES IN CHILDREN THROUGH ADJUSTED FLUORIDATED WATER. *N Y J Dent* 1965;35:57 PASSIM.
Ashkenazi M, Bidoosi M, Levin L. Effect of Preventive Oral Hygiene Measures on the Development of New Carious lesions. *Oral Health Prev Dent* 2014;12:61–9. doi:10.3290/j.ohpd.a31219
Ashkenazi M, Cohen R, Levin L. Self-reported compliance with preventive measures among regularly attending pediatric patients. *J Dent Educ* 2007;71:287–95.
Australian Research Centre for Population Oral Health, The University of Adelaide, South Australia. The benefits of water fluoridation across areas of differing socio-economic status. *Aust Dent J* 2008;53:180–3. doi:10.1111/j.1834-7819.2008.00030.x
Bagramian RA. A 5-year school-based comprehensive preventive program in Michigan, U.S.A. *Community Dent Oral Epidemiol* 1982;10:234–7. doi:10.1111/j.1600-0528.1982.tb00385.x
Bagramian RA, Graves RC, Bhat M. A combined approach to preventing dental caries in schoolchildren: caries reductions after one year. *J Am Dent Assoc* 1976;93:1014–9. doi:10.14219/jada.archive.1976.0032
Barnes VM, Santarpia P, Richter R, *et al.* Clinical evaluation of the anti-plaque effect of a commercial chewing gum. *J Clin Dent* 2005;16:1–5.
Barnhart WE, Hiller LK, Leonard GJ, *et al.* Dentifrice usage and ingestion among four age groups. *J Dent Res* 1974;53:1317–22. doi:10.1177/00220345740530060301
Barrett MJ, Williamson JJ. Oral health of Australian aborigines: survey methods and prevalence of dental caries. *Aust Dent J* 1972;17:37–50. doi:10.1111/j.1834-7819.1972.tb02744.x
Beal JF, James PM. Dental caries prevalence in 5-year-old children following five and a half years of water fluoridation in Birmingham. *Br Dent J* 1971;130:284–8. doi:10.1038/sj.bdj.4802658
Beltrán-Aguilar ED, Barker L, Dye BA. Prevalence and severity of dental fluorosis in the United States, 1999-2004. *NCHS Data Brief* 2010;:1–8.
Beltrán-Aguilar ED, Griffin SO, Lockwood SA. Prevalence and trends in enamel fluorosis in the United States from the 1930s to the 1980s. *J Am Dent Assoc* 2002;133:157–65. doi:10.14219/jada.archive.2002.0139
Biesbrock AR, Gerlach RW, Bollmer BW, *et al.* Relative anti-caries efficacy of 1100, 1700, 2200, and 2800 ppm fluoride ion in a sodium fluoride dentifrice over 1 year. *Community Dent Oral Epidemiol* 2001;29:382–9. doi:10.1034/j.1600-0528.2001.290508.x
Bixler D, Muhler JC. COMBINED USE OF THREE AGENTS CONTAINING STANNOUS FLUORIDE: A PROPHYLACTIC PASTE, A SOLUTION AND A DENTIFRICE. *J Am Dent Assoc* 1964;68:792–800. doi:10.14219/jada.archive.1964.0195
Bixler D, Muhler JC. Effectiveness of a stannous fluoride-containing dentifrice in reducing dental caries in children in a boarding school environment. *J Am Dent Assoc* 1966;72:653–8. doi:10.14219/jada.archive.1966.0076
Blinkhorn AS, Byun R, Mehta P, *et al.* A 4-year assessment of a new water-fluoridation scheme in New South Wales, Australia. *Int Dent J* 2015;65:156–63. doi:10.1111/idj.12166
Bohaty BS, Parker WA, Seale NS, *et al.* The prevalence of fluorosis-like lesions associated with topical and systemic fluoride usage in an area of optimal water fluoridation. *Pediatr Dent* 1989;11:125–8.

Exclude on intervention (n=149)
Bonow MLM, Azevedo MS, Goettems ML, *et al.* Efficacy of 1.23% APF gel applications on incipient carious lesions: a double-blind randomized clinical trial. *Braz Oral Res* 2013;27:279–85. doi:10.1590/S1806-83242013000300007
Bottenberg P, Declerck D, Ghidey W, *et al.* Prevalence and determinants of enamel fluorosis in Flemish schoolchildren. *Caries Res* 2004;38:20–8. doi:10.1159/000073916
Bramlett MD, Soobader M-J, Fisher-Owens SA, *et al.* Assessing a multilevel model of young children's oral health with national survey data. *Community Dent Oral Epidemiol* 2010;38:287–98. doi:10.1111/j.1600-0528.2010.00536.x
Brodeur JM, Simard PL, Demers M, *et al.* Comparative effects of FMR programs in fluoridated and unfluoridated communities. *J Can Dent Assoc* 1988;54:761–5.
Broffitt B, Levy SM, Warren J, *et al.* Factors associated with surface-level caries incidence in children aged 9 to 13: the Iowa Fluoride Study. *J Public Health Dent* 2013;73:304–10. doi:10.1111/jphd.12028
Bronson ME. Dental health in an area of maximum water fluoridation. *Dent Hyg (Chic)* 1982;56:38–41.
Broughton JR, Person M, Maipi JTH, *et al.* Ukaipō niho: the place of nurturing for oral health. *N Z Dent J* 2014;110:18–23.
Brunelle JA, Carlos JP. Recent trends in dental caries in U.S. children and the effect of water fluoridation. *J Dent Res* 1990;69 Spec No:723–7; discussion 820-823. doi:10.1177/00220345900690S141
Burton VJ, Rob MI, Craig GG, *et al.* Changes in the caries experience of 12-year-old Sydney schoolchildren between 1963 and 1982. *Med J Aust* 1984;140:405–7. doi:10.5694/j.1326-5377.1984.tb108100.x
Butler WJ, Segreto V, Collins E. Prevalence of dental mottling in school-aged lifetime residents of 16 Texas communities. *Am J Public Health* 1985;75:1408–12. doi:10.2105/ajph.75.12.1408
Chankanka O, Cavanaugh JE, Levy SM, *et al.* Longitudinal associations between children's dental caries and risk factors. *J Public Health Dent* 2011;71:289–300. doi:10.1111/j.1752-7325.2011.00271.x
Choo-Wosoba H, Levy SM, Datta S. Marginal regression models for clustered count data based on zero-inflated Conway-Maxwell-Poisson distribution with applications. *Biometrics* 2016;72:606–18. doi:10.1111/biom.12436
Colquhoun J. Influence of social class and fluoridation on child dental health. *Community Dent Oral Epidemiol* 1985;13:37–41. doi:10.1111/j.1600-0528.1985.tb00417.x
Cons NC, Janerich DT, Senning RS. Albany topical fluoride study. *J Am Dent Assoc* 1970;80:777–81. doi:10.14219/jada.archive.1970.0113
Creedon MI, O'Mullane DM. Factors affecting caries levels amongst 5-year-old children in County Kerry, Ireland. *Community Dent Health* 2001;18:72–8.
de Sousa M da LR, Wagner M, Sheiham A. Caries reductions related to the use of fluorides: a retrospective cohort study. *Int Dent J* 2002;52:315–20. doi:10.1002/j.1875-595x.2002.tb00877.x
Dean HT, Jay P, ARNOLD FA Jr, *et al.* Nutriton classics. Public Health Reports, Volume 56, 1941, pages 761-792. Domestic water and dental caries. II. A study of 2,832 white children, aged 12-14 years, of 8 suburban Chicago communities, including Lactobacillus acidophilus studies of 1,761 children. By H. Trendley Dean, Philip Jay, Francis A. Arnold, Jr., and Elias Elvove. *Nutr Rev* 1976;34:116–8. doi:10.1111/j.1753-4887.1976.tb05724.x
Dimitropoulos Y, Holden A, Gwynne K, *et al.* Outcomes of a co-designed, community-led oral health promotion program for Aboriginal children in rural and remote communities in New South Wales, Australia. *Community Dent Health* 2020;37:132–7. doi:10.1922/CDH_00005Dimitropoulos06
Do LG, Spencer AJ. Decline in the prevalence of dental fluorosis among South Australian children. *Community Dent Oral Epidemiol* 2007;35:282–91. doi:10.1111/j.1600-0528.2007.00314.x

Exclude on intervention (n=149)
Do LG, Spencer AJ. Risk-benefit balance in the use of fluoride among young children. *J Dent Res* 2007;86:723–8. doi:10.1177/154405910708600807
do Nascimento HAR, Soares Ferreira JM, Granville-Garcia AF, *et al.* Estimation of toothpaste fluoride intake in preschool children. *Braz Dent J* 2013;24:142–6. doi:10.1590/0103-6440201302087
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7.4 Appendix D Extraction form

Table 30 General information data form

Study ID *From Eppi*	Author *First author*	Year *Of publication*	Location *Country*	Area *State/County/City/Town*	Objective *Aim of study*	Secondary publication *Data will not be extracted unless additional endpoints*	Associated papers *Same overall project different analysis*	Study design *HRB decision*	Participant age *Mean or ranges described in study*	Artificial fluoridation *Confirm if explicitly stated (Y/N)*	Fluoride interventions	Outcome *Oral health outcome assessed*	Outcome details *Including method of measurement*	Extracted	Validated

Table 31 Study design data form

Study ID	Author	Year	Study design (Author allocated)	Study design (HRB allocated)	Justification	Length of study	Length of exposure to CWF	Details of exposure	Details of comparator	Eligibility criteria	Sample size calculation	Response rate	Blinding of assessors to exposure	% Lost to follow-up	Method for handling missing data	Data collection	Confounders	Control for confounding	Identification of effect modification	Effect modifiers	Notes
From Epi	*First author*	*Of publication*	*As stated in the study*	*As agreed by research team*			*Length of time exposed to community water fluoridation*	*Inlcuding dose*	*Including dose*		*expected prevalence, power to detect a difference and allowed variance, results CIs calculated*			*For main analysis*	*e.g. last observation carried forward*	*Brief description*			*Yes or not reported*		

Table 32 Study participants data form

Study ID	Author	Year	Group for characteristics	N	Mean age/Age range	% Female	N included in final analysis
From Eppi	*First author*	*Of publication*		*Enrolled*			

Table 33 Outcomes

Of publication	Outcome of interest: Caries	% caries primary teeth	% caries free primary teeth	% caries permanent teeth	% caries free permanent teeth	dmft/ deft	dmfs/ defs	DMFT	DMFS	Method of caries identification	Clinical examination criteria	Outcome of interest: Fluorosis	Fluorosis (Dean's index)	Fluorosis (Thylstrup-Fejerskov index)	Tooth Surfaces Index of Fluorosis	Type of teeth examined for fluorosis	Hypomineralisation by photographs

Table 34 Caries outcome data form using example of primary dentition dmft

Country	Author	Year	Age in years	CWF ppm	Baseline dmft CWF	Baseline CWF SD	Baseline CWF Total	Final dmft CWF	Final dmft SD CWF	Final CWF Total	Fluoride deficient ppm	Baseline mean dmft No F	Baseline SD No F	Baseline CWF Total	Final dmft No F	Final SD No F	Final No F Total	Difference in % point or dmft

This table was repeated for dmfs, % with CDC, and % without CDC for primary dentition. The table was also repeated for DMFT, DFMS, % with CDC, and % without CDC for permanent dentition

Table 35 Fluorosis outcome data form

Country	Author	Year	Age in years	CWF ppm	Baseline % fluorosis	Baseline 95% CI	Baseline CWF affected number	Baseline CWF Total	Final % fluorosis	Final 95% CI	Final CWF affected number	Final CWF Total	Baseline 5 fluorosis No F	Baseline 95% CI No F	Baseline affected number No F	Baseline CWF Total	Final % No F	Final 95%CI No F	Final affected number No F	Final No F Total	Difference in % point or dmft

7.5 Appendix E Quality assessment tools

See 6.5 in Section 6.5 National Heart, Lung, and Blood Institute's (NHLBI's) quality assessment tool for observational cohort studies and cross-sectional survey

Table 36 NHLBI's quality assessment tool for observational case- control studies for question 2A

Questions NHLBI's quality assessment tool for observational case-control studies	Yes	No	Other*cannot decide, not reported, not applicable
1. Was the research question or objective in this paper clearly stated and appropriate?			
Did the authors describe their goal in conducting this research? Is it easy to understand what they were looking to find? This issue is important for any scientific paper of any type. High quality scientific research explicitly defines a research question.			
2. Was the study population clearly specified and defined?			
Did the authors describe the group of individuals from which the cases and controls were selected or recruited, while using demographics, location, and time period? If the investigators conducted this study again, would they know exactly who to recruit, from where, and from what time period? Investigators identify case-control study populations by location, time period, and inclusion criteria for cases (individuals with the disease, condition, or problem) and controls (individuals without the disease, condition, or problem). For example, the population for a study of lung cancer and chemical exposure would be all incident cases of lung cancer diagnosed in patients ages 35 to 79, from January 1, 2003 to December 31, 2008, living in Texas during that entire time period, as well as controls without lung cancer recruited from the same population during the same time period. The population is clearly described as: (1) who (men and women ages 35 to 79 with (cases) and without (controls) incident lung cancer); (2) where (living in Texas); and (3) when (between January 1, 2003 and December 31, 2008). Other studies may use disease registries or data from cohort studies to identify cases. In these cases, the populations are individuals who live in the area covered by the disease registry or included in a cohort study (i.e., nested case-control or case-cohort). For example, a study of the relationship between vitamin D intake and myocardial infarction might use patients identified via the GRACE registry, a database of heart attack patients. NHLBI staff encouraged reviewers to examine prior papers on methods (listed in the reference list) to make this assessment, if necessary.			

Questions NHLBI's quality assessment tool for observational case-control studies	Yes	No	Other*cannot decide, not reported, not applicable
In order for a study to truly address the research question, the target population–the population from which the study population is drawn and to which study results are believed to apply–should be carefully defined. Some authors may compare characteristics of the study cases to characteristics of cases in the target population, either in text or in a table. When study cases are shown to be representative of cases in the appropriate target population, it increases the likelihood that the study was well-designed per the research question. However, because these statistics are frequently difficult or impossible to measure, publications should not be penalized if case representation is not shown. For most papers, the response to question 3 will be "NR." Those subquestions are combined because the answer to the second subquestion–case representation–determines the response to this item. However, it cannot be determined without considering the response to the first subquestion. For example, if the answer to the first subquestion is "yes," and the second, "CD," then the response for item 3 is "CD."			
3. Did the authors include a sample size justification?			
Did the authors discuss their reasons for selecting or recruiting the number of individuals included? Did they discuss the statistical power of the study and provide a sample size calculation to ensure that the study is adequately powered to detect an association (if one exists)? This question does not refer to a description of the manner in which different groups were included or excluded using the inclusion/exclusion criteria (e.g., "Final study size was 1,378 participants after exclusion of 461 patients with missing data" is not considered a sample size justification for the purposes of this question). An article's methods section usually contains information on sample size and the size needed to detect differences in exposures and on statistical power.			
4. Were controls selected or recruited from the same or similar population that gave rise to the cases (including the same timeframe)?			
To determine whether cases and controls were recruited from the same population, one can ask hypothetically, "If a control was to develop the outcome of interest (the condition that was used to select cases), would that person have been eligible to become a case?" Case-control studies begin with the selection of the cases (those with the outcome of interest, e.g., lung cancer) and controls (those in whom the outcome is absent). Cases and controls are then evaluated and categorized by their exposure status. For the lung cancer example, cases and controls were recruited from hospitals in a given region. One may reasonably assume that controls in the catchment area for the hospitals, or those already in the hospitals for a different reason, would attend those hospitals if they became a case; therefore, the controls are drawn from the same population as the cases.			

Questions NHLBI's quality assessment tool for observational case-control studies	Yes	No	Other*cannot decide, not reported, not applicable
If the controls were recruited or selected from a different region (e.g., a State other than Texas) or time period (e.g., 1991-2000), then the cases and controls were recruited from different populations, and the answer to this question would be "no." The following example further explores selection of controls. In a study, eligible cases were men and women, ages 18 to 39, who were diagnosed with atherosclerosis at hospitals in Perth, Australia, between July 1, 2000 and December 31, 2007. Appropriate controls for these cases might be sampled using voter registration information for men and women ages 18 to 39, living in Perth (population-based controls); they also could be sampled from patients without atherosclerosis at the same hospitals (hospital-based controls). As long as the controls are individuals who would have been eligible to be included in the study as cases (if they had been diagnosed with atherosclerosis), then the controls were selected appropriately from the same source population as cases. In a prospective case-control study, investigators may enroll individuals as cases at the time they are found to have the outcome of interest; the number of cases usually increases as time progresses. At this same time, they may recruit or select controls from the population without the outcome of interest. One way to identify or recruit cases is through a surveillance system. In turn, investigators can select controls from the population covered by that system. This is an example of population-based controls. Investigators also may identify and select cases from a cohort study population and identify controls from outcome-free individuals in the same cohort study. This is known as a nested case-control study.			
5. Were the definitions, inclusion and exclusion criteria, algorithms or processes used to identify or select cases and controls valid, reliable, and implemented consistently across all study participants?			
Were the inclusion and exclusion criteria developed prior to recruitment or selection of the study population? Were the same underlying criteria used for all of the groups involved? To answer this question, reviewers determined if the investigators developed I/E criteria prior to recruitment or selection of the study population and if they used the same underlying criteria for all groups. The investigators should have used the same selection criteria, except for study participants who had the disease or condition, which would be different for cases and controls by definition. Therefore, the investigators use the same age (or age range), gender, race, and other characteristics to select cases and controls. Information on this topic is usually found in a paper's section on the description of the study population.			
6. Were the cases clearly defined and differentiated from controls?			

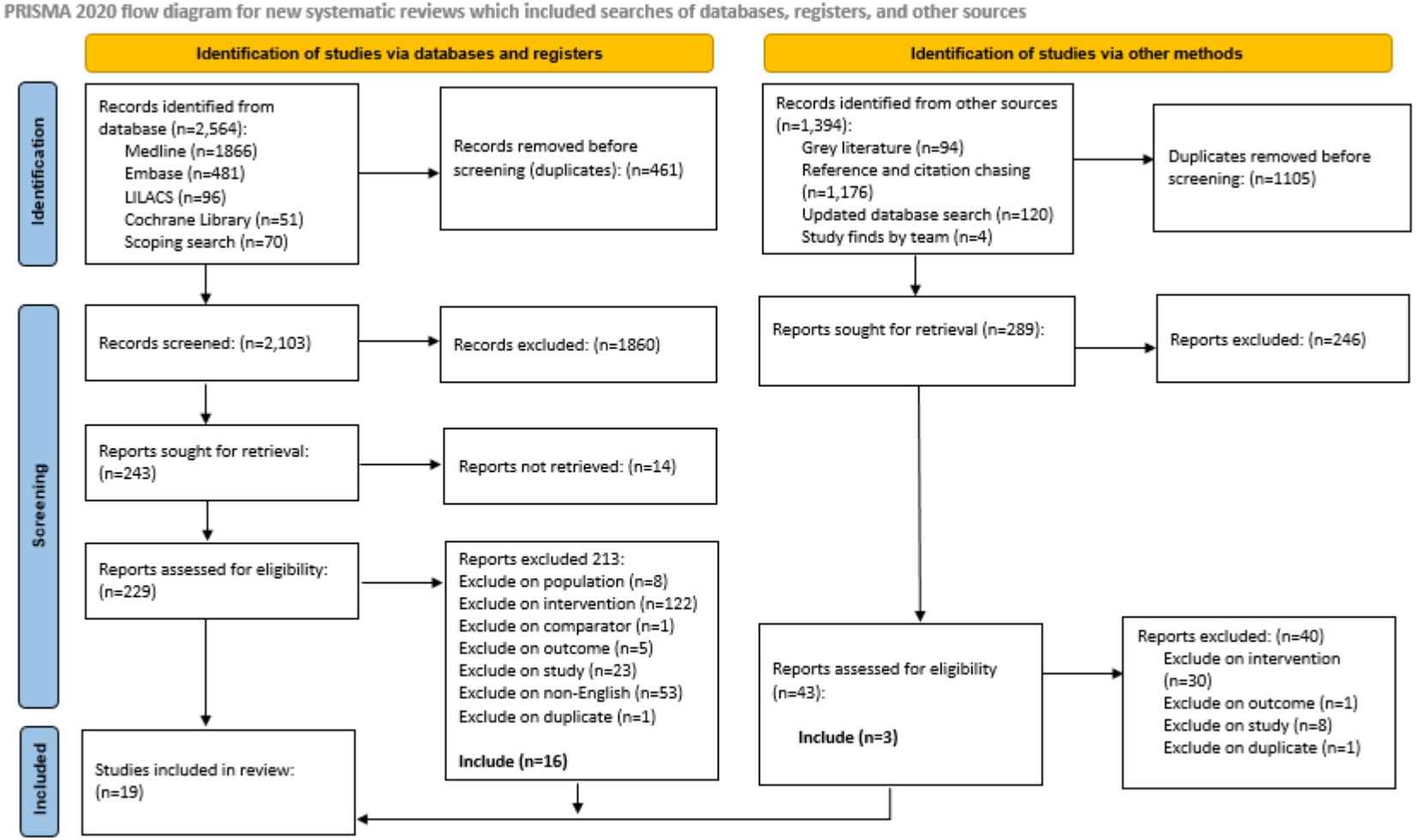
Questions NHLBI's quality assessment tool for observational case-control studies	Yes	No	Other*cannot decide, not reported, not applicable
For this question, reviewers looked for descriptions of the validity of case and control definitions and processes or tools used to identify study participants as such. Was a specific description of "case" and "control" provided? Is there a discussion of the validity of the case and control definitions and the processes or tools used to identify study participants as such? They determined if the tools or methods were accurate, reliable, and objective. For example, cases might be identified as "adult patients admitted to a VA hospital from January 1, 2000 to December 31, 2009, with an ICD-9 discharge diagnosis code of acute myocardial infarction and at least one of the two confirmatory findings in their medical records: at least 2mm of ST elevation changes in two or more ECG leads and an elevated troponin level. Investigators might also use ICD-9 or CPT codes to identify patients. All cases should be identified using the same methods. Unless the distinction between cases and controls is accurate and reliable, investigators cannot use study results to draw valid conclusions.			
7. If less than 100 percent of eligible cases and/or controls were selected for the study, were the cases and/or controls randomly selected from those eligible?			
If a case-control study did not use 100 percent of eligible cases and/or controls (e.g., not all disease-free participants were included as controls), did the authors indicate that random sampling was used to select controls? When it is possible to identify the source population fairly explicitly (e.g., in a nested case-control study, or in a registry-based study), then random sampling of controls is preferred. When investigators used consecutive sampling, which is frequently done for cases in prospective studies, then study participants are not considered randomly selected. In this case, the reviewers would answer "no" to Question 8. However, this would not be considered a fatal flaw. If investigators included all eligible cases and controls as study participants, then reviewers marked "NA" in the tool. If 100 percent of cases were included (e.g., NA for cases) but only 50 percent of eligible controls, then the response would be "yes" if the controls were randomly selected, and "no" if they were not. If this cannot be determined, the appropriate response is "CD."			
8. Was there use of concurrent controls?			
A concurrent control is a control selected at the time another person became a case, usually on the same day. This means that one or more controls are recruited or selected from the population without the outcome of interest at the time a case is diagnosed. Investigators can use this method in both prospective case-control studies and retrospective case-control studies. For example, in a retrospective study of adenocarcinoma of the colon using data from hospital records, if hospital records indicate that Person A was diagnosed with adenocarcinoma of the colon on June 22, 2002, then investigators would select one or more controls from the population of patients without adenocarcinoma of the			

Questions NHLBI's quality assessment tool for observational case-control studies	Yes	No	Other*cannot decide, not reported, not applicable
colon on that same day. This assumes they conducted the study retrospectively, using data from hospital records. The investigators could have also conducted this study using patient records from a cohort study, in which case it would be a nested case-control study. Investigators can use concurrent controls in the presence or absence of matching and vice versa. A study that uses matching does not necessarily mean that concurrent controls were used.			
9. Were the investigators able to confirm that the exposure/risk occurred prior to the development of the condition or event that defined a participant as a case?			
Investigators first determine case or control status (based on presence or absence of outcome of interest), and then assess exposure history of the case or control; therefore, reviewers ascertained that the exposure preceded the outcome. For example, if the investigators used tissue samples to determine exposure, did they collect them from patients prior to their diagnosis? If hospital records were used, did investigators verify that the date a patient was exposed (e.g., received medication for atherosclerosis) occurred prior to the date they became a case (e.g., was diagnosed with type 2 diabetes)? For an association between an exposure and an outcome to be considered causal, the exposure must have occurred prior to the outcome.			
10. Were the measures of exposure/risk clearly defined, valid, reliable, and implemented consistently (including the same time period) across all study participants?			
Were the exposure measures defined in detail? Were the tools or methods used to measure exposure accurate and reliable–for example, have they been validated or are they objective? This is important, as it influences confidence in the reported exposures. Equally important is whether the exposures were assessed in the same manner within groups and between groups. This question pertains to bias resulting from exposure misclassification (i.e., exposure ascertainment). For example, a retrospective self-report of dietary salt intake is not as valid and reliable as prospectively using a standardized dietary log plus testing participants' urine for sodium content because participants' retrospective recall of dietary salt intake may be inaccurate and result in misclassification of exposure status. Similarly, BP results from practices that use an established protocol for measuring BP would be considered more valid and reliable than results from practices that did not use standard protocols. A protocol may include using trained BP assessors, standardized equipment (e.g., the same BP device which has been tested and calibrated), and a standardized procedure (e.g., patient is seated for 5			

Questions NHLBI's quality assessment tool for observational case-control studies	Yes	No	Other*cannot decide, not reported, not applicable
minutes with feet flat on the floor, BP is taken twice in each arm, and all four measurements are averaged).			
11. Were the assessors of exposure/risk blinded to the case or control status of participants?			
Blinding or masking means that outcome assessors did not know whether participants were exposed or unexposed. To answer this question, reviewers examined articles for evidence that the outcome assesso s) was masked to the exposure status of the research participants. An outcome assessor, for example, may examine medical records to determine the outcomes that occurred in the exposed and comparison groups. Sometimes the person measuring the exposure is the same person conducting the outcome assessment. In this case, the outcome assessor would most likely not be blinded to exposure status. A reviewer would note such a finding in the comments section of the assessment tool. One way to ensure good blinding of exposure assessment is to have a separate committee, whose members have no information about the study participants' status as cases or controls, review research participants' records. To help answer the question above, reviewers determined if it was likely that the outcome assessor knew whether the study participant was a case or control. If it was unlikely, then the reviewers marked "no" to Question 12. Outcome assessors who used medical records to assess exposure should not have been directly involved in the study participants' care, since they probably would have known about their patients' conditions. If the medical records contained information on the patient's condition that identified him/her as a case (which is likely), that information would have had to be removed before the exposure assessors reviewed the records. If blinding was not possible, which sometimes happens, the reviewers marked "NA" in the assessment tool and explained the potential for bias.			
12. Were key potential confounding variables measured and adjusted statistically in the analyses? If matching was used, did the investigators account for matching during study analysis?			
Were key potential confounding variables measured and adjusted for, such as by statistical adjustment for baseline differences? Investigators often use logistic regression or other regression methods to account for the influence of variables not of interest. This is a key issue in case-controlled studies; statistical analyses need to control for potential confounders, in contrast to RCTs in which the randomization process controls for potential confounders. In the analysis, investigators need to control for all key factors that may be associated			

Questions NHLBI's quality assessment tool for observational case-control studies	Yes	No	Other*cannot decide, not reported, not applicable
with both the exposure of interest and the outcome and are not of interest to the research question. A study of the relationship between smoking and CVD events illustrates this point. Such a study needs to control for age, gender, and body weight; all are associated with smoking and CVD events. Well-done case-control studies control for multiple potential confounders. Matching is a technique used to improve study efficiency and control for known confounders. For example, in the study of smoking and CVD events, an investigator might identify cases that have had a heart attack or stroke and then select controls of similar age, gender, and body weight to the cases. For case-control studies, it is important that if matching was performed during the selection or recruitment process, the variables used as matching criteria (e.g., age, gender, race) should be controlled for in the analysis.			

7.6 Appendix F PRISMA flow diagram for Question 2A



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

7.7 Appendix G Periodontal health results

No papers examined periodontal disease

7.8 Appendix H Complete quality assessment scores

Table 37 National Heart, Lung, and Blood Institute's (NHLBI's) quality assessment scores for observational cohort and cross-sectional studies for Question 2A

Author	Year	Location	Study design	1*	2	3	4	5	6	7.	8	9	10	11	12	13	12	13	14
Williams and Zwemer	1990	USA	Cross-sectional survey	Yes	Yes	No	Yes	Not applicable	Cannot determine	Cannot determine	Yes	Yes	Yes	Not applicable	Yes	Not applicable	Cannot determine	Not applicable	Partial
Riordan	1993	Australia	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Not applicable	Cannot determine	Not applicable	Partial
Riordan	2002	Australia	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Not applicable	Cannot determine	Not applicable	Partial
Clark et al.	1994	Canada	Cross-sectional survey	No	Yes	No	Yes	No	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not applicable	Not applicable	Not reported	Not applicable	Partial
Clark et al.	1995	Canada	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Cannot determine	Yes	Cannot determine	Yes	Not applicable	Not applicable	Not applicable	Not reported	Not applicable	Partial
Clark et al.	2006	Canada	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not applicable	Not applicable	Not reported	Not applicable	Extensive
Rock and Sabieha	1997	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Cannot determine	Not applicable	Some
Kumar and Swango	1999	USA	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Cannot determine	Not applicable	Partial
Tabari et al.	2000	England, UK	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes	Not applicable	Yes	Not applicable	Some
Tiano et al.	2009	Brazil	Cross-sectional survey	Yes	Yes	Yes	Yes	No	Cannot determine	Cannot determine	Yes	Cannot determine	Yes	Not applicable	Not applicable	Not applicable	Not reported	Not applicable	None
de Moura et al.	2013	Brazil	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	No	Yes	Yes	Yes	Yes	No	Not applicable	Yes	Not applicable	Yes	Not applicable	Partial
Silva et al	2021	Brazil	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	No	Yes	Not applicable	Not applicable	Not reported	Not applicable	Partial

Bal et al.	2015	Australia	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Not applicable	Yes	Not applicable	Cannot determine	Not applicable	Some
James et al.	2021	Ireland	Cross-sectional survey	Yes	Yes	Cannot determine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	No	Not applicable	Partial
Marques et al.	2021	Brazil	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Cannot determine	Not applicable	Partial
McLaren et al.	2021	Canada	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Not applicable	Not applicable	Not applicable	Partial
Mohd Nor et al.	2021	Malaysia	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not applicable	Not applicable	Not applicable	Partial

*1. Research question stated

2. Study population clearly specified

3. Participation rate at least 50%

4.Subjects selected from the same population and inclusion and exclusion criteria prespecified

5. Sample size justification, power description, or variance and effect estimates provided

6. Exposure(s) of interest measured prior to outcome(s) measure

7.Timeframe sufficient to see an association between exposure and outcome

8. For exposures, study examine different levels of the exposure as related to the outcome

9. Exposure measures defined, valid, reliable, and consistently applied

10. Exposure(s) assessed more than once

11. Outcome measures defined, valid, reliable, and consistently applied: Caries

11. Outcome measures defined, valid, reliable, and consistently applied: Fluorosis

12.Outcome assessors blinded to the exposure status

13.Loss to follow-up 20% or less

14. Potential confounding exposures measured and adjusted statistically in outcomes

Table 38 National Heart, Lung, and Blood Institute's (NHLBI's) quality assessment scores for observational case-control studies for Question 2A

Study ID	Year	Country	1. Research question appropriate	2. Study population specified	3. Cases represent the cases in target population?	4. Sample size justification?	5. Controls selected from the same population	6. Definitions, inclusion and exclusion criteria for select cases and controls valid, reliable, and implemented consistently	7. Cases differentiated from controls	8. Cases and/or controls randomly selected or census	9. Use of concurrent controls	10. Confirm that the exposure/risk occurred prior to the condition or event	11.Measures of exposure clearly defined, valid, reliable, and implemented consistently	12. Assessors of exposure blinded	13. Potential confounding variables measured and adjusted statistically
Osujp et al.	1988	Canada	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Partial
Keller Celeste and Blaya Luz	2016	Brazil	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Some

For each paper reporting on a longitudinal cohort study, cross-sectional survey, or case-control study, the scores were summed (for a total score ranging from 0.0 to 5.0). Papers scoring less than 3.0 were rated 'low quality', papers scoring 3.0 were rated 'moderate quality', and papers scoring 3.5 or more were rated 'high quality'. As many studies were cross-sectional in nature (point-in-time surveys) and scored 0.0 on item 13 (loss to follow-up not applicable), the maximum possible score for papers reporting on these types of studies was effectively capped at 4.0; for this reason, the threshold for 'high quality' was set at 3.5, rather than 4.0, in order to allow more effective differentiation of papers at the upper end of the range of scores. We also report the quality deficiencies by low-, moderate- and high-quality papers.

7.9 Appendix I Feasibility assessment results

Table 39 Feasibility assessment to determine the validity of meta-analysis to determine the summary effect of exposure to CWF and fluoridated toothpaste during the first 6 years of life on the prevalence of mild to severe dental fluorosis

Study, year, country	Study design	Study population	CWF ppm (intervention)	Details of comparator	Outcome, measure, and cut offs	Statistical measure	Variance	Adjustment for confounding	Confounders	Study quality	Suitable for meta-analysis
Williams and Zwemer 1990 USA	Cross-sectional survey/census	12–14-year-old school children	CWF 0.9 to 1.2 ppm plus preschool fluoridated toothpaste	0.2 to 0.9 ppm plus fluoridated toothpaste	Dental fluorosis Tooth Surface Index of Fluorosis Single scores for each grade of fluorosis	Number and proportion reported for each score	No	Simple chi square texts and none were significant	Gender, race, preschool dietary patterns, preschool fluoridated toothpaste, swallowing toothpaste, and fluoride supplements	Low	No, due to type of comparator. In addition, the analysis does not investigate interactions between or control for confounding effects
Riordan 1993 Australia	Cross-sectional survey	Children born in 1983 (7 years of age)	Years exposed to CWF 0.8 ppm plus fluoridated toothpaste	Years exposed to CWF	Dental fluorosis Thylstrup and Fejerskov Index Scores 0–3	Adjusted OR and 95% CI	Yes	Logistic regression	Age of weaning, preschool fluoridated toothpaste, swallowing toothpaste, and supplements	Low	No, as the comparator is not comparable with other comparators. In addition, the analysis does not investigate interactions between or control for confounding effects
Rock and Sabieha 1997 England, UK	Cross-sectional survey	School children aged 8–9-year-old	CWF 1.0 ppm plus low, medium and high fluoride toothpaste	Comparisons within toothpaste	Dental fluorosis Modified Thylstrup and Fejerskov Index Scores 0–6 0 versus 1–6	Number and proportion reported for each score means and ranges for variables) by fluorosis status	Range	Interaction of paste weight and the type of brush, and brushing frequency and the occurrence of fluorosis	Regular or low fluoridated toothpaste and toothbrushing practices (age, toothpaste weight, times brushed teeth daily, fluoride in grammes ingested daily), and DMFT	Low	No, as the comparator is not comparable with other comparators. No adjusted statistical measures as interaction between significant tooth paste and brush variables

Kumar and Swango 1999 USA	Cross-sectional survey	School children with lifelong residency, aged 7–10-years and 11–14-years	CWF 1±0.2 ppm plus fluoridated toothpaste	Nonfluorinated water plus fluoride toothpaste	Dental fluorosis Dean's Index of Fluorosis Normal compared with questionable, very mild, and mild to severe	Adjusted mean DMFS (SD)	SD	Regression models to determine factors associated with fluorosis	Age, race, poverty level, education level of household head, fluoridated toothpaste use before 2 years of age, supplements during first 8 years, and sealants	Low	No as interactions between 3–4 variables in models
Tabari *et al.* 2000 England, UK	Cross-sectional survey	8–9-year-old school children who were lifetime residents in the area	CWF 1.0 ppm plus fluoride toothpaste	Less than 0.1 ppm plus fluoride toothpaste	Dental fluorosis Thylstrup and Fejerskov Index 0 compared with 1, 2, and 3+	OR and 95% CI	95% CI	Logistic regression model analysing the contribution of three variables to fluorosis— the area of residence (p <0.001), Jarman (deprivation) score (p =0.03), and type of toothpaste used (p =0.02) No interactions identified	Age started to brush Brushing frequency Amount of paste Toothpaste weight Toothpaste type Jarman score	Moderate	Yes
de Moura *et al.* 2013 Brazil	Cross-sectional survey	8–12-year-old children who were lifelong residents of Teresina	CWF (0.6–0.8 ppm) status ascertained plus fluoridated toothpaste and tooth brushing educational programme	CWF 0.6–0.8 ppm plus fluoridated toothpaste	Dental fluorosis Thylstrup and Fejerskov Index 0 versus 1–6	Adjusted ORs and 95% CI	95% CI	Logistic regression to determine what prevents fluorosis	Age matched Adjusted for education and gender Group 1: Toothpaste (F content of 1,000 ppm) and taught toothbrushing practices	Low	No, not measuring CWF and fluoride toothpaste but the effect of education on prevention of fluorosis
Bal *et al.* 2015 Australia	Cross-sectional survey	School children aged 7–11 years	CWF 1 ppm 64% had lifetime exposure to CWF Fluoridated toothpastes, supplements, mouth rinses, and fluoride gel; Tooth brushing practices and age at exposure to	Control region (fluoridated at 1 ppm since 1967/9)	Dental fluorosis Dean's index of fluorosis Normal and questionable compared very mild to severe	Adjusted ORs and 95% CIs	95% CI	Logistic regression to determine what prevents fluorosis	Five of 58 variables were significant: frequency of toothbrushing, rinsing habit after brushing, eating or licking toothpaste (these behaviours relate to when toothbrushing commenced as a	Low	No, as interactions present. Exposure to fluoridated water and water from various sources used for reconstitution of infant formula were highly

			each fluoride intervention						habit), exposure to fluoridated water, and type of water used for the reconstitution of infant formula Exposure to fluoridated water and water from various sources used for reconstitution of infant formula were highly correlated variables		correlated variables
Celeste and Luz 2016 Brazil	Matched case-control study	12-year-old schoolchildren	CWF 0.6–0.8 ppm Tooth brushing practices and age at exposure to each fluoride intervention. Swallowing toothpaste	Not applicable Cases had fluorosis and controls had no fluorosis	Dental fluorosis Dean's index of fluorosis Fluorosis cases versus no fluorosis controls	Adjusted ORs and 95% CIs	95% CIs	Matched by sex and school case control study Conditional logistic regression to identify exposures in exposure cases Significant interaction between eating toothpaste, amount applied to brush, and size of toothbrush	Toothpastes, toothbrushing habits, supplements, mouth rinses, and fluoride gel.	Low	No as different study design and low quality
James *et al.* 2021 Ireland	Cross-sectional survey	Random sample of 5-year-old schoolchildren in Dublin & Cork-Kerry in 2014, follow up at age 8 years in 2017	Reduced fluoride in CWF from 0.8–1 ppm in 2007 to 0.6–0.8 ppm since; plus fluoridated toothpaste and guidance	0.2 ppm in rural Cork-Kerry with fluoride deficient water ; plus fluoridated toothpaste and guidance	Dental fluorosis Thylstrup and Fejerskov Index Normal and questionable versus very mild or higher	Not applicable	Not applicable	No significant findings for fluorosis outcome	National tooth brushing guidance in Urban Cork, Kerry and Dublin (since 2002)	High	No as not all data available No significant findings but no table informing us what was tested

Marques *et al.* 2021 Brazil	Cross-sectional survey	High school students from 17 to 20 years of age, enrolled in public schools	Fluoridated toothpaste assumed plus CWF 0.6–0.8 ppm,	Fluoridated toothpaste assumed and fluoride deficient areas of Teresina	Dental fluorosis Thylstrup and Fejerskov Index Score 0 (absent) compared with scores 1 and 2 (very mild), scores 3 and 4 (moderate), and scores 5–9 (severe)	Adjusted ORs and 95% CIs	95% CIs	In the final multivariate model, students exposed to fluoridated water were more likely to have very mild/mild fluorosis (OR 2.26; 95% CI 1.54–3.32) and moderate fluorosis (OR 3.66; 95% CI 1.93–6.95), than those who were not exposed. The odds of moderate fluorosis were 2.01 times higher in males than females	Model adjusted toothache, treatment need, how long since last appointment (years) and last appointment reason. Tooth brushing practices asked about.	High	No as measuring the additional influence of CWF over toothpaste on diagnosis of fluorosis, rather than the other way round

8 Appendices Question 2B

8.1 Appendix A Search Question 2B

Please see 7.1 for the search strategies and resources used in retrieving evidence for 2B. The same search results were used for both questions and a different screening code was utilised in screening the evidence. See Table 28 for a summary of search results for Q2B.

8.2 Appendix B PRISMA checklist and PRISMA-S for Question 2B

8.2.1 PRISMA checklist for Question 2B

Topic	Item	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title page
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Executive summary
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Section 1.1.4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Section 1.2
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Sections 2.3.1, 2.3.2, and 2.3.3
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Sections 2.4 and 2.5
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix A of Section 8, Sections 2.4 and 2.5
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Section 2.6**Error! Reference source not found.**
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Section 2.7

Topic	Item	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Sections 2.3.2, Table 3
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Sections 2.7.1
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Section 2.8
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Section 2.9.1
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Section 2.9.2
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Section 2.9.3
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Section 2.9.2 and 2.9.3
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Section 2.9.3
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Section 2.9.3
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Section 2.9.3
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Section 2.9.2 and 2.9.3

Topic	Item	Checklist item	Location where item is reported
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Section 2.10
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Section 3.3, Appendix F of Section 8.6
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Appendix C of Section
Study characteristics	17	Cite each included study and present its characteristics.	Section 3.3.2, Table 48
Risk of bias in studies	18	Present assessments of risk of bias [and/or quaity assessment] for each included study.	Section 3.3.3, Tables 49 and 50, Appendix H of Section 8
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Section 3.3.4
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Section 3.3.3, Appendix H of Section 8
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Section 3.3.4.1.4, 3.3.4.1.5, 3.3.4.2.3 and 3.3.4.2.4
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Sections 3.3.4.1.4 and 3.3.4.2.4
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Not applicable
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Not applicable as mainly cross section surveys

Topic	Item	Checklist item	Location where item is reported
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Section 3.3.4.1.6 and 3.3.4.2.5
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Sections 4.1 and 4.2
	23b	Discuss any limitations of the evidence included in the review.	Section 4.3
	23c	Discuss any limitations of the review processes used.	Section 4.3
	23d	Discuss implications of the results for practice, policy, and future research.	Sections 4.4 and 4.5
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Section 2.3.2
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Section 2.3.2
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Section 2.3.2
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Not applicable as all authors are salaried public servants who are funded from the DOH public funding and are obliged to be objective
Competing interests	26	Declare any competing interests of review authors.	None
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Appendix D and E of Setion 8

Source: Page *et al.* (2021)[1]

8.2.2 PRISMA-S Q 2 A and B

Section/topic	#	Checklist item	Location(s) Reported
INFORMATION SOURCES AND METHODS			
Database name	1	Name each individual database searched, stating the platform for each.	Sections 2.4.4 and 2.5
Multi-database searching	2	If databases were searched simultaneously on a single platform, state the name of the platform, listing all of the databases searched.	n/a
Study registries	3	List any study registries searched.	Sections 2.4 and 2.5
Online resources and browsing	4	Describe any online or print source purposefully searched or browsed (e.g., tables of contents, print conference proceedings, web sites), and how this was done.	Sections 2.4.5, 2.4.6
Citation searching	5	Indicate whether cited references or citing references were examined, and describe any methods used for locating cited/citing references (e.g., browsing reference lists, using a citation index, setting up email alerts for references citing included studies).	Section 2.4.5
Contacts	6	Indicate whether additional studies or data were sought by contacting authors, experts, manufacturers, or others.	n/a
Other methods	7	Describe any additional information sources or search methods used.	n/a
SEARCH STRATEGIES			
Full search strategies	8	Include the search strategies for each database and information source, copied and pasted exactly as run.	Appendix A of Section 7
Limits and restrictions	9	Specify that no limits were used, or describe any limits or restrictions applied to a search (e.g., date or time period, language, study design) and provide justification for their use.	Sections 2.5 and Appendix A of Section 7
Search filters	10	Indicate whether published search filters were used (as originally designed or modified), and if so, cite the filter(s) used.	n/a
Prior work	11	Indicate when search strategies from other literature reviews were adapted or reused for a substantive part or all of the search, citing the previous review(s).	n/a

Updates	12	Report the methods used to update the search(es) (e.g., rerunning searches, email alerts).	Appendix A of Section 7
Dates of searches	13	For each search strategy, provide the date when the last search occurred.	Appendix A of Section 7
PEER REVIEW			
Peer review	14	Describe any search peer review process.	Section 2.4.3
MANAGING RECORDS			
Total Records	15	Document the total number of records identified from each database and other information sources.	Appendix A of Section 7
Deduplication	16	Describe the processes and any software used to deduplicate records from multiple database searches and other information sources.	Section 2.4.4

PRISMA-S: An Extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews

Rethlefsen ML, Kirtley S, Waffenschmidt S, Ayala AP, Moher D, Page MJ, Koffel JB, PRISMA-S Group.

Last updated February 27, 2020.

8.3 Appendix C Studies excluded at full text and extraction screening stages

8.3.1 Exclude on population

Exclude on population (n=19)
Bagramian RA. A 5-year school-based comprehensive preventive program in Michigan, U.S.A. *Community Dent Oral Epidemiol* 1982;10:234–7. doi:10.1111/j.1600-0528.1982.tb00385.x
Bagramian RA, Graves RC, Bhat M. A combined approach to preventing dental caries in schoolchildren: caries reductions after one year. *J Am Dent Assoc* 1976;93:1014–9. doi:10.14219/jada.archive.1976.0032
Brunelle JA, Carlos JP. Recent trends in dental caries in U.S. children and the effect of water fluoridation. *J Dent Res* 1990;69 Spec No:723–7; discussion 820-823. doi:10.1177/00220345900690S141
Chattopadhyay A, Arevalo O, Cecil JC. Kentucky's oral health indicators and progress towards Healthy People 2010 objectives. *J Ky Med Assoc* 2008;106:165–74.
de Sousa M da LR, Wagner M, Sheiham A. Caries reductions related to the use of fluorides: a retrospective cohort study. *Int Dent J* 2002;52:315–20. doi:10.1002/j.1875-595x.2002.tb00877.x
Devoto FC, Bordoni NE, De Manfredi CF. Dental caries in deciduous teeth of nineteenth century Araucanians. *J Dent Res* 1968;47:571–4. doi:10.1177/00220345680470040901
Driscoll WS, Swango PA, Horowitz AM, *et al.* Caries-preventive effects of daily and weekly fluoride mouthrinsing in an optimally fluoridated community: findings after eighteen months. *Pediatr Dent* 1981;3:316–20.
Duangthip D, Chu CH, Lo ECM. A randomized clinical trial on arresting dentine caries in preschool children by topical fluorides--18 month results. *J Dent* 2016;44:57–63. doi:10.1016/j.jdent.2015.05.006
Edelstein BL, Hirsch G, Frosh M, *et al.* Reducing early childhood caries in a Medicaid population: a systems model analysis. *J Am Dent Assoc* 2015;146:224–32. doi:10.1016/j.adaj.2014.12.024
Englander HR, Sherrill LT, Miller BG, *et al.* Incremental rates of dental caries after repeated topical sodium fluoride applications in children with lifelong consumption of fluoridated water. *J Am Dent Assoc* 1971;82:354–8. doi:10.14219/jada.archive.1971.0042
Hausen H, Heinonen OP, Paunio I. Fluoride exposure combinations and caries in permanent dentition among Finnish children. *Community Dent Oral Epidemiol* 1981;9:108–11. doi:10.1111/j.1600-0528.1981.tb01039.x
Klein SP, Bohannan HM, Bell RM, *et al.* The cost and effectiveness of school-based preventive dental care. *Am J Public Health* 1985;75:382–91. doi:10.2105/ajph.75.4.382
Mellberg JR, Franchi GJ, Englander HR, *et al.* Short intensive topical APF applications and dental caries in a fluoridated area. *Community Dent Oral Epidemiol* 1978;6:117–20. doi:10.1111/j.1600-0528.1978.tb01133.x
Pereira AC, Pardi V, Mialhe FL, *et al.* A 3-year clinical evaluation of glass-ionomer cements used as fissure sealants. *Am J Dent* 2003;16:23–7.
Radike AW, Gish CW, Peterson JK, *et al.* Clinical Evaluation of Stannous Fluoride as an Anticaries Mouthrinse. *The Journal of the American Dental Association* 1973;86:404–8. doi:10.14219/jada.archive.1973.0061
Seppä L, Hausen H, Luoma H. Relationship between caries and fluoride uptake by enamel from two fluoride varnishes in a community with fluoridated water. *Caries Res* 1982;16:404–12. doi:10.1159/000260627
Smallridge J, Wills AK, Mahmoud O, *et al.* Centre-level variation in dental treatment and oral health and individual- and area-level predictors of oral health in 5-year-old children with non-syndromic unilateral

Exclude on population (n=19)
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8.4 Appendix D Extraction form

Table 40 General information data form

Study ID *From Eppi*	**Author** *First author*	**Year** *Of publication*	**Location** *Country*	**Area** *State/County/City/Town*	**Objective** *Aim of study*	**Secondary publication** *Data will not be extracted unless additional endpoints*	**Associated papers** *Same overall project different analysis*	**Study design** *HRB decision*	**Participant age** *Mean or ranges described in study*	**Artificial fluoridation** *Confirm if explicitly stated (Y/N)*	**Fluoride interventions**	**Outcome** *Oral health outcome assessed*	**Outcome details** *Including method of measurement*	**Extracted**	**Validated**

Table 41 Study design data form

Study ID	Author	Year	Study design (Author allocated)	Study design (HRB allocated)	Justification	Length of study	Length of exposure to CWF	Details of exposure	Details of comparator	Eligibility criteria	Sample size calculation	Response rate	Blinding of assessors to exposure	% Lost to follow-up	Method for handling missing data	Data collection	Confounders	Control for confounding	Identification of effect modification	Effect modifiers	Notes
From Eppi	*First author*	*Of publication*	*As stated in the study*	*As agreed by research team*			*Length of time exposed to community water fluoridation*	*Including dose*	*Including dose*		*expected prevalence, power to detect a difference and allowed variance, results CIs calculated*			*For main analysis*	*e.g. last observation carried forward*	*Brief description*			*Yes or not reported*		

Table 42 Study participants data form

Study ID	Author	Year	Group for characteristics	N	Mean age/Age range	% Female	N included in final analysis
From Eppi	*First author*	*Of publication*		*Enrolled*			

Table 43 Outcomes

Of publication	Outcome of interest: Caries	% caries primary teeth	% caries free primary teeth	% caries permanent teeth	% caries free permanent teeth	dmft/deft	dmfs/defs	DMFT	DMFS	Method of caries identification	Clinical examination criteria	Outcome of interest: Fluorosis	Fluorosis (Dean's index)	Fluorosis (Thylstrup-Fejerskov index)	Tooth Surfaces Index of Fluorosis	Type of teeth examined for fluorosis	Hypo mineralisation by photographs

Table 44 Caries outcome data form using example of primary dentition dmft

Country	Author	Year	Age in years	CWF ppm	Baseline dmft CWF	Baseline CWF SD	Baseline CWF Total	Final dmft CWF	Final dmft SD CWF	Final CWF Total	Fluoride deficient ppm	Baseline mean dmft No F	Baseline SD No F	Baseline CWF Total	Final dmft No F	Final SD No F	Final No F Total	Difference in % point or dmft

This table was repeated for dmfs, % with CDC, and % without CDC for primary dentition. The table was also repeated for DMFT, DFMS, % with CDC, and % without CDC for permanent dentition

Table 45 Fluorosis outcome data form

Country	Author	Year	Age in years	CWF ppm	Baseline % fluorosis	Baseline 95% CI	Baseline CWF affected number	Baseline CWF Total	Final % fluorosis	Final 95% CI	Final CWF affected number	Final CWF Total	Baseline 5 fluorosis No F	Baseline 95% CI No F	Baseline affected number No F	Baseline CWF Total	Final % No F	Final 95%CI No F	Final affected number No F	Final No F Total	Difference in % point or dmft

8.5 Appendix E Quality assessment tools

See 6.5 in Section 6.5 National Heart, Lung, and Blood Institute's (NHLBI's) quality assessment tool for observational cohort studies and cross-sectional surveys

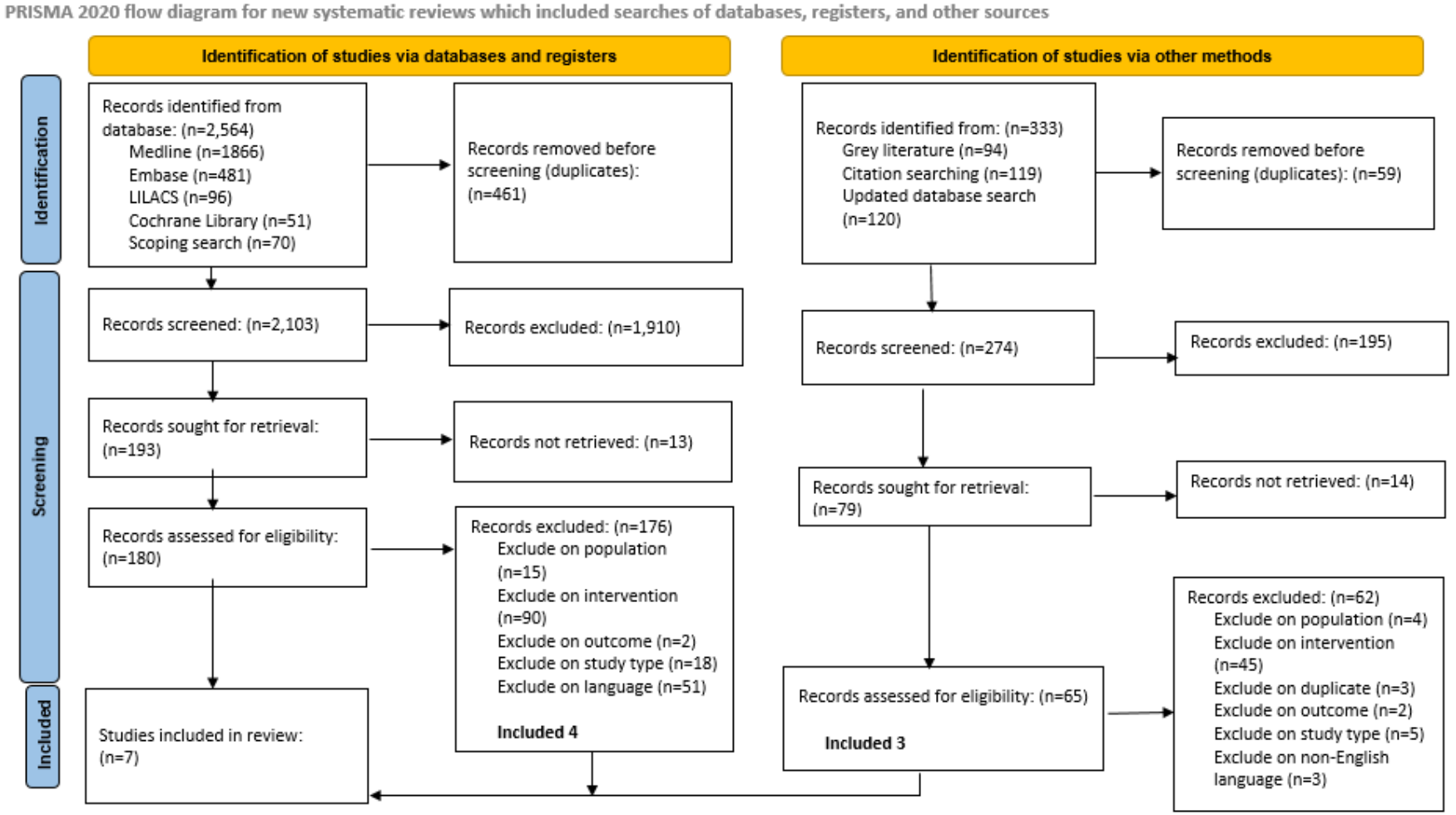
Table 46 Bias domains included in version 2 of the Cochrane risk-of-bias tool for randomized trials for Question 2B

Bias domain	Issues addressed*
Bias arising from the randomisation process	Whether: 1. The allocation sequence was random 2. The allocation sequence was adequately concealed, and 3. Baseline differences between intervention groups suggest a problem with the randomisation process.
Bias due to deviations from intended interventions	Whether: 4. Participants were aware of their assigned intervention during the trial 5. Carers and people delivering the interventions were aware of participants' assigned intervention during the trial 6. Deviations from the intended intervention arose because of the experimental context (i.e. do not reflect usual practice); and, if so, whether they were unbalanced between groups and likely to have affected the outcome 7. An appropriate analysis was used to estimate the effect of assignment to intervention, and, if not, whether there was potential for a substantial impact on the result 8. Important non-protocol interventions were balanced across intervention groups 9. Failures in implementing the intervention could have affected the outcome 10. Study participants adhered to the assigned intervention regimen, and 11. An appropriate analysis was used to estimate the effect of adhering to the intervention.
Bias due to missing outcome data	Whether: 12. Data for this outcome were available for all, or nearly all, participants randomised 13. Evidence that the result was not biased by missing outcome data, and 14. Missingness in the outcome was likely to depend on its true value (e.g. the proportions of missing outcome data, or reasons for missing outcome data, differ between intervention groups).
Bias in measurement of the outcome	Whether: 15. Method of measuring the outcome was inappropriate 16. Measurement or ascertainment of the outcome could have differed between intervention groups 17. Outcome assessors were aware of the intervention received by study participants, and

Bias domain	Issues addressed*
	18. Assessment of the outcome was likely to have been influenced by knowledge of intervention received.
Bias in selection of the reported result	Whether: 19. Trial was analysed in accordance with a pre-specified plan that was finalised before unblinded outcome data were available for analysis 20. Numerical result being assessed is likely to have been selected, on the basis of the results, from multiple outcome measurements within the outcome domain, and 21. Numerical result being assessed is likely to have been selected, on the basis of the results, from multiple analyses of the data.

Adapted from [9]

8.6 Appendix F PRISMA flow diagram



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

8.7 Appendix G Periodontal health results

No papers examined periodontal disease

8.8 Appendix H Complete quality assessment scores for Question 2B

Table 47 National Heart, Lung, and Blood Institute's (NHLBI's) quality assessment scores for observational cohort and cross-sectional studies for Question 2B

Author	Year	Location	Study design	1*	2	3	4	5	6	7	8	9	10	11 Caries	11 Fluorosis	12	13	14
Szpunar and Burt	1988	USA	Cross-sectional survey	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Not applicable	Partial
Maupomé et al.	2001	Canada	Retrospective/prospective cohort study	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Not reported	Yes	Not applicable	No	No	Partial
Clark et al.	2006	Canada	Cross-sectional survey	No	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Cannot determine	Not applicable	Yes	Not applicable	Not applicable	Not applicable	Partial
McLaren et al.	2021	Canada	Cross-sectional survey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cannot determine	Yes	Yes	Not applicable	Not applicable	Not applicable	Partial
Bal et al.	2015	Australia	Cross-sectional survey	No	Yes	Yes	Yes	No	Yes	Yes	Not applicable	Yes	Not reported	Not applicable	Yes	Not reported	Not applicable	Partial

*1. Research question stated

2. Study population clearly specified

3. Participation rate at least 50%

4.Subjects selected from the same population and inclusion and exclusion criteria prespecified

5. Sample size justification, power description, or variance and effect estimates provided

6. Exposure(s) of interest measured prior to outcome(s) measure

7.Timeframe sufficient to see an association between exposure and outcome

8. For exposures, study examine different levels of the exposure as related to the outcome

9. Exposure measures defined, valid, reliable, and consistently applied

10. Exposure(s) assessed more than once

11. Outcome measures defined, valid, reliable, and consistently applied: Caries

11. Outcome measures defined, valid, reliable, and consistently applied: Fluorosis

12.Outcome assessors blinded to the exposure status

13.Loss to follow-up 20% or less

14. Potential confounding exposures measured and adjusted statistically in outcomes

For each paper reporting on a longitudinal cohort study, cross-sectional survey, or case-control study, the scores were summed (for a total score ranging from 0.0 to 5.0). Papers scoring less than 3.0 were rated 'low quality', papers scoring 3.0 were rated 'moderate quality', and papers scoring 3.5 or more were rated 'high quality'. As many studies were cross-sectional in nature (point-in-time surveys) and scored 0.0 on item 13 (loss to follow-up not applicable), the maximum possible score for papers reporting on these types of studies was effectively capped at 4.0; for this reason, the threshold for 'high quality' was set at 3.5, rather than 4.0, in order to allow more effective differentiation of papers at the upper end of the range of scores. We also report the quality deficiencies by low-, moderate- and high-quality papers.

Table 48 RoB2 scores for randomised controlled trials included in Question 2B

Country	Author	Year	Study design	Randomisation	Effect of assignment	Effect of adherence	Missing outcome data	Measurement of outcomes	Reported results	Overall ROB score
Hong Kong	Jiang et al.	2014	Randomised controlled trial	Low	Some concerns		Low	Low	Some concerns	Some concerns
Hong Kong	Lam et al.	2021	Randomised controlled trial	Low	Low	Low	Low	Some concerns	Low	Some concerns

9 Appendices Question 3

9.1 Appendix A Q3 Search

Top level guidance from countries specified in the 087 protocol Australia, New Zealand, UK, Canada, Israel, USA, South American countries, EU countries. Community fluoridation countries only

Targeted searches for fluoridation guidance

Search date: 16 February 2022 and updated 9 February 2023

Browser: Firefox 97.0

Table 49 Organisational websites searched for Q3.

Country	Website	URL
Australia	Australian Institute of Health and Welfare	https://www.aihw.gov.au/
	Australian Dental Association	https://www.ada.org.au
	Government of Australia Department of Health	https://www.health.gov.au
	Australian Dental Association oral health information	https://www.teeth.org.au/
	Australian Government National Health and Medical Research Council (NMHRC)	https://www.nhmrc.gov.au/
	Australian Dental and Oral Health Therapists Association	https://www.adohta.net.au/
	Safe Work Australia	https://www.safeworkaustralia.gov.au/
	Royal Australian College of General Practitioners	https://www.racgp.org.au/
	Health Direct (public health site)	https://www.healthdirect.gov.au/
	Australian Research Centre for Population Oral Health	https://www.adelaide.edu.au/arcpoh/
Brazil	Governo de Brasil	https://www.gov.br/
	Governo de Brasil Ministério de Saúde	https://www.gov.br/saude/pt-br
	Ministério de Saúde. Secretaria de Atenção Primária à Saúde	https://aps.saude.gov.br
	Latin American Oral Health Association	https://laoha.org.br/
	Pan American Health Organization Repository	https://iris.paho.org
Canada	Health Canada	https://www.canada.ca/en/health-canada.html

Country	Website	URL
	Canadian Dental Association	https://www.cda-adc.ca/
	CPG Infobase: Clinical Practice Guidelines	https://joulecma.ca/cpg/homepage
	Canadian Paediatric Society	https://cps.ca
	The Canadian Task Force on Preventive Health Care	https://canadiantaskforce.ca/
	One Health Canada	https://www.onehealth.ca/
	Canadian Association of Public Health Dentistry	https://caphd.ca/
	Dental Hygiene Canada	https://www.dentalhygienecanada.ca/ https://www.dentalhygienecanada.ca/cdha/The_Profession_folder/Resources_folder/Position_Papers_Statements__Standards_folder/CDHA/The_Profession/Resources/Position_Statements.aspx
	Canadian Medical Association	https://www.cma.ca/
	Canadian Foundation for Dental Hygiene Research and Education	https://www.cfdhre.ca/
	Canadian Institute for Health Information	https://www.cihi.ca/en
Israel	State of Israel Department of Health	https://www.health.gov.il
	Israel Dental Association	https://www.ida.org.il/
	State of Israel Government	https://www.gov.il/
	Israeli Association of Pediatrics	https://pediatrics.doctorsonly.co.il/ (full access not allowed)
	The Israel National Institute for Health Policy Research	http://www.israelhpr.org.il/en/
New Zealand	New Zealand Ministry of Health	https://www.health.govt.nz/
	New Zealand Dental Association	https://www.nzda.org.nz/
	Office of the Prime Minister's Chief Science Officer	https://www.pmcsa.ac.nz
	Dental Council	https://www.dcnz.org.nz/
	Dental Council Practice Standards	https://www.dcnz.org.nz/resources-and-publications/resources/practice-standards/
United Kingdom	Gov.uk	https://www.gov.uk/

Country	Website	URL
	NICE	https://www.nice.org.uk/
	NHS UK	https://www.nhs.uk
	British Dental Association	https://bda.org/
	British Society of Paediatric Dentistry	https://www.bspd.co.uk/
	British Society of Paediatric Dentistry Guidelines and Evidence Reviews	https://www.bspd.co.uk/Professionals/Resources/Clinical-Guidelines-and-Evidence-Reviews
	Royal College of Surgeons of England Faculty of Dental Surgery	https://www.rcseng.ac.uk/dental-faculties/fds
	British National Formulary	https://bnf.nice.org.uk
	College of General Dentistry (including Faculty of General Dental Practice)	https://cgdent.uk/
	British Association for the Study of Community Dentistry	https://www.bascd.org/
	Scottish Dental	https://www.scottishdental.org
	Scottish Government	https://www.gov.scot
	Public Health Scotland	https://publichealthscotland.scot/
	Health Scotland [now Public Health Scotland]	http://www.healthscotland.com
	National Services Scotland Information Services Division [now Public Health Scotland]	https://www.isdscotland.org/
	Public Health Information for Scotland	https://www.scotpho.org.uk/
	ChildSmile	http://www.child-smile.org.uk/
	Scottish Dental: information portal	https://www.scottishdental.org/
	Scottish Intercollegiate Guideline Network	https://www.sign.ac.uk/
	Scottish Dental Clinical Effectiveness programme	https://www.sdcep.org.uk/
	SIGN	https://www.sign.ac.uk/
	Welsh Government	https://gov.wales/
	NHS Public Health Wales	https://phw.nhs.wales
	NHS 111 Wales	https://111.wales.nhs.uk/
	Welsh Oral Health Information Unit	https://www.cardiff.ac.uk/research/explore/research-units/welsh-oral-health-information-unit

Country	Website	URL
	Department of Health Northern Ireland	https://www.health-ni.gov.uk/
	Department of Health Northern Ireland Professional dental guidance publications	https://www.health-ni.gov.uk/publications/professional-dental-guidance-publications
	HSC Public Health Agency	https://www.publichealth.hscni.net/
	NI Direct	https://www.nidirect.gov.uk/
	Health Service Executive for Northern Ireland	https://www.hseni.gov.uk/
United States	American Dental Association	https://www.ada.org/
	American Academy of Pediatric Dentistry (AAPD)	https://www.aapd.org/
	My Children's Teeth (an information portal by the American Association of Pediatric Dentistry)	https://www.mychildrensteeth.org/
	Centers for Disease Control and Prevention	https://www.cdc.gov/
	American Public Health Association	https://apha.org/
	US Preventive Service Task Force	https://www.uspreventiveservicestaskforce.org/uspstf/
	Agency for Healthcare Research and Quality (AHRQ)	https://www.ahrq.gov/
	U.S. Department of Health & Human Services (HHS)	https://www.hhs.gov/
	American Academy of Pediatrics (AAP)	https://www.aap.org/
	American Academy of Pediatrics: Oral health practice tools	https://www.aap.org/en/patient-care/oral-health/oral-health-practice-tools/
	American Association of Public Health Dentistry	https://www.aaphd.org/
	American Dietetics Association	https://www.eatright.org/
General & international guidelines	Guidelines International Network (GIN)	https://guidelines.ebmportal.com/
	Guideline Central	https://www.guidelinecentral.com/guidelines/
	TRIP: Turning Research into Practice	https://www.tripdatabase.com/

Country	Website	URL
	European Academy of Paediatric Dentistry (EAPD)	https://www.eapd.eu/
	International Association of Paediatric Dentistry (IAPD)	https://iapdworld.org/
	FDI World Dental Federation	https://www.fdiworlddental.org/
	World Health Organization (WHO)	https://www.who.int/
	Health Services/Technology Assessment Texts (HSTAT)	https://www.ncbi.nlm.nih.gov/books/NBK16710/
Databases and search engines	General: EBSCO MEDLINE Complete	PT "Guideline+") OR (MH "Guidelines as Topic+")) OR ((TI (guideline OR guidelines OR guidance OR standards OR "white paper" OR "policy statement" OR "best practice"))) OR ((MW (guideline OR guidelines OR guidance OR standards OR "white paper" OR "policy statement" OR "best practice"))) AND (MH "Fluorides") OR (MH "Fluorides, Topical") OR ((TI (fluoride OR "oral health" OR caries OR tooth OR teeth OR "dental health" OR dentist* OR toothpaste OR dentifrice OR varnish* OR sealant*)) OR ((AB (fluoride OR "oral health" OR caries OR tooth OR teeth OR "dental health" OR dentist* OR toothpaste OR dentifrice OR varnish* OR sealant*)) AND TI (boy# OR boyfrien* OR boyhood* OR child* OR fifth-grader* OR first-grader* OR fourth-grader* OR girl# OR girlfriend* OR girlhood* OR juvenil* OR kid# OR kindergarten* OR minor# OR minority OR paediatric* OR peadiatric* OR pediatric* OR PICU OR preschool* OR pre-school* OR second-grader* OR seventh-grader* OR sixth-grader* OR stepchild* OR step-child* OR third-grader* OR toddler# OR young OR youngster* OR youth*) OR AB (boy# OR boyfrien* OR boyhood* OR child* OR fifth-grader* OR first-grader* OR fourth-grader* OR girl# OR girlfriend* OR girlhood* OR juvenil* OR kid# OR kindergarten* OR minor# OR minority OR paediatric* OR peadiatric* OR pediatric* OR PICU OR preschool* OR pre-school* OR

Country	Website	URL
		second-grader* OR seventh-grader* OR sixth-grader* OR stepchild* OR step-child* OR third-grader* OR toddler# OR young OR youngster* OR youth*) OR MH ("Child" OR "Child, Preschool") AND limit to 2009-2023
	General: Google.com	Fluoride/fluoridation/ toothpaste/varnish/dentifrice/sealant Dental/dentist/teeth/tooth Guidance/guide/guideline/summary/position statement/white paper
	General: Google Scholar	Fluoride/fluoridation/ toothpaste/varnish/dentifrice/sealant Dental/dentist/teeth/tooth Guidance/guide/guideline/summary/position statement/white paper
	Virtual Health Library (VHL) Regional Portal https://bvsalud.org/en/	Fluor*

10 GRADE scores and justifications

Table 50 GRADE scores and justifications for the primary dentition dental caries studies

Outcome and number of studies*	Study design score	Study design justification	Participants numbers (High quality, moderate quality studies)	Risk of bias	Risk of bias justification	Inconsistency of results	Inconsistency of results justification	Indirectness	Indirectness justification	Imprecision	Imprecision justification	Publication bias	Publication bias justification	Final score†	Certainty of the evidence
Primary dentition – dental caries															
dmft (single time point) - 18 studies (excludes 3 outliers)	-5	Majority cross-sectional surveys (1 cohort study)	All 20782 High (H) 3521 Moderate (M) 13231 (64%) Low (L) 4030 (19%)	-2	≥ 75% participants in moderate or low quality studies	-2	Heterogeneity = 97.1%	0	PICO framework was carefully designed to ensure relevance of included studies	0	Narrow CI, good sample size	0	Our search was comprehensive, findings are largely in favour of intervention	-9	Very low
dmft (two time points) - 5 studies	-5	Cross-sectional surveys	All 3225 H 912 M 1912 (59%) L 401 (12%)	-1	< 75% participants in moderate or low quality studies	-2	Heterogeneity based on single time point MA, inconsistent findings between studies	0	PICO framework was carefully designed to ensure relevance of included studies	-1	No CI available, some imprecision assumed	0	Our search was comprehensive, findings are largely in favour of intervention	-9	Very low
dmfs (single time point) - 6 studies (excludes 1 outlier)	-5	Cross-sectional surveys	All 3687 H 0 M 1933 (52%) L 1754 (48%)	-2	≥ 75% participants in moderate or low quality studies	-2	Heterogeneity = 92.6%	0	PICO framework was carefully designed to ensure relevance of included studies	0	Narrow CI	0	Our search was comprehensive, findings are largely in favour of intervention	-9	Very low

dmfs (two time points) - 0 studies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
% without CDC in primary dentition (single time point) - 4 studies	-5	Cross-sectional survey	All 14582 H 912 642 (4%) 13028 (89%)	-2	≥ 75% participants in moderate or low quality studies	-2	84.0%	0	PICO framework was carefully designed to ensure relevance of included studies	0	Narrow CI	0	Our search was comprehensive, findings are largely in favour of intervention	-9	Very low
% without CDC in primary dentition (two time points) - 1 study	-5	Cross-sectional survey	All 3509 H 0 M 1166 (33%) L 2343 (67%)	-2	≥ 75% participants in moderate or low quality studies	0	Results based on a single study, reported by the authors to be statistically significant in favour of intervention	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Wide CI at both time points	0	Our search was comprehensive, findings are largely in favour of intervention	-8	Very low
% with CDC in primary dentition (single time point) - 4 studies	-5	Cross-sectional surveys	All 3926 H 1717 M 2209 (56%) L 0 (0%)	-1	< 75% participants in moderate quality studies	0	Heterogeneity = 0%	0	PICO framework was carefully designed to ensure relevance of included studies	0	Narrow CI, good sample size	0	Our search was comprehensive, findings are largely in favour of intervention	-6	Low
% with CDC in primary dentition (two time points) - 2 studies	-5	Cross-sectional surveys	All 1614 H 0 M 1614 (100%) L 0 (0%)	-2	≥ 75% participants in moderate quality studies	-2	Percentage point differences were very different between studies	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Narrow CI for each study, but small sample size	0	Our search was comprehensive, findings are largely in favour of intervention	-9	Very low

Table 51 GRADE scores and justifications for the permanent dentition dental caries studies

Outcome and number of studies*	Study design score	Study design justification	Participants numbers (High quality, moderate quality studies)	Risk of bias	Risk of bias justification	Inconsistency of results	Inconsistency of results justification	Indirectness	Indirectness justification	Imprecision	Imprecision justification	Publication bias	Publication bias justification	Final score†	Certainty of the evidence
Permanent dentition – dental caries															
DMFT (single time point) - 21 studies (excluded 4 outlier papers)	-5	Cross-sectional surveys	All 17644 H 2065 M 10694 (61%) L 4885 (28%)	-2	≥ 75% participants in moderate or low quality studies	-2	Heterogeneity = 98.4%	0	PICO framework was carefully designed to ensure relevance of included studies	0	Narrow CI, good sample size	0	Our search was comprehensive, findings are largely in favour of intervention	-9	Very low
DMFT (two time points) - 5 studies	-5	Cross-sectional surveys	All 4333 H 0 M 4333 (100%) L 0 (0%)	-2	≥ 75% participants in moderate quality studies	-2	Heterogeneity based on single time point MA, inconsistent findings between studies	0	PICO framework was carefully designed to ensure relevance of included studies	-1	No CI available, some imprecision assumed	0	Our search was comprehensive, findings are largely in favour of intervention	-10	Very low
DMFS (single time point) 5 studies (excluded 1 outlier paper)	-5	Cross-sectional surveys	19354 H 0 M 393 (2%) L 18961 (98%)	-2	≥ 75% participants in moderate or low quality studies	-2	Heterogeneity = 98.5%	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Narrow CIs for each study, but small sample size	0	Our search was comprehensive, findings are largely in favour of intervention	-10	Very low
DMFS (two time points) - 0 studies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Outcome and number of studies*	Study design score	Study design justification	Participants numbers (High quality, moderate quality studies)	Risk of bias	Risk of bias justification	Inconsistency of results	Inconsistency of results justification	Indirectness	Indirectness justification	Imprecision	Imprecision justification	Publication bias	Publication bias justification	Final score†	Certainty of the evidence
% without CDC in permanent dentition (single time point) - 3 studies	-5	Cross-sectional survey	All 9090 H 0 M 988 (11%) L 8102 (89%)	-2	≥ 75% participants in moderate or low quality studies	-2	Heterogeneity = 96.6%	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Wide CI	0	Our search was comprehensive, findings are largely in favour of intervention	-10	Very low
% without CDC in permanent dentition (two time points) - 1 study	-5	Cross-sectional survey	All 1079 H 0 M 1079 (100%) L 0 (0%)	-2	≥ 75% participants in moderate quality studies	0	Results based on a single study, reported by the authors to be statistically significant in favour of intervention	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Wide CI, small sample size	0	Our search was comprehensive, findings are largely in favour of intervention	-8	Very low
% with CDC in permanent dentition (single time point) - 3 studies	-5	Cross-sectional surveys	All 3236 H 1703 M 1533 (47%) L 0 (0%)	-1	<75% participants in moderate quality studies	-2	Heterogeneity = 95%	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Wide CI	0	Our search was comprehensive, findings are largely in favour of intervention	-9	Very low
% with CDC in permanent dentition (two time points) - 2 studies	-5	Cross-sectional surveys	All 1978 H 0 M 1978 (100%) L 0 (0%)	-2	≥ 75% participants in moderate quality studies	0	Two linked studies showed the percentage point difference strongly in favour of the intervention	0	PICO framework was carefully designed to ensure relevance of included studies	0	Narrow CIs for each study,	0	Our search was comprehensive, findings are largely in favour of intervention	-7	Very low

†There were no upgrades for large magnitude of effect, dose-gradient response or effect of plausible residual confounding

Table 52 GRADE scores and justifications for the dental fluorosis studies

Outcome and number of studies	Study design score	Study design justification	Risk of bias	Risk of bias justification	Inconsistency of results	Inconsistency of results justification	Indirectness	Indirectness justification	Imprecision	Imprecision justification	Publication bias	Publication bias justification	Final score	Certainty of the evidence
Q1 Fluorosis (26 studies in 33 papers)	-5	26 Cross-sectional surveys	-2	≥ 75% participants in moderate or low-quality studies	-2	Different country contexts influence the baseline fluorosis prevalence	0	PICO framework was carefully designed to ensure relevance of included studies	-1	No CIs	0	Our search was comprehensive, findings are largely associated with the intervention	-10	Very low
Q2A CWF plus fluoride toothpaste (17 papers)	-5	15 Cross-sectional survey, 2 case control studies	-2	≥ 75% participants in moderate or low-quality studies	-2	Different country contexts influence the baseline fluorosis prevalence	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Few CIs calculated	0	Our search was comprehensive, findings are largely associated with the intervention	-10	Very low
Q2B CWF plus fluoride toothpaste plus other topical fluoride interventions (7 papers)	-5	4 cross-sectional surveys, 1 prospective cohort study and 2 block randomised trials	-2	≥ 75% participants in low quality studies	-2	Different country contexts influence the baseline fluorosis prevalence	0	PICO framework was carefully designed to ensure relevance of included studies	-1	Few CIs calculated	0	Our search was comprehensive, findings are largely associated with the intervention	-10	Very low

11 Comparison between Cochrane 2015 review and HRB 2024 review

Table 53 Fluorosis: Comparison of Cochrane 2015 and HRB included papers for Question 1

Included by Cochrane	Found in HRB search	Reason for exclusion by HRB	Included by HRB for fluorosis
Acharya 2005	Yes	Natural endemic fluoride in India	No
Adair 1999	Yes	Excluded at full text Mixed natural and CWF intervention Exclude	No
Al-Alousi 1975	Yes	Excluded at extraction as assessing all enamel defects not just fluorosis	Yes
Alarcon-Herrera 2001	Yes	Natural fluoride at high levels in Mexico	No
Albrecht 2004	Yes	Natural fluoride at suboptimal, optimal and high levels in Hungary	No
AlDosari 2010	Yes	Natural fluoridation of water to determine ideal level	No
Angelillo 1999	Yes	Natural fluoridation of water	No
Arif 2013	Yes	Natural fluoride at high levels in India	No
Azcurra 1995	Yes	Natural fluoride at very low and very high levels in Argentina	No
Beltran-Aguilar 2002	Yes	Natural, optimal and suboptimal in the USA. Optimal includes CWF, optimal, and adjusted fluoride.	No
Booth 1991	Yes	Excluded for fluorosis as assessment of enamel defects in general. Included for dental caries	No
Brothwell 1999	Yes	Varying levels of natural fluoride	No
Chandrashekar 2004	Yes	Natural endemic fluoride in India	No
Chen 1989	Yes	Drinking water contains negligible, optimal, and above-optimal concentrations of natural fluoride in China	No
Chen 1993	Yes	Drinking water contains high concentrations of natural fluoride in China	No

Clark 1993	Yes	Included	Yes
Clarkson 1989	Yes	Excluded as measurement of dental development effects (of which fluorosis is only 1) in Ireland and New Zealand	No
Cochran 2004a	Yes	Excluded on study design as review. Also, a mix of natural and CWF exposures in Europe	No
Correia Sampaio 1999	Yes	Excluded as mix of natural and CWF fluoride in Brazil	No
Cutress 1985	Yes	Excluded as defects of tooth enamel in New Zealand.	No
Driscoll 1983	Yes	Excluded as optimal and above-optimal natural water fluoride concentrations in USA	No
Ekanayake 2002	Yes	Excluded as natural water fluoride concentrations in Sri Lanka	No
Eklund 1987	Yes	Excluded as optimal and above-optimal natural water fluoride concentrations in USA	No
Ellwood 1995	Yes	Excluded for fluorosis as assessment of enamel defects in general. Included for dental caries	No
Ellwood 1996	Yes	Excluded for fluorosis as assessment of enamel defects in general. Included for dental caries	No
Firempong 2013	Yes	Excluded as high natural water fluoride concentrations in Ghana	No
Forrest 1965	Yes	Excluded, CWF in intervention area in Wales, but ppm for control area not reported	No
Garcia-Perez 2013	Yes	Excluded as natural fluoride plus salt fluoridation, not CWF in Mexico	No
Gaspar 1995	No	Not located Gaspar M, Pereira A, Moreira B. Non-fluorosis and dental fluorosis opacities in areas with lower (0.2 ppm F) and optimum (0.7 ppm F) fluoride concentration in drinking water [Opacidades de esmalte de origem não fluorótica e fluorose dentária em áreas	No

		com baixa (0,2 ppm F) e ótima (0,7 ppm F) concentrações de flúor nas águas de abastecimento público]. Revista Brasileira de Odontologia 1995;52(2):13-8. We would exclude on foreign language	
Grimaldo 1995	Yes	Excluded as natural fluoride in Mexico	No
Grobler 1986	Yes	Excluded as optimal and high natural fluoride areas, ?South Africa	No
Grobler 2001	Yes	Excluded as natural fluoride areas, ?South Africa	No
Haavikko 1974	Yes	Natural fluoride	No
Heintze 1998	Yes	Included CWF in 2 areas and fluoride deficient comparator	Yes
Heller 1997	Yes	Excluded as intervention school water not home water. Both optimal natural and CWF included and combined	No
HernandezMontoya 2003	Yes	Exclude as high natural fluoride in Mexico	No
Hong 1990	Yes	Included	Yes
Ibrahim 1995	Yes	Excluded as optimal and high natural fluoride areas in Sudan	No
Indermitte 2007	Yes	Excluded as natural fluoride areas in Estonia	No
Indermitte 2009	Yes	Excluded as natural fluoride (0.01 to 7.20 ppm) in Estonia	No
Ismail 1990	Yes	Included	Yes
Jackson 1975a	Yes	Excluded at extraction as assessing all enamel defects not just fluorosis Included for dental caries	Yes
Jackson 1999	Yes	Excluded as naturally fluoridated communities in Indiana, USA	No
Kanagaratnam 2009	Yes	Excluded as no dose of fluoride for CWF. Diffuse opacity Diffuse opacities appear white when the tooth erupts, and have a similar range of translucency to the demarcated defects. The main difference is that they lack a margin	No

		which clearly defines them from the adjacent normal enamel. Fluoride induced lesions are usually found within this type (Suckling *et al.*, 1989).	
Kotecha 2012	Yes	Exclude as high natural fluoride in India	No
Kumar 2007	Yes	Exclude as high natural fluoride in India	No
Kunzel 1976	Yes	Exclude as natural fluoride values of between 0.1 and 2.6 ppm in different rural areas of Cuba	No
Leverett 1986	Yes	Excluded as optimal fluoride may mean adjusted natural fluoride, USA Query	No
Levine 1989	Yes	Excluded on outcome enamel hypoplasia, Birmingham and Leeds and other causes besides fluorosis	No
Lin 1991	No	Excluded natural endemic fluoride in China	No would not include
Louw 2002	Yes	Excluded natural endemic fluoride, South Africa	No
Machiulskiene 2009	Yes	Excluded natural endemic fluoride in Lithuania	No
Mackay 2005	Yes	Excluded as no comparator ppm provided DDE diffuse opacity	No
Macpherson 2007	Yes	Excluded natural endemic fluoride in Sweden	No
Mandinic 2009	Yes	Excluded natural endemic fluoride in Serbia	No
Marya 2010	Yes	Excluded natural endemic fluoride in India	No
Masztalerz 1990	Yes	Excluded natural endemic fluoride in Poland	No
McGrady 2012	Yes	Excluded as no comparator ppm provided	No
McInnes 1982	Yes	Excluded natural endemic fluoride, South Africa	No
Mella 1992	Yes	Excluded natural endemic fluoride in Chile	No

Mella 1994	Yes	Excluded natural endemic fluoride in Chile	No
Milsom 1990	Yes	Excluded as enamel defects (diffuse separate), UK	No
Montero 2007	Yes	Excluded natural endemic fluoride and salt in Venezuela	No
Nanda 1974	Yes	Excluded natural endemic fluoride in India	No
Narbutaite 2007	Yes	Excluded natural endemic fluoride in Lithuania	No
Narwaria 2013	Yes	Excluded natural endemic fluoride in India	No
Nunn 1994a	Yes	Natural or CWF not clear Outcome DDE (diffuse)	No
Ockerse 1941	Yes	Excluded natural endemic fluoride, South Africa	No
Pontigo-Loyola 2008	Yes	Excluded as endemic fluoridated communities in Mexico	No
Ray 1982	Yes	Excluded natural endemic fluoride in India	No
Riordan 1991	Yes	Included	Yes
Riordan 2002	Yes	Excluded as not examining the effects of CWF per se but low fluoride toothpaste and supplements. Q2	No
Rwenyonyi 1998	Yes	Excluded natural endemic fluoride in Uganda	No
Rwenyonyi 1999	Yes	Excluded natural endemic fluoride in Uganda	No
Saravanan 2008	Yes	Excluded natural endemic fluoride in India	No
Sellman 1957	No	Excluded natural endemic fluoride in Sweden	No, would not include
Shanthi 2014	Yes	Excluded natural endemic fluoride in India	No
Shekar 2012	Yes	Excluded natural endemic fluoride in India	No
Stephen 2002	Yes	Excluded naturally fluoridated and fluoride deficient townships of Scotland	No

Szpunar 1988	Yes	Included Q 1and3	Yes
Tabari 2000	Yes	Included	Yes
Tsutsui 2000	Yes	Excluded natural endemic fluoride in Japan	No
Wang 1993	No	Excluded natural endemic fluoride in China	No, would not include
Wang 1999	Yes	Excluded natural endemic fluoride in China	No
Wang 2012	Yes	Excluded natural endemic fluoride in China	No
Warnakulasuriya 1992	Yes	Excluded natural endemic fluoride in Sri Lanka	No
Warren 2001	Yes	Excluded as Iowa cohort has a mix of natural fluoride and CWF, USA	No
Wenzel 1982	Yes	Excluded natural endemic fluoride in Denmark	No
Wondwossen 2004	Yes	Excluded natural endemic fluoride in Ethiopia	No
Zheng 1986	Yes	Suitable but excluded on Language	No
Zimmermann 1954	Yes	Excluded as natural fluoride in USA	No

Table 54 Dental caries: Comparison of Cochrane 2015 and 2024 and HRB included papers for Question 1

Included by Cochrane in 2015 and 2022	Found in HRB search	Reason for exclusion by HRB	Included by HRB for dental caries
Adriasola 1959	Yes	Spanish language CWF intervention 1.0 ppm No ppm for control	No
Arnold 1956/1957	Yes	Included	Yes
Ast 1951	Yes	Included	Yes
Backer-Dirks 1961	Yes	Included	Yes
Beal 1971	Yes	Included	Yes
Beal 1981	Yes	Included	Yes
Blinkhorn (unpublished)? 2015	Yes	Neither intervention nor control levels of F reported	No
Brown 1965	Yes	Included	Yes
DHSS England 1969	Yes	Excluded as control ppm not stated	No
DHSS Scotland 1969	Yes	Excluded as control ppm not stated	No
DHSS Wales 1969	Yes	Excluded as control ppm not stated	No
Goodwin 2022	Yes	Included	
Gray 2001	Yes	Included	Yes
Guo 1984	Yes	Included	Yes
Hardwick 1982	Yes	Included	Yes
Kunzel 1997	Yes	Included	Yes
Loh 1996	Yes	HRB excluded as overview and included original study by Wong *et al.*	Yes
Pot 1974	Yes	Excluded on foreign language (dutch) Have English publications for this cohort	No
Tessier 1987	Yes	Excluded on foreign language (French) No control F ppm	No
Maupomé 2001	Yes	Included	Yes