

# Health Research in Action

[#HRBResearchInAction](#)

Research.  
Evidence.  
Action.

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# HRB by numbers

– a snapshot of work completed in 2017

Serviced **199** requests for data from our National Health Information Systems

Published **8** peer-reviewed journal articles

Published **3** annual reports and **6** national bulletins

Published **5** evidence reviews and produced **7** evidence products to inform policy

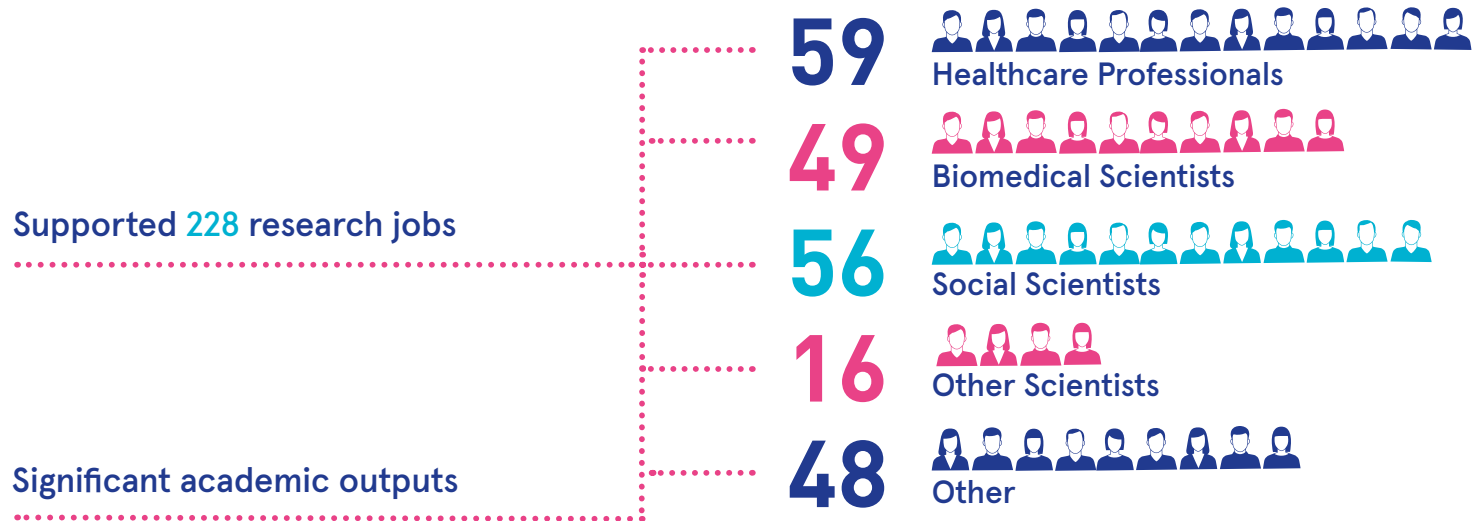
## In terms of funding

**108** awards completed in 2017,

worth a total of **€21,566,901**

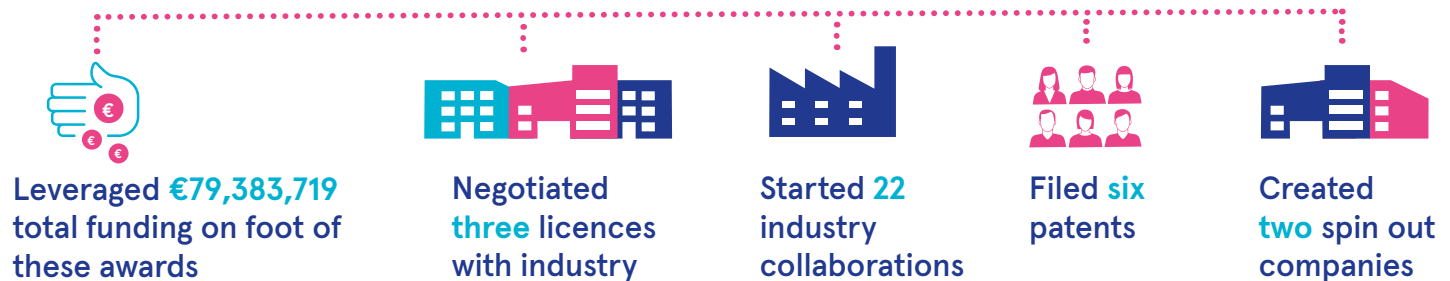
This research resulted in:

- 59** new methods or materials (e.g. assays, databases, training materials)
- 29** healthcare innovations (e.g. medical devices, therapies or interventions)
- 58** influences on policy or practice (e.g. new clinical guidelines, policy reports)
- 69** engagements with public bodies and media



- 50 PhDs completed or in progress
- 407 peer-reviewed publications
- 47 non-peer reviewed publications
- 723 presentations at scientific conferences
- 69 patient and public engagement activities
- 153 academic collaborations, 96 with international colleagues

### The economic impact



**In order to illustrate some examples of our research in a user friendly way, we captured a few of the success stories, summarised them and turned them into tweets we can share on social media.**

**So in just a few seconds, you should get a good sense of some of the great discoveries and outcomes that the Health Research Board is supporting across many areas of health.**

**Thanks to @claireoconnell and all the researchers for helping us to pull this together.**

@hrbireland research @RCSI\_IrI suggests that blocking a ‘volume control’ on brain seizures could offer a future way to help babies at risk.

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### In summary

**Babies who experience reduced oxygen to the brain during birth are at risk of brain seizures in infancy. These are difficult to detect and treat.**

**Professor David Henshall and his team at RCSI used a research drug to block a molecule called the P2X7 receptor on brain cells that normally triggers inflammation. Blocking it reduced the intensity of seizures in lab models of the infant brain. The HRB-funded research paves the way for further trials, and has opened up new research to detect neonatal seizures with a blood test.**



## Turning down the volume on brain seizures in babies

Lead researchers: Professor David Henshall, Dr Tobias Engel, Dr Eva Jimenez-Mateos, Royal College of Surgeons in Ireland, Professor Geraldine Boylan, INFANT Research Centre, University College Cork

### The problem

Lack of oxygen during birth can put babies at higher risk of brain seizures in infancy, which in turn is linked to higher risk of developing epilepsy later in life. The drug typically used to tackle brain seizures in babies only works about 50% of the time.

### The project

In a lab model of an oxygen-deprived infant brain, Professor David Henshall and his team at the RCSI used a specific drug to block a molecule called the P2X7 receptor, which senses brain injury and triggers inflammation. Blocking the P2X7 receptor reduced the intensity of seizures.

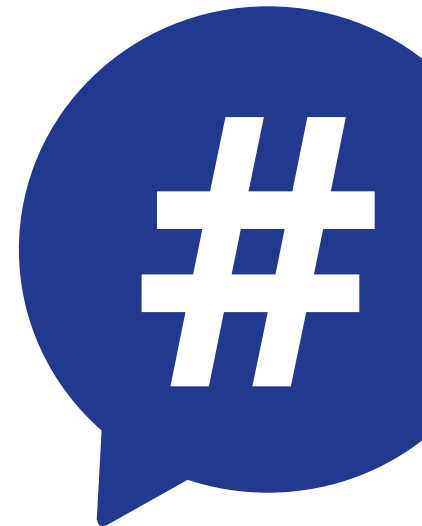
### The outcomes

- » The team at RCSI worked with a pharmaceutical company to explore the potential of the research drug in a model of infant seizures.
- » We now know that blocking the P2X7 receptor in a lab model can turn down the volume on seizures in a lab model of infant brain injury.
- » The research drug is to be explored in other models of brain injury.

- » Through exploring how the P2X7 receptor senses brain injury, the research has led to a new project to develop a blood test for detecting brain seizures in babies.

Professor David Henshall, Professor of Molecular Physiology and Neuroscience at RCSI and Director of the FutureNeuro Research Centre, says:

“We know that therapies that work for adults with epilepsy do not work well in babies, because the brain is at a difference stage of development. This research points to a potential new therapy to help babies who have brain seizures.”



@hrbireland research on international practice is helping to inform Ireland's policies on regulating and financing homecare services.

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### In summary

A public consultation for *Sláintecare*, the proposed new national health strategy for Ireland, highlighted the need for more formal support and regulation of homecare services. The Department of Health asked the HRB to study approaches that other countries in Europe take to financing and regulating homecare services. The study found that these countries could reportedly meet the demand for homecare needs, but that they had taken steps to reduce the need, such as encouraging informal caregiving, and tightening the access criteria for services.



## Regulating and financing homecare services: how can Ireland learn from other countries?

Research commissioner: Dr Jean Long, HRB

### The problem

Ireland needs more formal support and regulation of homecare services, and we can learn from the experiences of other countries in this area.

### The project

The HRB worked with independent researchers to collect and analyse information about home care services in four countries: Germany, the Netherlands, Sweden and Scotland.

### The outcomes

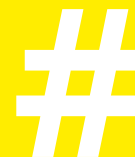
We now know that, for the countries studied:

- » Homecare services take the form of personal care and help with household tasks.
- » Support to keep people living in their own homes is the main principle underpinning home care policy, and informal care by close relatives is encouraged to fill the need.
- » Regulatory bodies are, or appear to be, partly funded through contributions made by long-term care insurances or by registration fees paid by care providers.

- » Countries have taken interventions to either restrict formal home care supply, such as tightening access criteria, or funding additional demand through co-payments.

Minister Helen McEntee, TD, said:

“ This evidence review carried out by the HRB concludes that there are several principles included in regulated home care in other countries, such as standards, transparency, consultation, choice, equity and sustainability. These principles are implemented through legislation, policy, strategy, service planning and financing. The experience of other countries will help to inform the debate around future consideration of approaches to formal homecare regulation and financing here in Ireland. This is an important step towards the development of a new statutory homecare scheme for Ireland.”



Bacterial biofilms on medical devices can cause serious infection. @HRBireland funded research @RCSI\_Irl disrupted biofilms by blocking fibrin recruitment from the host.

#HRBResearchInAction

### In summary

Biofilms are hard-to-shift collections of bacterial cells that can attach to a surface. When they grow on devices that are inserted into the body, they can cause life-threatening infections. HRB-funded research led by Dr Eoghan O'Neill at RCSI explored how staphylococcal bacteria build biofilms by recruiting the host's blood clotting mechanisms. The project found that blocking this recruitment could disrupt staphylococcal biofilms in a model of a living environment. It opens the way for new options to tackle these sources of infection in healthcare settings.



## A new approach to busting bacterial biofilms

Lead researcher: Dr Eoghan O'Neill, Royal College of Surgeons in Ireland

### The problem

When staphylococcal bacteria form biofilms on devices such as catheters or tubes placed in the body they can cause serious and life-threatening infections. Because of their biofilm configuration, these bacteria are hard to eradicate with conventional approaches such as antibiotics.

### The project

Using models that reflect the living environment, the team at RCSI were able to show that *Staphylococcus aureus* bacteria recruit a blood-clotting agent called fibrin from a living host in order to build biofilms. When they blocked this recruitment of fibrin, biofilms could be dispersed, making the bacteria more vulnerable to antibiotic treatments.

### The outcomes

- » We now know that *Staphylococcus aureus* bacteria use blood-clotting agents from a host to build biofilms.
- » The research showed that blocking that recruitment could disperse biofilms and novel treatment options were identified.
- » The discovery opens up new approaches to tackling biofilms on medical devices and reducing levels of infection.

Dr Eoghan O'Neill, Consultant Microbiologist at Connolly Hospital Blanchardstown and Senior Lecturer at the Department of Clinical Microbiology in RCSI says:

"Within the healthcare environment, devices are one of the most common sources of serious bacterial infection. We hope that our research disrupting a key mechanism by which staphylococcal bacteria form a hard-to-treat biofilm on devices will lead to new ways to tackle these sources of infection."



A @hrbireland study at @UL found 1 in 4 patients in Ireland have high uric acid, which is linked with higher risk of various diseases.

#HRBResearchInAction

### In summary

Uric acid has been linked with a range of conditions from gout to kidney disease. It is a by-product of the body's metabolism and is associated with conditions such as heart disease, high blood pressure, stroke and kidney disease. A HRB-funded study led by the Graduate Entry School of Medicine (GEMS) at the University of Limerick examined data from more than 128,000 patients in the Irish health system between 2006 and 2014 and found rising levels of uric acid across all clinical settings and age groups.



## Uric acid levels are rising alarmingly in patients in Ireland

Lead researcher: Professor Austin Stack, University of Limerick

### The problem

Uric acid occurs naturally in the body, but high levels in the blood are associated with various diseases. Little was known about uric acid levels nationally among Irish patients.

### The project

Researchers at UL analysed data from more than 128,000 patients across all clinical settings in the Irish healthcare system and examined the levels of uric acid recorded in their blood.

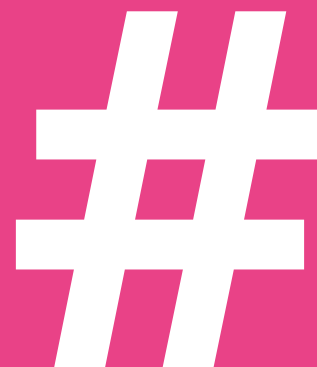
### The outcomes

We now know that:

- » One in four people in the Irish health system have elevated blood levels of uric acid.
- » In 2006 just over one fifth of all patients (20.1 per cent) were estimated to have elevated uric acid levels in their blood. By 2014, this number had increased to almost one quarter (24.5%).
- » Uric acid levels rose in every subgroup of patients and in all clinical settings between 2006 and 2014.

Professor Austin Stack, a Consultant Nephrologist at the University Hospital Limerick and a Principal Investigator for the UL Kidney Health Consortium, says:

“What we found was an astonishing increase in the numbers of patients presenting with high levels of uric acid in their blood. Rising blood levels of uric acid mean that more patients are at risk of serious conditions, including kidney disease, gout, diabetes, heart attacks and strokes.”





@hrbireland research found that meaningful dialogue between senior management and hospital staff facilitates hospital mergers.

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### In summary

Ahead of the merger of three existing hospitals (Temple St, Crumlin and Tallaght) into a new children's hospital on the campus of St James's Hospital in Dublin 8, the Department of Health asked the HRB to review research on the barriers and facilitators to successful hospital mergers and to identify good practice as reported in the literature. The results show that good communication and dialogue between senior management and hospital staff is a key to the successful implementation of hospital mergers.



## Meaningful dialogue overcomes barriers in hospital mergers

Researchers: Martin Keane, Dr Marie Sutton, Louise Farragher, Dr Jean Long, Health Research Board

### The problem

Three existing hospitals will merge in the creation of the new children's hospital in Ireland, and research was needed to identify the factors that hinder and facilitate the successful implementation of hospital mergers.

### The project

HRB researchers looked at the international literature on hospital mergers and found a lack of reviews in the area. The researchers carried out their own systematic review of available data across 49 published studies, particularly exploring issues in hospital mergers such as culture, priorities and communication, and looking at what tends to be linked to success.

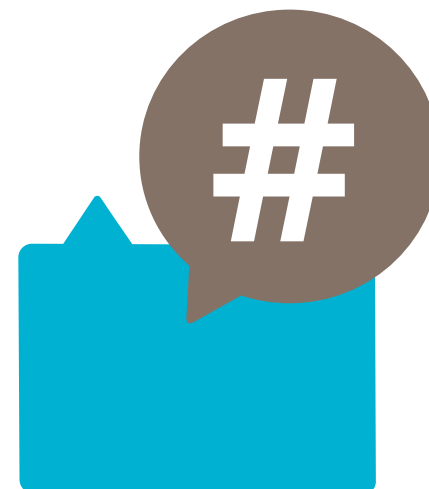
### The outcomes

- » The research found that mergers were hindered when hospital staff were excluded from active participation and dialogue and when the staff felt their autonomy and professional identity was threatened.
- » Successful implementation was linked to clear communication and less distance between senior management and staff.

- » The study was presented to the Department of Health and published on the Department's website following positive peer review.
- » The findings have been presented to stakeholders who will be involved in the upcoming merger to create a new children's hospital.

Martin Keane, HRB Evidence Centre, says:

"We found that the distance between senior management and hospital staff is a greater threat to a merger than any cultural differences between merging institutions. People were quite surprised and encouraged that good communication and dialogue can overcome cultural issues in hospital mergers."



@hrbireland funded outreach supported the @CERVIVA project @tcddublin to raise awareness about cervical cancer and boost HPV vaccination.

#HRBResearchInAction

### In summary

Human Papillomavirus (HPV) is a common virus that is linked to the risk of various cancers. The HRB-funded CERVIVA project researches various aspects of HPV, including ways to detect HPV sub-types, enable more precise diagnosis and improve outcomes for patients. Reducing HPV risks needs healthcare professionals and the wider public to be informed and engaged, and a HRB Knowledge Exchange and Dissemination Scheme (KEDS) Award has enabled the CERVIVA team to build this engagement. The time-frame of the award was associated with an increase in HPV vaccination rates in Ireland.



## A shot in the arm for HPV knowledge and prevention

Lead researchers: Professor John O’Leary, Dr Cara Martin, Trinity College Dublin and the Coombe Women & Infants University Hospital, Dublin

### The problem

Specific types of HPV are a risk factor for developing cervical and other cancers, but by 2016 HPV vaccination levels in Ireland had fallen to below 50%. There was a general lack of awareness about HPV and its role in cancer.

### The project

A HRB KEDS award supported the CERVIVA team in relaying their findings about HPV from their studies with 13,000 women in Ireland to a wide audience of health professionals and the public.

### The outcomes

- » CERVIVA has helped to increase HPV awareness in Ireland, and this correlated with an increase in vaccination rates.
- » Information leaflets about HPV were produced and distributed to GP waiting rooms nationally.

- » Several public events were held, including ‘town hall’ style meetings where CERVIVA researchers spoke about the project, and a National HPV Awareness Day event attracted an audience of more than 300 for a day of talks.
- » Information from CERVIVA about the prevalence of HPV sub-types in the Irish screening population and the new HPV-screening approach was relayed to health professionals and the wider public.

Dr Cara Martin, Assistant Professor in Molecular Pathology and Tumour Biology at Trinity College Dublin, says:

“We are now at a point globally where, thanks to science and technology, we can envisage a world that is almost free of cervical cancer, but we need to take action. The HRB KEDS award enabled us to talk about real data from Irish women, and the results deliver a powerful message: women need to be vaccinated and they need to keep getting screened.”



A @hrbireland funded study @TILDA\_tcd says stop smoking in order to cut the risk of developing severe AMD, a leading cause of blindness in Ireland.

#HRBResearchInAction

### In summary

The eye condition age-related macular degeneration, or AMD, is a leading cause of incurable vision loss in people aged over 55 years in developed countries. A HRB-funded study analysed samples from participants aged over 50 in The Irish Longitudinal Study on Ageing (TILDA). The study of 4,500 people identified various genes associated with the progression of AMD in Ireland, and found that current smoking vastly increased risk of AMD progressing, while stopping smoking could reduce that risk.



## Ditch the cigarettes to cut the risk of blindness in older age

Lead researcher: Dr Sarah Doyle, Trinity College Dublin

### The problem

AMD affects around 7.2% of people over 50 in Ireland, and in severe cases, causes blindness. Little was known about the genetic and other factors that are associated with AMD in an Irish population.

### The project

The study looked at genetic data, eye health and blood samples among people aged over 50 taking part in the TILDA study. More than 4,000 participants included 300 who had AMD, and the researchers were able to track over time how quickly the disease progressed in almost 200 of those with AMD.

### The outcomes

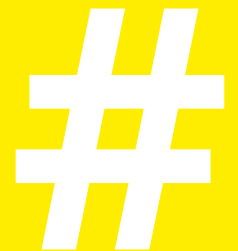
We now know that, in an Irish population:

- » Having a particular form of specific genes (CFH and ARMS2) puts people at greater risk of developing AMD and of the disease progressing to more severe levels.
- » Features that can be picked up during eye exams (soft drusen and hyperpigmentation) can help to identify if a person is at risk of AMD progressing.
- » People who have AMD and who currently smoke have a greater than 4.6-fold increased risk of the disease progressing to more severe levels.

- » People who had stopped smoking in the past, cut their risk of AMD getting worse.
- » Non-current smokers have a better chance of their AMD becoming less severe – in the four-year study period, 16% of past or never smokers regressed to a lower stage of AMD but no current smokers regressed.

Dr Sarah Doyle, Assistant Professor at the Trinity College Institute for Neuroscience, says:

“The genetic risks we saw in an Irish population were in line with what we expected from looking at other populations in Europe. What we did not expect was the size of the increased risk from smoking. What’s encouraging though is that this is a reversible lifestyle factor, if people stop smoking they can reduce their risk of blindness from AMD.”



@hrbireland funded research @ucddublin and @stjamesdublin has discovered why people who have surgery for oesophageal cancer eat less and has found ways to restore a healthy appetite.

#HRBResearchInAction

### In summary

**Outcomes after surgery for oesophageal cancer are improving, with more patients than ever cured from the disease. But many of these patients experience a loss of appetite and weight loss in the months and years after their operation. Dr Jessie Elliott and colleagues examined patients before and after surgery and discovered changes in how the gut talks to the brain that maps to the reduced desire for food. The results are leading to new ways to support patients in recovery after oesophageal cancer surgery.**



## How to restore a healthy appetite after oesophageal cancer surgery

Researchers: Dr Jessie Elliott, St. James's Hospital, Dublin, Professor Carel le Roux, University College Dublin, Professor John Reynolds, St. James's Hospital, Dublin

### The problem

Patients who have cancer of the oesophagus (the tube that links the mouth to the stomach) often need surgery to remove the oesophagus, which changes the way food passes through the digestive tract after eating. Afterwards, patients often suffer a lack of appetite, which can lead to weight loss and nutritional problems in the longer term.

### The project

Dr Elliott and colleagues tracked patients as they went through surgery for oesophageal cancer and recovery. They measured the natural chemicals produced by the gut, which talk to the brain to signal hunger, fullness and food reward, and they examined whether using a medication called somatostatin could increase their desire for food.

### The outcomes

- » We now better understand the physiology of what happens to a person's appetite after surgery for oesophageal cancer.
- » We know that people who have undergone such surgery experience changes in how the gut talks to the brain, affecting appetite after surgery.

- » We know that blood sugar fluctuates more dramatically after eating among people who have undergone this surgery. A follow-on study is now exploring how patients can monitor and control blood sugar to feel better.
- » The study showed that somatostatin therapy can help to increase the desire to eat following surgery for cancer of the oesophagus. A follow-on study is now exploring its effects in larger numbers of patients.
- » The researchers are now working with a group of experts in Europe to better understand quality-of-life issues among people undergoing treatment for oesophageal cancer.

Dr Jessie Elliott, now a Surgical Specialist Registrar with RCSI, says:

“Patients are surviving longer after treatment for oesophageal cancer, and this study points to ways we can improve their nutrition, health and quality of life. If they have the desire to eat, they are less likely to suffer from weight loss and issues with muscle mass and bone health, and may feel more comfortable when eating with friends and family – all of these factors will help support people in their recovery after treatment.”



@hrbireland funded research led by the National Rehabilitation Hospital shows more patients with spinal cord injuries in Ireland are older and increasingly are linked to falls and degenerate conditions.

#HRBResearchInAction

### In summary

The pattern of spinal cord injury is changing in Ireland, but until this study there was a lack of hard data about the nature of those changes. This HRB-funded project examined the data about patients presenting in Ireland with traumatic and non-traumatic spinal cord injury. It showed that an increasing proportion of older people are presenting with both, traumatic, mostly due to falls and non-traumatic, mostly due to degeneration of the spine or cancer. Having data about spinal cord injuries in Ireland will inform policy and help to identify the resources needed for treatment and rehabilitation.



## Back to reality – a clearer picture of spinal cord injuries in Ireland

Lead researcher: Dr Eimear Smith, National Rehabilitation Hospital, Dublin

### The problem

People who experience spinal cord injury generally need extensive treatment and rehabilitation, and their needs depend on the type of injury and other factors, such as their age. It was known that the patterns of spinal cord injury were changing, but the data had not been gathered and analysed.

### The project

Dr Eimear Smith and colleagues examined the cases of all patients who had been referred to centres in Ireland with spinal cord injury. They looked at the cases of traumatic spinal cord injury from accidents, falls and violence, for instance, which amounts to around 50–60 each year in Ireland. They also examined data for non-traumatic spinal cord injury, which is often the result of disease.

### The outcomes

- » We now know that non-traumatic spinal cord injury is twice as common in Ireland as traumatic spinal cord injury.
- » The data show a trend towards a greater proportion of older people presenting with spinal cord injury as a result of disease.

- » Understanding the incidence of older people presenting with spinal cord injury will allow better planning of resources and policies, including rehabilitation and care after discharge.

Dr Eimear Smith, Consultant in Rehabilitation Medicine and Medical Director of the Spinal Cord System of Care Programme at the National Rehabilitation Hospital and Mater Hospital, Dublin, says:

“It gives me great assurance to have such a wide and accurate view of spinal cord injury epidemiology in Ireland at present. I can now contribute confidently to any strategies for service development in the country, not guessing or speculating on figures of incidence, patterns of injury or illness and age profile. I feel this is a platform on which to move forward with service development and further epidemiological research.”



A @hrbireland review of international funding for Assisted Reproductive Technology shows public funding can increase access to fertility services for relatively modest economic cost.

#HRBResearchInAction

### In summary

One in six couples experiences problems with fertility, and in some cases Assisted Reproductive Technology (ART) can help couples to have a baby. The Department of Health is considering whether to provide public funding for ART and what form this funding, if approved, might take. To help in their considerations, the Department asked the HRB Evidence Centre to review the literature on ART funding and access in other countries. The findings will inform the development of policy on ART in Ireland.



## Public funding increases access to Assisted Reproductive Technology

Researchers: Martin Keane, Dr Jean Long, Dr Gerald O’Nolan, Louise Farragher – Health Research Board

### The problem

The Department of Health is considering whether to provide public funding for ART, which applies laboratory or clinical technology to human eggs or sperm and/or embryos for the purposes of reproduction, and requested a study of funding schemes internationally.

### The project

The HRB carried out a systematic review of the international literature about public funding mechanisms for ART, the costs and benefits and the criteria, rationale and clinical evidence for accessing such publicly funded ART services.

### The outcomes

We now know that, for the countries included in the review:

- » Full public funding for ART is available in six countries in Europe and in Israel, New Zealand and Ontario (Canada). Within Europe 19 countries offer partial public funding and Australia provides partial funding.

- » Public funding for ART can increase access and the overall economic cost to society is relatively modest in the context of public spending from the overall health budget.
- » Since 2008, the number of countries providing public funding for ART has increased, but individual countries’ level of public funding has decreased and out-of-pocket payments have increased.
- » Criteria used to determine access to funded ART are clinical and social, and national policies are a hybrid of political, cultural and economic pressure combined with clinical evidence.
- » The HRB report is contributing directly to Oireachtas debates and policymaking in Ireland on assisted human reproduction and associated areas of research.

Dr Gerald O’Nolan, Researcher at the HRB Evidence Unit, says:

“The pressure on those seeking fertility treatment, due to its cost in relation to average take-home pay, is immense, particularly for lower income groups. From the HRB analysis we can see that partial or full public funding of ART can help to support more clinically and economically beneficial procedures and outcomes. The report is now helping to shape Government discussion and policy on assisted human reproduction in Ireland.”



Dental data mapped by @ucc researchers to inform dental service planning.

#HRBResearchInAction

### In summary

In Ireland, there is geographic variation in the amount and the severity of tooth decay in children. The HRB-funded *Mapping the Divide* project mapped out the geographic variation of tooth decay in children aged 12 in Cork and Kerry and the availability of dental services nationally. The study identified areas where children's oral health needs were high and also the geographic distribution and demographic profile of the dental workforce. This information is available to inform dental service planning in Ireland.



## Mapping dental data to inform dental service planning

Lead researchers: Dr Patrice James, Dr Máiréad Harding and Professor Helen Whelton, University College Cork

### The problem

Up-to-date information was lacking about the regional variation of tooth decay in children in Ireland; the last national survey was carried out in the early 2000s. The distribution and demographics of the dental workforce in Ireland were also unknown.

### The project

The *Mapping the Divide* project mapped out the location of dentists, dental hygienists and dental practices, using information from national registries, dental treatment claims databases and a postal survey. Using an electronic oral health record system in operation by the public dental service in Cork and Kerry since 1999/2000, the project retrieved and analysed anonymised information about tooth decay in children aged 12, and mapped the information to see the geographical variations.

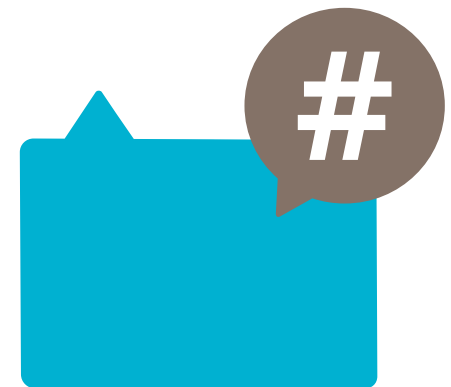
### The outcomes

- » A report of the dental workforce analysis was prepared and the findings are contributing to a new national oral health policy.

- » A geo-referenced database of regional tooth decay levels in children aged 12 in Cork and Kerry is now available to assist dental service managers plan local delivery of dental services for children.
- » The research also provides a basis for exploring the potential of electronic oral health records to monitor trends in children's oral health as part of the Fluoride and Caring for Children's Teeth (FACCT) study at UCC.

Dr Patrice James, Dentist and researcher at the Oral Health Services Research Centre in UCC, says:

"The HRB-funded study allowed us to find, analyse and map up-to-date information about oral health care needs in children and see where the dental services are geographically. The results are not only feeding into national policy, we are also building on them for other studies about oral health in Ireland."



@hrbireland funded research @tcddublin is helping to identify patients at risk of developing life-threatening clots following surgery to treat gynaecological cancer.

#HRBResearchInAction

### In summary

A study at Trinity College Dublin is uncovering a new way to help predict whether someone who has had surgery for a gynaecological cancer is at high or low risk of developing a clot after that surgery. The research analysed blood and tumour samples from patients who did and did not develop clots, and identified risk factors and clot risk signals to watch out for. The work has helped to raise awareness of the issue of clots following cancer surgery, and the initial results will be validated in further, larger trials.



## Assessing the risk of clots after gynaecological cancer surgery

Lead researcher: Dr Lucy Norris, Trinity College Dublin

### The problem

After a patient has surgery to treat gynaecological cancer, the risk of developing a blood clot is relatively high. If left untreated, such clots can be fatal. We can't easily predict who is most likely to develop a clot, so everyone is put on medication to prevent clots. However, despite the medication, some people still develop clots.

### The project

Dr Lucy Norris and colleagues at Trinity College Dublin analysed biobank blood and tumour samples from consenting patients undergoing surgery for gynaecological cancer. From these they could identify factors that help predict the clot risk in advance of surgery.

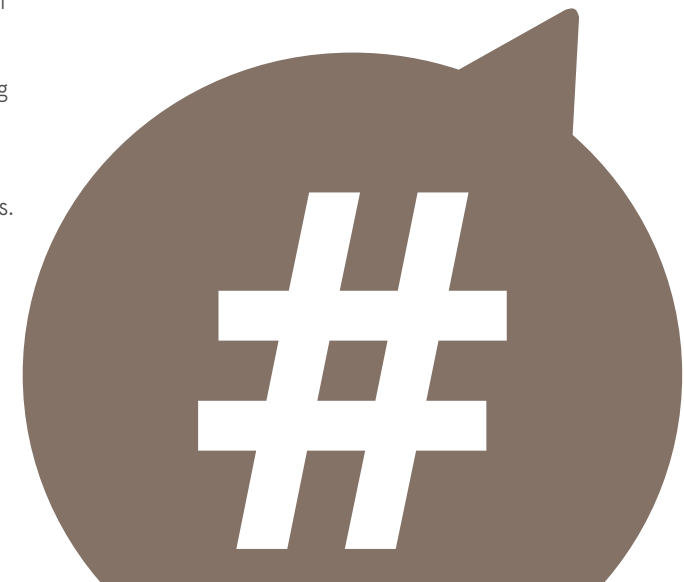
### The outcomes

- » The preliminary clot risk prediction system can identify, before surgery, the patients at low (2%) risk or at high (44%) risk of developing a clot in the two years following surgery.
- » The clot-prediction system is to be tested and validated in larger numbers of patients.

- » A leaflet has been produced for patients about clot risks following cancer surgery.
- » The research team has run information sessions with gynaecologists to increase awareness about clot risks following cancer surgery.

Dr Lucy Norris, Department of Obstetrics & Gynaecology, Trinity College Dublin, says:

“Patients who have gynaecological surgery can be at risk of clots, and these clots are the leading cause of death after the cancer itself. Being able to easily predict the risk before the patient has surgery will mean that clot-prevention treatments can be tailored for that individual patient.”





@hrbireland funded outreach at @UCC is helping to ensure that workplaces encourage a healthy diet to safeguard the health of the workforce.

#HRBResearchInAction

### In summary

Eating a DASH diet pattern – lots of fruit and vegetables, whole grains and low-fat dairy products with limited saturated fat and salt – is linked with healthier blood pressure in middle age, according to research at the HRB Centre for Health and Diet Research (CHDR) in University College Cork. The researchers have also shown that making DASH-friendly food available in canteens is linked to weight loss and reduced absenteeism among workers. A HRB award has enabled partnerships between the researchers, companies and media to encourage a move towards the DASH diet.



## DASHing towards healthier eating in the workplace

Lead researcher: Professor Ivan Perry, University College Cork

### The problem

Research has shown that the DASH pattern of eating supports healthy blood pressure and weight, but it is difficult to narrow the gap between what we know and what we do.

### The project

A HRB award enabled researchers at the HRB Centre for Health and Diet Research (CHDR) to work with researchers, policy makers and media on translating the dietary research findings into practical change in the workforce.

### The outcomes

- » Greater awareness among researchers, media and industry about the benefits of the DASH eating pattern for health in the workforce.
- » A spin-out company from the research on the DASH diet, Food Choice at Work Ltd, is providing an evidence-based public health nutrition consultancy service to major public-sector agencies and multinational companies.
- » The KEDS award has led to new work at the CHDR to map food policy in Ireland and benchmark it against international standards.

Professor Ivan Perry, Professor of Epidemiology & Public Health in University College Cork and director of the HRB Centre for Health and Diet Research, says:

“Translating research findings into practice can be challenging, but with this HRB award we have been able to raise the profile of our findings about the DASH diet being good for health in the workplace, and it is leading to incremental changes.”



@hrbireland funded research at @ucddublin designed and tested group education, exercise and behaviour-change sessions to help chronic pain, delivered by physios in the community.

#HRBResearchInAction

### In summary

Physiotherapy can help patients with chronic pain, and education and exercise sessions in primary care clinics in the community would take the pressure off hospitals. Psychological techniques could also motivate patients to better manage their behaviours to reduce pain. A HRB-funded study at UCD assessed the resources in primary care physiotherapy centres, then designed and tested group education and exercise sessions that physiotherapists could deliver for patients with osteoarthritis of the hip and knee and lower back pain. It's one of the first studies to explore a practical behaviour-change and physiotherapy approach for chronic pain.



## Behaviour change meets physiotherapy to help with chronic pain

Lead researcher: Dr Deirdre Hurley-Osing, University College Dublin

### The problem

Until this study, there had been little data about how a behaviour-change-based intervention in the community could work for physiotherapists and patients dealing with chronic pain.

### The project

The UCD researchers designed behaviour-change-based group education and exercise classes to be delivered in Dublin and Kildare by physiotherapists in primary care clinics for patients with osteoarthritis and lower back pain. Physiotherapists were trained in the programme and the techniques. The study worked with 14 practices and 120 patients, and compared the behaviour-change-based group sessions against the standard one-to-one physiotherapy sessions.

### The outcomes

- » Physiotherapists in the community delivered a set of six behaviour-change-based education and exercise classes to help patients with osteoarthritis and lower back pain self-manage their condition.
- » Patients generally found the sessions acceptable and helpful in supporting them to self-manage, though more work is needed to encourage patients who were reluctant to take part in a group setting.

- » All physiotherapists reported benefitting from the behaviour-change training, and are now using it in wider practice.
- » A follow-on grant from the HRB supported the team to develop online training for physiotherapists across Ireland in behaviour-change techniques, which was also found to be effective.
- » The Patient Voice in Arthritis wrote about the study in its *News Rheum* circular.

Dr Deirdre Hurley-Osing, Associate Professor, UCD School of Public Health, Physiotherapy and Sports Science, says:

“We designed a set of community-based group exercise and education sessions that promote behaviour change to help self-manage chronic pain. It's one of the first studies that has looked practically at behaviour-change techniques in physiotherapy for chronic pain, and now we have an online learning package that will allow us to train physiotherapists at scale in this approach.”

Research co-funded by @hrbireland and @cystinosisirl has designed a prototype drug-eluting contact lens to help people with the rare disease cystinosis

#HRBResearchInAction

### In summary

Cystinosis is rare genetic disease that leads to a damaging build-up of the amino acid cystine in the body. People with cystinosis can use cysteamine eye drops to help clear excess cystine from the cornea, but the drops require hourly administration and can be painful. Through the HRB-Medical Charities Research Group co-fund scheme, Cystinosis Ireland co-funded a research project to explore the design of a contact lens to deliver cysteamine to the cornea. The research was led by Professor Anuj Chauhan at the University of Florida and has developed a prototype drug-eluting contact lens.



## A contact lens to combat the rare disease cystinosis

Lead researcher: Professor Anuj Chauhan, University of Florida

### The problem

People who have the rare disease cystinosis can experience pain and impaired vision when cystine crystals build up in the cornea of the eye. They can use cysteamine eye drops, but the drops have a difficult dosing regime and are difficult to store.

### The project

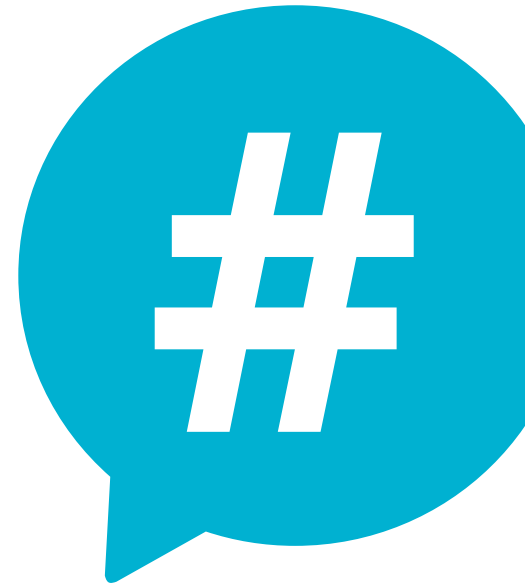
Cystinosis Ireland co-funded a research project led by chemical engineer Professor Anuj Chauhan and colleagues at the University of Florida, Gainesville, who are designing a contact lens that can maintain cysteamine and deliver it to the cornea over time.

### The outcomes

- » A prototype for a contact lens that can deliver the drug cysteamine to the cornea of the eye.
- » The lens incorporates Vitamin E to keep the drug stable over time and allow slow release of the drug after placing the lens in the eye.
- » The lenses are being used in trials to administer cysteamine in a more effective way for people with cystinosis to reduce the impact of the disease on their eyes and vision.

Anne-Marie O'Dowd, co-founder of the Irish patient organisation Cystinosis Ireland, says:

"Rare diseases have no borders, and the HRB-MRCG funding scheme enabled us to work with the University of Florida scientists on this potential solution to improve the lives of people with cystinosis. A contact lens to deliver drugs into the eye increases the potential of patients to adhere to the dosing regime and helps reduce eye pain and the risk of severe eye damage."



@hrbireland research shows that more older people are presenting for treatment for opioid abuse in Ireland – important info for designing future services.

#HRBResearchInAction

### In summary

International agencies such as the United Nations and the European Monitoring Centre for Drugs and Drug Addiction have recently highlighted their concerns about increased drug misuse among older people. A HRB study looked at the data between 1996 and 2014 for around 19,000 people entering treatment in Ireland for problem opioid use. It found a growing proportion of older people were starting treatment and they may have been using opioid drugs for a relatively long time. The results provide an indication of future service need, which is essential for planning purposes.



## The ageing profile of the Irish opioid epidemic

Lead researcher: Anne Marie Carew, Health Research Board and PhD candidate at Trinity College Dublin

### The problem

Current drug policies and treatment services are predominately focused on the needs of the known profile of younger drug users. Older people who misuse opioids are a neglected population and we know little about the ageing profile among people who use these drugs.

### The project

The study analysed the HRB's National Drug Treatment Reporting System data spanning two decades on almost 19,000 individuals who entered treatment for problem opioid use for the first time.

### The outcomes

We now know that, for Ireland:

- » In recent years, more and more people aged 50 years and older are entering treatment for opioid abuse – a trend that has not previously been observed.
- » There is evidence of late-onset drug use – individuals who begin drug use later in life.

- » People are now older when entering treatment, and they are injecting for longer and are taking longer to enter treatment.

Anne Marie Carew, Research Officer with the National Health Information Systems Unit at the HRB, says:

“It is inevitable that existing services and interventions related to illicit drug use need to adapt to the ageing population. The study findings will be of great interest to policy makers, practitioners and researchers both in Ireland and internationally working in this area.”



@hrbireland funding boosted involvement of young adults with Type 1 diabetes to work with @nuigalway researchers on ways to help their age group manage the condition.

#HRBResearchInAction

### In summary

A HRB-funded project led by NUI Galway found that young adults with Type 1 diabetes tend to have relatively poor control over blood sugar levels, which can cause health problems. Working with Jigsaw, they recruited and trained a Young Adult Panel of people with Type 1 diabetes to co-produce better ways to support that age group in managing their condition. Another HRB award supported the *Strength in Numbers* conference for researchers and patients, and boosted the participation of the Young Adult Panel in developing new interventions.



## Thinking outside the box with young people who have Type 1 diabetes

Lead researchers: Professor Seán Dinneen, Professor Molly Byrne, Dr Bláithín Casey, NUI Galway

### The problem

A HRB-funded study recruited a Young Adult Panel of people with Type 1 diabetes to help people in that age group to control their symptoms. There was a need to raise the profile of the findings and of the Young Adult Panel to continue to involve patient voices.

### The project

The HRB Knowledge Exchange and Dissemination (KEDS) Award supported the *Strength in Numbers* conference and 'hackathon' at NUI Galway that brought together researchers, patients, the Young Adult Panel and other experts in Type 1 diabetes.

### The outcomes

- » The conference and hackathon informed the next phase of the D1 NOW project, which is rolling out and evaluating interventions to improve the health of young people with Type 1 diabetes.
- » The Irish University Association invited the D1 Now team to speak at the PPI Campus Engage event held for Science Foundation Ireland funding awardees.

- » D1 Now has also been featured as a case study on a dedicated national website focusing on engaged research, and used to promote engaged research with policy makers, funding agencies and civil society organisations.

Professor Seán Dinneen, Consultant Endocrinologist and Senior Lecturer in Medicine at NUI Galway, says:

“Young people with Type 1 diabetes really need a new approach to help them manage their condition, and we are fortunate to have the HRB to help us do that. This KEDS award worked really well. It allowed us to bring everything together in a concentrated event, and out of that pressure cooker came the next phase of the D1 NOW project to involve and support people in this age group.”



@hrbireland funded research @tcddublin has identified how #HIV disarms cells, pointing to new ways to help the body get rid of the virus.

#HRBResearchInAction

### In summary

When your body is attacked by a virus, you produce a substance called interferon to raise the alarm and 'tell' cells to get rid of the virus. With HRB funding, Dr Nigel Stevenson and his group at Trinity discovered that HIV can halt the interferon alarm call by breaking down STAT proteins that normally relay the message. This finding has paved the way for a potential new drug to restore the interferon alarm call when HIV is present, so patients can clear the virus.



## A new approach to outmanoeuvre HIV infection

Lead researcher: Dr Nigel Stevenson, Trinity College Dublin

### The problem

If a person is infected with HIV, even if they have effective treatments to keep the virus in check, some HIV remains in the body. This means the person still has an infection.

### The project

The TCD researchers explored how HIV affects the interferon signalling pathway, and discovered that the virus breaks down key STAT proteins inside cells that normally pass on interferon's message. Thus, the virus can remain.

### The outcomes

- » The study provided a major insight into how HIV disarms the body's natural anti-virus defences.
- » The research has led to subsequent work to develop a therapeutic drug that can restore the interferon pathway in cells, and so reinstate the body's own defences against HIV.
- » A HRB KEDS award allowed the researchers to work with Whipsmart Media, HIV Ireland, Science Gallery Dublin and Nexu Science Communication on a film (to be launched in 2019) about how HIV/AIDS affects lives and the science behind the new discoveries.



© NEXU Science Communication

Dr Nigel Stevenson, Assistant Professor at the School of Biochemistry and Immunology in Trinity, says:

"This research has identified a major process by which HIV is targeting the basic interferon signalling pathway in cells, thereby allowing the virus to avoid elimination. This discovery has allowed us to go on to begin designing new therapies aimed at restoring natural immunity, so the body can then attack the virus. It's ambitious, but we hope such an approach might help to completely remove HIV from the body."

Funding from @hrbireland allowed researchers at @UCC to bring their Babyscreen cognitive assessment app for young children to wider use in research.

#HRBResearchInAction

### In summary

Even brief interruptions of oxygen supply before or during birth may lead to long term learning difficulties. The HRB-funded BiHIVE2 project at UCC's INFANT centre has worked with the gaming industry to develop the Babyscreen touch-screen system for use in toddlers to assess their early cognitive skills, including working memory and attention. A HRB Knowledge Exchange and Dissemination Scheme (KEDS) award enabled the researchers to develop training materials and share the app with other groups internationally, and to refine their parental consent procedures for research in newborns.



## A boost for the Babyscreen app to assess thinking skills in young children

Lead researcher: Professor Deirdre Murray, University College Cork

### The problem

Current assessments of learning and problem solving in young children rely heavily on the child's understanding of verbal commands. The BiHIVE2 project developed a touch-screen assessment system, Babyscreen, which allows young children from 18 months to solve touchscreen tasks without the need to understand language. They wanted to share this technology with other researchers.

### The project

A HRB KEDS award supported the researchers to develop training materials for other groups to use the Babyscreen app. The researchers also surveyed parents about their experiences of taking part in the BiHIVE2 study.

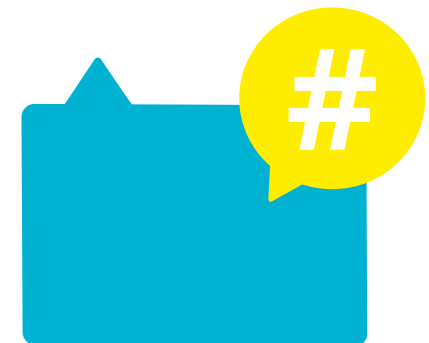
### The outcomes

- » Training materials were developed for the Babyscreen app.
- » International groups are now using the Babyscreen app to assess developmental skills in various contexts, including premature birth (University College London and Doha, Qatar), nutritional deficiency (Gambia and Cambridge University), early brain injury (Karolinska Institute).

- » A follow-on project with Science Foundation Ireland and industry partner Hello Games, UK is further developing the Babyscreen system to include more assessments.
- » Parents are generally very grateful for the support provided to them in the BiHIVE2 study, and some suggested positive refinements to the consent procedures, which will be incorporated in future studies.

Professor Deirdre Murray, Consultant Paediatrician and Professor of Paediatrics at UCC, says:

“Babies and toddlers love completing tasks on a touchscreen, and the Babyscreen app lets them do problem-solving tasks with a demonstration but crucially no instruction, so it takes the language out of the assessment. That means we can zone in on their thinking ability, and we want more people to use the app so we can learn lots more about early brain injury in young children.”



@hrbireland funded research @tcddublin @stjamesdublin shows that immune cells in smokers' lungs cannot switch on to fight TB. This will inform ways to support compromised lungs.

#HRBResearchInAction

### In summary

People who smoke are more susceptible to tuberculosis or TB, and a new study has shown why. HRB-funded research, led by Dr Laura Gleeson, had previously demonstrated that immune cells called macrophages in the lung switch gears in the way they burn fuel when they are fighting the bacterium that causes TB. Now Dr Gleeson has built on that research, showing that in people who smoke, these immune cells become exhausted and no longer make that switch when faced with TB-causing bacteria. This opens new understanding of how to support patients with immune-compromised lungs.



## Exhausted immune cells fail to tackle TB in smokers' lungs

Researchers: Dr Laura Gleeson, Dr Fred Sheehy, Professor Joseph Keane, St James's Hospital and Trinity College Dublin

### The problem

Smokers are at greater risk than non-smokers of infection with TB, and when infected they tend to suffer more severe symptoms and higher death rates.

### The project

Researchers at St James's Hospital took samples of lung cells from consenting patients, seven of whom were smokers and seven of whom were not. In the lab, they exposed the isolated immune cells from those patients to the bacterium that causes TB. They saw that macrophages from smokers had a lower rate of activity and did not switch on the fuel-burning pathways linked with fighting disease.

### The outcomes

- » The study showed that frontline immune cells in the lung are 'bio-energetically exhausted'.
- » The findings help to explain why smokers are more susceptible to TB.
- » The research is pointing to new ways to support the immune system of smokers and others at risk of infection.

Dr Laura Gleeson, Specialist Registrar in Respiratory Medicine, says:

"Around the world, approximately two billion people are latently infected with TB, and if their lungs are compromised through smoking or exposure to pollution, this could impair their ability to fight the bacterium if the infection becomes active. We have shown a mechanism by which immune cells fail to switch on in this situation, so now we can work on ways to support the immune cells and enable them to better fight TB and other diseases."





Doctors leave Ireland due to poor working conditions, training and career options, @hrbireland funded research @RCSI\_Irl shows.

#HRBResearchInAction

### In summary

HRB-funded research at RCSI had previously shown large scale recruitment of foreign trained doctors to Ireland. In a follow-on HRB-funded study, the Doctor Emigration Project, the researchers measured the levels of intention and the factors that were contributing to the emigration of Irish-trained doctors from Ireland. The main factors were working conditions and lack of career opportunities in Ireland. The findings are being used by workforce planners to develop measures to retain and attract doctors back into the Irish health system.



## The Doctor Emigration Project: why do doctors leave after training in Ireland?

Lead researcher: Professor Ruairí Brugha, Royal College of Surgeons in Ireland

### The problem

Ireland is producing increasing numbers of medical graduates, but doctors are also leaving Ireland in greater numbers, resulting in the need to recruit doctors into the Irish health system from overseas.

### The project

The RCSI Health Workforce Research Group worked with the Medical Research Council in analysing registration data and conducting surveys, and undertook in-depth interviews with NCHD (medical) trainees in Ireland about their experiences of working in Irish hospitals and their future career and migration plans.

### The outcomes

- » Factors that predicted intention to leave Ireland included dissatisfaction with work-life balance, feeling that the quality of training in Ireland was poor and leaving for family or personal reasons.
- » Trainee doctors identified the stress of doing postgraduate training with inadequate supervision, lack of ring-fenced training time and pressures on personal and family life.

- » The findings of the Doctor Emigration Project were discussed at a high-level policy meeting where national medical stakeholders were represented.
- » The project and its findings received considerable media attention, including national radio interviews and articles in *The Journal* and *The Irish Times*.

Professor Ruairí Brugha, Head of the RCSI Health Workforce Research Group, says:

“Until we did this study there was very little hard evidence about why Irish-trained doctors were disappearing from the Medical Council registry here. The research gave us rich insights into the main issues that are driving Irish doctors to leave: the working conditions, the lack of training opportunities and the disappointments in terms of career. We are directly feeding the results of the study into policy discussions and planning.”

Some @hrbireland research at @tcddublin found 16% of 5k pregnant women in Ireland had probable depression, informing the need for mental health services in the maternity system.

#HRBResearchInAction

### In summary

Until this project, little was known about how many pregnant women in Ireland experienced depression. A HRB Knowledge Exchange and Dissemination Scheme (KEDS) award allowed the REDEEM Research Group (Research in Depression: Endocrinology, Epigenetics and Neuroimaging) based in the Trinity College Institute of Neurosciences to survey 5,000 women at antenatal clinics in Ireland. They found that 16% of the pregnant women showed signs of depression, helping to inform policies around providing mental health services in Ireland during pregnancy.



## Raised awareness of depression in pregnancy in Ireland

Lead researcher: Professor Veronica O'Keane, Trinity College Dublin

### The problem

A research project at Trinity was looking at depression, stress and baby outcomes in pregnant women, but information was not available on the levels of depression among pregnant women in Ireland.

### The project

The Trinity researchers carried out the *Well Before Birth* study. They used a screening questionnaire to survey around 5,000 women attending pre-natal services in Dublin, Sligo, Limerick and Cork.

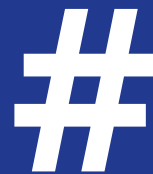
### The outcomes

- » The study found high rates of antenatal depression, approximately 16%. These rates are higher than EU averages.
- » The project led to a new level of awareness about psychiatric illnesses during pregnancy, and it informed discussions around the need for psychiatric services in the new national maternity strategy in Ireland.
- » The results were presented at the World Congress on Women's Mental Health in March 2017.

- » The findings were discussed with the researchers in national newspapers, television and radio channels.

Professor Veronica O'Keane, Professor in Psychiatry, TCD and Consultant Psychiatrist at Tallaght University Hospital, says:

"The results came out at the time when the National Maternity Services document was in gestation, and it offered leverage to argue for perinatal psychiatric services. This project helped to improve the profile of mental health in the context of maternity services and contributed to a national discussion about mental health during pregnancy."



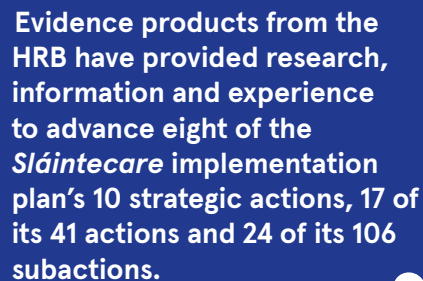


## HRB evidence is helping to shape the future of Irish healthcare

Where possible, healthcare policies and laws should be informed by evidence. This is why the HRB Evidence Centre undertakes studies, commissioned by the Department of Health, to review various subjects and themes relating to healthcare and its delivery.

Since 2017, the majority of the HRB's evidence products have focused on information and evidence about the international experience of various strategic priorities outlined in *Sláintecare*, a vision that will shape Irish healthcare for the next decade.

In August 2018, the Irish Government published the *Sláintecare Implementation Strategy* which presents the detailed 2018-2021 plan for the implementation of the *Sláintecare* report.



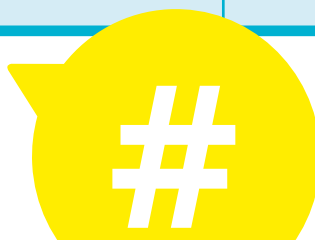
**Evidence products from the HRB have provided research, information and experience to advance eight of the *Sláintecare* implementation plan's 10 strategic actions, 17 of its 41 actions and 24 of its 106 subactions.**



**#HRBResearchInAction**

# HRB evidence helping to shape the future of Irish healthcare

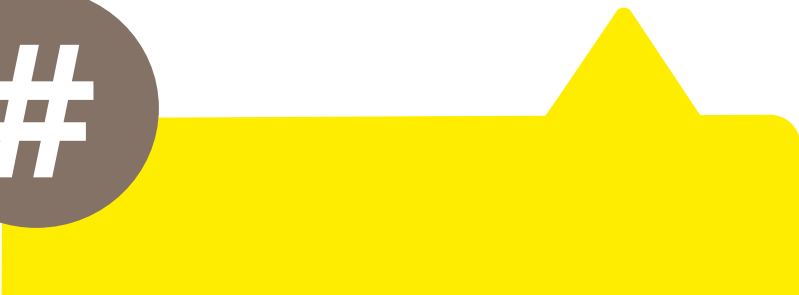
Title of HRB evidence product	Type of product	Action in <i>Sláintecare</i> it supports
Epidemiology of children's exposure to second-hand tobacco smoke in cars	Evidence review	Healthy Ireland implementation
Evidence base for and effectiveness of methods to reduce or eliminate smoking in cars in which children are travelling	Evidence review	Healthy Ireland implementation
National clinical audit: prioritising topics and ensuring quality	Evidence review	Clinical governance and patient safety
Integration of health and wellbeing services with general health services	Evidence review	Models of care and integrated care programme
The integration of health and social care services	Evidence review	Models of care and integrated care programme
Evidence base for major trauma systems in Ireland	Scoping exercise or research highlights	Implementing existing policies
Review of the regulation and governance processes of independent hospital entities in England and New Zealand	Evidence review	Develop hospital services
International models of career structure for medical practitioners	Evidence brief	Workforce framework and strategies
Mentoring in post-graduate medical education and specialist training	Evidence review	Workforce framework and strategies
Methods of GP remuneration for chronic disease management	Evidence review	Assess contracts and work practices Expand and develop services





Title of HRB evidence product	Type of product	Action in <i>Sláintecare</i> it supports
Evidence review of the food contents on carbohydrate and fats shelves of the food pyramid	Evidence review	Healthy Ireland implementation
Individualised budgeting for social care services for people with a disability: International approaches and evidence on outcomes and experiences	Evidence review	Develop new funding allocation models
Health workforce planning models, tools and processes in five countries	Evidence review	Workforce framework and strategies
Approaches to the regulation and financing of home care services in four European countries	Evidence review	Develop homecare services
Models of patient advocacy	Evidence brief	Clinical governance and patient safety
Data or health analytics	Scoping exercise or research highlights	Data, research and evaluation
Implementation frameworks for health workforce planners	Evidence review	Workforce framework and strategies
Interventions to reduce pressure on acute hospitals	Evidence review	Models of care and integrated care programme
Healthy workplace tools in five countries	Evidence review	Healthy Ireland implementation

Title of HRB evidence product	Type of product	Action in <i>Sláintecare</i> it supports
Codes of practice for patient safety complaints advocacy	Evidence brief	Clinical governance and patient safety
Mandated and managed networks in the health sector: Implications for design and implementation	Evidence brief	Implementing existing policies
Governance of voluntary health and social care providers Canada and England	Evidence brief	Revised healthcare structures
Removal of privately funded patients from tax funded hospitals	Comprehensive searches	Impact of removing private practice from public hospitals
Policy level responses to outbreaks of multi-drug resistance organisms	Comprehensive searches	Clinical governance and patient safety
Overview of national health system performance frameworks	Evidence brief	Data, research and evaluation
International approaches to and experiences of out of hours palliative care services	Evidence review	Expand and develop services
International approaches to and experiences of regional healthcare organisations	Evidence review	Governance, performance and accountability







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