North South Research Programme: Insights on Impact

All-Island collaboration in research, engagement and impact

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NORTH SOUTH RESEARCH PROGRAMME
HEA

AIREN
ALL-ISLAND RESEARCH EXCELLENCE NETWORK

Contents

Foreword

The Higher Education Authority (HEA) welcomes the publication of *North South Research Programme: Insights on Impact*. It showcases the impacts that have been achieved by the 62 projects funded under Call 1 of the North South Research Programme (NSRP) and demonstrates the value of an all-island approach to research and innovation.

NSRP funding to date has totalled €55.6 million. It has enabled higher education institutions (HEIs) across the island to deepen partnerships, to leverage new collaborative relationships in research and to build research capacity on an all-island basis. The *Insights on Impact* publication has been coordinated by the HEA in partnership with the All-Island Research Excellence Network (AIREN). It draws its findings from interviews carried out by scientific writer and journalist Dr Claire O'Connell with lead investigators from NSRP projects.

The interviews illustrate how the projects are collaborating to turn shared problems into shared solutions by coordinating research programmes, training the next generation of research talent across all disciplines, creating new knowledge and influencing the delivery of research-informed teaching.

The 11 projects featured in this publication reflect the breadth of achievement being delivered across the programme and the many ways in which the NSRP is contributing to the shared future of life on the island of Ireland.

Under Call 2 of the NSRP four new large-scale projects have been funded. These projects will continue to further all-island cooperation and build research capacity across HEIs. Call 2 projects will advance collaboration and partnerships across the island and further enhance the impact of the programme across teaching and learning and on the development of research talent.

I would like to thank the Shared Island Unit at the Department of the Taoiseach and the Department of Further and Higher Education, Research Innovation and Science for the provision of the funding and support that has enabled the NSRP. I also want to thank AIREN, Dr Claire O'Connell and all who contributed to the development of this high-quality report that showcases the unique value of the NSRP.

Caitríona Ryan
Head of Research Policy
HEA

1 Programme Introduction

1.1 Call 1 Programme Structure

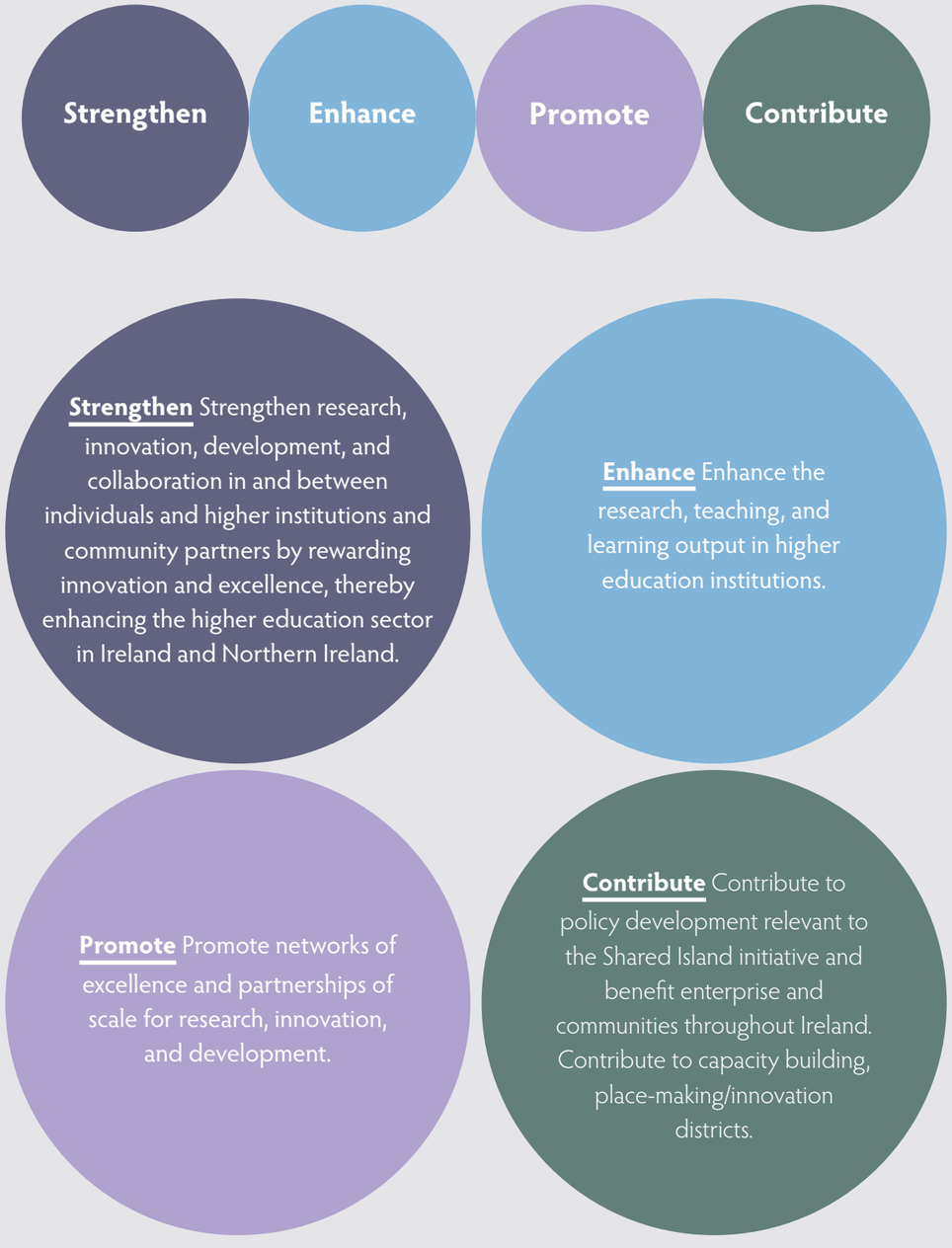
The NSRP is a collaborative programme being delivered by the HEA on behalf of the Shared Island Unit at the Department of the Taoiseach and the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS). The NSRP is one of several significant Government of Ireland initiatives supporting its ambitious agenda set out in *Building a Shared Island* and in the *Programme for Government* and *revised National Development Plan (2021-2035)*.

A total of 66 projects from across all disciplines have been funded to date under Call 1 (62) and Call 2 (4) of the NSRP, all progressing collaborative research underpinned by the key principles of the programme. The 62 projects supported under Call 1 in 2021 were awarded funding across the following 3 programme strands:

Strand	Strand Title	Duration	Max Funding	Projects funded
I	Bilateral researcher- researcher projects	24 months	€200,000	55
II	Emerging hubs of excellence	48 months	€4,000,000	5
III	Partnerships of Scale	48 months	€4,000,000	2

The 4 projects in receipt of funding under Call 2 are funded under Strands II (2) and III (2).

1.2 The Key Principles of The North South Research Programme



1.3 AIREN: All Island Research Excellence Network

The All-Island Research Excellence Network (AIREN) brings together Higher Education Institutions (HEIs) and Research Performing Organisations (RPOs) across the island of Ireland to connect and support Research Managers and Administrators. AIREN's mission to support research managers and administrators on an all-island basis. In 2022 the HEA provided funding to AIREN to expand its membership which now consists of over 270 research management and administration professionals. Together with the HEA Executive and science writer Dr Claire O'Connell, AIREN prepared this report arising from a workshop held with researchers funded through the NSRP at the inaugural NSRP conference held in Croke Park in November 2024.

1.4 Biography: Dr Claire O'Connell

Dr Claire O'Connell is a science journalist and communicator. She holds a PhD in cell biology from University College Dublin and a Master's in Science Communication from Dublin City University. She has been contributing to The Irish Times since 2005 and has authored two books. In 2016 the British Association of Science Writers named her Irish Science Writer of the Year.

2 Executive Summary

Supporting research and building capacity on the island of Ireland

How can research help to tackle major societal issues on the island of Ireland? How can it support communities to integrate and co-operate, encourage enterprise to thrive on the island of Ireland, and help patients to benefit from the best treatments that science can provide?

In this report, we highlight how projects funded under Call 1 of the North South Research Programme are strengthening research, innovation, and collaboration, training the next generation of researchers, promoting networks of excellence, and contributing to policy development on the island of Ireland.

Collaboration on shared challenges

When it comes to research, many heads are often better than one. Collaborations between researchers and pooling of resources through the NSRP are enabling research that explores shared challenges and creates new knowledge together.

In the High Green project, researchers are exploring new technology to measure greenhouse-gas emissions from farms, in a bid to encourage more sustainable scalable approaches.

The AIM4HEALTH project, meanwhile, is combining datasets and using AI to analyse factors that affect mental health on the island of Ireland and to validate AI methods reusable across data sets. And Our Shared Built Military History is documenting former army barrack buildings all around Ireland, with a view to opening up the history to all.

Training experts for the future

Research can provide opportunities for graduates to specialise in fields of expertise - and thanks to the NSRP, that includes developing their skills in medical technologies that harness the power of the body's immune system and healing processes.

ExoBCell sees researchers developing skills to deliver immune cells that could tackle auto-immune conditions such as lupus and Type 1 diabetes. Meanwhile, WoundActiv is connecting researchers with complementary expertise to create new materials to help wounds heal.

Partnership at scale

As well as connecting groups and training individuals, the NSRP is laying the foundations for partnerships at scale. AICRIStart saw 20 early-stage cancer researchers around the island of Ireland receive training in precision cancer medicine, while building collaborations between institutions.

The initiative acted as a foundation stone for the All-Island Cancer Research Institute (AICRI), a coalition involving 11 universities on the island of Ireland, which is scaling up research and influencing national policies and international research.

Evidence for policies and communities

The NSRP is designed to contribute to policy development and to benefit enterprises and communities north and south.

To that end, the BORDEX project is highlighting the 'informal' work of community members, organisations, and schemes in averting conflict and maintaining peace and stability in border areas, spotlighting the need to resource and support such efforts, because they contribute to peace on the island of Ireland.

Stable Lives, Safer Streets is taking an all-island approach to gathering evidence that supports youth justice policies to inform policy, prevent offending and make communities safer.

The project Multilingual Island: Sites of Translation and Encounter is exploring practical steps and changes for communities, to take account of multilingualism and offer more welcoming spaces for integration.

Finally, the NSRP is supporting researchers to engage with social enterprises across the island of Ireland, to provide evidence for policies, education, and strategies to support sustainable growth of the sector.

In short, the NSRP is building research capacity and evidence on the island of Ireland to make the shared island a safer, healthier, more sustainable, and more welcoming place to live.

2.1 Insights into impact

Quotes from NSRP Lead Investigators

High Green

"Dr Hamza Shakeel and I are now working to grow our collaboration with Queen's, applying for joint funding to evolve the technology and the impact that it could have."
Dr Fatima Gunning

WoundActiv

"Multidisciplinary collaboration is essential to respond to this unmet need and is testimony to the translational mindset of the teams at QUB and RCSI."
Professor Helen McCarthy

ExoBCell

"Working together allows us to increase the speed of our outputs, to support one another and to achieve shared goals that would not have been possible with either team working alone."
Dr Meadhbh Brennan

OSBMH

"The North South Research Programme was a good fit for the larger mapping project, because the shared island aspect is so important in military heritage and history more generally in Ireland."
Professor Charles Ivar McGrath

AICRIStart

"AICRIstart has been fundamental for building connections, and through AICRI we are building a momentum that is already influencing policy and global research. We compete, not against each other, but against cancer, our common enemy. Ultimately that will benefit patients, that is our focus."
Professor Mark Lawler

SE

"The collaboration between ATU and UU - specifically the two researchers involved in this study - has resulted in additional relationships on research projects with the Universidad de La Sabana, Bogata, Columbia and Deakins University Australia."
Professor Laura Bradley-McCauley

COVICAT

"Better collection and use of data would help the healthcare system to prepare initially and then monitor the health of these populations during an emergency. This would provide reliable evidence to inform timely public health interventions and support to help them."
Dr Ali Khashan

BORDEX

"The research has been enlightening in many respects, and we believe that now that we are identifying how informal security happens in practice, we need to inform policies and resources to better support it"
Dr Matt Bowden

SLSSHub

"By taking an all-island approach, we are breaking barriers, enhancing understanding, testing novel practices and building all of this into our teaching for students"
Dr Colm Walsh

MISTE

"Through encouraging reflection and raising awareness of the benefits of multilingualism, and promoting creative practices in translation and interpreting, we hope to contribute to building a truly shared island."
Professor Blumcynski

AIM4HEALTH

"Our findings are for everyone - for clinicians, charities, policy makers, service providers, and citizens themselves. The evidence we found can now help to inform policy, resource planning, and clinical practice, and improve people's mental health on the island of Ireland."
Professor Michaela Black

Outputs and Impact of the NSRP projects

High Green

Developed prototype measuring greenhouse gasses emissions

WoundActiv

Developed new wound barrier material

ExoBCell

Identified methods to calm drivers of auto immune disease B cells; additional non-exchequer funding earned

OSBMH

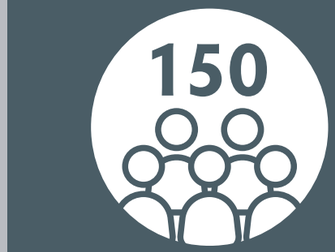
Identified and mapped 367 permanent historical barracks; Launched tourism maps and trails of historical barracks

AICRIstart

Trained 20 early career researchers across 10 institutions; Launched oncology industry landscape report; International partnerships progressed

SE

Engaged with 150 social enterprises, industry stakeholders, and policy makers to gather evidence to inform policies that support the sector; Connections established between enterprises to help assist each other in social enterprise work



COVICAT

Comparison of data north and south of the border has shone a light on how unique identification numbers and linking databases can facilitate research and more impactful responses

BORDEX

Researchers have engaged with more than 240 stakeholders in the border communities

SLSSHub

Embed research insights and 'what works' evidence into prevention efforts, directly influencing legislative, policy and practice change

MISTE

Produced guidelines for community organisations to highlight and embrace multilingualism

AIM4HEALTH

Developed tests for use in community health settings to help prompt more timely referrals for support for dementia; Improved understanding of early warnings that a person could be developing poor mental health in society

3 North South Research Project Themes

The 62 projects that were funded under Call 1 are diverse and wide-ranging in topics and scope. The projects can be categorised under 11 broad thematic areas.

The projects chosen for this report focus on research impact. Research impact can encompass not only data, but also impact on an individual's life, society, the environment, and the economy. The project impacts presented in this report are wide ranging and are divided into the following themes:

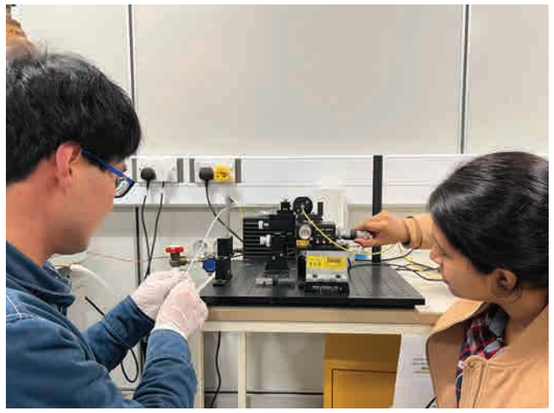
1. Environmental Sustainability
2. Medicine/Treatment Development
3. Molecular Biology
4. Arts, Culture and Heritage
5. Cancer research
6. Resources for Education, Practice and Policy
7. Women's Health and Reproductive Rights
8. Border Studies
9. Policy Development
10. Community Development
11. Mental Health

For the purpose of this report Dr Claire O'Connell interviewed Lead Investigators of projects funded under each theme in 2025 and distilled their engagement into a case study demonstrating project impact and illustrating how the NSRP is progressing research cooperation on the island of Ireland.

4 Case Studies

This section presents a project case study under each of the 11 themes.

4.1 Environmental Sustainability



High Green

Highly efficient and sensitive photonic sensors for monitoring greenhouse gases

Funded under: Call 1, Strand I

Lead Partners: University College Cork, Queen's University Belfast

A clever collaboration to better measure greenhouse gas emissions

Key Points

- Greenhouse gas emissions are difficult to monitor across jurisdictions.
- Researchers at the Tyndall National Institute in University College Cork (UCC) and Queen's University of Belfast (QUB) combined their expertise in materials science and photonics to develop and test a new, small sensor to measure greenhouse gas emissions.
- The sensors have the potential to be distributed around key environments to measure and monitor greenhouse gas emissions more effectively, so that excess can be tackled.

Gas is hard to pin down. This makes it difficult to measure emissions of 'greenhouse' gas, such as carbon dioxide and methane, that intensify climate change. But that could change thanks to a new technology supported through the North South Research Programme. It is a sensor that cleverly combines chemistry/materials science with photonics, or the physics of light, and which is small enough to be easily installed on a farm, landfill site, or any other environment where there is a need to keep an eye on greenhouse gas emissions.

Developed through the HIGH GREEN project between photonics experts at Tyndall National Institute and instrumentation engineers at QUB, the proposed miniature monitors could form a network to sniff out gas emissions on farms and in industry, thereby shedding light on how to reduce it.

"Greenhouse gas emissions really are a cross-border issue," says Dr Fatima Gunning, a senior staff researcher at Tyndall. "Each jurisdiction has responsibility for controlling greenhouse gas emissions, but the gases don't see a border, they move everywhere."

But now the 18-month cross-border collaboration between Tyndall and QUB has successfully built a prototype technology for measuring greenhouse gas emissions locally, according to Dr Gunning.

Tackling current limitations

Current methods of measuring greenhouse gases have their limitations, notes Dr Gunning.

"At the moment, we can use satellite technology to monitor levels of greenhouse gas emissions over spatial areas, but the results we get are quite low resolution, which means they are not very clear," she explains. "Also, Ireland is quite humid, and the water in the air can make it more difficult to get accurate reading from sensors."

To address these challenges, the HIGH GREEN project brought together two labs: Dr Gunning's in Tyndall and Dr Hamza Shakeel's in Queen's, with Dr Nadia Anam in Cork and Dr Jingqin Mao in Belfast as the postdoctoral researchers doing the groundwork research.

"We are working together to incorporate two different technologies, one based on chemistry, and one based in photonics to try to identify greenhouse gases, such as carbon dioxide, methane, carbon monoxide and potentially ammonia too," says Dr Gunning.

Working together on a prototype

The technology first pushes gas into a small chamber or 'pre-concentrator' that is coated with specific materials, which has been developed by Dr Shakeel and his team at QUB.

"The current state-of-the-art emission monitoring systems are expensive, bulky, power-hungry, and unsuitable for field deployments. Similarly, portable sensor solutions lack the resolution required for real-time gas monitoring. Therefore, our team has developed a novel sensing platform by integrating a sampling device (or pre-concentrator) with photonic sensing," says Dr Shakeel.

Then a tiny light beam, around one millimetre in diameter, completes the measurement using expertise from Tyndall.

"There are things that still need to be smoothed out," says Dr Gunning. "But we have been able to show that yes, we can measure not only the quantity of a specific gas, but also its variation over time, which could be very important to understand the emissions too."

"We are working together to incorporate two different technologies, one based on chemistry, and one based in photonics to try to identify greenhouse gases, such as carbon dioxide, methane, carbon monoxide and potentially ammonia too,"
Dr Gunning.

Shared language and vision

The short length and multidisciplinary nature of the HIGH GREEN project encountered some speed bumps – it took time to recruit the best experts to work on the technology, and the chemists and the photonics experts needed to develop a 'common language' to work on the technology together, notes Dr Gunning.

With the early prototype showing such encouraging results, Dr Gunning and Dr Shakeel are keen to grow their new collaboration.

"We have the kernel of the technology, and the longer-term vision is to integrate electronics, communications and data analytics so we can deploy a network of these small devices, probably no bigger than a mobile phone, around farms and other environments where it is important to monitor gas emissions," says Dr Gunning.

"Then by having a better resolution of what gases are being emitted, where they are located and how that changes over time, it means more effective steps could be taken to lower those emissions."

Sensing the future

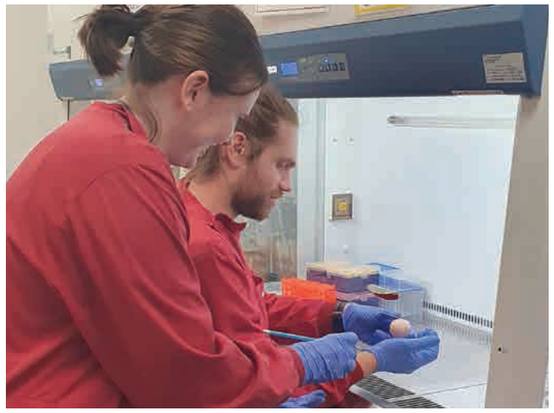
With the ball now rolling on the technology, several challenges remain to fully realise a true portable system capable of high-resolution measurements, says Dr Shakeel.

"For example, currently our sampling and sensing systems are developed separately and integrated using off the shelf components. Our team's vision is to monolithically integrate both systems on a single chip which will significantly reduce the size, power, and cost of the sensing platform," he says.

And while the HIGH GREEN project sought to meld technologies together for better sensing results, for Dr Gunning the ultimate outcome has been to bring expertise together into a fruitful collaboration: "Hamza and I are now working to grow our collaboration with Queen's, applying for joint funding to evolve the technology and the impact that it could have."

4 Case Studies

4.2 Medicine/Treatment Development



WoundActiv

Bioactive scaffolds functionalised for the delivery of genetic cargoes for the healing of complex wounds

Funded under: Call 1, Strand I

Lead Partners: RCSI University of Medicine and Health Sciences, Queen's University Belfast

Delivering the goods to heal chronic wounds

Key Points

- Slow-healing or chronic wounds are prone to serious infection and can leave prominent scars.
- WoundActiv is developing a new kind of barrier material to protect such wounds and encourage repair, using nanoparticles to stimulate healing and minimise scarring.
- The technology, developed by Royal College of Surgeons (RCSI) and QUB, could potentially help millions of people with diabetes and improve quality of life in rare skin conditions such as 'butterfly skin' (epidermolysis bullosa, or EB).

Suppose you get a small cut on your skin. In a few hours, you have probably forgotten about it, as the wound gets on with the business of healing. But what happens if a cut, burn or skin ulcer doesn't heal and instead becomes infected, threatening life and limb? Or what if surgery leaves a prominent scar?

Working together and funded by the North South Research Programme, researchers in Dublin and Belfast, led by Professor Fergal O'Brien and Professor Helen McCarthy, have developed a new, enriched biomaterial that could encourage a chronic or slow-healing wound to repair.

"Your skin normally heals fine after you've had an injury, but problems can arise when the injury from a cut or a burn is really big, or if there is a medical condition in the background like diabetes," says Professor O'Brien, Professor of Bioengineering & Regenerative Medicine at RCSI.

"In severe cases, wounds that don't heal can lead to life-endangering infections and the need to amputate toes or limbs."

A healing barrier

To encourage chronic wounds towards repair, the teams at RCSI and QUB combined their expertise in biomaterials and nanotechnology in the WoundActiv project. The result? A new type of barrier material that can be placed on a wound to redirect it towards healing.

"We developed a scaffold material that mimics the top layers of skin, and that is biocompatible with the body," says Professor O'Brien, who heads the Tissue Engineering Research Group at RCSI.

"We wanted to enrich the skin-like scaffold with genes and other factors that could encourage wounds to repair, so we collaborated with our colleagues in Queen's, who develop tiny peptides as nanoparticles that can be engineered to deliver genes."

Professor Helen McCarthy, who holds the Chair of Nanomedicine at QUB, explains that it is critical the delivery system itself does not cause further inflammation.

"We address this challenge by using natural amino acids to deliver genes, as these do not evoke an immune response. Multiple applications of the scaffold can therefore be given," she says.

"By combining the delivery technology of QUB and the scaffold of RCSI, we are able to create an engineered biology solution for multiple skin-related conditions. Multidisciplinary collaboration is essential to respond to this unmet need and is testimony to the translational mindset of the teams at QUB and RCSI."

"We address this challenge by using natural amino acids to deliver genes, as these do not evoke an immune response. Multiple applications of the scaffold can therefore be given,"
Professor Helen McCarthy

Precision delivery

The shared WoundActiv project explored how to build molecular 'messengers' into the scaffold that could then be delivered to the wound. These messengers are designed to encourage healing processes, such as the formation of blood vessels or minimising scarring. The collaboration involved shuttling cells, molecules, and biomaterials back and forth between Dublin and Belfast so they could be augmented and tested, explains Professor O'Brien.

"This was probably the biggest challenge we faced," he recalls.

"Because we needed to ensure that people were in the right place at the right time to receive the deliveries and make sure they were stored and treated in the right way."

But the coordination paid off: the project showed that skin cells naturally grew into the scaffold structure over time, and that some of the nanoparticle-delivered molecules elicited the desired response in lab studies. One molecule in particular emerged as a surprising star player, according to Professor O'Brien.

"MicroRNAs are powerful shapers of cell activities, and one specific microRNA that we tested had a remarkably positive effect. We hadn't anticipated that it would be so powerful in encouraging healing processes, so this really stood out."

In addition, the team was able to formulate this microRNA into a product that was stable at room temperature, which significantly reduced cold-chain storage costs, notes Professor McCarthy:

"There were no solvents required in this formulation, which aligns with the 'green science' agenda."

Both Professor O'Brien and Professor McCarthy have extensive experience of bringing discoveries from their labs into companies and clinical applications, and the WoundActiv project has identified several potential routes towards becoming treatments.

"The 'plug and play' design of this technology means that the genetic cargo can be substituted for any skin condition," says Professor McCarthy.

Targeting EB and diabetes

The project has also led to an important collaboration between RCSI and the charity Debra Ireland, which advocates for people with a rare disease called Epidermolysis bullosa (EB). In this debilitating condition, skin layers are easily damaged, resulting in painful, chronic wounds.

"We are developing an activated scaffold specifically to target EB," explains Professor O'Brien. "We really want to make a difference for the people who live with this disease and for their families."

He also sees enormous applications for the technology to help people with diabetes. "Globally hundreds of millions of people are living with diabetes, and we want to help ensure that people do not suffer from chronic wounds and their potentially catastrophic consequences."

4 Case Studies

4.3 Molecular Biology

ExoBCell

Role of mesenchymal stromal cell extracellular vesicles in limiting B cell hyperactivation and autoimmune disease

Funded under: Call 1, Strand I

Lead Partners: University of Galway, Queen's University Belfast

Calming the Busy Bs of immune diseases

Key Points

- Over-excited B cells are drivers of auto-immune diseases such as Type 1 diabetes and lupus.
- Researchers at the University of Galway and QUB captured natural bubbles called extracellular vesicles produced by stem cells.
- Their analysis showed that these extracellular vesicles could calm over-excited B cells in the lab, suggesting that the tiny bubbles could be developed as a therapeutic to help tackle auto-immune disease.

At any given moment, your immune system is on alert. And when it picks up something that could pose a threat – say a harmful microbe or virus – immune cells become activated and go on the attack. But what if the immune system's alarms are set off by something that's not really harmful to you at all? This can happen in auto-immune diseases such as Type 1 diabetes, lupus, and rheumatoid arthritis, where the immune system misfires and damages its own tissues.

Funded through the North South Research Programme, the ExoBCell project between the University of Galway and QUB has developed a way to calm over-excited immune cells using the body's own signals.

Busy Bs

The 18-month project specifically looked at how to calm down B cells, explains Dr Meadhbh Brennan from the University of Galway, because these cells are often over-active in immune diseases.

"B cells are key players in auto-immune disease, they have been recognised for a long time as playing a role in these immune disorders, so that is why we want to target them," she explains. "We think there is a potential therapeutic application in reducing these dysfunctional B cells in autoimmune disease, using our approach to therapy."

Her co-investigator on the project, Dr Dessi Malinova from QUB, adds that some current therapies try to remove B cells, but this brings challenges. "Removing B cells can leave a patient more susceptible to common infections," she explains. "Our approach attempts to dampen B-cell activity while preserving the immune system's ability to protect us."

Bubbles of calm

That approach centres on tiny bubbles that naturally travel around the body and deliver information to cells and tissues. These signal-laden parcels are called extracellular vesicles, or EVs, and the ExoBCell project looked at the power of EVs released by stem cells that live in the bone marrow.

"These stem cells send out the EVs, these little nano bubbles, and they will contain all sorts of therapeutic cargo," explains Dr Brennan. "The stem cell does all the work, and we just collect them." That said, 'just collecting them' involves a tremendous amount of expertise and care.

"We use protocols for isolating the EVs that the stem cells release, so we are able to expose B cells to these purified EVs in the lab and see what happens to them." says Dr Brennan.

Exciting EVs that dampen activity

When the researchers took B cells and added EVs collected from bone marrow stem cells, the results were highly promising, notes Dr Brennan.

"We found that the EVs were able to switch the activated B cells back into more of a resting state. This would be very desirable from a therapeutic perspective." And if that were not enough, the researchers also found that if they first provoked the stem cells with inflammatory signals in the lab, the calming power of the EVs increased.

"This is the first time it has been shown that treating the stem cells this way results in a more calming effect of EVs on B cells," says Dr Brennan. "And again, this looks very promising when we are thinking about using EVs as potential treatments to calm immune cell activation."

"B cells are key players in auto-immune disease, they have been recognised for a long time as playing a role in these immune disorders, so that is why we want to target them,"
Dr Meadhbh Brennan

Travelling knowledge

The original plan for the ExoBCell collaboration was to ship purified EVs and cells from Galway and Belfast for testing, but that was easier said than done.

"After Brexit it became very difficult to send cells and EVs between the labs, " says Dr Brennan. "It was a hurdle we had not anticipated."

Undeterred, the researchers found a way through – by getting on the road themselves.

"One of the researchers from Queen's – Manon Williams - visited us in Galway and worked with researcher Pamina Contreras Kallens to learn the techniques for collecting the EVs, then Manon was able to bring that back to Belfast," says Dr Brennan. "That meant the project led to even more training and upskilling than we had planned, which was good."

Success leads to success

Part of the success of ExoBCell is down to the complementary expertise of the teams north and south of the border.

"Working together allows us to increase the speed of our outputs, to support one another and to achieve shared goals that would not have been possible with either team working alone," says Dr Brennan.

Dr Malinova agrees: "Combining different disciplines has allowed us to learn from each other and expand our networks, bringing us closer to understanding EV mechanisms and translating them to the clinic," she says.

And, thanks to their cross-border collaboration, supported by the Government of Ireland and delivered by the HEA, Dr Malinova and Dr Brennan have secured non-exchequer funding from healthcare company GlaxoSmithKline to support two PhD students in Belfast to work on models in the lab that analyse specific diseases, including Type 1 diabetes.

"We are early in the journey, but we want to translate our findings in the lab so that someday EVs could be used to calm patients' overactive immune system," says Dr Brennan. "We have got the momentum now, and we are going to keep going."

4 Case Studies

4.4 Arts, Culture & Heritage

Our Shared Built Military Heritage

The online mapping, inventorying and recording of the army barracks of Ireland, 1690–1921

Funded under: Call 1, Strand I

Lead Partners: University College Dublin, The Open University, Belfast

Opening new conversations on the past and future of army barracks in Ireland

Key Points

- Since 1690, hundreds of permanent military barracks have been built and used on the island of Ireland, but to date there has been no cohesive record of their history.
- Researchers at University College Dublin (UCD) and The Open University Belfast identified and recorded permanent barracks around the 32 counties of Ireland, uncovering patterns of use and geographical spread.
- The project is opening up new conversations about military history and innovation on the island of Ireland and is identifying how former barracks can be sustainably re-used for community benefit.

How many of us walk past a former army barracks every day, possibly without even realising it? Hundreds of built structures on the island of Ireland reflect a long history of military activity and innovation, and they have the capacity to offer community benefits in the future. Since 2022, finding and exploring these barracks around 32 counties has been the focus of Our Shared Built Military Heritage, a project funded by the HEA North South Research Programme.

Researchers at UCD and The Open University Belfast worked together to identify and analyse records from hundreds of buildings that served as permanent army barracks on the island of Ireland between 1690 and 1921. Their project is now enabling new ways for people to engage with barracks through maps and heritage trails, and its findings are sparking more informed conversations about Ireland's military history and how best to harness our built military heritage for the future benefits of communities.

A 17th-century innovation in Ireland

"The project is about cultural heritage, military heritage and a hidden Ireland that is there in plain view," explains historian Professor Charles Ivar McGrath from UCD.

Ireland's place in global military history was a driver to explore as far back as the 1690s, explains Professor McGrath, who co-led the project with historian Dr Suzanne Forbes from The Open University Belfast.

"Before this time, soldiers tended to be housed in local establishments and houses, and even slept on porches, and they could sometimes cause disturbances in the area," he says. "Ireland was one of the first locations where structures were built to house and train soldiers. This development of residential army barracks reflects a professionalisation of military structures, where the army now has a dedicated place to live and train, and this model is rolled out in other countries thereafter."

Shared history

Digging into the military history of Ireland can raise questions and issues that people don't always want to face, according to Professor McGrath, but it is important to understand the nuances of the British army's presence in Ireland, and how Irish people served in that army and fought for the British Empire further afield.

"Mapping all of these residential army barracks opens up a conversation about what these buildings were for, and who served in them," he says.

The Our Shared Built Military Heritage project sprang from previous work by Professor McGrath and Dr Forbes, including a pilot study of barracks in the 18th century.

"We wanted to expand the work across centuries and the 32 counties of Ireland," says Professor McGrath.

"The North South Research Programme was a good fit for the larger mapping project, because the shared island aspect is so important in military heritage and history more generally in Ireland."

The project team, which included research assistants Dr Jack Kavanagh at UCD and Dr Caroline Wilhelmsson at The OU in Northern Ireland, set about scouring records in all provinces of Ireland and in London. They were looking for permanent, residential barracks on the island of Ireland, but they soon encountered pockets of history where the records grew scant or inconsistent.

They also encountered locations having multiple names - for example, Ballina in County Mayo was known as Belleek, which is also a town in County Fermanagh - and gaps arising from changes in record-keeping policies. But thanks to ingenious sleuthing, they have now identified and mapped 367 permanent barracks on the island of Ireland - though the researchers insist this is not the final number - and they have developed online and printed heritage trails for Cork, Dublin, the west of Ireland and North Ulster. The map and trails were launched at events at the Irish Georgian Society in Dublin and Ulster Museum in Belfast in February 2024.

"We went into the project with a view to making these buildings and sites something to engage with rather than to ignore, and the trails are a way for people to find out more," says Professor McGrath. "We hope that people who live in the locality or perhaps are visiting on holidays will use the trails to discover more about the history."

> "The structures of many permanent barracks remain on the island of Ireland, and for many in the general public the history of these buildings remains a great unknown."
> **Professor Charles Ivar McGrath, UCD**

Patterns of history

With a large body of data now at their fingertips, the research team has been able to identify patterns of barrack building, use and meaning across the centuries.

"We see clustering of barracks at particular times and places, and we believe that a spike in barracks in South Tipperary and Armagh in the 18th century could be linked with increased outlaw activity and the need to protect the roads in those areas, while an increase in barracks in Ulster was possibly tied in with the rise of illegal *poitín* distilleries," explains Dr Forbes.

"Then through the 19th century, more barracks were built in urban areas compared to rural, and in the 1870s and 1880s some barracks became more closely identified with local regiments, such as the Munster Fusiliers and Connaught Rangers."

The team is now engaging with the Royal Irish Regiment Museums in Northern Ireland, who are developing a new 'Untold' museum in Belfast that reflects the military history of the island.

"We are very much in support of the new museum, and we are sharing the findings of our project with them," says Professor McGrath.

Sustainable re-use

Looking to the future, the findings of the Our Shared Built Military Heritage project can help to support the sustainable re-use and repurposing of barracks buildings that still have plenty to offer local communities, says Professor McGrath.

"We have seen some excellent re-use of these buildings as residences and community spaces, and we saw Richmond Barracks in Dublin used as a vaccination centre during COVID-19," he says. "But some buildings are lying vacant, which just doesn't add up when there is such pressure on housing and health services."

Conserving and restoring such sites could offer a sustainable approach to relieving that pressure, he explains.

"Destroying buildings can have a big environmental impact, so we would like to see the focus on restoring and reusing these historic buildings, and we feel our findings can shine a light on the potential here."

4 Case Studies

4.5 Cancer Research

AICRIstart: Building Critical Mass in Precision Cancer Medicine

Funded under: Call 1, Strand III

Partners: University College Dublin, Queen's University Belfast, Trinity College Dublin, RCSI University of Medicine and Health Sciences, TU Dublin, Dublin City University, University of Ulster, University of Galway, University of Limerick, and University College Cork.

A foundation stone for collaborative cancer research on the island of Ireland

Key Points

- Cancer research is transforming treatment and care, so the island of Ireland needs to build critical mass and infrastructure in cancer research.
- AICRIstart is training 20 early-career researchers around the island of Ireland in precision cancer medicine and building collaborations between institutions on the shared island.
- AICRIstart has been a foundation stone for the All-Island Cancer Research Institute (AICRI), a coalition involving 11 universities on the island of Ireland, which is scaling up research and influencing national policies and international research.

The right medicine, to the right patient at the right time. That's the goal of precision cancer medicine, which takes a personalised approach to prevent, diagnose, and treat this deadly disease. For cancer patients, it means aiming for the best outcomes with the least side effects.

Research is key to delivering precision cancer medicine, and AICRIstart, a strategic partnership and training initiative led by UCD and QUB and funded by the North South Research Programme, has laid a foundation stone for collaborative cancer research across the island of Ireland.

"We know that potentially one in two people living on the island of Ireland will develop cancer during their lifetime," says cancer biologist Professor William Gallagher at UCD.

"Cancer diagnosis and treatment are becoming more effective, and more collaboration in the area of cancer research throughout the island of Ireland will help to improve the lives of many living with and beyond the disease."

The four-year AICRIstart project, led collaboratively between UCD and QUB, brings ten academic institutions across the island of Ireland together to build critical mass in precision cancer medicine research. AICRIstart was also a major step in the development of the All-Island Cancer Research Institute, or AICRI, which empowers researchers on the island of Ireland to work together on cancer at scale.

"We like to call AICRIstart the foundation stone for AICRI," says Professor Gallagher. "AICRIstart is a demonstrator for inter-institutional and often cross-border training for the next generation of cancer researchers on the island of Ireland. And now we are in a position to scale those inter-institutional efforts to a much more significant level through AICRI."

Simple maths multiplies in AICRIstart

With 10 PhD students and 10 post-docs trained across 10 institutions around the island of Ireland, the mathematics of AICRIstart is simple, but the outcome is greater than the sum of its parts, explains Professor Gallagher.

The 20 AICRIstart researchers funded through the North South Research Programme are working on shared projects relating to a range of cancers, including paediatric leukaemia, ovarian, lung, colorectal and pancreatic cancer as well as studying immune responses and cancer that spreads to the brain. The researchers have taken part in shared workshops about communicating with the media and in a competition for innovation awards. Each of the 10 PhD researchers also spends several months working outside of their host institution, collaborating with other academic institutions in the partnership, or with relevant industry or clinical collaborators, and all are encouraged to bring their research to the wider world of cancer research.

As well as advancing knowledge and understanding of precision medicine in these research domains and helping early-career researchers to build their skills and networks, the act of working as part of a connected group in AICRIstart has built new, shared connections between the participating labs, notes Professor Gallagher.

"Through AICRIstart and the North South Research Programme, we have demonstrated that we can work collectively across institutions," he says. "This is important, because it strengthens research on shared challenges across the island."

"Cancer diagnosis and treatment are becoming more effective, and more collaboration in the area of cancer research throughout the island of Ireland will help to improve the lives of many living with and beyond the disease."
Professor William Gallagher, cancer biologist

"Cancer knows no borders, so why should we?"

Relationships that the North South Research Programme have consolidated through AICRIstart stretch back to long-standing partnerships between Ireland, Northern Ireland, and the US National Cancer Institute.

"AICRIstart and AICRI came from the ground up," says QUB digital health researcher and AICRIstart co-lead Professor Mark Lawler.

"It is a grassroots initiative, really building consensus on creating a more connected infrastructure for cancer research and care on the island of Ireland. Cancer knows no borders, so why should we?"

AICRIstart grew from a call-out for ideas by AICRI across the cancer-researcher community on the island of Ireland, which generated more than 150 proposals for research and training.

"We had engagement and buy-in across the cancer research ecosystem north and south," says Professor Lawler.

"Cancer affects everyone on the island of Ireland; getting the funding through the North South Research Programme meant we could collaborate on an all-island basis to harness our collective expertise in cancer research and care."

And the model works, according to Professor Gallagher.

"We have an intensive focus on really providing for the AICRIStart researchers and listening to their needs. We have centralised funding for the researchers to go on training courses and develop specific skills," he says. "It is innovative, and unlike any other programme I've ever been involved with."

Immediate impacts and wider ripples

While cancer research takes time to reach the clinic, many initiatives forged by AICRIstart and AICRI, are already making a difference to the research ecosystem.

They include a much-praised report on the oncology industry landscape on the island of Ireland, a two-day "Davos of Cancer" event at Farmleigh House in Dublin that brought together 100 global cancer leaders to discuss key issues such as lung cancer and health inequalities, and partnerships with prestigious international institutions such as Roswell Park Comprehensive Cancer Centre, a major centre of cell-therapy expertise in the US.

"The AICRIstart and AICRI models have attracted considerable attention internationally and have very much put Ireland on the global map for collaborative cancer research," says Professor Lawler.

"Ireland is now seen as a bridge that unites researchers, on the island of Ireland and internationally, across Europe and North America - particularly challenging given recent developments in the US."

Looking to the future, Professors Gallagher and Lawler see the AICRIstart researchers as ambassadors who will impact the future of cancer research, treatment, and care.

"AICRIstart has been fundamental for building connections, and through AICRI we are building a momentum that is already influencing policy and global research," says Professor Lawler.

"We compete, not against each other, but against cancer, our common enemy. Ultimately that will benefit patients, that is our focus."

> "AICRIstart and AICRI came from the ground up. It is a grassroots initiative, really building consensus on creating a more connected infrastructure for cancer research and care on the island of Ireland. Cancer knows no borders, so why should we?"
> **Professor Mark Lawler, QUB digital health researcher and AICRIstart co-lead**

Research Student Spotlight

In March 2025, two of the AICRIstart PhD researchers, Panagiotis Sarametidis and Saoirse Flanagan, took part in the prestigious American Association for Cancer Research (AACR) Annual Conference in Chicago.

Panagiotis, who is supervised by Dr Naomi Walsh at DCU, presented his poster on using blood samples to predict how pancreatic cancer will respond to a form of treatment called immunotherapy. Such insights would help to ensure that a patient receives the best treatment for their cancer.

Saoirse is doing her PhD at UL with Dr Catríona Dowling (RCSI), Professor Paul Murray (UL) and Professor Jarushka Naidoo (RCSI/Beaumont Hospital) as co-supervisors. Her research looks at how changes in the DNA of non-small cell lung cancer (NSCLC) could open up new ways to treat aggressive forms of the disease.

Both students were supported to attend through the North South Research Programme.

"AICRIstart has been fundamental for building connections, and through AICRI we are building a momentum that is already influencing policy and global research. We compete, not against each other, but against cancer, our common enemy. Ultimately that will benefit patients, that is our focus."

Professor Mark Lawler

4 Case Studies

4.6 Resources for Education, Practice and Policy

SE: Supporting the social missions of enterprises across the island of Ireland

Key Points

- The social enterprise sector is growing on the island of Ireland and has deep impacts on communities.
- Researchers at Atlantic Technological University (ATU) and Ulster University (UU) are surveying, interviewing and mapping social enterprises in Ireland, and finding they need stronger collaborative networks, tailored support and recognition of their impact.
- The project has raised the profile of social enterprises in Ireland on both sides of the border, and is providing evidence for policies, education, and strategies to support sustainable growth of the sector.

Understanding the Social Entrepreneurship Ecosystem on the Island of Ireland

Lessons for Education, Practice and Policy

Funded under: Call 1, Strand I

Partners: Atlantic Technological University, Ulster University

What is a social enterprise? Is it a charity? Is it a not-for-profit run by volunteers? A for-profit business with a mission to help people? It could be any of these and more - but if you were not entirely sure, you are not alone. That's why, with support from the North South Research Programme, researchers from ATU and UU are engaging with social enterprises across the island of Ireland.

Their aim is to raise the profiles of these important enterprises, to build evidence about their activities and to identify and address the challenges they face - not least the lack of definition around social enterprise itself.

"We are looking at social enterprise from an evidence-based perspective," explains ATU researcher Dr Isobel Cunningham.

"Social enterprise has exploded on the island of Ireland, and we set out to raise the profile of these organisations and the importance of their work, to inform policy discussions and to develop a community of practice."

An appetite to share

To carry out the study, the researchers have to date engaged with around 150 social enterprises, industry stakeholders, and policy makers around Ireland through surveys, round tables, and deep interviews.

"There was a huge appetite for interviews among the social enterprises, they wanted to tell their stories," says Dr Cunningham.

"Because of that, we adjusted our data-collection plans to incorporate more interviews, which meant we had rich qualitative data to combine with the responses of surveys that we sent to businesses across the island of Ireland."

A complex picture started to emerge from the data - one where a variety of sizes and types of business were lumped under the one, poorly understood umbrella.

"We saw immediately that there was a lack of understanding of what actually defined a social enterprise," says Dr Cunningham. "As researchers we found this shocking, because social enterprise is a hugely important sector for communities, and it has exploded all around Ireland, north and south, in recent years."

What is a social enterprise, anyway?

Social enterprises take many forms, spanning a continuum from voluntary activities to for-profit organisations with a social mission, explains Dr Cunningham.

The key, she notes, is that the organisation has a social mission.

"Some social enterprises are purely not for profit, they might be charities or community groups that are run by volunteers and perhaps have a board made up of older or retired people who want to give back to a community," she says.

"Then you can have small businesses that provide important services in a community like childcare or skills training. And there are businesses of all sizes that perhaps have a policy to provide employment for people who have been out of work or offer subsidised rates for people who might not otherwise be able to afford or access a service. Or you might have large companies fulfilling their corporate social responsibility by engaging with social enterprise."

One example the project encountered is a physiotherapy practice, No Barriers, in Letterkenny that provides access to an exoskeleton - a device to help people with mobility issues - for rehabilitation. "This is one of only two exoskeletons in Ireland, and in this case, the owner of the business set up the No Barriers Foundation and Gym to make the exoskeleton available to people in the community, as well as a range of other equipment and services," says Dr Cunningham. "This is the social mission."

"Social enterprise has exploded on the island of Ireland, and we set out to raise the profile of these organisations and the importance of their work, to inform policy discussions and to develop a community of practice."
Dr Isobel Cunningham

Not one size fits all

At present, the supports made available for social enterprise in Ireland do not always take the diversity in the sector into account, according to the researchers.

"Everything is put under the one banner of social enterprise, whether it's a community group of volunteers, a physio practice or an SME - the common thread is that they generate income through an enterprise business model," says Professor Laura Bradley-McCauley, an expert in inclusive entrepreneurship from UU. "Yet these different types of organisations can have different needs."

Many social enterprises deliver a deep social impact, providing important services, products, and support in communities, as well as local employment and skills development, she adds.

"We discovered that many social enterprises are missing out on funding because they are not identified as enterprises that will scale and grow, but if they were removed from the locality the loss would be enormous."

In practice, many social enterprises that engaged with the study reported leaning heavily on grants to survive, which takes time and resources but does not provide long-term security, notes Dr Cunningham.

"We could see a large proportion of enterprises are less than five years old, and more than 75% of all of the social enterprises we engaged with had no succession planning," she says. "There is an urgent need to support them, to help them reach maturity and become sustainable businesses."

Social enterprise transcends borders

To date, the study has not found substantial differences between the social enterprise sector in the Republic of Ireland and Northern Ireland, suggesting that their needs and impacts are similar.

"Your social mission and impact doesn't necessarily stop when you hit the border," says Dr Cunningham. "And it would be a detriment to any research that's done on the island if it doesn't take in the perspectives of voices from both sides of the border."

The cross-border element itself has been a vital part of developing the research further, opening many doors, adds Professor Bradley-McCauley.

"Both institutions have committed to supporting three PhDs in a cross-border supervisory model in the area of social entrepreneurship for the next three years at minimum," she says.

"Indeed, one PhD student at Ulster University has secured the competitive Vice Chancellor's Research Scholarship to support their research. And the collaboration between ATU and UU - specifically the two researchers involved in this study - has resulted in additional relationships on research projects with the Universidad de La Sabana, Bogata, Columbia and Deakins University Australia."

> "Everything is put under the one banner of social enterprise, whether it's a community group of volunteers, a physio practice or an SME - the common thread is that they generate income through an enterprise business model,"
> **Professor Laura Bradley-McCauley**

Impacts for the future

By listening to the stories, successes, and concerns of social enterprises on the island of Ireland, the researchers are gathering evidence that can be used to inform policies that support the sector, and they are building connections between enterprises that could help each other. For individual organisations, the research points to the opportunities of working together, notes Dr Cunningham.

"Some of the smaller social enterprises could benefit from understanding where they are in the ecosystem, and if there are other organisations they can collaborate with, to pool or share resources such as bookkeepers for example, to apply for grants as collaborators rather than competitors and to collaborate with conventional businesses."

'Acquirepreneurship' could also help social enterprises in Ireland to grow, where an organisation is acquired to allow a social enterprise to scale and grow their income generation through additional product and/or service offerings, notes Professor Bradley-McCauley.

The researchers are also finding an openness in the sector to widening networks and sourcing relevant education and training for staff, she adds.

Mapping the ecosystem and identifying the different kinds of social enterprise will also help to enrich educational courses in business in Ireland, and the researchers hope to engender a mindset change more generally in Ireland about social enterprise as a career.

"So much of what we do in all walks of life, we measure people through financial impact," notes Dr Cunningham.

"If we look at the social impact, we see that social enterprises are hugely important on the island of Ireland and across the world. Yet still, there's a barrier to them when it comes to their support. Through this research we are providing the evidence we need to support them to become more sustainable, stronger enterprises within our communities and our regions."

"Some of the smaller social enterprises could benefit from understanding where they are in the ecosystem, and if there are other organisations they can collaborate with, to pool or share resources such as bookkeepers for example, to apply for grants as collaborators rather than competitors and to collaborate with conventional businesses."

Dr Isobel Cunningham

4 Case Studies

4.7 Women's Health and Reproductive Rights

COVICAT

COVID-19 infection and vaccination in pregnancy: An Irish cohort study and European ecological study to assess risks of congenital anomalies

Funded under: Call 1, Strand I

Lead Partners: University College Cork, Ulster University

Towards stronger data on vaccinations and infections in pregnancy

Key Points

- Little was known about COVID-19 infection, vaccination uptake, and the impact of these among pregnant women on the island of Ireland.
- The COVICAT study found that available data sources on infection and vaccination rates in Ireland were not suitable for scientific analysis, while data sources in Northern Ireland had unique ID numbers, allowing research to be conducted.
- The study has outlined how a more robust and reliable information-gathering system about vaccinations and pregnancy could help the island of Ireland to be more prepared for future healthcare emergencies such as a pandemic.

The arrival of vaccines was a major turning point in the COVID-19 pandemic. For many people, it potentially reduced their chances of severe illness from the SARS-CoV2 coronavirus. However, pregnant women who were thought to be at particular risk from the virus had concerns about whether the vaccines would be safe for their unborn babies.

COVICAT, a project funded under the North South Research Programme, sought to examine the data on COVID-19 infection and vaccine uptake among pregnant women on the island of Ireland, and to explore the effects, if any, on the developing foetus.

The research team at University College Cork (UCC) and UU soon identified serious barriers to accessing data needed for the research. The project is now highlighting the need for more streamlined data processes, improved data access, and better data collection to help prepare for future pandemics and other health emergencies.

COVID-19 and pregnancy - the bigger picture

"Monitoring COVID-19 infection and vaccination during pregnancy is important because we know that during pregnancy a person can be at greater risk of becoming severely ill from the virus. When a vaccine becomes available, there is another question - should women take the vaccine or not?" explains COVICAT lead Dr Ali Khashan, a researcher in public health and epidemiology at the INFANT Centre in UCC.

When COVICAT started in 2022, studies showed that only 58% of new and expectant mothers in Ireland had been vaccinated against COVID-19, and reports in the United Kingdom suggested that pregnant women were more likely to need intensive care if infected with the virus.

The researchers at UCC and UU wanted to get the bigger picture, explains Dr Khashan.

"Originally we set out to establish the patterns of exposure to COVID-19 infection and vaccine uptake in pregnancy in the North and South of Ireland, and to look at rates of congenital anomalies in pregnant women exposed to infection or vaccination in 19 European regions or countries, including the Republic of Ireland," he says.

"We were particularly interested to see if there was an association between rates of COVID-19 infection and vaccine uptake, and the prevalence of anomalies of foetal development in the first three months of pregnancy (first trimester)."

> "Monitoring COVID-19 infection and vaccination during pregnancy is important because we know that during pregnancy a person can be at greater risk of becoming severely ill from the virus. When a vaccine becomes available, there is another question - should women take the vaccine or not?"
> **Dr Ali Khashan**

Data challenges north and south

Collaborating on an all-island basis made sense, according to Dr Khashan.

"Our expertise in UCC and UU aligned on this issue, and working together meant we could compare data about infections and vaccines during pregnancy from Northern Ireland and from the Republic of Ireland," he says.

The researchers began looking for relevant data in several open-access data sources on COVID-19 infection and vaccines and conducted a survey of relevant policies and data sources in the European Surveillance of Congenital Anomalies (EUROCAT) registries, but issues soon arose. While the virus was the same on the island of Ireland, it soon became clear that the types of data collected and shared about COVID-19, vaccination and pregnancy differed north and south of the border. The population-level data in Northern Ireland was good, but accessing it was time-consuming, according to COVICAT co-lead Dr Maria Loane, a Senior Research Fellow at UU.

"In Northern Ireland, everyone is allocated a unique Health & Care number at birth, which can be used to link their health care records held in different databases," she explains.

"For instance, a pregnant woman's maternity records can be linked to her records in the infection or vaccination database using her unique ID number. This allows population-level data to be available for research, but it is time-consuming to get all the ethical and governance approvals to access the data, and there is a cost involved."

The picture south of the border was even less ideal.

"It was difficult to access suitable data on COVID-19 and pregnancy from hospital records, and pregnancy status had not always been recorded in the available vaccine or infection databases," says Dr Khashan. "Also, we could source useful data from some counties - notably Cork and Kerry, but not national data."

Project pivot

The lack of linkage between the datasets in Ireland, the inconsistent quality, and the long wait to access data - up to two years in some cases - meant that meaningful research on COVICAT's initial question was not possible.

"The Republic of Ireland strand of the project pivoted away from analysing the data and towards highlighting the need for more co-ordinated and reliable data collection and access about pregnancy and COVID-19 infections and vaccines," says Dr Khashan.

"As a research and healthcare community, we need to be able to access and analyse high-quality data on COVID-19, pregnancy, and vaccination. High quality data will give us more reliable information to evaluate public health guidelines and improve research on mother and child health across the island of Ireland."

Better data for pandemic preparedness

With the focus now on improving data quality and access for research into COVID-19 and pregnancy, the COVICAT team has written papers and is preparing policy briefings to highlight issues such as data quality and fragmentation, privacy issues, incomplete reporting and the need for standard procedures for researchers to access data in Ireland. Meanwhile in Northern Ireland, although there was a delay in getting access to the data, analysis of the data is ongoing.

"In our experience of seeking to access data about pregnancy and COVID-19 infection and vaccination, once we were put in touch with the right individuals, they were very helpful," says Dr Khashan. "But there are systemic issues that need to be addressed for the data to be useful for delivering better healthcare."

In particular, COVICAT's comparison of data north and south of the border has shone a light on how unique identification numbers and linking databases can facilitate research and more impactful responses. COVICAT also found that researchers on the island of Ireland face delays in data access, even after sometimes lengthy ethical approval for research, underscoring the need for more efficient systems to support future pandemic preparedness.

Addressing issues and looking forward

The project team is now working with many colleagues in the health system to address issues raised by COVICAT about data collection, reporting and access for research, says Dr Khashan.

"Pregnant and breastfeeding women and their babies are vulnerable populations in events such as pandemics and outbreaks of infections," he says.

> "Pregnant and breastfeeding women and their babies are vulnerable populations in events such as pandemics and outbreaks of infections,"
> **Dr Ali Khashan**

"Better collection and use of data would help the healthcare system to prepare initially and then monitor the health of these populations during an emergency. This would provide reliable evidence to inform timely public health interventions and support to help them."

Dr Loane notes that the need for developing, strengthening and maintaining national healthcare systems on infections and vaccinations is consistent with the World Health Organisation's Pandemic Agreement (Article 6.3), adopted 20th May 2025 at the 78th World Health Assembly.

She explains that results from the Northern Ireland strand of the study will describe COVID-19 infection and vaccination rates in pregnant women and in women of childbearing age as well as factors such as maternal age, which may affect vaccine uptake.

"This information is essential for future pandemic preparedness as it may be used to target pregnant women who are less likely to get vaccinated," she says.

The results from the European study will provide evidence-based information on the risk of congenital anomalies associated with COVID-19 infection and vaccine uptake, adds Dr Loane.

"This is a valuable contribution to the literature as our results are based on the analysis of a large European congenital anomaly database. Finally, the results will benefit pregnant women who are hesitant to get vaccinated due to concerns that the vaccine may harm their unborn baby, as well as their health care providers who want to provide optimum care and treatment to both the pregnant woman and her unborn child."

"In our experience of seeking to access data about pregnancy and COVID-19 infection and vaccination, once we were put in touch with the right individuals, they were very helpful, but there are systemic issues that need to be addressed for the data to be useful for delivering better healthcare."

Dr Khashan

4 Case Studies

4.8 Border Studies

BORDEX

The Post-Brexit Security Field on the Island of Ireland: The Role of Civil Society in Everyday Security

Funded under: Call 1, Strand I

Lead Partners: Technological University Dublin, Queen's University Belfast

The 'informal security' that helps keep the peace on the island of Ireland

Key Points

- Peace is vital on the island of Ireland, but security is not the sole domain of formal institutions.
- The BORDEX project is highlighting the 'informal' work of community members, organisations, and schemes in averting conflict and maintaining peace and stability in border areas.
- The research is spotlighting the need to resource and support such efforts, because they contribute to peace on the island of Ireland.

Who keeps the peace? We often think of the formal structures, such as policing bodies and the judiciary. But what about the people and organisations in local communities who, through their dedication, know-how and dialogue, maintain a type of 'informal security' that averts conflict?

The BORDEX project, a partnership between Technological University Dublin (TU Dublin) and QUB, sought to find out more about the initiatives that quietly maintain peace and stability in everyday life on the island of Ireland.

By focusing particularly on border regions, and speaking with community members, they are shining a light on the work that often goes unrecognised, but which form an important component of peacekeeping.

BORDEX, which is funded through the North South Research Programme, explores the premise of 'nodal governance security,' explains Dr Matt Bowden, a sociologist at TU Dublin.

"This is the idea that security does not rely only on the formal institutions but is also carried out in disparate networks and local communities that seek to maintain civic peace," he says.

Informal security in border regions

The BORDEX researchers - Dr Bowden (Lead), Dr Amanda Kramer (Co-Lead), Dr Allely Albert (Co-Lead) and Chloe Carragher (Postgraduate Researcher) - focused their efforts on two regions, spending a year each in the area between Newry and Dundalk on the East coast, and the area around Derry-Londonderry, Strabane and Letterkenny on the northern coast.

"There is a lot of fluidity of people across the border, particularly between Derry and Donegal," says Dr Bowden. "We saw that many people lived on one side of the border and worked on the other, many of them spanned the jurisdictions in the course of their day." When the researchers engaged with people living in these border areas, they found that the word 'security' could be contentious and narrowly defined, he notes.

"We believe that security needs a wider redefinition," says Dr Bowden. "Security is not the sole property of the formal institutions; in practice we see a more 'informal security' that takes into account the agency that people in the community exercise on a daily basis."

> "We believe that security needs a wider redefinition. Security is not the sole property of the formal institutions; in practice we see a more 'informal security' that takes into account the agency that people in the community exercise on a daily basis."
> **Dr Matt Bowden**

Everyday security in practice

To date in the BORDEX project, the researchers have engaged with more than 240 stakeholders in the border communities. They have held workshops, carried out surveys and conducted in-depth interviews with key figures in each border region. And what they found was that several subtle and everyday activities and diversions were happening on the ground.

"We encountered the everyday work of local people and civil society organizations who manage very tricky and often tension-laden situations," says Dr Bowden.

"They are able to avert a crisis before it becomes a crisis, or deal with an issue before it becomes a major security challenge."

Some of that work focuses on traditional flashpoints, such as parades and marches, explains Dr Bowden.

"We saw that people and civil organisations were working with the Police Service of Northern Ireland and planning routes to help ensure that a planned parade would pass peacefully, and maybe working with groups of young people, providing activities that would draw them away from the parades where they might otherwise be involved in tension."

Other examples included community alert schemes, farmers' organisations, groups that support ethnic minorities in border communities and organisations working in addiction services, mediation interventions, and mental health support, and with people at risk from domestic or gender-based violence.

Insights to strengthen informal security

One of the challenges facing the work of 'informal security' is that it tends to go under the radar, according to Dr Bowden, who hopes that the BORDEX project can highlight its importance and need for support.

"We have been astonished at the scale and extent of informal security activities in communities in the border areas," he says.

"Many of these are driven by volunteers, and we see a high degree of cooperation between groups, such as traditionally loyalist communities engaging with the GAA, for example, or voluntary organisations working with the policing bodies to help keep older and more vulnerable people in communities safe in their homes."

Many of the activities that support everyday peace and stability are supported by fundraising, and Dr Bowden hopes that the findings of BORDEX will highlight the need to resource and support such activities more sustainably.

"Fundraising takes extra time and commitment, it is a lot of extra work, and there is a strong reliance on voluntary activity," he says.

The interpersonal relationships and networks that underpin the activities also need to be protected and strengthened, he adds. "So often we see that people are drivers of this informal security, and when someone moves on from a role it can introduce a level of fragility," he says.

Dr Albert from QUB highlights the central role of informal security: "'What this research seems to indicate is that local everyday security efforts are not simply complementing formal institutions, as commonly portrayed, but are an integral and vital part of the security fabric, generating the foundations of safety in many communities."

"We have been astonished at the scale and extent of informal security activities in communities in the border areas. Many of these are driven by volunteers, and we see a high degree of cooperation between groups, such as traditionally loyalist communities engaging with the GAA, for example, or voluntary organisations working with the policing bodies to help keep older and more vulnerable people in communities safe in their homes."
Dr Matt Bowden, Sociologist at TU Dublin

Support for peace

The BORDEX project has now raised external funding for a large stakeholder event and is applying to form a consortium for further research, explains Dr Bowden.

"The research has been enlightening in many respects, and we believe that now that we are identifying how informal security happens in practice, we need to inform policies and resources to better support it," he says.

"We don't read about these everyday actions in the newspaper, but without them peace and stability in the border areas could be much more at risk."

Dr Albert believes the research will bring the importance of informal security into the spotlight.

"It is challenging for these organisations to reflect the value of their work, as it is often preventative in nature and therefore difficult to capture," she says. "However, it is clear that without their efforts, communities would not experience the same level of safety and support that they currently do."

"'What this research seems to indicate is that local everyday security efforts are not simply complementing formal institutions, as commonly portrayed, but are an integral and vital part of the security fabric, generating the foundations of safety in many communities."

Dr Albert

4 Case Studies

4.9 Policy Development

Stable Lives, Safer Streets

A north south hub of scientific excellence to serve intergovernmental and statutory frameworks in the policy area of Youth Crime

Funded under: Call 1, Strand II

Lead Partners: University of Limerick, Queen's University Belfast with the Centre for Effective Services

Youth-informed evidence to help divert young people from a life of crime

Key Points

- Thousands of young people on the island of Ireland are at risk of becoming involved in serious and violent crime, and the Stable Lives, Safer Streets takes an all-island approach to gathering evidence that supports youth justice policies to prevent offending and make communities safer.
- Understanding the reasons that influence serious crime and violent offending and guiding young people away from crime on the island of Ireland, is central to prevention.
- More effective, evidence-informed policies and interventions will prevent and divert young people from crime and reduce harm on the island of Ireland.

When a young person gets involved in crime, the impact can cast a long shadow for the young person, their victims, and the wider community. Youth work and diversion initiatives on the island of Ireland can help to reduce harm and improve opportunities, directing thousands of young people away from serious and violent crime, towards more stable and safe lives.

But how can we give young people a voice in these initiatives? How can we ensure that youth justice policies on the island of Ireland are informed by evidence? And how can the two jurisdictions in Ireland learn from each other, to help prevent youth crime, exploitation, and detention?

Enter the Stable Lives, Safer Streets research hub, a partnership between University of Limerick (UL), QUB and the Centre for Effective Services (CES), funded through the North South Research Programme.

"Our focus is on gathering evidence to inform policy and decision-making, and to identify gaps in our knowledge," says co-lead Dr Catherine Naughton, whose research at UL focuses on intervening with young people involved in criminal networks.

"Our research across the Stable Lives, Safer Streets hub looks to make youth justice systems more efficient and effective across the island of Ireland, so that young people are diverted from a life of crime."

An all-island approach to youth justice

The Stable Lives, Safer Streets hub, which runs until 2026, links the two jurisdictions on the island of Ireland, and the four-years of funding under the North South Research Programme offers the opportunity to develop projects of different scales and depths.

That includes working with young people and frontline workers across Ireland and tackling challenges that both jurisdictions face.

Some of the projects, for example, explore why those who have left state care are over-represented in the criminal justice system.

"We are mapping the policies and the available supports north and south," explains Dr Naughton.

"Our work is showing that they need support systems before they leave and as they transition out of care, and we are speaking with young people from both jurisdictions to find out what is needed to reduce offending and divert them from detention," she says.

The hub's research is also uncovering evidence that the needs that underlie serious youth crime and child criminal exploitation are similar across the two jurisdictions, notes Dr Colm Walsh from QUB, who co-leads the project.

"The support from the North South Research Programme through the HEA has allowed us to embed research insights and 'what works' evidence into prevention efforts, directly influencing legislative, policy and practice change - particularly in the area of criminal exploitation and supporting," he says.

"The needs of vulnerable children and the motivations of criminal networks do not care about jurisdictions - they may even benefit from it. By taking an all-island approach, we are breaking barriers, enhancing understanding, testing novel practices, and building all of this into our teaching for students in QUB and UL."

"Our focus is on gathering evidence to inform policy and decision-making, and to identify gaps in our knowledge,"
Dr Catherine Naughton

Giving young people their voice

Earlier stage prevention is a central tenet of youth justice strategies north and south and giving voice to children involved in serious crime and violence is a means of achieving this via Stable Lives, Safer Streets.

Several researchers in the hub work directly with young people who have lived experience of youth justice and diversion programmes, including young people in alternative care and in detention.

"We are working to ensure that all of our research amplifies voices that are often marginalised, that we build in mechanisms to actively enhance children's participation in research," says Dr Walsh.

Dr Naughton speaks of the need to give young people a voice in youth justice in a meaningful way.

"Our researchers are speaking to young people directly, finding out about how their histories have shaped their offending behaviours," she says.

"In some cases, the young people who are in detention are being trained to become peer researchers themselves. These young people are carrying out their own projects, and they will help us with the analysis of our findings."

Protecting vulnerable young people

As well as taking a grassroots approach with young people and frontline workers, Stable Lives, Safer Streets is identifying evidence gaps in youth justice policy on the island of Ireland and gathering evidence to inform future policies and priorities.

"Our policy-led research collaboration with key departments and agencies, across the island, is helping to embed evidence into policy, and it's identifying some areas that require special attention," says Dr Walsh.

He highlights that a key benefit of the hub has been being able to respond to the needs of the youth justice system. "As an example, Youth Justice services in Northern Ireland recognised a distinct need with young women," he says.

"They asked if the hub could support research around understanding the specific needs of this group, and we were in a position to move with agility. We have undertaken two studies, both due to be published, that highlight the gendered pathways into serious offending for girls and young women. These findings have practice implications."

The research is also looking at how to protect socially isolated or impressionable young people at risk of being recruited into the dangerous world of drug-related organised crime.

"We are speaking to the young people and to the parents and frontline workers," says Dr Naughton. "We need to identify the barriers and make sure that vulnerable children are getting the joined-up, holistic support they need."

> "We are mapping the policies and the available supports north and south. Our work is showing that they need support systems before they leave and as they transition out of care, and we are speaking with young people from both jurisdictions to find out what is needed to reduce offending and divert them from detention,"
> **Dr Catherine Naughton**

Engaging with decision-makers

To ensure that the evidence is put into practice, Stable Lives, Safer Streets is engaging with policy and decision-makers who shape the systems themselves. That includes regular meetings with a ministerial/youth justice working group that was set up following the Good Friday Agreement to foster a coordinated approach to youth criminal justice on the island of Ireland.

"The two co-leads attend the meetings of that group to update them on the progress we are making with the research," says Dr Naughton. "And we listen to the inputs from both jurisdictions, to help us identify policy and research gaps for their policy priorities."

In May 2025, the research team presented their work to both Ministers for Justice, who provided positive feedback and expressed interest in the cross-border, evidence-informed approach.

Quoted from the press release marking the occasion Minister O'Callaghan said: "It was insightful to hear from the academics leading the Stable Lives, Safer Streets project. Their collaboration will create an all-island Research Hub in Youth Justice which will be a superb resource in creating evidence-informed policy across the island and successfully translating that into practice."

Minister Long said:
"The Stable Lives, Safer Streets initiative represents a significant investment in understanding the issues that affect vulnerable young people and their communities. It is encouraging to see cross-border research being put at the centre of future policy development. This collaborative approach will help ensure that our responses to youth crime and criminal exploitation are both evidence-based and effective."

> "The support from the North South Research Programme through the HEA has allowed us to embed research insights and 'what works' evidence into prevention efforts, directly influencing legislative, policy and practice change - particularly in the area of criminal exploitation and supporting."
> **Dr Colm Walsh**

4 Case Studies

4.10 Community Participation

MISTE: Multilingual Island: Sites of Translation and Encounter

Funded under: Call 1, Strand I

Lead Partners: University of Galway, Queen's University Belfast

Stories, tech, churches, and footballs: Understanding multilingualism in community spaces

Key Points

- Community organisations and activities can support and welcome people from different cultures who speak languages other than English, but language can be a barrier in these spaces.
- The Multilingual Island project found that technology and volunteers often enable multilingualism in communities in practice, and that storytelling can be a powerful way for cultures to share experiences.
- The findings offer practical steps and changes for communities to take account of multilingualism and offer more welcoming spaces for integration.

From Polish to Portuguese, from Ukrainian to Urdu and everything in between, the island of Ireland is home to many tongues. How we speak is an important part of our identity, so how can communities open up to welcome more languages in day-to-day and shared activities?

The Multilingual Island project, funded by the North South Research Programme and run by the University of Galway and QUB, examines community spaces where multilingualism occurs in Ireland without professional interpreters or translation, focusing on religious sites, sports venues, and cultural spaces.

The project partners hope that by highlighting and enabling multilingual interactions in these spaces, they can support the integration of cultures in Galway and Belfast, and across the wider island of Ireland.

"We know from census information in Ireland and in Northern Ireland that there is a huge increase in multilingualism in Ireland, but sometimes it happens behind closed doors, or people don't realise the extent of different languages being used in communities," says linguist and project co-lead Professor Anne O'Connor from the University of Galway.

"Understanding the extent and character of multilingual interactions can help us facilitate the most appropriate translation and interpreting practices to create more welcoming, supportive, and creative spaces of cross-cultural encounter," adds Professor Piotr Blumczynski, translation expert, and project co-lead from QUB.

Observing multilingualism in action

To build a deeper understanding of multilingualism in practice, the researchers worked with and visited communities, to witness multilingualism playing out in practice.

"We got in touch with local community groups, sporting organisations, libraries and religious communities in multicultural and multilingual districts of Galway and Belfast," says Professor O'Connor.

The research team, who themselves speak multiple languages, attended sporting and religious events, training and other community-based activities and took notes of their observations. Then they interviewed key figures about their work and experiences in encountering and encouraging the use of different languages.

"We wanted to highlight aspects of multilingualism where people are naturally mixing, and also to look at barriers to participation," says Professor O'Connor.

"For example, a sporting organisation like a football club might want to encourage diversity, but perhaps they don't even realise there is a language barrier that is stopping people from participating in their activities."

The research also set out to inform municipal or city-level integration initiatives, she adds: "We are highlighting the benefits of these multilingual community interactions and the need to support local groups and reduce linguistic obstacles that can hinder full participation and positive outcomes."

All-island integration can benefit from the findings, too. According to Professor O'Connor and Professor Blumczynski, there is a need to understand the things that people do to make integration work in a multicultural society, what solutions people are finding in local communities, to explore how that could be resourced and scaled.

"Understanding the extent and character of multilingual interactions can help us facilitate the most appropriate translation and interpreting practices to create more welcoming, supportive, and creative spaces of cross-cultural encounter,"
Professor Piotr Blumczynski

Technology and volunteers

The study observed high degrees of multilingualism in the community spaces analysed - so what works to encourage this multilingualism in practice?

Technology and volunteers play crucial roles, according to the research. 'Pocket' technologies such as translation apps and websites on phones enable real-time communication between individuals, or can support translating material into multiple languages, notes Professor O'Connor.

"You have to be careful with the technology of course, as it can mistranslate, but we found that in practice in these communities, it offers people an immediate way to communicate with people who speak another language," she says.

"And in religious communities, we saw simultaneous interpreting through ear sets, they had invested in the technology to promote understanding across languages."

Volunteers also play crucial roles on the ground, according to the study.

"A lot of the communities we worked with are leveraging the members of their community who are proficient in more than one language," says Professor O'Connor. "These volunteers are acting as language ambassadors, offering their services and their abilities to enable communication within their groups."

Volunteers are typically happy to do so, says Professor O'Connor, but the study also found that it could potentially stray into becoming a burden. "This is especially if someone is trying to participate in an event themselves, and are also constantly having to be the interpreter," she says.

"Meanwhile, religious practices and sports activities often provide safe, welcoming spaces for migrants to participate in the life of a local community, regardless of communication barriers. Religious worship and sport may function as international languages," says Professor Blumczynski.

Sharing stories

As well as documenting the enablers and barriers for multilingualism in Irish communities, the project brought members of various migrant and Irish communities together to share stories from their cultures.

'Telling and Translating Folktales' workshops took place in Galway, and in Belfast there were workshops on stories about language learning, migration and interlingual and cross-cultural encounter.

"We worked on storytelling as an activity that would bring people together in a way that values their own language," explains Professor O'Connor.

By telling their 'Once Upon a Time' stories in their own language, participants found a creative and welcoming outlet where they could express aspects of their culture and talk about their own journeys in life. The activity reframed multilingualism as an asset, according to Professor O'Connor.

"What we all have in common is a heritage of telling stories, so we focused on finding that moment of connection between people that their multilingualism enables," she says.

"Encountering others and their stories in different languages, and relating them to our own through creative translation, allows us to challenge stereotypes and develop cross-cultural sensitivity," says Professor Blumczynski.

> "We are highlighting the benefits of these multilingual community interactions and the need to support local groups and reduce linguistic obstacles that can hinder full participation and positive outcomes."
> **Professor Anne O'Connor, University of Galway.**

Simple changes, profound impacts

The research took place at a time of anti-migrant protests in Galway and Belfast, which underscored the need to understand approaches to peaceful integration, notes Professor O'Connor. The team is now producing guidelines for community organisations to highlight and embrace multilingualism.

"It could be something simple like a football club displaying 'welcome' signs in different languages, and coaches being aware that some players and parents did not grow up speaking English and may not be aware of slang terms," she says.

"Then for religious services, multilingualism can be a way for generations in families to connect in that space, so children, parents and grandparents can spend time together."

The findings also provide insights for communities and policymakers about how technology can help to overcome language barriers, and how volunteerism is needed, but individuals must not be overloaded.

"We were very much working at community level in this project, but what we have found can now inform policy and practice in integration on the island of Ireland," says Professor O'Connor. "More support for linguistic diversity in community organisations can help build diversity and understanding."

"Through encouraging reflection and raising awareness of the benefits of multilingualism, and promoting creative practices in translation and interpreting, we hope to contribute to building a truly shared island," concludes Professor Blumczynski.

List of religious sites
St Mary's Claddagh, Galway Polish Mass
St Anthony's Parish Church, Belfast Polish Mass
St Nicholas Cathedral
Loughrea Cathedral Ukrainian Easter Mass
Holy Family Church Mervue Malayalam Mass
Discovery Church, Galway
Biserica Ortodoxă (Orthodox Church), Galway
Good Shepherd Catholic Church Doughiska, Galway
Maryam Mosque in Galway
Every Nation Church Belfast
Fisherwick Presbyterian Community
Great Victoria Street Baptist Church
North Belfast Christian Fellowship
Ishan Youth and Family Centre Mosque, Belfast

Sports Research Projects:
Belfast, Multi-Ethnic Sports & Cultures NI (MSCNI)
Belfast, Shankill Leisure Centre; World United Futsal team
Belfast, Street Soccer NI
Galway St James GAA
Galway City Partnership, Healthy Ireland program
Sports Hub, ARD Family Resource Centre, Doughiska
Community Development, ARD Family Resource Centre, Doughiska
St Michaels GAA Club, Galway
St James's Ladies Club, Renmore Galway
ARD Family Resource Centre, Health Fit, Physical Fitness Centre, Doughiska
Galway Sanctuary Runners group
University of Galway Parkrun
Indian Sports Community, Galway Lawn Tennis Club
SheMoves, Salthill Knocknacarra GAA Club

4 Case Studies

4.11 Mental Health

AIM4HEALTH

AI helps to uncover factors that influence mental health in Ireland

Artificial Intelligence approaches to addressing Mental Health inequalities in Ireland through improved diet and lifestyle.

Funded under: Call 1, Strand I

Partners: Ulster University, Trinity College Dublin, The Open University

Key Points

- AIM4HEALTH used innovative Artificial Intelligence (AI) tools to analyse data from more than 5,000 people on the island of Ireland, seeking indicators of mental health issues in older adults.
- Social isolation, smoking, and social deprivation emerged as important risk factors, and the research identified a simple test that could potentially help GPs to identify people at risk of dementia.
- The findings are being shared with citizens - all who participated received a report on the outcomes from the engagement - and the findings can now help to inform policies and clinical practice and to empower people to protect their mental health into older age. The AI tools applied in the study can now be used for further research.

Depression and anxiety are often overlooked and undertreated in older people. If we understood the factors that put a person at more risk of developing cognitive and mental health issues as they get older, more resources could be put in place to help.

But what are the important risk factors? By using Artificial Intelligence (AI) to examine a large set of data from the island of Ireland, the AIM4HEALTH project sought to discover indicators that could help identify people who are at risk of mental health issues in adulthood and older age - and it has turned up some unexpected results.

AI for complex datasets

"The AIM4HEALTH project is about looking for indicators of what affects people's mental health across Ireland, using AI to identify factors and patterns in the data," explains Professor Michaela Black, who is Professor of Artificial Intelligence at UU.

The researchers used AI to analyse the all-island Trinity-Ulster-Department of Agriculture (TUDA) dataset, which contains information about hundreds of factors relating to medical, biological and lifestyle history in 5000 generally healthy older adults recruited from the island of Ireland, and from 1000 who took part in follow-up assessments.

"We looked in TUDA for predictors or indicators of mental health issues," says Professor Black. "That included factors relating to nutrition, lifestyle, genetic and socio-economic factors."

The scope and depth of the data - which included blood tests, brain scans, bone density measures, and mental health scores as well as survey answers - offered an opportunity to use new AI methods that could spot patterns that may otherwise be missed.

With funding from the North South Research Programme, the cross-border team applied two specialised AI techniques to analyse the TUDA data. The researchers in Trinity College Dublin, led by Dr Mimi Zhang, used an innovative clustering technique to overlay sections of data and identify relationships between them. The researchers in Ulster University, led by Professor Black, used a classification and prediction approach powered by AI.

"In both cases, we didn't try to influence the AI, we wanted to see what it would draw out," says Professor Black. "These are the kinds of patterns that would otherwise be very difficult to identify in such a rich and diverse dataset, even with standard AI."

"The AIM4HEALTH project is about looking for indicators of what affects people's mental health across Ireland, using AI to identify factors and patterns in the data,"
Professor Michaela Black

Loneliness, smoking, and deprivation push up risk

Some of the indicators that emerged through the AI-powered analysis are known to be linked to poorer mental health and cognitive function in older age. They include social isolation or loneliness, physical frailty, and smoking.

"The results confirmed that, for populations on both sides of the border, older age, physical frailty, smoking and living alone were each linked with diminished mental health," says Professor Black.

Socio-economic context also emerged as an important factor, she adds: "For those living in deprived areas, we could see that the cognitive function and mental health tended to be poorer when compared with other groups."

According to the data, women experienced depressive symptoms more frequently than men, and married men were more likely to have better general health than men who did not have a partner. And when the researchers merged the results for people living north and south of the border, the findings typically held, notes Professor Black.

"We anticipated that there might be a difference, given that there are separate health systems in each of the jurisdictions," she says. "But that is not what we saw when we analysed the data."

Timed up and go

One of the most surprising findings was an association between the standard 'Timed up and go' mobility test for older people and the onset of dementia, according to Professor Black.

"The test measures the time it takes for a person to get out of a chair and walk a few steps," she explains. "Our data showed that if someone was taking longer to complete the test, it could be an indicator that dementia is developing."

The finding, which supports other research in this area, suggests that the test could be used in community health settings, such as GP surgeries, to help identify people at risk of dementia and perhaps prompt more timely referrals for support for dementia.

An all-island response to an all-island issue

The entire AIM4HEALTH project was enriched by collaboration across the border, which brought diverse skills and insights to bear - including Professor Black's expertise in AI, Trinity College Dublin-based Project Coordinator Professor Anne Molloy's understanding of the TUDA dataset, nutritional and lifestyle insights on TUDA from Professor Helene McNulty's team in UU and clinical insights from consultant geriatrician Professor Conal Cunningham's team in St James's Hospital in Dublin.

Professor Jonathan Wallace, Professor of Innovation at UU, and Paul Carlin at the Open University facilitated the community engagement within the research, utilising the 'engage' methodology and service solution developed by Ulster and widely used across research projects, as well as with government departments, professional bodies, and private sector organisations.

By compressing weeks or months of data collection and analysis into a single event, 'engage' is the only solution that delivers same-day objective consultation at scale.

"Mental health in older age is an all-island problem," says Professor Molloy. "And having the data and skills from both sides of the border for this project was invaluable."

> "The evidence we found can now help to inform policy, resource planning and clinical practice, and improve people's mental health on the island of Ireland."
> **Professor Michaela Black**

Implications for society

The insights emerging from AIM4HEALTH can now be used to improve the understanding of early warnings that a person could be developing poor mental health in society, according to Professor Black.

"Our findings are for everyone - for clinicians, charities, policy makers, service providers and citizens themselves," she says. "The evidence we found can now help to inform policy, resource planning and clinical practice, and improve people's mental health on the island of Ireland."

The project also shows the power of AI in this type of research, notes Professor Molloy. "As researchers using these AI tools, it is reassuring to show that patterns within our TUDA dataset can provide independent supportive evidence for factors that are already suspected to influence the development or progression of some complex age-related conditions," she says. "Our work provides further proof of concept for the value of these tools in future research."

In particular, the cross-clustering used in AIM4Health is a new AI-based technique that came out of this work, notes Professor Black. "This approach could now be applied to other datasets on the island of Ireland and indeed around the world," she says.

Citizen engagement - a key element of research

A key part of the AIM4HEALTH study design was to engage with citizens, says project co-lead Professor Jonathan Wallace, Professor of Innovation at UU.

"We held events in Dublin and Derry where people could discuss openly with us about what they wanted from the research, and then we fed back to them about what we were finding," he explains. "This is really important, because often papers and reports are written but people outside of the academic or policy-making sphere don't find out about them."

The initial workshops asked citizens what they felt were the key factors which contribute to good and poor mental health in Ireland, and how they would like AIM4Health to impact these factors and risks. Several themes emerged in the discussions about how to support good mental health. They included the need to be active and socialise, to have good nutrition and a supportive community and for financial security and access to healthcare and services.

The stakeholders consulted suggested that the AIM4Health research project could help to empower older people with information about how to lower the risk of developing poor mental health and that the findings could influence government policy and funding for social engagement groups.

"This kind of engagement is really important to help inform effective responsible and trustworthy research," says Professor Wallace.

"Patient and Public Involvement and Engagement (PPIE) is essential in healthcare research because it enhances research quality and relevance by incorporating lived experiences, strengthens the ethical basis of studies, and promotes trust and public confidence in research. By including patients, carers, and community members, PPIE ensures research addresses real-world needs, results in more acceptable and understandable study designs, and leads to better recruitment and dissemination of findings, ultimately improving the impact and value of healthcare research for society."

> "We held events in Dublin and Derry where people could discuss openly with us about what they wanted from the research, and then we fed back to them about what we were finding. This is really important, because often papers and reports are written but people outside of the academic or policy-making sphere don't find out about them."
> **Professor Jonathan Wallace**

CLÁR TAIGHDE THUAIDH THEAS
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