Scottish Research Innovation Futures

Our Future Health in Scotland

Event Report | 18th May 2021

"We're bringing together the triple helix of government, academia and industry to explore where the opportunities lie [for Research and Innovation] to move us further towards a sustainable post-Covid healthcare system."

Dr Terry O'Neill, Event Chair and Head of Health, KTN

Scottish Research Innovation Futures is a challenge-focused workshop series, organised by Research Innovation Scotland (RIS) in collaboration with KTN. This series aims to take a closer look at key challenge areas and understand how collaborative research and innovation can contribute to overcoming them in Scotland's mission to build back better.

The first workshop 'Our Future Health in Scotland' aimed to identify where the immediate and long-term challenges exist for our Health Service and how collaborative research and innovation can help overcome them. This workshop was led by two Scottish Research Pools – SULSA (Scottish Universities Life Sciences Alliance) and SINAPSE (Scottish Imaging Network: A Platform for Scientific Excellence) – in collaboration with KTN and focused on the health and wellbeing theme.

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1. Introduction

As public and private sector attempt to address the clinical backlog exacerbated by Covid-19, collaborative research and innovation (R&I) can – and must – provide solutions. In May 2021, Research Innovation Scotland (RIS) invited 45 researchers, clinicians, entrepreneurs, investors and policymakers to explore the challenges and opportunities in two key health technology areas:

- **management of existing long-term conditions**
- **early detection of disease**

Every participant had front-line experience and involvement in clinical care, impact-focused research & innovation, running trials, raising finance or policy intervention. The event design leveraged this transdisciplinary experience, focusing on interactive discussion of core opportunities, hurdles, enablers, priorities, and successful examples of advancing R&I during the pandemic, including over 30 case studies showcased in the workshop brochure.

2. Setting the Scene

Two presentations from policymakers and funders kicked off the event, providing context, themes and pointers for the interactive discussions that would follow.

First, **Andrew Fowlie**, Scottish Government Lead for Health, Social Care and Industrial Innovation, outlined the key trouble areas for the NHS now and in the future, and signposted key priorities and programmes of activity for his team.

Then **Richard Hebdon**, Interim Deputy Director for Health & Life Sciences, Innovate UK, summarised the current funding landscape and priorities for innovation and change, and presented a useful summary of health & social care and life sciences wish lists:

Of the 770 life science companies and 41,000 people working across Scottish life sciences, 250 of these companies and 9,000 of those individuals operate in the medical technology subsector.

What is needed from a health & social care perspective?	What does the life sciences sector want?
Prediction and case finding	Investment
Referral management & triage	Accelerated growth
Early diagnostics / assessment and AI	Support with regulation
Asynchronous consulting	Staff
Staff and fixed assets resource utilisation	Access to NHS and social care test beds
Risk stratification and prioritisation	Access to supply chains
Dynamic waiting list tools	End to end innovation – shorten the distance between innovator and customer
More effective treatment / interventions	Sales in UK markets and growth –early sales to investment
Personalised and simplified follow-up surveillance	

Richard referred to possible future funding areas, which could extend beyond the development of technologies, medicines and self-managed care solutions to include:

- pandemic preparedness R&I
- new investor partnership models
- funding plus targeted support, e.g. support with navigating regulation
- industrial skills & training

Scotland's med tech industry has enjoyed 8% growth for the past decade

Both presentations, and the pointers to possible future funding areas, informed the rest of the workshop, and gave participants useful signposts for future planning and collaborations.

3. Insights for Change and Recovery: The Breakout Sessions 1

After the first plenary session, eight breakout groups discussed three set questions addressing healthcare technology challenges and opportunities, with the composition of each group designed to promote cross-disciplinary and cross-sectoral thinking:

1. **Where are the hurdles in management of existing long-term conditions / early detection of disease?**
2. **Where are the opportunities for innovation in healthcare (health tech specifically) to alleviate the Covid-19 backlog and protect our future health?**
3. **What other areas are compounding the backlog and could be supported through innovation?**

The breakout discussions were wide-ranging, informed and packed with specific examples for each question and a number of cross-cutting themes were apparent across the groups.

> *"We should look on the backlog as an opportunity, not a challenge, for building better systems in future – for example, the pressure on (NHS) waiting lists will force new ways of working"*
>
> **Workshop Participant**

EMERGING THEME: FOCUS

Despite (or perhaps because of) the clear confidence in the richness of research and innovation in life sciences and healthcare tech in Scotland, there were questions about focus, ranging from the conceptual to the specific. Here's a taster:

- Does a challenge focus mean missing out on left-field solutions, or overlooking local needs?
- Are public-sector funders too cautious about funding high-risk, high-win innovation?
- Should we focus on primary or secondary care, and where does integrated care fit in?
- Should we work differently, e.g. moving to AI-driven community diagnostic hubs? And should we prioritise devices that provide *earlier* diagnosis or algorithms for more *accurate* diagnosis?

Participants highlighted numerous opportunities to address the clinical backlog using health tech, ranging from better management of diabetes or multiple morbidities, to earlier detection of cancers, to improved monitoring of resources such as bed space, to further development of teleconsulting approaches (including into the acute setting), as well as other examples mentioned below. Advocates of suggested opportunities all thought them worthy of further investigation by RIS.

EMERGING THEME: DATA

Data was a key theme across the breakout groups, with participants highlighting uncertainties or lack of knowledge around:

- what data to gather
- how to access large-scale data sets (and what a 'large' data set actually means)
- where and how it is stored
- how it is distributed and integrated into the product development process

Participants said many answers and solutions to these issues already exist, but are not necessarily understood or applied. **Collaboration, especially transdisciplinary collaboration, could address this, easing and improving the development of new devices, technologies and approaches.**

Opportunities were also highlighted to use big data and AI to improve the management of existing long-term conditions, and reduce hospital admissions, e.g. the integration of environmental data with patient data to enable predictive and proactive management of respiratory and cardiac illness.

EMERGING THEME: REGULATION

"*Obviously, these regulations are there for a good reason, but we find a lot of bureaucracy wrapped up around them, especially in the UK,"* said one industry participant, explaining it can take up to six months to get regulatory approval in the UK, compared with two weeks in the US.

- **The Covid Exemplar:** Unsurprisingly, there was a chorus about learning from the accelerated approval and adoption of Covid-19 vaccines. There was a call for a collaboration between researchers, policymakers, regulators, clinicians and NHS managers to explore and map this process, to provide an exemplar for accelerating wider non-vaccine innovation.
- **Approvals**: A related regulatory hurdle was the requirement for multiple approvals: "*Is there also something we can learn from vaccine updates that allows incremental or dynamic changes / improvements to devices and systems without having to go through the whole approval process?"*
- **Expertise**: Several participants referred to the need to improve regulatory expertise among SMEs, clinicians, researchers and other innovators. One suggested enabler was an infrastructure of regulatory specialists working across the whole ecosystem (not individual NHS Trusts or HEIs) to guide and accelerate innovators through regulatory processes.

EMERGING THEME: ADOPTION AND SCALING-UP

Speed of assessment and adoption, after the regulatory stage – or rather, lack of speed – was a recurrent lament, and an obstacle course of hurdles was mentioned. As a result, innovators and investors are taking their ideas elsewhere for adoption. But opportunities were also mentioned:

- **Improved Digital Training / Skills:** Among clinicians and procurement teams could extend their understanding of, or openness to, healthcare tech's potential.
- **Access**: There was repeated praise of the NHS testbed system for helping companies build evidence, though also a feeling that, *"Innovators also need to speak with the procurement decision makers."*
- **Systemic Issues**: Improvements in diagnostics could increase short-term waiting list pressures and perhaps act as a disincentive to adopting solutions that could generate significant long-term savings. However, dismantling of silos in health economics could help on this.

4. Views from the Frontline

Following the breakouts, participants returned to a plenary session to hear from Dr Poonam Malik, Scottish Enterprise and Skills Development Scotland board member, who highlighted the power of strategic partnerships and innovation across healthcare, industry and academia. This was followed by short presentations from researchers and clinicians who have advanced their own R&I activity during the pandemic.

> *"Our ecosystem allows the opportunity to advance science with collaborators, extend beyond the standard comfort zone, engage transdisciplinary scientists, clinicians, machine learning and AI experts, mentor entrepreneurs, start and grow companies. At the bottom of it all – it's about people."*
>
> **Dr Poonam Malik**
> Scottish Enterprise and Skills Development Scotland Board Member

THE FLASH PRESENTATIONS: SPEAKERS AND LEARNING POINTS

- **Dr Tom MacGillivray, University of Edinburgh** – *Assistive technology for eye care and developing imaging biomarkers*
- **Dr Debbie Wake, MyWay Digital Health** – *MyWay Diabetes: Evolving digital diabetes care*
- **Prof Rod Murray-Smith, University of Glasgow** – *Closed-loop data science and healthcare*
- **Prof Frances Mair, University of Glasgow** – *Experiences from the SelfBACK study- an AI-based smartphone app to promote self-management of Low Back Pain*
- **Russell Overend, WideBlue** – *Developing Covid response medical devices: opportunities and remaining challenges*

Useful insights and learning points emerging from their presentations included:

- Adoption in the NHS can be easier or quicker if the solution fits into current clinical pathways: *"Our products and technology may be disruptive but we're not disrupting that pathway."*
- Earlier diagnosis may exacerbate clinical waiting lists, and therefore generate some resistance. Clinicians and managers may be more receptive to solutions that support decision-making about which patients to see first – important in the post-Covid backlog.
- Agility can open new doors, eg during Covid, changes of application or biology in medical devices led to new opportunities, partnerships and trials.
- Multi-disciplinary input is important: "*We used strong theoretical underpinning and best evidence … we followed clinical guidelines … and there was extensive involvement of end-users and healthcare professionals."*

5. Insights for Change and Recover: The Breakout Sessions 2

In the next phase of the workshop the eight breakout groups considered a further three set questions, exploring solutions to the healthcare technology challenges discussed earlier:

1. **How can collaborative R&I help in the health tech area to tackle these challenges?**
2. **How do we influence funding?**
3. **How can we work together differently to drive these ideas forward?**

As in the earlier breakout sessions, the breadth and depth of participants' expertise meant discussion was wide-ranging, some high-level, some specific. The headline themes below are summary, and include views expressed in the breakout groups as well as by speakers and questioners in a final panel Q&A session.

NEXT STEPS: COLLABORATION

There was agreement that collaborative R&I could certainly provide answers to reducing the backlog, and that Scotland has strong collaboration networks to build upon. Ideas for where the Research Pools, and RIS more widely, could extend existing activity included:

- **Widening the conversations:** There was a clear ask to take collaboration wider and deeper, initially through 'pre-filtered' workshop activity. Data scientists, social scientists, health economists and NHS procurement teams were some of the 'new' collaborators mentioned. Participants suggested more sharing of lessons from successful projects at, e.g., monthly KE meetings.
- **Support with connections:** Most SMEs and researchers thought it would be useful to have signposting to, and matchmaking with, clinicians and healthcare professionals open to collaborating on early input or trials. One SME pointed to some hospital trusts south of the border having central groups that can signpost to relevant researchers and specialists, making it easier to set up trials.
- **NHS connections:** It was mentioned that NHS clinicians and procurement teams may lack time or resources for networking since its value is not formally recognised. Mechanisms or funding allowing NHS procurement and assessment teams to network with researchers and SMEs and to scout out innovation could support progress.
- **Skills development**: Specifically, around better and wider understanding of healthcare technology (e.g. among clinicians, procurement and investors). Suggestions included: combined MSc programmes covering STEM and business, and being creative with industrial internships, scholarships and fellowships to bridge gaps (CDTs were mentioned positively in this connection).
- **Barriers to collaboration and collectivism:** It was posited that current systems disincentivise collaboration – e.g. researchers may face pressure to keep funding in-house, or be nervous of the individual risk involved in transdisciplinary research with uncertain outcomes. Could SFC and government mechanisms for impact assessment and funding give more recognition of the value of consortium-building, e.g. awarding "team points"? Are there lessons from funders (Leverhulme was mentioned) to show that collectivism is expected and that the risks are understood?
- **Dissemination and impact:** Another barrier may be lack of opportunities to talk about or publish interdisciplinary research. The regular KE meetings suggested above could help here.

Discussion of the themes below also suggested opportunities for future collaboration activity, which the Research Pools and RIS partners are ideally positioned to direct.

"Bottom-up partnerships are fundamental to success – where all parties engage in generating the shared mission and vision and all buy into it."

Workshop Participant

NEXT STEPS: FOCUS

As in the morning breakout, there was an abundance of views about where and how we find "high value". Below is a distillation of key points and perspectives:

- **Questions of scale:** There were advocates for both small-scale, 'fail-fast' approaches to funding and the 'grand challenge' approach, and a warning about defaulting to a position of "More research is needed" when iteration or translation of existing research could be more effective. There was some meeting of minds across these divides that stage-gate funding approaches could identify "winning" teams who were likely to achieve momentum and success.
- **Fragmentation and duplication:** Some felt there was too much of this in the system, with, e.g., trusts duplicating trials and spend. Suggested remedies included more centralised oversight of innovation (that still recognises local needs); and the requirement (and funding) for *"all innovation discovery to start with scanning what has been done, or is being done, already".*
- **Mapping exercise:** There was a call for collaborative activity to identify and map the pain and friction points in the landscape for innovation and deployment at scale, in order to address them.
- **Understanding costs:** Several discussions referred to health economics, and the need for a means of "measuring the overall costs to society" in delaying or not funding health and social care. It was suggested that access to operational data, including costs of treatment, would help researchers to understand the cost implications of tech developments, and also improve decision-making by policymakers, funders and the NHS. There was a sense that data was available for hospitals but not across the system, e.g. for social care. Further collaboration on this area was suggested.

NEXT STEPS: DATA

The afternoon breakouts looked at mechanisms to address the morning's points about data-related hurdles and opportunities. Among the suggestions and questions were:

- **Access to data:** Could infrastructure(s) be put in place for trusted groups / individuals to make better use of data? Would this be better done at local, national or transnational level?
- **Homogeneity:** Those who produce data may not fully understand the needs of data users (e.g. biologists and clinicians may not have the same needs), and academia and industry would also benefit from greater standardisation in the collection of data (e.g. by health boards). Input from data scientists could help to address these issues.
- **Next-step suggestions**: Included follow-up transdisciplinary workshops, bringing together clinicians / researchers and data scientists. Given the issues around privacy, trust and consumer attitudes, these collaborations should include expertise in social sciences, humanities and, perhaps, regulation.

NEXT STEPS: INVESTMENT

Several participants noted the value of Scottish Enterprise support for spinouts in Scotland, but there were also references to the difficulties in accessing VC funding for scale-up. Next-step suggestions for raising VC awareness of Scotland's healthcare tech strengths included:

- **Outward networking**: Could Scotland's healthcare innovation ecosystem, including RIS, use existing networks to open doors and make connections with VCs? These could include KTN, Scotland House in London and elsewhere, Global Scots and the Scottish Business Network.
- **Inward networking**: Could more VCs be brought here to meetings, events and showcases to build awareness of, and relationships with, Scotland's healthcare tech ecosystem?

6. Conclusion

As this report illustrates, the workshop participants identified a vast number of target areas for change, but what came over most strongly, in every session, was the importance the community places on collaborative, rather than competitive, working. Also clear was the demand for wider collaboration, bringing in different disciplines, sectors and job roles.

Facilitating such collaboration is at the core of the Scottish Research Pools' activity, as they have long worked to nurture productive networks and research partnerships that can respond to global challenges. Now, through partnership with the Innovation Centres and Interface, RIS can take this further by working collectively across disciplines and sectors to drive research and innovation to overcome society's grand challenges. Addressing the clinical backlog is just one of many areas where RIS can support Scotland's recovery and ambitions.

The 'Our Future Health in Scotland' workshop was an important step towards this, planting the seeds for future workshops, studies, and new research and innovation collaborations. The Research Pools and RIS partners will now nurture and develop these.

"There is a connected and collaborative culture already in place in Scotland – we should take advantage of this."

Workshop Participant

"The coming together of such a diverse group made for creative and inspiring discussion and we look forward to working collaboratively within our networks to move toward next steps"

Dr Alison Dun, SULSA Executive Director

"We need to be really challenging about the way Scotland funds a patient's journey, and not look at that funding in separate silos"

Workshop Participant

Be part of Scottish Research Innovation Futures

Scottish Research Innovation Futures is a series of workshops and other activities, organised by Research Innovation Scotland with KTN, exploring how collaborative research and innovation can tackle grand challenges and help Scotland build back from Covid-19. The series' themes include Health & Wellbeing, Digital Infrastructure and Manufacturing & Green Recovery, Just Transition to a Net Zero Carbon Society, and Climate & Environment.

To register your interest in any of these themes, please visit:
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