

Literature review (summary): how high-performing organisations have developed improvement and/or innovation hubs

1. Introduction

Improvements and innovations are essential to transformation and driving the quality agenda. Evidence provided from innovations and improvements in practice will in turn help to develop and evaluate better tools and ways of working. In its recent review of the innovation landscape in Wales, the Innovation Advisory Council for Wales (IACW) posited that 'Innovation is the most powerful tool at the disposal of government in tackling the grand challenges in Wales, including reducing poverty, improving public services [and] addressing wellbeing ...' (IACW, May 2021). Six months later, the First Minister announced building capacity in health and life sciences as one of five research, development and innovation priorities (Welsh Government, November 2021).

Innovation has thrived during the Covid-19 pandemic. This has been achieved by eliminating (or at least minimising) barriers hampering innovation, and working together across sectors (NHS, industry, academia) to introduce innovations and improvements at both pace and scale. Public Health Wales needs to harness the momentum and learnings from doing things differently as it develops its approach to establishing an Improvement and Innovation (I&I) Hub.

This paper outlines the findings of a literature search on how high-performing organisations have developed improvement and/or innovation hubs.¹ It provides a brief assessment of the context in Wales with respect to innovation and improvement approaches, and summarises good practice drawn from the NHS, local authorities, other public sector organisations and the private sector.

2. Welsh perspective

Innovation and improvement in NHS Wales has been underpinned by a Welsh Government-funded infrastructure since 2018/19. Deriving from *A Healthier Wales* (2018), the government's long-term plan for health and social care in Wales, Research, Innovation and Improvement Co-ordination (RIIC) Hubs have been established in each regional partnership board (RPB) across Wales. As a nationally-coordinated network, it aims to bring together RII activity in each region to accelerate and support the drive towards new and better models of care. In addition, the three NHS Wales Trusts have appointed senior strategic partnership and co-ordination national leads to engage with and work alongside the regional hub network.

While RIIC hubs determine their own work plans on an annual basis, they are required to consider the 'scalability' and 'value' of RII activities to support the broader ambition of spreading and scaling improvements and/or innovations from one region to another, or from local to national level. Examples of work undertaken by RIIC hubs and national leads (Trusts) includes:

¹ The term 'hub' is used as shorthand for varying structures that exist to support an organisation's improvement and/or innovation agenda; some are called labs, units, teams or other related terms.

- Collecting and developing ideas i.e. Improvement and Innovation Network Portal (Welsh Ambulance Services NHS Trust)
- Working in partnership to support the testing of ideas i.e. Get Fit Wales, a programme delivered with Newydd Housing Association to support children's activity levels through the use of fitness trackers (Cwm Taf RPB (lead) with Cardiff & Vale RPB and Public Health Wales as partners)
- Developing online resources to support the Emotional Health and Wellbeing 'Five Ways to Wellbeing' project (North Wales RPB)

The creation of RIIC hubs was designed to enhance, rather than replace, existing provision for improvement and/or innovation. For example, several health boards have a dedicated staff member or team responsible for providing quality improvement (QI) training for staff: the QI Hub at Betsi Cadwaladr University Health Board (UHB) delivers the Improvement in Practice training developed by Improvement Cymru, as does Swansea Bay UHB's improvement team (it also delivers Improving Quality Together Bronze). Aneurin Bevan UHB's Continuous Improvement (ABCi) approach is underpinned by two teams: one tasked with building QI capability, and the other developing integrated analytical and modelling capability to support decision making and quality planning. Powys Teaching Health Board currently has one improvement coach, though is planning to recruit another to enhance its QI training and support offer.²

Innovative approaches deployed during the Covid-19 pandemic led to the establishment of an Advanced Digital and Physical Engineering Hub to address specific challenges Cwm Taf Morgannwg UHB was facing in sourcing parts from suppliers. Based at Prince Charles Hospital, the hub brings together industry, engineers, academics and health board staff to rapidly prototype (and later scale) solutions using 3D printing capabilities that were already present in its Maxillofacial-Dental laboratory. Hywel Dda UHB is also working closely with industry through its newly-established TriTech Institute, which offers a 'single point of access to the NHS' for health technology developers.

Following precedents set in the US (Virginia Mason) and Sweden (Jönköping), leaders at Cardiff & Vale UHB believe that staff have two roles: to do the day job, and to improve the day job (Collins, 2021). This is enabled by simplifying decision-making processes, empowering frontline staff to deliver improvement projects and supporting them with QI training provided by a central improvement and implementation team (currently being developed into a hub and spoke model).

3. I&I Hub: Functions

Scoping for Public Health Wales' I&I hub has been underpinned by a review of over 65 hubs in Wales, the UK and beyond.³ Reasons for setting up the hubs

² Appendix A outlines information captured on staff resourcing in I&I Hubs and/or improvement functions in Wales.

³ This includes 19 improvement hubs, 37 innovation hubs and 9 improvement and innovation hubs (see Appendix B).

varied. Some were principally set up to increase QI awareness, capability and engagement among NHS frontline staff (Bunn et al., 2020; B. Jones & Woodhead, 2015), while others were designed as ecosystems to accelerate innovation, often focussing on one part of the 'innovation spiral' (Nesta, 2019) e.g. generating ideas or developing and testing. Creating and communicating a strong core mission for the hub arose as a vital step towards enabling its success. From its review of 20 i-teams⁴ across the world, Nesta's primary lesson in establishing a new i-team is: be clear about your ultimate goal, and create the i-team accordingly (Puttick et al., 2014).

Building improvement capability and driving innovation requires sufficient resources, both to support the immediate setting up of a hub structure and to sustain its activities over time. South Eastern Health and Social Care Trust's Safety, Quality and Experience programme in Northern Ireland minimised costs by designing and delivering its programme in-house using staff who have (and are retaining) other day-to-day roles (clinical and managerial) (B. Jones & Woodhead, 2015). Most examples, however, comprised a dedicated, often centralised, team. In some cases, efforts are made to leverage additional funds from external partnerships to undertake I&I projects. For example, Centro de Innovación Social (Centre for Social Innovation) in Columbia utilises funding from public-private partnerships to run pilots, and the Urban Lab in Barcelona enables businesses to test prototypes in real urban settings (all testing costs covered by the company) (Puttick et al., 2014).

There is a danger, however, that insufficient resourcing will be detrimental to the hub achieving its aims. A QI leader from one NHS Wales health board outlined to us the challenges of unstable resourcing; their QI team had dwindled by almost 50% in recent years due to roles not being backfilled. This led to difficult decisions about which projects to support, due to reduced capacity to support 'bottom-up' projects (though every effort is made to do so in order to maintain engagement of frontline staff with the QI agenda). Fixed term funding also proves challenging. Annual funding allocations (as per the RIIC model) can, as RIIC leaders have described, create job insecurity leading to staff attrition. In addition, the scale of the hub's ambition can be curtailed by focussing on year-on-year plans without the option to develop and work towards longer-term objectives.

4. I&I Hub: Approaches and Activities

A broad approach to supporting I&I is taken by some hubs, such as the Behavioural Insights Team. Established in 2010 as part of the Cabinet Office (now operating as a global social purpose company), the team worked across a spectrum of projects from healthcare to taxation, each time using behavioural economics and randomised controlled trials to solve problems and/or improve services. It began with an initial skunkworks model, whereby the team worked

⁴ 'I-teams' refers to teams, units and funds set up or funded by governments to make innovation happen.

largely under the radar. In time, impact created through transformation in initial projects drove up the demand for its services.

In contrast to this broad-based model, other hubs operate in a more targeted way by aligning their activities to priority areas and/or to their organisational strategy. For example, NHSX Innovation Lab’s work is underpinned by alignment to the five NHSX priorities (reducing staff burden; helping access to clinical information; improving productivity; providing tools to access services directly; improving safety). Similarly, the Alder Hey Children’s Hospital Innovation Hub publishes priority needs on its website, and invites responses from industry with technical solutions (even if not market ready). Scottish Health Innovations Ltd appears in-between targeted and broad approach; it lists a current priority area (frailty), though is open to exploring other ideas.

Cognitive diversity emerges as a key factor, especially for innovation hubs. A toolkit developed by members of the Healthcare Innovation Lab at Washington University in St. Louis’ School of Medicine suggests that the ‘ideal’ innovation team brings together clinical, research, operations and data/analytical expertise (Bhatia & Maddox, 2020). In addition, Puttick et al (2014) advocates for a combination of insiders and outsiders to push forward the innovation agenda. MindLab, an innovation and invention incubator based in Danish central government (2002-2018), deliberately built a team with mixed expertise, as did the Centro de Innovación Social (Centre for Social Innovation) in Columbia (for which two thirds of staff are drawn from the private sector).

The following table outlines key activities undertaken by the hubs we reviewed:

	Key Activity
Top activities for improvement hubs	<p>Training</p> <ul style="list-style-type: none"> • 79% of improvement hubs provided training. • Methodologies: lean, kaizen (continuous improvement), model for improvement • Provision for differing levels of competency i.e. bronze/silver/gold or yellow- and green-belt for more advanced training.⁵
	<p>Resources</p> <ul style="list-style-type: none"> • Guidance e.g. starting an improvement project. • Case studies of successful I&I projects. • Toolkits e.g. Nesta’s Innovation Growth Lab experimentation toolkit.
	<p>Coaching</p> <ul style="list-style-type: none"> • Beneficial to support both I&I projects. • Can help to build capability at scale: <ol style="list-style-type: none"> Sheffield Teaching Hospital’s Microsystem Coaching Academy expects each trained coach to develop an improvement microsystem in their area. Innovation Agency’s Coaching Academy provides a coaching programme and promotes a culture of spreading and scaling innovation. (Innovation Agency is the AHSN for the North West Coast, England)
T	Trials / test bed

⁵ Southcentral Foundation in Alaska expects all staff to know basic QI methods (Collins & Berwick, 2015).

Other	<ul style="list-style-type: none"> • Most prominent activity for innovation hubs; approach typified by 'doing'. • Use of randomised control trials to test interventions. • Attractive to industry partners wishing to test innovations in a real world setting (approach taken by NHS Scotland West of Scotland Innovation Hub, with a proven track record of scaling up innovations to regional and national level).
	<p>Working in partnership</p> <ul style="list-style-type: none"> • With universities and industry partners • Aligns with NHS Wales Planning Framework 2020-23: 'working with others [...] must be a key part of our approach to innovation'.
	<p>Idea generation and development</p> <ul style="list-style-type: none"> • Provision for collecting ideas e.g. web form, online portal, WhatsApp (in one case). • Some hubs focus submissions by outlining a clear remit e.g. NHSX Innovation Lab's remit does not include medical devices or projects on Artificial Intelligence. • Support for spread and scale.
	<p>Citizen engagement</p> <ul style="list-style-type: none"> • Co-production of systems design and service improvements with patients, families, carers and the public. • Involvement in user testing e.g. Innovation Agency has a youth forum (members aged 13-20) to test innovations.
	<p>Grant giving</p> <ul style="list-style-type: none"> • Often competitive allocation to support or test 'bottom-up' I&I ideas. • Can be a step towards attracting external investment e.g. Innovation Ventures (Cincinnati Children's Hospital) provides proof-of-concept/early stage funding. • Can support scale e.g. baseline criteria for the Investing in Innovation Fund (i3) in the US: the idea (i) must be better than status quo; (ii) must be scalable.
	<p>Events</p> <ul style="list-style-type: none"> • Conferences • Webinars e.g. Newham I&I Hub hosts bimonthly webinars with patients • 'Labs' e.g. South Yorkshire & Bassetlaw Integrated Care System Innovation Hub introduced quarterly 'labs' to bring together health and care professionals to explore innovation challenges. Delivered in partnership with a trans-disciplinary research group's 'living lab'.
	<p>Signposting</p> <ul style="list-style-type: none"> • To national programmes e.g. Improvement Cymru's work. • Making connections to/between organisations within the system (e.g. NHS providers) and beyond (industry/academia).
<p>Commercialisation</p> <ul style="list-style-type: none"> • Support functions to aid commercialisation feature in some innovation hubs e.g. Health Innovation Manchester's Innovation Nexus programme (STEP INTO healthcare) helps SMEs to develop and pitch for the healthcare sector. • Requires specialised expertise: intellectual property guidance and protection; regulatory compliance advice; liaison with and support from procurement. 	

	Key Activity
improvement hubs	Training <ul style="list-style-type: none"> • 79% of improvement hubs provided training.
	Resources <ul style="list-style-type: none"> • Guidance, Case studies or Toolkits
	Coaching <ul style="list-style-type: none"> • support both I&I projects and help to build capability at scale
innovation hubs	Trials / test bed <ul style="list-style-type: none"> • Most prominent activity for innovation hubs; Attractive to partners wishing to test innovations in a real world setting
	Working in partnership <ul style="list-style-type: none"> • With universities and industry partners
	Idea generation and development <ul style="list-style-type: none"> • Provision for collecting ideas and support for spread and scale.
Other	Citizen engagement <ul style="list-style-type: none"> • Co-production of systems design and service improvements and involvement in user testing
	Grant giving <ul style="list-style-type: none"> • Often competitive allocation to support or test 'bottom-up' I&I ideas.
	Events <ul style="list-style-type: none"> • Conferences, Webinars, 'Living labs' e.g. to bring together health and care professionals to explore innovation challenges.
	Signposting <ul style="list-style-type: none"> • To national programmes
	Commercialisation <ul style="list-style-type: none"> • Support functions to aid commercialisation feature in some innovation hubs

5. I&I Hub: Communication and Stakeholder Engagement

I&I hubs bring unique value and expertise to organisations by deploying novel methodologies and maximising time and space (which is so often scarce) to explore new solutions or improve current practices. To be successful, I&I hubs need to 'continually demonstrate and communicate [their] unique value', or risk low stakeholder engagement and, ultimately, failure (Puttick et al., 2014).

Many I&I hubs have strong strategies in place for creative use of social and online media to build credibility, share their successes and extend their reach. For example, the NHSX Innovation Lab (established in 2020) uses its website as a roadmap for its work, outlining projects completed, underway and in the pipeline. Its approach is open and transparent; proof-of-concept codes are made openly available on [Github](#) (a software development platform) and the team publishes which I&I ideas submitted via its online form have been referred on (e.g. if outside of the Lab's remit). Yorkshire & Bassetlaw Integrated Care System Innovation Hub is extending its reach via a podcast, which is used to disseminate positive I&I stories (one initiative per podcast).

Discussions with a CVUHB I&I leader highlighted a need to consider how best to message the hub's offer. They outlined different approaches for different users;

unlike internal communications, the [Dragon's Heart Institute](#) – the external-facing arm for innovation – is not overtly badged as CVUHB which seems to increase engagement with their target audience (largely businesses). Similarly, several I&I hubs market themselves to innovators outside the health and care sector as a 'single point of entry to the NHS'. Dedicated I&I communications staff enable powerful and professional messaging to ensure that key stakeholder groups are reached and engaged.

There also needs to be clear strategies in place for the wider implementation and ongoing delivery of successful I&I solutions. Good practice is to identify relevant stakeholders ('operational partners') early on in the I&I process, and work with them to ensure a smooth handover (Bhatia & Maddox, 2020). Timely handovers also ensure that I&I teams remain focussed on their core mission of developing solutions for identified problems.

6. I&I Hub: Evaluation and Success Criteria

We are told that innovation labs (and I&I hubs by extension) are more likely to fail without metrics measuring their performance (Bhan Ahuja, 2019), yet defining measures of 'success', especially for innovation, is not easy. Possibilities include:

- (i) macro-level metrics, such as number of innovations generated or implemented (approach used to evaluate Welsh Ambulance Service Trust's I&I Network Portal (J. Jones et al., 2020));
- (ii) project-specific metrics, such as adoption uptake, clinical outcomes (e.g. hospitalisation figures, length of stay etc), and financial impacts (e.g. cost savings or project-specific return on investment) (Bhatia & Maddox, 2020);
- (iii) less tangible metrics, such as return on investment in the form of new knowledge and insight gained (Bhan Ahuja, 2019).

Dr Alan Willson argues that outcome data linked to Welsh Government's Quadruple Aim⁶ should be the metrics used to measure innovation change (Willson, 2021). Further, he asserts that changing the measures requires a culture shift in terms of staff expectations, particularly within the NHS where performance culture is deeply embedded.

As well as growing what works well, metrics can also help us to identify what is ineffective and can be stopped. Findings from our Staff Innovation Survey (2020) indicate that this is an area to strengthen at Public Health Wales. Stopping projects and/or services 'build[s] credibility and focus[es] scarce resources on what's effective' (Puttick, 2014).

7. Recommendations

⁶ As outlined in *A Healthier Wales* (2018), the four themes of the Quadruple Aim are: (i) improved population health and wellbeing; (ii) better quality and more accessible health and social care services; (iii) higher value health and social care; (iv) a motivated and sustainable health and social care workforce. (Welsh Government, 2018) (accessed 8 December 2021).

To summarise learning, here are some key recommendations to support the development of Public Health Wales' I&I Hub:

1. We need a clear vision and mission to underpin the hub and its activities.
2. We need senior executive support to champion I&I, help create the conditions for it to flourish, to encourage staff engagement and help overcome barriers.
3. We need to develop a team that is diverse in its skillset and expertise to drive forward I&I.
4. We need to identify and track metrics so we know what is working well (and, importantly, what is not).
5. We need to continually demonstrate and communicate the team's unique value by drawing upon creative communication strategies and tools.
6. We need to consider carefully the 'route to market' e.g. handovers to other parts of the organisation, or as part of I&I adoption and implementation.
7. We need the hub to work with others (e.g. through partnerships or networking) to maximise opportunities to develop and embed improvements and innovations.

8. References

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Appendix A

Table 1. Staff resourcing in I&I Hubs and/or improvement functions in Wales

Name	No. of staff (FTE if known)	Job titles (band if known)
Aneurin Bevan UHB	Not known	<ul style="list-style-type: none"> • ABCi Improvement Lead
Betsi Cadwaladr QI Hub	4 ⁷ (Overall the health board has 29.8FTE aligned to QI. There are three teams: Nursing QI Team; Medical QI Team (leads QI Hub); Service Improvement Team ⁸)	<ul style="list-style-type: none"> • Lead Manager for Quality • QI Facilitator • Senior Associate Medical Director and Improvement Cymru Clinical Lead • Service Improvement Manager, Improvement Cymru
Cardiff & Vale UHB (CVUHB)	17 ⁹	<ul style="list-style-type: none"> • Head of Improvement & Implementation • Project Managers • Improvement Advisors
- Dragon's Heart Institute Innovation Team (also CVUHB)	2 ¹⁰	<ul style="list-style-type: none"> • Assistant Director of Innovation • Service Improvement Manager
Cwm Taf Morgannwg UHB	Not known	<ul style="list-style-type: none"> • Director of Improvement & Innovation
Hywel Dda UHB – TriTech Institute	9 ¹¹	<ul style="list-style-type: none"> • Scientific Lead and Head of TriTech • Clinical Lead

⁷ <https://www.bcuqi.cymru/ytim-team> (accessed 11 February 2022).

⁸ <https://bcuhb.nhs.wales/about-us/information-request/foi-disclosure-log-2021-22/002-21-foi-final-response-doc/> (accessed 11 February 2022).

⁹ Collins (2021).

¹⁰ <https://dragonsheart.org/introducing-the-innovation-team/> (accessed 14 February 2022). This innovation team at Dragon's Heart Institute works alongside an established Innovation Multidisciplinary Team (MDT) led by Professor Jared Torkington, Consultant Surgeon at CVUHB. The Innovation MDT is a partnership between CVUHB and Cardiff University. For further information, see <https://www.cardiff.ac.uk/medicine/research/clinical-innovation/the-clinical-innovation-multi-disciplinary-team> (accessed 14 February 2022).

¹¹ <https://tritech.nhs.wales/our-team/> (accessed 21 February 2022).

Appendix 2: I&I Hub Literature Review (Summary)

		<ul style="list-style-type: none"> • Innovation and Research Lead (also Senior Innovation and Grants Manager at Hywel Dda UHB) • Research Associate • Research Assistant x 2 • Healthcare Scientist • Clinical Scientist • Administrative Officer
Powys Teaching HB	1 (likely to increase to 2)	<ul style="list-style-type: none"> • Safety and QI Manager
Swansea Bay UHB Improvement team	5	<ul style="list-style-type: none"> • QI Manager (8a) • QI Facilitator (7) • Quality Analyst Manager (8a) • QI Analyst (6) • Administrator (3)
Velindre	Not known	<ul style="list-style-type: none"> •
WAST QI team	6 (5FTE) ¹² Will shortly recruit an additional four roles (4 x Senior Quality leads, band 8a) which will be embedded in territory areas across Wales.	<ul style="list-style-type: none"> • Head of QI • Improvement Lead – older people • Improvement Lead – falls • Improvement Coordinator • Improvement Manager (2 x 0.5FTE) <p>Additional resource via WAST RIIC lead (see below)</p>
RIIC Hubs		
Cardiff & Vale RPB	2	<ul style="list-style-type: none"> • RII Lead • Project Manager (7)
Cwm Taf RPB	6 ¹³	<ul style="list-style-type: none"> • RIIC Hub Lead • Local Authority Engagement Officer x3 • Project Manager • Communications & Engagement Manager
Gwent RPB	Not currently resourced	-
West Wales RPB	3 ¹⁴	<ul style="list-style-type: none"> • Head of Research, Innovation and Improvement (RII) • RII Practitioner • PA and Team Administrator
North Wales RPB	4	<ul style="list-style-type: none"> • Hub Manager • Project Manager • Specialist Librarian • Administrator

¹² Information from virtual site visit held 14 February 2022.

¹³ <https://www.ctmregionalpartnershipboard.co.uk/wp-content/uploads/2021/06/CTM-RIIC-HUB-ANNUAL-REPORT-1.pdf> (accessed 14 February 2022).

¹⁴ <https://nhs.walesleadershipportal.heiw.wales/research-innovation-and-improvement-hub> (accessed 14 February 2022).

Appendix 2: I&I Hub Literature Review (Summary)

West Glamorgan RPB	7	<ul style="list-style-type: none"> • Performance Manager • Data Analyst • Programme Director • Deputy Director • Transformation Manager (Integrated Board) • Finance & Performance Manager • Project Manager
Powys RPB	3 (2.4FTE)	<ul style="list-style-type: none"> • Hub Manager • Hub Business Manager • Administration Support Officer
Velindre	2.3	<ul style="list-style-type: none"> • Senior Strategic Partnership & Co-ordination National Lead
WAST	1	<ul style="list-style-type: none"> • Senior Strategic Partnership & Co-ordination National Lead

Appendix B

Table 2. List of Improvement and/or Innovation Hubs examined as part of the literature review.

Name	Type	Location
Alder Hey Children's Hospital Innovation Hub	NHS	England
AQuA	Public	UK
Behavioural Insights Team	Private (previously UK Government)	Global (initiated in London)
Betsi Cadwaladr University Quality Improvement Hub	NHS	Wales
Big Innovation Centre	Private	London (with franchises in Saudi Arabia and Dubai)
Birmingham Health Innovation Campus (in development - opening 2023)	NHS, local authority, academia	England
Birmingham Women's and Children's NHS Foundation Trust	NHS	England
Centre for HealthTech Innovation	Academia, NHS	England
Centre for Public Service Innovation	Government	South Africa
Centro de Innovación Social (Centre for Social Innovation)	Government	Columbia
Cincinnati Children's Hospital	Non-profit academic	United States
Cwm Taf Morgannwg (CTM) RPB RIIC Hub	NHS with government funding	Wales
Cystic Fibrosis Trust Innovation Hub	Academia and third sector	England
Dragon's Heart Institute (CVUHB)	NHS	Wales
East London NHS Foundation Trust	NHS	England
Fonds d'expérimentation pour la jeunesse (Experimental Fund for Youth)	Government	France
Greater Baltimore Medical Centre	Private	United States
Health Foundation Innovation Hub – Bradford and Craven	NHS, public sector and academia	England
Health Foundation Innovation Hub – Cambridgeshire and Peterborough	NHS, public sector and academia	England
Health Foundation Innovation Hub – Dorset	NHS	England
Health Foundation Innovation Hub – Manchester	NHS, third sector and academia	England
Health Innovation Hub Ireland (HIHI)	Public sector	Ireland
Health Innovation Manchester	NHS and academia	England
Healthcare Improvement Scotland iHub	NHS	Scotland
Hertfordshire Partnership NHS Foundation Trust Innovation & Improvement Hub	NHS	England

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Innovation Agency, Academic Health Science Network (AHSN) for the North West Coast	NHS	England
Intermountain Ventures	Private	United States
Investing in Innovation Fund (i3)	Government	United States
John Hopkins Technology Innovation Center	Academia	United States
Jönköping County Council	Public sector	Sweden
La 27e Région	Government	France
Leeds Innovation Pop Up	NHS	England
Mayo Clinic Innovation Exchange	Private	United States
Mayo Clinic Quality Academy	Private	United States
Mayor's Office of New Urban Mechanics (MONUM)	Government	United States
Memorial Hermann Surgical Innovation and Robotics Institute	Not-for-profit	United States
MindLab	Government	Denmark
Nesta Innovation Growth Lab	Third sector	Global
Newham Innovation and Improvement Hub	NHS / public sector (network of multidisciplinary primary care teams, community and social care providers)	England
NHS Education for Scotland's Quality Improvement Zone	NHS	Scotland
NHS England Improvement Hub	NHS	England
NHS Scotland West of Scotland Innovation Hub	NHS	Scotland
NHSX Innovation Lab	NHS	England
North Wales RIIC Hub	NHS with government funding	Wales
NYU Langone Medical Center	Academia	United States
Oxford University Hospitals NHS Trust QI Hub	NHS	England
Royal College of Physicians QI Hub	Professional body	UK
Royal Devon and Exeter NHS Foundation Trust	NHS	England
Salford Royal NHS Foundation Trust	NHS	England
Scottish Health Innovations Ltd (SHIL)	Private	Scotland
Sheffield Teaching Hospitals NHS Foundation Trust	NHS	England
South Eastern Health and Social Care Trust Quality Improvement and Innovation Centre	Public sector	Northern Ireland
South Yorkshire & Bassetlaw Integrated Care System Innovation Hub	NHS	England
Southcentral Foundation	Public sector	United States

Appendix 2: I&I Hub Literature Review (Summary)

Surrey and Sussex Healthcare (SASH) NHS Trust	NHS	England
TriTech Institute (Hywel Dda UHB)	NHS	Wales
University Hospitals Coventry and Warwickshire (UHCW) Innovation Hub	NHS	England
Urban Lab	Government	Barcelona
Veterans Health Administration	Public sector	United States
Welsh Ambulance Services Trust (WAST) Improvement & Innovation Network (WIIN) Portal	NHS	Wales
West Wales RIIC Hub	NHS with government funding	Wales
Western Sussex Hospitals NHS Foundation Trust	NHS	England
Wiltshire Health Improvement Hub	Local authority	England
Y Lab	Academia	Wales