

# **Connected Health North:** A Northern Supercluster in Health and Life Sciences to anchor industry in the UK

An outline case for investment

# Testimonials

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"As one of the world's leading health technology companies, Philips is supportive of developing new approaches to population health and addressing healthcare inequalities through the application of world-class research and development. We take the firm view that healthcare should be addressed as a connected whole, in order to unlock gains and efficiencies that drive innovations and deliver on the quadruple aim: enhancing the patient experience, improving health outcomes, lowering the cost of care, and improving the work life of care providers. We also believe that, where possible, the UK healthcare sector has the opportunity to set a trailblazing standard that other healthcare systems around the world might consider implementing, especially as the global community navigates its way through any treacherous future waves of COVID-19 outbreaks. This includes looking closely at how connected care and informatics can work together to connect patients and providers and use real-time patient data and clinical analytics to unlock more personalized patient care. All of this is closely aligned with the work you are looking to deliver in support of Health and Life Sciences across the North of England."

**Neil Mesher, CEO Philips UKI**

"Cytiva is looking forward to the opportunity to support the Northern Advanced Therapies Accelerator in the Connected Health North proposal. If successful in enabling the development and manufacture of Advanced Therapies, this proposal will perfectly compliment the work of the Northern Alliance Advanced Therapy Treatment Centre (NAATTC) in bringing these life-saving medicines to the regions patients"

**Bill Shingleton – Alliances Manager, Cytiva Cell & Gene Therapy**

"Having discussed the idea of a Northern Advanced Therapies Accelerator with Dr Scott and Prof Shaw, it is our opinion that such an accelerator would provide significant commercial value to companies such as our own; aiding the decision to locate to the North of England. We recognise its unique strengths and, once established, the Northern Advanced Therapies Accelerator will have our enthusiastic support."

**Nikolai Kunicher - CEO at Betalin Therapeutics Ltd**

"We are excited to support the Northern Advanced Therapies Accelerator as part of the Connected Health North proposal. The work that is being done in the North East can support more growth in the region and make a strong contribution to a wider UK initiative to promote research collaboration, partnership and investment globally as part of the government's Life Sciences Industrial Strategy."

**Suzanne Holden, Vice President, Thermo Fisher Scientific, Corporate Accounts, Country Leader United Kingdom**

"Alderley Park is part of Bruntwood SciTech, a 50:50 joint venture between leading property company Bruntwood and Legal and General. As the UK's largest life science campus, Alderley Park supports the generation of the Northern Supercluster in Health and Life Sciences to strengthen the industry in the UK. With 200 companies on site specialising in drug discovery and development, medtech, and diagnostics, our businesses would directly contribute to, and benefit from, the following accelerators: Northern Advanced Therapies, Digital Pathology and AI, Diagnostics and MedTech and Civic Data Cooperatives linked across northern cities"

**Anastassia Bolotkova, Business Development Lead, Alderley Park**

# 1 Executive Summary

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**This £260m proposal over three years has been developed and coordinated by the Northern Health Science Alliance, a mature supercluster of industrial, academic and health service strengths.**

It is a pan-northern England response to the needs of industry across the health and life sciences sector. It builds on the region's excellence in the sector to anchor companies in the UK. It will connect and mobilise the health and life sciences assets that matter to industry at a globally unique sector scale.

**By addressing current market failures in business support, over a 12-year period it will deliver:**

- Over 2,000 jobs created, and 3,000 jobs safeguarded with a £420m increase in GVA
- Over £500m in investment leveraged by companies as a result of NHS partnerships
- At least 50 companies fast tracking their growth from small to medium sized
- Facilitated international market entry at scale
- £5.7bn to the NHS in cumulative efficiency savings and additional clinical trials
- Enhanced coherence and visibility of UK excellence to international investors
- A new paradigm of cross-organisational collaboration at scale in support of industry.

**Connected Health North** will mobilise clinical and academic excellence, plus data curation and the application of artificial intelligence (AI) across a population of 16m to support industry and drive economic growth.

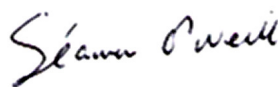
It complements other investments by the Government in northern cities and localities by amplifying and scaling up activities across the proposed work programmes. The infrastructure proposed is vital to enable companies to understand and address pressures and failures in the life sciences translational process and supply chain that have been exposed by Covid-19 and are likely to be further stress-tested by Brexit.

The programme will be led from, and will be delivered by, organisations with a track record for achievement and offers a unique opportunity to mobilise public sector assets in a globally important sector of the economy.

## On behalf of the NHSA membership



**Professor David Burn** Chair Northern Health Science Alliance and Pro-Vice Chancellor Faculty of Medical Sciences Newcastle University



**Dr Séamus O'Neill** Chief Executive Officer Yorkshire and Humber Academic Health Science Network

## Steering group

### University representatives

#### Professor Graham Lord

Vice-President and Dean of the Faculty of Biology, Medicine and Health University of Manchester, Executive Director of Manchester AHSC

#### Professor Louise Kenny

Executive Pro-Vice-Chancellor Faculty of Health & Life Sciences University of Liverpool,

**Professor Jo-Rycroft Malone** Dean of the Faculty of Medicine Lancaster University

### NHS Trust representatives

**Dame Jackie Daniel** Chief Executive Officer Newcastle upon Tyne Hospitals NHS Foundation Trust

**Julian Hartley** Chief Executive Officer Leeds Teaching Hospitals NHS Trust

### AHSN representative

**Richard Stubbs** Chief Executive Officer Yorkshire and Humber Academic Health Science Network

### NHSA Non-executive directors

**Professor Sir John Tooke**

**Dr Kath Mackay**

**Dr Johnathan Sheffield OBE**

# 2 Introduction

**Through Connected Health North, the Treasury can invest sustainably in the levelling up agenda, achieving a solid return in a globally important growth area.**

The investment will give a timely boost to the economy of northern England, and the UK as a whole. This will be built on over subsequent years to deliver lasting improvement. It will provide a long-term competitive advantage for the UK economy by unlocking the collective power of northern assets.

**About the NHSA:** This proposal is being led from the Northern Health Science Alliance (NHSA). Established in 2013 as a partnership between the leading NHS trusts, universities and Academic Health Science Networks across northern England, NHSA combines research and clinical excellence.

This civic scientific combination is unmatched in the UK and the quality and scale of the clinical-academic interface has unique global potential as an attractor for industry.

The NHSA has, over recent years, excelled in mobilising these assets across the north in delivering game-changing programmes of work such as the Treasury-funded £20m Connected Health Cities.

We have since, along with MedCity in London, secured UKRI funding to continue our work across the north on cluster development, international engagement and realising the Life Sciences Industry Strategy.

We have become the pre-eminent cluster-support organisation in the UK, and we are now able to offer, through our member organisations, this proposal which represents a paradigm shift in how publicly funded organisations take responsibility for supporting economic growth.

**This northern supercluster covers a population of 16m and the benefits of the investment will be far-reaching, enabling:**

- Established companies, large and small, to more easily access facilities and expertise to develop products and services with greater market fit, as well as bringing them to market sooner.
- Government to more securely level up public sector investment in the north, supporting excellence and promoting the resilience of the UK research and innovation infrastructure.
- The public to benefit from new approaches to population health and tackling health inequalities through application of world-class R&D in the north of England.

## 2.1 The case for investment

Industry partners have been central to the development of this proposal, with over 200 companies from major multi-nationals to SMEs feeding into the workstreams to identify barriers to growth and meeting clinical need. Many multi-nationals with a strong presence in the UK will benefit from this investment.

Those already involved with our member organisations, in areas covered by the proposed workstreams, include: Roche Diagnostics, GE Healthcare, Qiagen, Autolus, Philips, Novartis Gene Therapies, Leica Biosystems, Avacta Life Sciences, BAE Systems, Johnson & Johnson, IBM, Thermo Fisher Scientific, and many others including hundreds of SMEs which will benefit from access to the infrastructure developed.

We have also consulted with, and taken input from, the Office for Life Sciences, and included the relevant Catapults and arms-length bodies such as NHS E/I and NHSX as active partners.

A key ask from industry is to join up and develop existing assets rather than create new, unless there is evidence of a gap or to meet a need from industry. This is the quickest and most cost-effective way to deliver solutions to industries' urgent needs and a good return on investment.

This urgency is driven by the need to give a clear signal of support for this sector on the journey through Brexit and Covid-19 recovery.

**The offer to industry: Connected Health North can address this by providing a new networked infrastructure of nationally and internationally excellent assets across academia and the NHS through the following workstreams:**

- **Northern Advanced Therapies Accelerator**
- **Digital Pathology and AI** – building on the National Pathology Imaging Cooperative
- **Diagnostics and MedTech Accelerator**
- **Mental Health Innovation Accelerator**
- **Civic Data Cooperatives** linked across northern cities

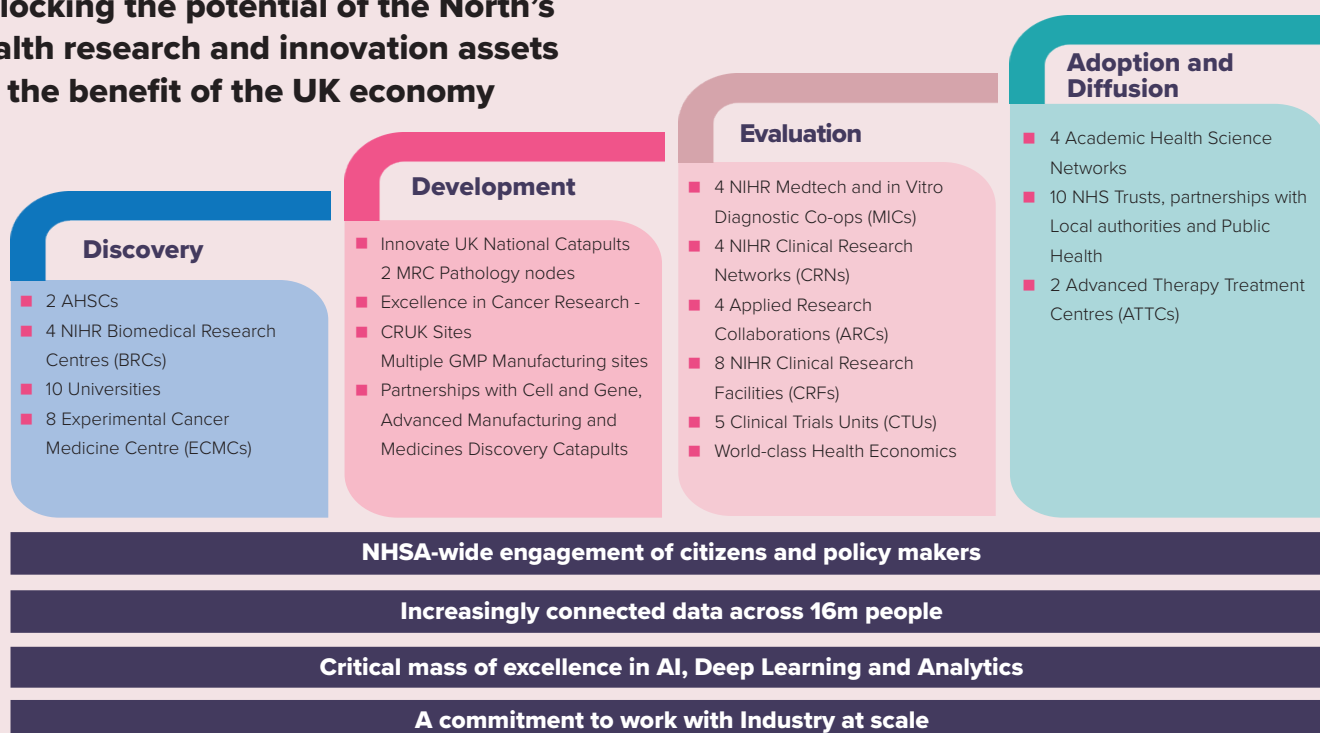
Across each of these areas, we have mapped UK ambition in sustaining world-class life sciences capability to a consistent and high-quality platform that can be established across northern England to service the needs of industry. An offer is being made to innovators and industry for co-development, evaluation and adoption of products and services.

These activities will enable universities and trusts to maximise their contribution to economic growth, by collaborating in co-development with companies, nationally and internationally.

**Investment required: Connected Health North** requires £260m government investment over three years to build on the collective assets of northern England's life sciences cluster, the investment required is estimated at 40% capital: 60% revenue.

All workstreams will generate significant revenue from year one. The assets in place are working with industry and generating income. The scaling up of the infrastructure and further professionalising of the service offered to industry will increase that revenue stream beyond the three-year funding period requested here and the first call on this income will be sustaining the offer to industry beyond that initial period.

## Unlocking the potential of the North's health research and innovation assets for the benefit of the UK economy



## 2.2 Outputs and Impact

**Impact:** while **Connected Health North** will generate sufficient income to forward fund a successor programme of activity, the major impact relates to new products and services in life science and digital companies. These have been estimated over a 12-year period, building up quickly in years three to four. At year 12, over 2,000 jobs will have been created and 3,000 jobs safeguarded. This will have delivered an increase of £420m in GVA from the **Connected Health North** programme and collaborations.

This is in addition to the expected > £500m in investment that will be leveraged by companies because of NHS partnerships, an estimated 50 companies fast tracking their growth from small to medium sized companies. NHS benefits: benefits accruing to the NHS and care sector will also be a principal outcome of **Connected Health North**.

Efficiency savings are estimated at £900m per annum by year 12, primarily through protection of capacity. The impacts on health outcomes of early access to and widespread adoption of transformative innovation, such as application of AI in digital diagnostics, will be captured.

By specifically addressing the imbalance in UK health R&D funding this will help the long-term viability of the global UK offer in science and technology.



# 3 Strategic case

## 3.1 Addressing National Priorities

There is a failure within the internal UK market for life sciences support. This has been created by sustained under-investment in some regions. Long-term policy direction and implementation have resulted in the UK being the most unbalanced industrialised economy in the world [*Onward, Measuring Up for Levelling Up, September 2020*]. This proposal will help to address this, for the health of the population, the economy and the stability of the nation. Covid-19 consequences and Brexit will hit the north harder than other regions, increases in northern mortality this year from March to July are estimated to cost the UK £6.8bn in lost GDP.

### Driving growth

So, there is an acute need to mobilise health and life sciences assets in the north to help drive national economic growth. This mobilisation will have the amplifying effect of introducing much-needed geographic breadth and distributed resilience into national R&D and healthcare structures.

The themes identified in the *Life Sciences Industrial Strategy* recommendations for the long-term success of the life sciences sector, [www.gov.uk/government/publications/life-sciences-industrial-strategy](http://www.gov.uk/government/publications/life-sciences-industrial-strategy) have provided a framework for this offer to industry. It focuses on creating a vibrant and large-scale interface between the NHS, academia, citizens and industry that is mutually beneficial and transforms the public's understanding of the role of life sciences companies in their health and wellbeing.

### Levelling up

Increasing the UK's expenditure on R&D is a national priority. It has historically been low compared to other countries [*Onward, Measuring Up for Levelling Up September 2020*]. The health and life sciences sector will need to play a major part if the country is to meet its stated ambition of 2.4% of GDP being invested in R&D by 2027. The north's life sciences economy is worth £13.6 billion, and it is home to 21% of the total UK life sciences sector workforce, 19% of the UK biopharmaceutical sector workforce, 22% of the UK medical technology sector workforce and a third of the UK digital health workforce [*OLS Strength in Places 2017*].

The sector is one of four prioritised for growth in northern England [*Northern Independent Economic Review, 2016*]. However, NESTA's *The Missing 4 Billion* report estimates UK regions have missed out on government R&D spending to the tune of £4 billion each year which could have leveraged a further £8 billion from the private sector. The effects, on population health, of sustained under investment and a sluggish economy are significant: the NHTA's landmark 2018 report *Health for Wealth* demonstrated that a third of the productivity gap between the North and the rest of England is due to ill health at a cost of £13.2bn a year GVA.

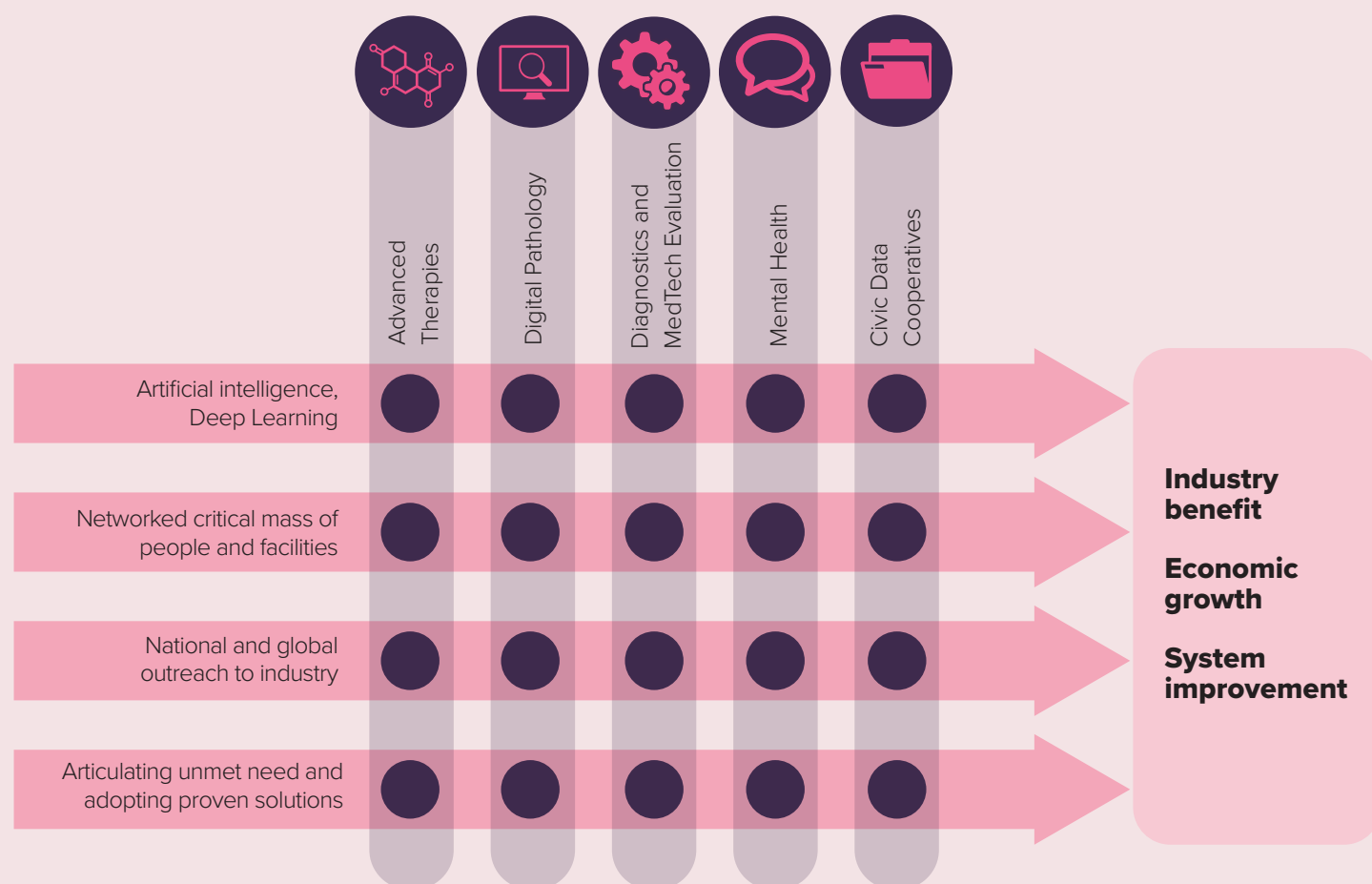
There is a relationship between investment in health research and innovation in northern England, its potential to tackle increasing health inequalities, poorer productivity and stifled economic growth. This is understood by the public who are increasingly aware of the issues and there is a compelling argument for levelling up through investment in this area.

## 3.2 Meeting industry need and addressing market failure

Consultation with the health and life sciences industry has highlighted serious limitations to its growth, development of products and services. Companies (from SME upwards) working in the areas covered by this bid have identified a lack of access, at scale and in a structured way to the facilities and expertise to help them.

This includes understanding need and opportunity; access to support in co-developing products and generating evidence; availability and capacity of cutting-edge facilities; predictable, responsive access to well-curated and responsibly managed data; evaluation methodology expertise and support with adoption.

**Connected Health North** mobilises health and life sciences assets across the north to meet this industry demand. It focusses on areas for investment in which there is clear opportunity for economic growth across the UK and in which the UK has strategic global ambition. We have limited the bid to areas of activity in which the north excels.



## 3.3 Identifying Market Failures

**Developing the proposal with industry: Some of the specific barriers identified by companies across our proposed workstreams are:**

**Northern Advanced Therapies Accelerator:** The scientific and clinical infrastructure is fragmented, and companies require an end-to-end product development pathway from access to basic science excellence for discovery of potential treatments, through to clinical expertise for trials and adoption into clinical practice. Companies need greater access to networked early stage co-development facilities, clinical trials space and GMP manufacturing capacity.

**Digital Pathology and AI:** Through the National Pathology Imaging Cooperative, which is led from Leeds, the north is currently a global leader in driving adoption of digital pathology. Digital pathology infrastructure acts as a platform to drive growth in AI applications (across all sectors) as well as in drug and diagnostics development. However, to unlock this growth requires an economy of scale and commercial interface not yet in place.

UK advantage is time limited – a 3rd of UK pathologists will retire in five years with no replacement pipeline, while Covid-19 and remote working has accelerated adoption of digital pathology globally. Industry needs (1) large scale digitisation roll out, (2) comprehensive and connected data sets, and (3) commercially facing teams with which to engage.

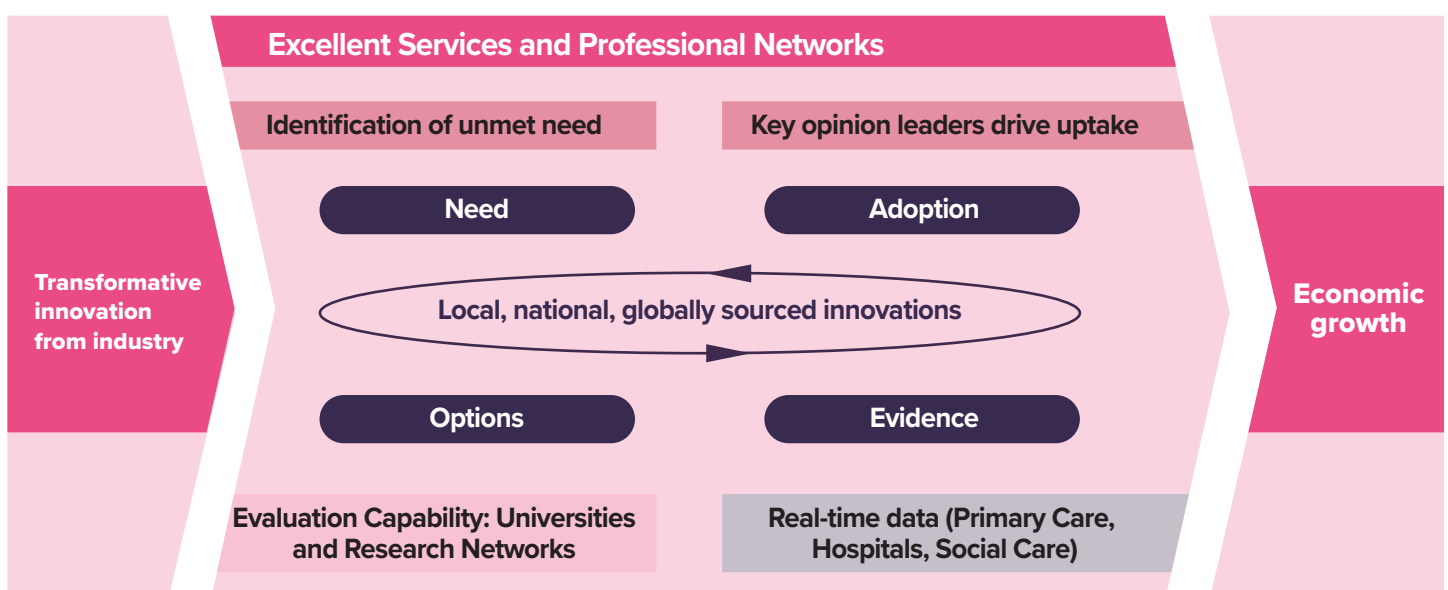
**National Diagnostics and MedTech Accelerator:** The UK has a world-leading competitive edge in evaluation of diagnostic technologies and devices, however the potential to transform this into substantial economic growth is restrained by capacity and by the lack of an innovation fund to pump-prime work currently not serviced by other funding streams; with companies having potentially transformative products and platforms.

**Northern Mental Health Accelerator:** Companies developing digital products for mental health struggle to get access to the design, development, and deployment of mental health solutions at scale. There is no dedicated infrastructure for this in the NHS for rapid, real-world evaluation.

Furthermore, the effects of Covid-19 on the mental health of the population are a serious risk for employers. There is a strong industry interest across all sectors in finding new ways to support the mental health of their workforce to increase productivity, and in creating new digital interventions with commercial value.

**Civic Data Cooperatives:** Companies and accelerators need better access to better quality, more joined-up data. Health and care systems need the same. We address these needs once with a grid (potentially national) of well-curated and publicly trusted data systems embedded in the civic centres and populations. We will fill the gap in trained specialists to curate the data and involve data subjects/citizens, earning public trust and improving data quality with methods proven in the Connected Health Cities project and the existing regional data initiatives. Each Civic Data Cooperative will borrow strength from others across a northern grid, sharing expertise, tools and infrastructure – creating an extensible, sustainable, national economic asset.

## The offer to industry



# 4 Investment case

## 4.1 Proposed Investment

**Connected Health North** requires £260m Government investment over three years to build on the collective assets of the north of England's life sciences supercluster to support post-Covid and post-Brexit economic growth.

**The investment required is estimated at 40% capital: 60% revenue.  
The financial profile by investment area is set out below.**

- **£50m** for Advanced Therapies (**£25m** in Year 1, **£20m** in Year 2, **£5m** in Year 3)
- **£51m** for Digital Pathology and AI (**£11m** in Year 1, **£22m** in Year 2, **£18m** in Year 3)
- **£45m** for Diagnostics and MedTech (**£10m** in Year 1, **£20m** in Year 2, **£15m** in Year 3)
- **£25m** for Mental Health (**£7m** in Year 1, **£9m** in Year 2, **£9m** in Year 3)
- **£80m** for Civic Data Cooperatives (**£20m** in Year 1, **£30m** in Year 2, **£30m** in Year 3)
- **£9m** for International Market Outreach (**£2m** in Year 1, **£3.5m** in Year 2, **£3.5m** in Year 3)
- **Totals: £260m overall (£75m in Year 1, £104.5m in Year 2, £80.5m in Year 3).**

## 4.2 Overview

**Connected Health North** offers the opportunity to build a pan-northern network of accelerators and cooperatives, linking multiple locations and areas of excellence with critical mass and momentum. The focus will be on working with industry on co-development of innovation and the real-world evaluation and adoption of their products and services.

Across all workstreams there is a network of centres, all nationally excellent in their own right. Individually and together, these centres will provide the support industry needs. This will help anchor industry in the UK and will attract companies to the north from across the UK and globally. With an ecosystem of excellent science, outstanding clinical practice and a vibrant corporate interface, transformative technologies in high-growth areas which will be exploited rapidly and assimilated into NHS services. The five workstreams of **Connected Health North** are detailed below.

**Northern Advanced Therapies Accelerator** programme, where investment will include a network of early stage co-development and GMP manufacturing facilities, servicing academic and industry demands for translational research, evaluation and adoption of transformative cell and gene therapies.

Well-connected to other UK networks and structures, most notably the advanced therapies treatment centres (ATTCs), it will help keep the UK at the forefront of the global advanced therapy medicinal products (ATMP) market. Development will include bespoke clinical research facilities for delivery of industry-funded ATMP trials (£84m expected in years one to three, currently the UK loses many of these trials to the US) and a cohort of highly trained technical and professional staff networked across industry, the NHS and academia.

**Digital Pathology and AI:** Building on the excellence within the National Pathology Imaging Cooperative this workstream will deliver expanded digitisation and linkage of the data to create a globally unique offer to industry for the development of AI applications, as well as therapeutics and diagnostics development.

The creation of a dedicated commercial development team will engage with industry partners, guide them through the process of clinical engagement, product development, evaluation and regulatory approval. In doing so we will accelerate AI adoption within the NHS. This will not only contribute to a healthier north of England but help the **Connected Health North** NHS trusts become innovation engines to support introduction of AI and digital health in daily care, creating wealth and creating a vibrant innovation ecosystem that fuels further improvement in care and economic opportunity.

**National Diagnostics and MedTech Accelerator** will build on the UK's world-leading competitive edge in evaluation of diagnostic technologies and devices, with a virtual national centre delivered jointly by the five lead centres. It will deploy a rapid development, evaluation and commercialisation infrastructure, which will deliver services to industry across the region. Its priorities will be based on clinical need to provide market pull, at pace and scale and pump prime collaborative partnerships between NHS and industry. It will create a globally important attractor for high-potential innovation seeking robust evidence generation and evaluation.

**Northern Mental Health Accelerator**, a partnership between the NHS and industry for the design, development, and deployment of mental health solutions will provide a globally unique scale for evidence generation around mental health and wellness interventions.

The accelerator will establish an infrastructure for real-time and real-world evaluation across the north of England, drawing on the region's unique and long-standing mental health electronic data assets.

All the mental health trusts have electronic patient records linked to integrated local care records. It will include dedicated staff in the NHS, study design methodologists and academic expertise from leading northern universities. It will be powered by real-time data from the Civic Data Cooperatives and will have an innovation fund for seed funding new collaborations. It will include a focus on testing and deploying interventions to support large corporates and SMEs based in the north as they seek to maintain healthy and productive workforces amidst the fall-out of the Covid-19 pandemic.

A network of **Civic Data Cooperatives** offers transformative opportunities of itself and underpins the accelerators above. These cooperatives will focus on health and social care system integration, extending to local authority education, housing, environmental and other civic data – enabling hybrid AI advancement across the smart cities and predictive healthcare sectors.

New data streams from wearables and home devices will then be incorporated affording more connected civic incubation of MedTech. National health data (intensive) research activities, for example in Health Data Research UK (HDRUK) and the Early Disease Detection Research Project UK, will benefit from richer data, deeper public involvement/trust and a network of industry-facing activities invited by civic/health and care systems.

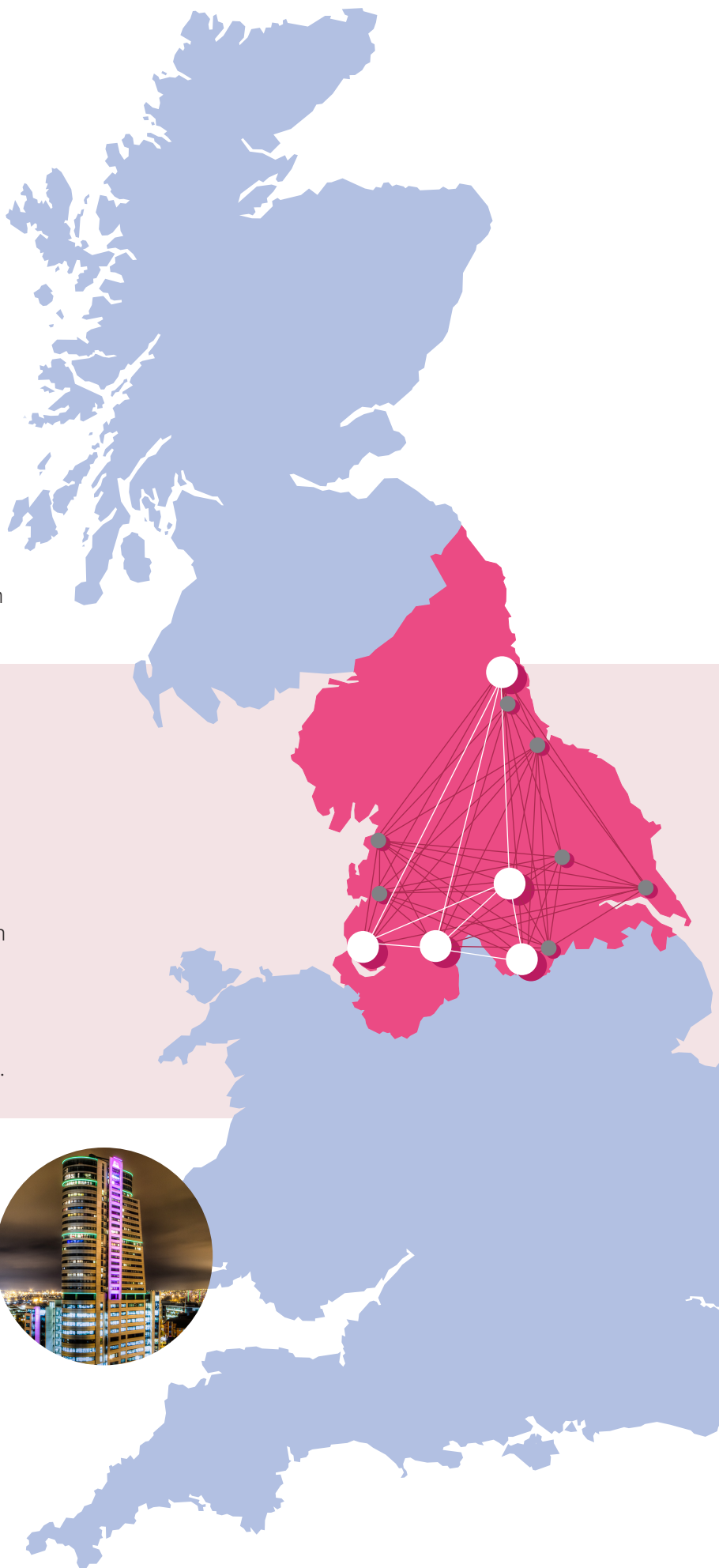
The network of CDCs will link activity and excellence in large centres with problems to be addressed and reach out to towns, rural and coastal areas to help meet their health and economic challenges. The CDCs will draw on excellence from universities and NHS trusts across the north in addition to that from the host cities, including computing excellence in Durham and data security and population health approaches in Lancaster.

## 4.3 Income generation and IP

All of the workstreams will generate significant revenue from year one. We conservatively estimate that the revenue generated in years one to three will guarantee continuation of the offer to industry for a further three years (six years in total). Parallel investment from industry is available to augment HMT's contribution, for example over £80m of trials revenue is expected in the first three years of the Northern Advanced Therapies Accelerator. This will ensure an impact far beyond the funding period.

Similarly, in the Civic Data Cooperatives work, substantial efficiency savings can be made in the NHS through better integration of data sets. Experience suggests that this is likely to result in increased capacity within services rather than cost savings.

The lead centres will provide commercial, patent and IP support through the contract for services that they provide. A specification for services will be defined with commercial partners at the outset, drawing on those established by the advanced therapy treatment centres. This model has worked well for collaboration with established companies and in particular for dealing with background IP and shared input to IP generated. Support will also be available to SMEs and innovators seeking to work with the NHS around emerging innovation.



## 5.1 Market Opportunities

The economic benefits of **Connected Health North** reflect the scale of the markets and health challenges involved, and the subject of recent market research, including:

■ **Advanced Therapies:** The UK is a global leader in AT development, evaluation and clinical delivery. The field is expected to be worth \$11.96bn globally by 2025, with the vision for the UK of 4,000 additional jobs and £2bn in revenue by 2025, rising to 18,000 additional jobs and £10bn in revenue by 2035 [*Cell and Gene Therapy Catapult figures, Sept 2020*].

■ **Digital Pathology and AI:** Investment in this segment offers return in three channels: (1) growth of the digital pathology sector – the UK currently works closely with the market leaders in this segment and establishing this platform will anchor those companies into the UK.

Once the infrastructure is established, software and services will be a growth market of high value jobs in the north, (2) as a platform for AI, digital health, drug discovery and diagnostics discovery segments. (3) The cancer cost to the UK (including productivity loss) stands at £18.3bn, the direct NHS cost comprising £5bn [*2015 DHSC figures*], the majority of that £5bn coming from diagnosis and monitoring. This investment can increase capacity in the NHS via reduced costs and improve UK productivity through better cancer survival rates as targeted in the NHS long term plan.

■ **Diagnostics and Medtech:** The sector employs 131,800 people in 4,060 businesses with a UK turnover of £25.6bn. It grew by £7.7bn, 2010-2019, while the biopharma sector shrank by 9.3bn, largely due to top 25 pharmaceutical companies restructuring in the period. Core MedTech employment grew by 9,800 between 2010 to 2019, an 11% increase [*OLS, Bioscience and Health Technology Sector Statistics 2019*].

There is also an urgent national bio-security need for diagnostics capacity and expertise to be re-built in the UK. The current Covid-19 crisis has emphasised the chronic underinvestment and lack of coordinated leadership in diagnostics. Not only is this crucial in the context of pandemics, diagnostic capacity is central to the future NHS, facilitating risk-stratified integrated care and personalised, precision medicine.

■ **Mental health** problems are the largest single cause of disability in the UK, and at 23%, consume the highest proportion of NHS disease spending. Mental health problems are estimated to cost the UK upwards of £70-100bn per year, around 4.5% of GDP [*DOH, 2017*].

Within the workplace, mental health issues account for 13% of all sick days lost in the economy, 21% in the NHS. There is strong evidence that the Covid-19 pandemic has had a negative impact on the mental health of the population. Pre-Covid-19 mental health problems were 74% higher in the north of England than the south and this is expected to get worse. The productivity and the GVA of the Northern Powerhouse will fall further behind the rest of the country unless action is taken.

■ **Connected Civic Data:** The value of the curated NHS data set alone is estimated to be worth as much as £5bn per annum and deliver around £4.6bn of benefit to patients per annum [*Ernst and Young, 2019*]. Companies and accelerators need better access to better quality, more joined-up data. Health and care systems need the same.

We address these needs once with a grid (potentially national) of well-curated and publicly trusted data systems embedded in the civic centres and populations.

We will fill the gap in trained specialists to curate the data and involve data subjects/citizens, earning public trust and improving data quality with methods proven in the Connected Health Cities project and the existing regional data initiatives. Each Civic Data Cooperative will borrow strength from others across a northern grid, sharing expertise, tools and infrastructure – creating an extensible, sustainable national economic asset.

These markets include both commercial opportunities and the potential to contribute real and measurable health benefits, significantly increasing the quality adjusted life year benefits to hundreds of thousands of citizens across the UK.

## 5.2 Scale of Activities and Business Engagement

The long-term economic benefits are a result of the intensity of the business assists delivered, the long-term nature of the partnerships developed between the companies and the NHS and academia and the scale of activity.

This supercluster covers a population of 16m people across the great cities of the north of England and also a new paradigm for in-depth and sustained support for industry by the NHS. The ultimate effect will be to radically alter, for the better on both sides, the dynamics of NHS-industry relationships and make genuine collaboration the norm. The data below sets out the expected increase in trials attracted, contracts awarded, and companies (large and SMEs) supported over the three years of the Government investment in **Connected Health North**.

### 419 additional trials delivered

■ 40 in advanced therapies ■ 64 in digital pathology and AI ■ 260 in in vitro diagnostics and MedTech  
■ 27 in mental health ■ 28 in Civic Data Cooperatives

### 200 Large Company New Assists

■ 19 in advanced therapies ■ 20 in digital pathology ■ 60 in in vitro diagnostics and MedTech, ■ 45 in mental health ■ 56 in Civic Data Cooperatives

### 630 SME New Assists

■ 44 in advanced therapies ■ 40 in digital pathology and AI ■ 150 in in vitro diagnostics and MedTech ■ 76 in mental health ■ 320 in Civic Data Cooperatives

### 422 New Contracts awarded

■ 54 in advanced therapies ■ 31 in digital pathology and AI ■ 60 in in vitro diagnostics and MedTech  
■ 77 in mental health ■ 200 in Civic Data Cooperatives.

**Connected Health North** will provide an unprecedented increase in academia/NHS/industrial collaboration, including the largest specialist life science companies in the UK and a significant group of smaller and medium sized companies already engaged with health and digital innovation. The international outreach work proposed will drive inward investment in trials, contract and industry partnerships.

These small and medium sized companies are already involved in the business eco-system, with high growth companies part of northern membership organisations such as Bionow and based in a number of city science parks and specialist innovation and incubation facilities including Manchester Science Park and City Labs at the Oxford Road Corridor; Alderley Park in Cheshire; Sci-Tech Daresbury and Liverpool Science Park in the Liverpool city region; Newcastle Helix and the National Innovation Centres for Ageing (NICA) and for Data (NICD) in Newcastle, the Advanced Wellbeing Research Centre in Sheffield and Nexus in Leeds.

## 5.3 Cumulative Economic Benefits

While **Connected Health North** will earn sufficient income to forward fund a successor programme of activity, the major impact relates to new products and services in life science and digital companies. These have been estimated at over 2,000 jobs created and 3,000 jobs safeguarded by year 12 and an increase of £420m in GVA to the economy by year 12.

### Jobs created and safeguarded:

**400** by Year 3   **1,800** by Year 6   **2,800** by Year 9   **5,000** by Year 12

### Gross value added (GVA) in year

**£24m** by Year 3   **£126m** by Year 6   **£204m** by Year 9   **£420m** by Year 12

NHS efficiencies and new trials undertaken: The cumulative benefits over 12 years to the NHS and care system, through system efficiencies, added to the economic value of the additional new trials undertaken (£830m over 12 years), is estimated to be £5.7bn over the period. This breaks down per year as:

### NHS Efficiencies and Trials (per annum)

**£100m** in Year 1-3   **£300m** in Year 4-6   **£600m** in Year 7-9   **£900m** in Year 10-12

The economic benefits cited will be a result of the £260m requested for **Connected Health North** plus over £500m of investment leveraged by companies into new production facilities and service provision as a result of partnerships supported; and an estimated 50 companies fast tracking their growth from small to medium sized companies.

## 5.4 Procurement

Contracts to be procured will be procured under an OJEU compliant open procurement process (if still applicable) and in line with the EU Directives [*Public Sector Procurement Directive 2014/24/EU*]; National Legislation [*Public Contracts Regulations 2015 SI 2015/102*], and the Procurement Law ESIF Compliance Guidance Note [*ESIF-GN-1-001 v5*].

All of the universities and NHS trusts have dedicated commercial and procurement teams which provide specialist procurement advice and support and ensures compliant approaches for all goods and services procured. NHSA and partner organisations will also implement any consequent amendments to the above named, or new legislative requirements that come into force during procurement periods.



# 6 Delivery, Management and Governance

## 6.1 Overview

Delivery and management of the investment programme will be managed and delivered by a consortium of the NHSA and health partnerships in the major northern cities: **Leeds, Liverpool, Manchester, Newcastle and Sheffield**. These health partnerships, including the two academic health science centres in Manchester and Newcastle, will mobilise NHS, local authority and academic assets across their health and care economies in support of the ambition.

An **anchor institution** (university or NHS trust) in each of the health partnerships will hold a contract for delivery against the investment.

**The model, a new paradigm of the NHS and academia working with industry at scale**, with success being judged at a cluster and system level. It will create an exemplar for large-scale investments in other regions and in other sectors.

**The role of the host organisations:** The host organisations will be anchor institutions in their regional economies and will already be involved in local growth agendas. They will have contractual accountability. They will bring vision and inclusive leadership to the programme and the hosting function will include responsibility to act as agents of economic growth on a pan-northern stage, ensuring that:

- The investment is used for the purpose intended and delivers value for money.
- Delivery of the ambition to provide world-class infrastructure to support industry is realised.
- Monitoring and reporting on behalf of the funder is timely and high-quality
- Representation from industry and citizens at every level of governance and delivery is embedded.
- Cooperation and collaboration with the other host organisations is applied within governance, management, and delivery frameworks.
- Effective engagement with excellence across the north and beyond is encapsulated.

The scale and amplifying effects that make this proposal unique will come from not only a contracted commitment from the host organisations to act collectively in delivery of the services, but also a commitment to work towards system-wide approaches to engaging industry whereby the organisations' efforts amount to more than the sum of the parts.

**The role of the NHSA** will be to provide the vehicle for coordination of the effort between the cities and the work programmes. It will not hold the contract for the programme but will provide the means through which the five host organisations and their health partnerships collaborate and act in concert. By building on this neutral, system integration and advocacy role, we will ensure that sub-regional priorities or ambition do not affect programme delivery.

As well as convening the programme board and facilitating the workstream steering groups, the NHSA will bring together the host organisations and ensure consistency of interpretation and action across the programme activity. The NHSA has brought together its 24 member organisations (NHS trusts, universities and AHSNs) and industry partners in preparing this proposal and will continue to do so in its development and delivery. Through the NHSA, the combined excellence of all 24 member organisations will be harnessed and mobilised in the delivery of this programme.

Already acting as a trusted national and international advocate for the excellence of the north, the NHSA is a named partner in the Life Sciences Industrial Strategy and was awarded a Science Innovation Audit in Health Research in 2016.

The NHSA will also continue to support integration of health and life sciences innovation and industry engagement of the broader innovation landscape across the north and beyond through its role as a supercluster. The NP11, N8 Universities, MedCity, Northern Powerhouse Partnership and the Cell and Gene, Advanced Manufacturing and Medicines Discovery Catapults, DIT, UKTI and a multitude of other agencies have been involved in shaping this proposal and those relationships will be crucial in its formation and delivery.

The NHSA will be commissioned within the programme to deliver certain cross-cutting elements of the work such as raising visibility to UK industry and on the international stage to drive growth in both indigenous industry and foreign direct investment. We are already recognised internationally as an exemplar life sciences cluster organisation, having signed MoUs with Israel, Singapore, Canada and Australia.

## 6.2 Management structure

Programme Board: To provide overall leadership, ensure that the objectives of funders are met, and manage risk across the **Connected Health North** portfolio of work, we will convene a programme board comprising:

- Chair - senior industry-sector figure with international profile
- Representation from relevant industry trade bodies
- CEO-level representation from the host organisations
- Workstream leads
- Citizen representation
- NHSA CEO
- Funder representation

**Sub-groups of the programme board will be established as required. These will include:**

**Workstream Sub-Group:** Each of the five workstreams have already been convened and will perform the major delivery and industry engagement functions. Each will report to the programme board via this workstream subgroup. Each workstream will have its own steering group which will contain representation from a representative cross-section of industry partners.

The chairs of the workstream steering groups will meet regularly in this board sub-group to ensure that delivery is being achieved and that cross-workstream potential is realised.

**Host Organisation Sub-Group:** There will be a board sub-group for host organisations to oversee delivery against funding and contracts. This sub-group will be tasked by the programme board with reporting against spend and delivery of objectives.

The hosts will have individual responsibility for delivery of objectives within their own geographies, for ensuring workstream activity is supported within their organisations and localities and that the benefits of pan-northern scale are realised.

**Engagement and International Outreach Sub-Group:** **Connected Health North** offers huge scope for international investment and a specific programme will be dedicated towards developing this. This sub-group will ensure that industry stakeholders, nationally and internationally, have the opportunity to invest in and benefit from the infrastructure that is built.

The NHSA and our member organisations have extant programmes that we will build upon in this area. Notable historic examples include working with UK ministers, international dignitaries and industry at BIO US; developing international partnerships at BIO Japan and in Korea; signing MOUs with Canada, Australia and Singapore, all of which have created strong working relationships across the Commonwealth which will be built on post-Brexit

An exemplar in this area is the NHSA's work with the UK Israel tech hub and the Israel Innovation Authority (IIA). This has brought around 50 companies to the UK for early engagement with the UK market. We have signed a MoU with the tech hub and are in the process of signing another with the IIA, drawing together a significant investment in high-quality evaluation of technologies between the Israeli government and the north of England.

Our engagement work nationally will build on our partnership with MedCity and our leadership of the network of cluster support organisations across the UK. The opportunities for shared learning and national level system approach to policy and investment are potentially transformative when one considers previous investment approaches which have often been piecemeal and siloed.

## 6.3 Executive Function

A small executive team, employed and hosted by the NHSA, will provide high level secretariat support to the programme board and its sub-groups. Contracting the delivery of industry support functions and procurement of infrastructure development via the host organisations will keep the central function small and minimise bureaucracy. This will potentially involve seconding members of staff from partnership organisations.

**The executive team will be led by a chief operating officer who will be part of the NHSA senior management team. They will oversee:**

- Overall KPI monitoring and reporting to HMG
- The secretariat function for the programme board and sub-groups
- Project management support within and across workstreams
- The communications and marketing function to capture successes and promote the capabilities of Connected Health North nationally and internationally,
- A system learning approach to sharing knowledge developed and spread best practice
- The function and mechanisms whereby reporting between the host organisations and the funder is timely and meets the government's objectives and strategy

**For more information contact:**

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# Testimonials

"Being a part of the NHS's Mental Health Accelerator gives us an opportunity to try different, more innovative, modern and out-of-the-box initiatives to leverage sustainable change in physical and mental health within our business and local community. This innovative approach, tied together by the Civic Data Co-operatives is a project which assists industry in informing the health sector of the requirements we are trying to resolve and would see us taking a partnership approach to resolve."

**Angela Barker, Safety, Health & Environment Director, BAE Systems**

"Working with NICE and Innovate UK to work with digital health catalyst funded companies has demonstrated the need for whole networks to support innovation and bridge areas of expertise. SMEs in particular need support to learn how to develop evidence, to engage within the health sector, and identify how they can help solve the challenges of a data-driven health and care system. A network of linked Civic Data Cooperatives will enable this platform for consultancy and partnerships to grow across the public and private sectors."

**Gary Leeming, Chief Technical Officer, Connected Health Cities coordinating Centre, The University of Manchester**

"At Leica Biosystems we are excited by this opportunity to partner with NHS on the Connected Health North initiative. We have strong ties with the North of England through our Digital Pathology Centre of excellence in Leeds, which has expanded to the broader Northern Pathology Imaging Cooperative, plus our facility in Newcastle developing and manufacturing in vitro diagnostic reagents for cancer detection and prognosis. We see this as an opportunity to expand our footprint in the North, creating jobs and collaboratively driving to our goal of advancing cancer diagnostics, through expansion of digital pathology and development of AI tools for clinical applications."

**Leica Biosystems**

"Working with our trusted partners and being part of a collaborative approach through the Northern Mental Health Accelerator would provide a huge boost economically to Chimp Management as an SME through the opportunity to develop and evaluate products, increase revenue, brand awareness, employment retention and opportunities. It would also enable us to have a positive economic impact on our clients businesses by increasing staff wellbeing and retention whilst in turn providing skills to reduce stress, anxiety and burnout."

**Professor Steve Peters, CEO of Chimp Management and author of The Chimp Paradox**

# Our member organisations

