

Innovation UK: Pushing life science frontiers in the North of England



A life science powerhouse

The UK has a strong and productive life science sector and is home to the world's largest integrated healthcare system – the National Health Service (NHS). The North of England sits at the heart of this life science powerhouse. It has a rich heritage of scientific discovery and world class capability in terms of people, facilities and innovation.

In this supplement we talk to biotech and healthcare leaders across the North of England about how the region competes on the global stage to unlock clinical and commercial opportunities.

If you would like to find out more about life science in the Northern Powerhouse please contact **Geoff.Davison@bionow.co.uk**
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Innovation UK

Pushing life science frontiers in the North of England

Capability and collaboration have become hallmarks of the Northern way

Two years ago the UK government unveiled an initiative dubbed the Northern Powerhouse in a bid to redress the socioeconomic divide between the North and South of England and to energize innovation and investment into the region. Stakeholders in the region's life sciences sector recognized that the initiative could provide a more visible focal point for its own collaborative efforts and highlight the attractiveness of the North of England. During 2016 BIO International Convention, bioscience northern powerhouse advocates met to discuss the expertise and opportunities the region has to offer.

When commentators talk about the strength of the UK life sciences sector the conversation tends to focus on the so-called golden triangle that has Oxford, Cambridge and London at its points and yet just 200 miles further north there is an attractive ecosystem where smart businesses from both within the UK and outside are choosing to locate. And there are plenty of reasons why that will continue.

The Northern powerhouse initiative has already catalyzed a number of very strategic commitments in life sciences in the North of England including a £20 million allocation to Newcastle to fund the National Centre for Ageing, £4 million to set up a new catapult for medicines discovery and £4 million for the Antimicrobial Resistance Centre both at Alderley Park, the internationally recognized bioscience campus. The University of Manchester, the National Graphene Institute and the Sir Henry Royce Institute have seen investments in excess of £200 million.

Up to a further £100 million has been pumped into the North East including the Centre for Process Innovation, which houses the National Biologics Manufacturing Centre, the new Healthcare Photonic Centre, and the biologics factory of the future.

There are skillsets that are available in the North that are hard to find in the South East. There is significant manufacturing technology and capability in the North for life sciences – led by Seqiris, Fujifilm Diosynth, Waters, Smith & Nephew, Baxter and AstraZeneca that doesn't exist elsewhere in the UK. Moreover, academic institutions in the region are emerging as centers of excellence. For example, the Christie in Manchester is the only cancer hospital in the UK that is ranked in the top ten in the world.

The region boasts more than 1,000 companies in the life sciences industry, 38,000 people employed in those companies (not including those in academia and the NHS), contributing over £10 billion to the UK economy. Two of the four UK biotech companies to go public in 2015, Redx Pharma and Evgen Pharma, are also based in the region.

The North of England produces 13% of all of the EU's manufactured

Panel Participants:

Dr Neil Murray
Redx Pharma Plc

Dr Chris Doherty
Alderley Park

Dr Hakim Yadi
Northern Health Science Alliance

Dr Linda Magee
Manchester Academic Health Science Centre

Jonathan Lewis
Dr Steve McConchie
Aptus Clinical

Michael Brossmer
Anjali Shah
KPMG USA

Steve Bates
BioIndustry Association

Norman Molyneux
Acceleris

Ned Wakeman
BioHub

Nigel Gaymond
Helomics



pharmaceutical products, and accounts for 47% of the UK exports of pharmaceutical manufactured products. And while the UK produces or conducts 30% of Europe's clinical trials some 37% of those take place in the North of England. The region delivers more clinical trials than London, Cambridge and Oxford combined. A major driver for this is the very stable population with a high burden of disease within the region.

"Sadly, we do have a large number of unwell people. That also makes them a group of people who are very willing to engage in clinical trials and we would like to see as many of our patients involved in trials of innovative products as possible," Linda Magee, business development director for the Manchester Academic Health Science Centre (MAHSC), one of six NIHR accredited centres of excellence for translational medicine in the UK.

More important, the roundtable participants agreed, has been the ability of all players to engage in constructive collaboration across disciplines.

"There is a huge amount of collaboration, already going on in the North before the Northern Powerhouse was a concept, and it is about building on those networks that have been established, taking them one step further. I haven't seen elsewhere the interaction between academia, clinic and industry that you get in the North of England. We must build on those networks and use them as a model for the rest of the UK so that UK bioscience can benefit as a whole," noted Neil Murray, CEO of Redx Pharma.

This is a strength that others envy. "The one thing that the rest of the UK looks at the North with jealousy about, is the way that you've got it together, that you are connected through clinical networks, through academic networks and through business networks in an effective way," added Stephen Bates, chief executive of the BioIndustry Association, the UK's Trade Association for Bioscience.

One example of how industry, academics and the UK National Health Service in the region have been able to collaborate successfully is the so-called Salford Lung Study (SLS), which involved healthcare professionals from eight organizations across Greater Manchester. The study involved over 2,800 consenting patients, supported by 80 GP practices and 130 pharmacies in Salford and the surrounding Greater Manchester area.

"With SLS we got the clinical leadership from Professor

Ashley Woodcock who is a respiratory medicine expert and key opinion leader, coming together with GSK, the expertise around electronic health records and the integrated system that was already in place in Salford in Greater Manchester. The first initial results have come out which are positive, very positive for the company. It has taken a number of years and has been a massive undertaking," noted MAHSC's Magee.

Sponsored by GSK, the ground-breaking study examined the safety and effectiveness of a new treatment for chronic obstructive pulmonary disease (COPD). SLS was delivered in partnership with NorthWest EHealth (NWEH), The University of Manchester, Salford Royal NHS Foundation Trust, CK Aspire, Salford CCG, University Hospital of South Manchester, South Manchester CCG and NIHR Clinical Research Network: Greater Manchester.

"You cannot underestimate the power in the UK of the way things are getting joined up. We blindly think that every other country is doing that, it is not. And that



Mike Ward of Informa with the roundtable delegates at the offices of KPMG San Francisco

connection through the industry with academia and the government, is incredibly important" Nigel Gaymond, a former CEO of UK BioIndustry Association, a strategic consultant and advisor to Helomics, a personalized healthcare business headquartered in Pittsburgh, Pennsylvania.

Indeed, it was the ability of the Northern Health Science Alliance (NHSa) to help outsiders get access to this interconnectedness that has already attracted inward investment from elsewhere in the UK and further afield. In the past 24 months, the NHSa, a membership

organization of the top eight universities' medical schools and NHS teaching Trusts across the North of England, has been approached by biotech companies across the globe doing technology scouting in the north of England.

NHSA has been working with one Singapore-based company which is looking at better diagnosis of prostate cancer. NHSA was able to get the lead colorectal surgeons from Leeds, Manchester, Newcastle, and Sheffield around the table with the health economics teams to look at how that trial should be developed, which data should be collected so that when the company went for regulatory approval it would have everything it needed.

“For that company to do that in the absence of the collaborative nature we have in the region would have taken months, if not years, to go round and talk to all of those centres. With our help they were able to do it in four weeks. They are now looking at setting up multiple clinical trials across the north of England,” explained Hakim Yadi, NHSA chief executive.

Companies from the golden triangle are also tapping into the North's expertise. “Congenica, a Cambridge-based spin out funded by the Wellcome Trust, developed as part of the Genome Centre's molecular diagnostics activity, has done all of its clinical validation in the North of England, because it recognizes strengths in genomics and integrated electronic health records,” noted Yadi.

One of NHSA's key objectives is to attract more investment into the region. “In the three years that we have been operational we have brought in £60 million worth of contracts for R&D studies that would not have been there without us,” noted NHSA's Yadi.

For others a key attraction is access to infrastructure at an affordable price. Helomics, a personalized healthcare business headquartered in Pittsburgh, Pennsylvania, sees the benefit of using the North as its entry point into the UK.

“Having access to a bunch of universities that together collectively represent world class best practice is fantastic. The fact that you can go from Liverpool or Manchester to London within two hours, be productive on the train on the way there, have a meeting around King's Cross or Euston stations, spend a whole day there and then return is a benefit that cannot be underestimated,” explained Gaymond.

“A lot of people looked quizzically at us. Why wouldn't you look at the golden triangle? It never even occurred to



Neil Murray, Redx Pharma; Steve Bates, BIA; Hakim Yadi, NHSA

us as we were thinking in a completely different way. The cost differential is too compelling, the expertise is there and I think from a cultural point of view the fit is there,” he revealed. According to Gaymond, the North feels familiar to Philadelphia natives.

Much of what makes the North attractive to life science businesses has evolved culturally over decades – if not centuries as the region was at the centre of the first industrial revolution. Paradoxically, probably the most significant catalyst for the region's regeneration as a life sciences hotspot was the decision by AstraZeneca two years ago to relocate its R&D activities from Alderley Park to Cambridge in the South.

Importantly, the region did not sit on its hands and lament the decision. Within a few months of the decision, the head of the University of Manchester and representatives of key public sector organizations around Manchester came together and formulated a plan for the site which was sold within a year. The site is now owned by Manchester Science Partnerships (MSP).

AstraZeneca's exit has been leisurely and the company will be there for three more years. “That early sale has allowed for a simultaneous exit and redevelopment. The site has still got 3,000 people working there as many AstraZeneca employees opted not to move to Cambridge. The key asset is the people. However, £550 million has been spent on the place in the past 12 years and half a billion pounds buys you a decent site these days,” noted Chris Doherty, Alderley Park Managing Director.

One of the first actions was to seek assistance from the incubator specialist BioCity running boot camps for former AstraZeneca employees to help them establish new

businesses, hone their skills and transition from a corporate to a start-up mindset. Alderley Park now has 150 small companies – from single person start ups to Redx who will shortly have around 190 employees on site.

Indeed, being part of that ecosystem has been key to the development of Aptus Clinical, a new start up by three ex-AZ employees in the clinical CRO space offering clinical services to industry, biotechs and academia.

"As a new CRO with two year's history, being part of the BioHub community has generated many opportunities for us. We have also been able to showcase our abilities on a much bigger stage, often alongside partner companies who offer complimentary services. The Alderley Park brand has international reach and provides us with the perfect platform from which to grow our business," noted Aptus business development director Jonathan Lewis.

Being an active player in the bigger network gives Aptus more visibility highlighting to biotechs that there still is an organization with deep knowledge of clinical research at Alderley Park, who are now able to use this wealth of experience to help them, design and deliver their studies.

An additional 200,000 square feet of lab and office space will become available at the Park this year. All of it has already been earmarked for new businesses. And with rents about a third of Cambridge and Oxford and a quarter of rents in London, Doherty expects high demand from new applicants.



Norman Molyneux, Acceleris

"Alderley Park has turned out to be a blessing in disguise for the sector because previously there was a real problem to find the right facilities in the region for decent sized biotechs to go into. We have been investing in the sector and it was very, very difficult to find appropriate space to accommodate businesses. With this site, we have got great science facilities that we can put proper capital in and start to see companies actually move forward and go through a whole funding process," explained Norman Molyneux, CEO, Acceleris Capital, an investment management business based in the North which has invested some £38 million in biotech SMEs primarily using high networth money.

Indeed, the move to Alderley Park has been crucial to the development of Redx Pharma, one of the companies Molyneux has backed. "When we were establishing our infectious disease group, we were exclusively a Liverpool company, and there wasn't a facility there for us to move in to. If we hadn't had Alderley Park we wouldn't have been able to accept the grant money that was on offer from UK government and grow the business in the way that we did," added Murray.

Apart from ready-to-use facilities – Redx was able to conduct chemistry experiments within two or three weeks of landing rather than having to wait six months for a lab to be built – there are local financial incentives such as enterprise zone rate relief on top of other UK government incentives such as R&D tax credits and the patent box.

Stakeholders in the life sciences northern powerhouse have one overriding ambition and that is to increase the proportion of R&D flowing into the North of England; and the track record so far is encouraging.



A clinical way forward

Dr Steve McConchie, CEO, Aptus Clinical

Aptus Clinical partners with life science companies to help them transform their promising oncology molecules into valued medicines.

Based in the BioHub at Alderley Park, Cheshire the site of innovative oncology R&D for over 65 years, Aptus Clinical is rapidly establishing itself as a leading UK based provider of oncology clinical development solutions:

Clinical development consulting

Our virtual project team support rapid client decision-making by providing a single voice of coordinated advice. We provide the full range of core technical disciplines necessary for successful drug selection & clinical development:

- preclinical safety
- pharmacokinetics
- formulation
- clinical program design and delivery
- regulatory



All of our experts have a proven track record of delivering oncology drugs to market. We leverage this extensive expertise and insight to ensure every client project has the most time optimal and cost efficient delivery route to the clinic based on it's mode of action or tumor of interest.

Aptus Clinical has relationships with some of the world's leading experimental cancer centres to provide academic input, innovation and clinical reality to our plans.



Whether you need a specific expert or a whole team we will partner with you to give your project the best delivery route to the clinic and on to value realization. We can provide expert support to your investment due diligence, building your roadmap to the right clinical trial or designing a whole clinical development program.

Full service delivery of studies

Through our extensive network of clinical delivery experts and strategic partnerships with service providers, Aptus Clinical provides a full service solution that supports the set-up, conduct and delivery of clinical studies including:

- Development of Protocols, IB, IMPD etc.
- Development and Submission of Regulatory and Ethical Approvals
- Identification, set-up and Monitoring of Study Sites
- Data Management, Analysis & Reporting
- Selection & oversight of third party vendors (Analytical and Biomarker Laboratories, Pharmacovigilance, Study Supply Chain etc.)
- Study Trial Master Filing
- SOPs and quality management infrastructure

Our comprehensive network of experienced CRAs allows us to build and develop long term relationships with leading Oncology centres in the UK, Europe and the US so maximizing recruitment into your studies.

Aptus Clinical has the knowledge, networks and capability to seamlessly partner with you to deliver timely, high quality and cost effective studies, whether you need support with delivering your First Time in Human, Proof of Concept, Combination Dose Finding or Clinical Pharmacology studies.

<http://www.apusclinical.com/>

Redx Pharma focused on quality drug candidates

Dr Neil Murray, CEO, Redx Pharma Plc

Drug discovery is becoming a more collective process, with the path from concept to target validation through to improved patient outcomes much changed from even five years ago.

Collaboration between pharma companies of varying sizes, contract research organizations, academia and public bodies is today commonplace.

Redx Pharma Plc is one of the new generation of biotechs which is working to improve R&D performance and deliver new therapies for patients. We have a broad pipeline of drugs in cancer, immunology and infectious disease and have entered into significant commercial partnerships with AstraZeneca, amongst others.

We believe our approach is different. Drug discovery tends to focus on creating large libraries which are

Redx Pharma

screened for activity – akin to looking for a needle in a haystack. Redx actively designs compounds to engineer in the characteristics we want, and design out those that we don't. This creates small, tailored and hit-rich libraries allowing us to optimize compounds more quickly. Typically, that means getting to high-quality drug candidates in around 18 months or two years, compared with the four or five years taken by the industry.

Our business was formed in 2010 and has grown rapidly, successfully listing on the London Stock Exchange's AIM market in March 2015. We are based at Alderley Park, Cheshire – the UK's largest biotech campus.

In cancer, Redx is focused on immuno-oncology therapeutics and products targeting cancer stem cells.

Our lead product is a Porcupine inhibitor, which is in IND-enabling studies. This targets the Wnt pathway, involved in the maintenance of cancer stem cells in a number of cancer types, and has potential in hard-to-treat cancers including pancreatic, gastric, triple negative breast and head and neck cancers. In addition to targeting cancer stem cells, Porcupine also plays a role in modulating the immune system opening up the potential for combinations with immune checkpoint inhibitors such as anti-PD-1 or anti-CTLA-4 antibodies.

Redx's reversible BTK inhibitor offers exciting potential to treat Chronic Lymphocytic Leukemia (CLL) patients who have become resistant to one of the main therapies, Imbruvica™ (ibrutinib).

BTK (Bruton's Tyrosine Kinase) is an important enzyme in the B-cell receptor signalling pathway and is implicated in blood cancers such as CLL. Ibrutinib, a key therapy for treating CLL, irreversibly inhibits BTK. However, following ibrutinib treatment, a significant proportion of the CLL patients who still have progressing disease have developed a genetic mutation that renders ibrutinib ineffective. Redx is developing a best-in-class reversible BTK inhibitor which has a reduced side effect profile. It is designed to be effective in both CLL patients suitable for ibrutinib treatment and patients that have acquired resistance to ibrutinib.



Redx actively designs compounds to engineer in the characteristics we want, and design out those that we don't.

IDO1 (Indoleamine 2,3-dioxygenase) is an immunosuppressive enzyme over-expressed in a wide range of cancers. IDO1 promotes formation and activation of regulatory T cells that allow tumors to escape immune surveillance: IDO1 over-expression is also a resistance mechanism which arises following treatment with other immune checkpoint blockers.

The co-administration of IDO1 inhibitors with immune checkpoint blockers such as the anti-PD-1 or anti-CTLA-4 antibodies therefore aims to restore a fully functional immune system and enhance response rates. Redx's IDO1 inhibitor program has successfully identified highly novel chemotype inhibitors that are being further optimized to give best in class activity profiles.

Our oncology deal with AstraZeneca was signed in September 2014 and was transformational for our business. We are working with AstraZeneca's Oncology Innovative Medicines group on an undisclosed cancer target. AstraZeneca retains the right to develop and commercialize any programs resulting from the collaboration.

Within infectious disease, our focus is on antimicrobial resistance creating new-generation antibiotics, including broad- and narrow-spectrum approaches to Gram-positive and Gram-negative bacterial infections.

Our lead program, targeting Gram-positive infections, is part of a pioneering agreement with the UK National Health Service. In November 2013, we signed a £5.6 million (approximately \$8.3 million) deal with the NHS Royal Liverpool and Broadgreen University Hospitals Trust to collaborate on the development of new anti-infectives against methicillin-resistant staphylococcus aureus (MRSA).

Based on a novel drug scaffold, this program has the potential to provide the first new class of antibiotics in a generation.

Redx also has a program tackling more challenging Gram negative bacterial infections. Like our Gram positive program, this also has the potential to provide the first new class of drugs in a generation.

Redx's immunology group is focused on inflammatory and fibrotic disease indications. Although at an earlier stage than our cancer and infectious disease activities, our immunology programs, building on expertise developed in these areas are already showing great promise.

As Redx's programs advance through development we will seek licensees and collaborators. However, with the



Redx is focused on immune-oncology therapeutics and products targeting cancer stem cells.

advantage of a broad pipeline, we aren't wedded to specific deal structures or timing – our focus is on generating the best value from each of the assets in our portfolio. In some cases, this will mean partnering early whilst we intend to progress some of our assets into clinical studies to secure higher-value returns.

<http://www.redxpharma.com>

New era for UK's largest bio campus

Dr Chris Doherty, Managing Director, Alderley Park

Alderley Park has long been renowned as a location for scientific research and collaboration, and now the bio campus in the North West of England is embarking on a new chapter of innovation and discovery.

It was from laboratories at Alderley Park that Nobel Prize winner, the late Professor Sir James Black discovered Beta-Blockers in the 1950s. Today, the 400-acre site is the UK's largest life science ecosystem.

The site achieved international profile as the R&D headquarters for AstraZeneca but has been under new ownership since 2014 and has been recast as a multi-occupier bio campus.

It's already become home to more than 150 businesses, not least because the 1.4 million sq. ft. facility offers life science businesses unrivalled scale for growth and expansion, with fully equipped biology, chemistry, in vivo and specialist laboratories ready for immediate occupation.

As well as world class facilities and equipment including 700/500MHz high field NMRs, mass spectrometers, open access lab, bio banking, tissue culture suites, biotech pilot plant and analytical suites, development is currently underway for the creation of new in-vivo suites and cGMP class 10,000 and 100,000 cleanrooms.

In terms of capability, few sites in Europe can match its physical assets, the scale of the investment that has been made and the access Alderley Park provides to a scientific workforce. Crucially, the lab space is available at a significantly lower rate, circa 25- 30%, to other locations in the South and East of the UK.

Alderley Park is easily accessible – 20 minutes' drive from Manchester Airport – the North's global gateway. It has excellent access to Manchester city centre and the thriving professional and financial services hub there. It is in close proximity to the mainline rail network which offers access to London in just two hours. Access to funding and talent is in abundance too. The site has close links with world class universities in Manchester and Liverpool, while the North of England has more than 1,000 life science businesses employing 38,000 people.

There are two life-science focused venture funds – the £42m Greater Manchester & Cheshire Life Sciences Fund and the £5m Alderley Park Ventures Fund – to support



Alderley Park overhead view

companies with investment for business growth.

Among the businesses currently based at Alderley Park's translational ecosystem including CROs specializing in Pre-clinical, Clinical, Safety/Tox, CMC/Formulation, Regulatory, Chemistry and Proteins and therapeutics companies specializing in Oncology and Anti-infectives.

The on-site BioHub incubator, operated in partnership with BioCity supports the formation and growth of new and early-stage companies. The lean start-up model and support from a mentor network of more than 90 highly qualified and experienced senior scientists helps to drive business growth and success. Further support for investors is available from several sources. Alderley Park benefits from Enterprise Zone status, which allows eligible companies to benefit from up to 100% business rate relief for five years, super-fast broadband infrastructure and business support initiatives from UK Trade & Investment.

In terms of future investment and opportunity, the UK government agency Innovate UK has chosen Alderley Park as the base for its new Medicines Discovery Catapult, whilst the government is also supporting the establishment of a new translational centre for Anti-Microbial Resistance (AMR) at the site.

A part of Manchester Science Partnerships, Alderley Park offers connections to some of the North of England's key health establishments and organizations such as the University of Manchester, Central Manchester University NHS Foundation Trust, Northern Health Science Alliance,



and the research intensive universities of the N8, making access to a clinical trial base and expertise easier.

Manchester Science Partnerships has detailed plans for the further evolution of the campus over the next decade.

In February 2016 outline planning approval, was granted for a development of 409,000 sq ft of new space for life sciences companies.

In addition to new and reconfigured commercial space, the development aims to deliver up to 275 new homes.

Alongside the housing development, a new village hub will offer complementary uses such as a shop, gastropub and hotel.

In terms of a wider UK context, the life sciences sector comprises over 5,600 companies and employs an estimated 220,000 people. The UK government has introduced a number of fiscal measures to stimulate innovation and growth for companies.

One attractive measure is The Patent Box which offers a lower corporation tax of 10% on qualifying profits and R&D tax credits for small and medium-sized enterprises gives back up to 33% back on spending. This is one of the most generous tax credits in the world and corporation tax is currently 20% - the lowest rate in the G7 and the G20 and due to fall further to 19% from April 2017 and to 17% from April 2020.

The UK is home to the world's largest integrated healthcare system – the National Health Service – and overseas businesses that base themselves in the UK



Chris Doherty

can gain access to this. The anonymised data captured by the NHS can help drive innovation and services through monitoring effectiveness, performance and value of the product.

The UK government is extremely supportive of the biotech sector in general and recognizes Alderley Park's role as one of the country's most important life science assets. The businesses based there will continue the site's rich heritage of innovation.

<http://mspl.co.uk/>



MSP is the UK's leading science and technology park operator with five campuses (one of which is Alderley Park) across the North West. CityLabs 1.0 is its bio-health centre of excellence, located on the largest clinical academic campus in Europe in Manchester city center.

The North – a world leading clinical research cluster

Dr Hakim Yadi, CEO, Northern Health Science Alliance

An economic force in life sciences has been created by the Northern Health Science Alliance (NHSA), leading the way for the Northern Powerhouse.

By uniting the North of England's eight great world-class research intensive universities: Durham, Manchester, Newcastle, Leeds, Liverpool, Sheffield, York, and Lancaster, their associated NHS teaching hospitals and four Academic Health Science Networks, the NHSA brings together an unparalleled 15 million population.

Professor Chris Day, Pro-Vice Chancellor for the Faculty of Medical Sciences at Newcastle University sits on the NHSA's board. He said: "The success of the NHSA in bringing the partners in the North together to provide a coherent offering to industry and the Government has been nothing short of extraordinary."

Globally leading research infrastructure, low start-up costs, dedicated support, national centres of excellence in cancer, antimicrobial resistance, ageing, smart data and health economics (among many others) and over 30% of the England's clinical trials means the North's Life Science sector is thriving. The region's life science companies contribute over £10bn to the UK's economy alone.

There is no political spin in this version of a Northern Powerhouse – just a great untapped resource which is only now, as it comes together to work as one, beginning to realize its reach and economic potential.

If the North of England was its own country it would be the fourth largest in Europe – but with a disproportionate



number of excellent higher education institutions, the benefits of the UK's National Health Service and excellent connectivity to the rest of the UK and the world.

There are 1,000 life science companies in the Northern Powerhouse, 97% of these companies are small and medium sized enterprises (SMEs) which provides a strong supply chain for new investors to the region. These companies manufacture and export over £8.1bn of medicinal and pharmaceutical products per year and are responsible for 13% of EU biopharmaceutical production and 47% of UK medicine exports.

The NHSA acts as focal point for its members and partner organizations to work corroboratively on projects that leverage the combined potential of the North for the North. The NHSA is actively involved in coordinated responses to national and international funding calls and as a result has secured over £60m worth of contracts to date.

The 20 founding members of the NHSA have agreed to collaborate to create a single-portal, bringing together research, health science innovation and commercialisation to provide benefits for researchers, universities, hospitals, patients as well as commercial partners.

Working with global top 10 & speciality pharma companies

NHSA support

Working in partnership with the NHSA companies have been able to establish calls for drug-discovery and clinical validation proposals across the NHSA's universities and NHS Trust members in the North of England. The NHSA provides companies with a single access point to the North's leading clinical academic institutions.

Results

By working with the NHSA these companies have been able to manage and coordinate responses to calls for proposals in a streamlined and efficient way. Successful applicants have then been able to work with companies to co-develop novel research programs from drug discovery to clinical trials. A key feature of these projects is the opportunity for academic teams to work in close collaboration with industry scientists by forming joint research teams and working towards common goals focused on patient need.

The top-level engagement in the NHTA means that it is truly an alliance in every sense of the word.

Professor Ian Greer, Chairman of the NHTA and Vice-President and Dean of the Faculty of Medical and Human Sciences at The University of Manchester said: "The NHTA demonstrates that when faced with some of the biggest challenges in health and economic development cities can put their differences aside and come together to deliver as one."

"The NHTA has already proven that it is capable of working across city boundaries for the health and wealth benefit of the North."

The NHTA has already produced significant results. One of the organizations that has worked with the alliance is US-based Molecular Pathology Laboratory Network Inc. (MPLN Inc.).

Roger Hubbard, PhD, President/Chief Executive Officer of MPLN Inc. said: "As an American company planning to

open a branch location in the North, we have found the NHTA to be very helpful in introducing us to key individuals for potential collaboration, facilitating connections that would have been difficult for us to accomplish on our own.

"The NHTA has been very informative and interactive in accommodating our needs while possessing deep knowledge and understanding of the health sciences ecosystem throughout the United Kingdom."

www.theNHTA.co.uk



Hakim Yadi



Manchester: a key player in northern England's life sciences sector

Dr Linda Magee, Business Development Director, Manchester Academic Health Science Centre

Manchester Academic Health Science Centre (MAHSC) has a vision to make Greater Manchester a world-class region for life sciences discovery and commercialisation.

We have been working closely with industry for seven years, since we achieved the prestigious 'AHSC' designation from the Department of Health. This is a government recognition of the excellence of our medical research, teaching and patient care facilities.

MAHSC's strategic focus is to leverage our entire asset base (people, programmes, infrastructure and property) to deliver an integrated innovation pathway.

To date MAHSC has made significant progress in supporting industry partners, SMEs to multinationals, in the development and commercialisation of their products. Successes include the world's first real-world study of a pre-licence drug, the GSK Salford Lung Study and a major initiative with Hitachi resulting in the set-up of their new European Big Data Lab. MAHSC is also in the second term of a very successful partnership with NICE which is located in Manchester.

Professor Ian Greer, MAHSC Director and Vice-President and Dean, Faculty of Medical and Human Sciences, The University of Manchester, observed: 'We believe that careful planning by MAHSC, and other key partners, has engineered the right combination of circumstances and opportunities for pharma and biotech colleagues to succeed within Manchester and the North of England.'

Manchester Academic Health Science Centre

In MAHSC's view there are three key factors making this an unprecedented period for life sciences investment in the North of England.

Firstly, MAHSC's ambitious targets for the health economy in Greater Manchester and its capability to build the research expertise, processes and infrastructure to drive continued success. Examples of industry-friendly regional facilities include: strong IP management across all MAHSC partners, major platform capabilities in informatics, e-health and precision medicine and a single access point for clinical trials expertise and facilities, costings and contracting, through the Greater Manchester Research Hub.

Our strategy is to further accelerate collaborations, partnerships and inward investment with translational and experimental medicine.

Secondly, there is the major opportunity to accelerate health innovations offered by the devolution of the annual £6bn NHS budget to Greater Manchester authorities, under the new Health and Social Care

Greater Manchester Highlights

- MAHSC is a partnership between The University of Manchester and six highly-rated NHS organizations in Greater Manchester
- Greater Manchester is a city region in North West England with a population of 3.5 million
- It is the UK lead recruiter for commercially funded clinical trials and is one of the UK's leading biomedical clusters
- The University of Manchester ranks 1st in the UK for total industry-generated biomedical research income
- Greater Manchester has world-class research strengths in cancer, musculoskeletal, respiratory and dermatological diseases amongst others
- The Christie Hospital is recognized as the most technologically advanced cancer centre in the world outside North America and 9th globally

Partnership ('DevoManc'). MAHSC is capitalizing on this initiative, with our regional partners, through the establishment of Health Innovation Manchester (HinM); an academic health science system dedicated to speeding up the discovery, development and delivery of cutting-edge health solutions for patients.

From an industry working point of view, HinM offers full translational capability and improved accessibility to the entire health ecosystem; from research, education and clinical studies through early adoption to diffusion of evidence-based innovation.

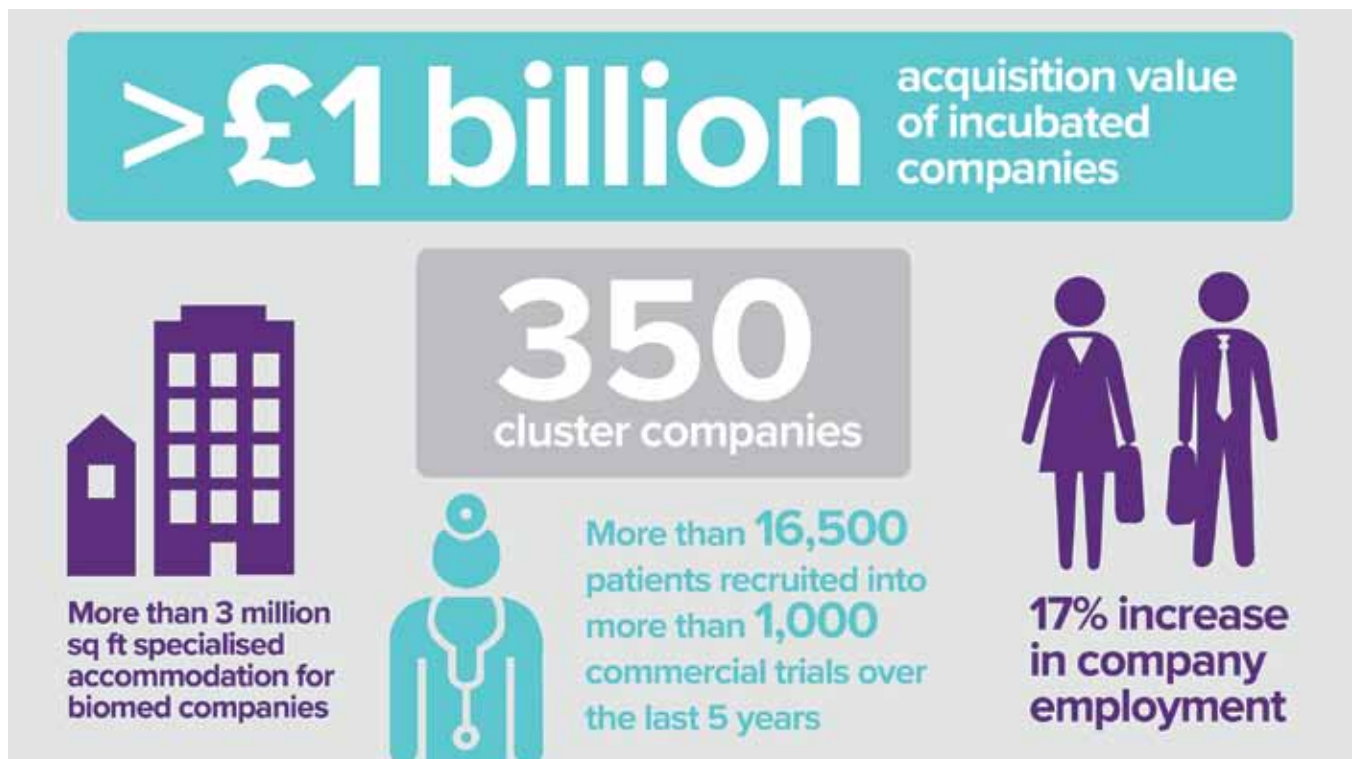
Devolution offers new opportunities for MAHSC to work with industry across the entire health and social care spectrum to deliver local health improvements, and act a 'test bed' for global markets supporting business growth and job creation.

Thirdly, Manchester has the resources and connections within the Northern Powerhouse to contribute to and benefit from life sciences expansion. Professor Ian Greer's roles, as both MAHSC Director and Chairman of the Northern Health Science Alliance, ensure strong alignment between the work of both organizations. MAHSC partner, The University of Manchester, has a key

role in the new, government-funded 'Connected Health Cities' information project to drive health and social care reform across northern England. MAHSC also helped shape the recent government-commissioned review of the economic contribution of the northern life sciences sector to the UK economy.

'There is a massive untapped resource for international investors and industry to work with the Northern Powerhouse for mutual benefit' said Professor Ian Greer. 'Greater Manchester and the wider region have the requisite facilities and there is a powerful collective momentum to push ahead with life sciences expansion.'

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