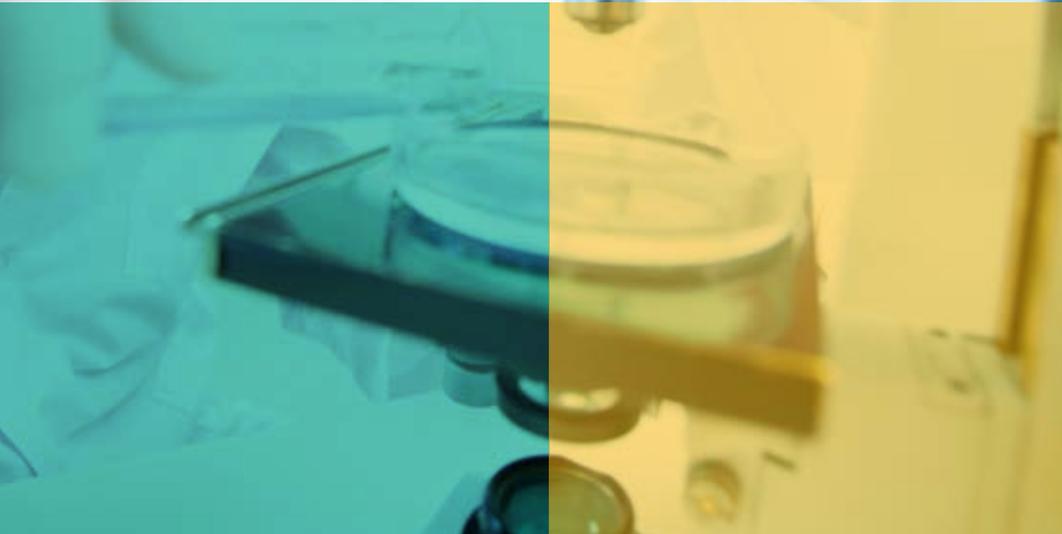


North East England

Life sciences healthy
and growing



North East
Local Enterprise Partnership



North East England

Life sciences healthy and growing

Pushing back the boundaries of medical knowledge, manufacturing and exporting medicines across the globe and pioneering new technologies.

North East England's life sciences and healthcare sectors are strong and growing.

Household names such as GlaxoSmithKline, MSD and Piramal Pharma Solutions all choose to call the region home, reaching out and spanning the globe with their manufacturing and innovation prowess.

They are significant jobs contributors, employing 38,000 people in nearly 160 life science and healthcare businesses. And in turn they are supported by 85 specialist supply chain companies.

Combined, these businesses contribute a turnover of £10.5bn to the regional economy, impressive numbers in an industry amongst the North East's largest employers.

Much of the region's pharmaceutical activity is concentrated in formulation, manufacturing and distribution. But there is also the depth and breadth of a diverse business base operating across the innovation and supply chain.

It has a broad range of medical technology and biotechnology companies with an extensive supply chain supporting the pharmaceutical industry

– including drug discovery, custom synthesis, specialist bioprocessing and technical support firms.

Firms such as E-Therapeutics, Leica Biosystems, ThermoFisher Scientific, Shield Therapeutics and NewGene undertake research and development into drug discovery, supplying research tools, producing speciality chemicals and manufacturing medical diagnostic devices.

This pipeline of new life science and healthcare businesses is supported by world class academic research in North East England's universities.

The North East has cemented its position as one of the UK's leading academic bioscience centres for research, teaching and training and its expertise in digital, data management and analytics means it has successful and growing clinical trials capability.

Working with the NHS as Newcastle Academic Health Partners, Newcastle University has built a global reputation as one of the world's top centres for research and innovation into ageing, age-related diseases and rare and debilitating genetic conditions.

It is leading the UK's efforts to improve the health and well-being of older people by developing new technologies and services.

Durham University has significant expertise and capabilities in biological science and agri-technology while Sunderland University has particular expertise in medicinal chemistry.

Northumbria University offers research and teaching strengths in sports science, exercise and public health.

Looking to the future, Newcastle City Council plans to build a 4,200 sq ft bio-incubator and grow-on facility on the Science Central site.

The initiative in the heart of the city will provide a base and potential clustering effect for homegrown and overseas life sciences and healthcare investors.



“Household names such as GlaxoSmithKline, MSD and Piramal Pharma Solutions all choose to call the region home.”

Facts & Figures

The North East has plenty of success stories in health and life sciences.

- ▶ The North East produces 33% of the UK's GDP in pharmaceutical manufacturing with 95% of finished product exported to global markets.
- ▶ Life sciences and healthcare businesses contribute £10.5bn to the North East economy.
- ▶ There are 13 sites of pharma manufacturing in North East England, employing 2,600 people.
- ▶ In 2010/11, 13,695 students undertook medical & healthcare related courses at Newcastle and Northumbria Universities.
- ▶ Significant investment into life sciences and healthcare innovation assets, including £40m by Newcastle University and the Government to establish the National Centre for Ageing Science and Innovation in Newcastle.

**THE NORTH EAST
PRODUCES 33%
OF THE UK'S GDP IN
PHARMACEUTICAL
MANUFACTURING**



**Life Science
contributes
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economy**

North East England – home to global best

Some of the world's leading pharma companies choose to call North East England home.

- ▶ MSD, in Cramlington, Northumberland, is one of the most advanced pharmaceutical manufacturing and packaging facilities in the world.
- ▶ Aesica, also in Cramlington, is a leading supplier of active pharmaceutical ingredients, formulations and custom synthesis solutions.
- ▶ Piramal Healthcare provides clinical trials, formulations and packaging of active pharmaceutical ingredients in Morpeth, Northumberland.
- ▶ GlaxoSmithKline, the world's second largest pharmaceuticals maker, employs over 1,100 staff at its 60-acre Barnard Castle site in County Durham.



Networks

Sector-specific support is available to help North East England health and life sciences companies grow.

- ▶ The NHS Innovations Hub identifies ideas within the NHS and gives support to licence them as new products and services provided by regional companies.
- ▶ The North East and North Cumbria Academic Health Sciences Network facilitates interactions across its member organisations and stakeholders, acting as a broker in areas that require collaborative working.
- ▶ NEPIC is a membership organisation supporting and promoting the process sector and its supply chain – all the North East's major pharmaceutical companies are members.
- ▶ BASME promotes senior executives from regional process industries and key academics mentoring small and medium-sized firms to increase their sales to the process industry sector.
- ▶ First for Pharma promotes the world-class services of pharmaceutical businesses based in North East England, as well as helping to grow networks between these companies.
- ▶ Bionow provides specialist business support and services to the life sciences industry and provides links to the wider cluster of life sciences companies in the North of England, representing 25% of the total UK sector.
- ▶ NB Research Partnership is a collaboration between the eight most research intensive universities in the North of England, including Durham and Newcastle. Working with industry, NB aims to maximise the impact of its research base by pinpointing powerful research collaboration opportunities.
- ▶ The Northern Health Science Alliance is a partnership between leading universities and NHS hospital trusts in the North of England. It aims to improve the health and wealth of the region by creating an internationally recognised life science and healthcare system.



Physical infrastructure

North East England has world class science parks and innovation bases where life sciences thrive and grow.

▶ Newcastle Science Central is a 100,000 sq ft site that focuses on the development of businesses investing and operating in the world of sustainable science. A bio-incubator facility has been approved and received £17m in funding. It will open for business from 2017.

▶ The International Centre for Life is a science village based in the heart of Newcastle where scientists, clinicians, educationalists and business people work to promote the advancement of life sciences.

▶ NETPark is rapidly becoming one of the UK's most high profile science parks. Based in Sedgefield, County Durham, it offers premises and facilities for innovative high tech companies, including 4,000 sq m of incubator space. It will be home to two key facilities in formulation and healthcare photonics by 2017.

▶ The Newcastle University Centre for Ageing and Vitality links together programmes to enable a greater understanding of the human ageing process. It is using its groundbreaking research to improve interventions for lifelong health and wellbeing.

▶ The North East is home to three Catapult Centres (technology innovation centres) relevant to healthcare and life sciences:

- High Value Manufacturing Catapult represented by the Centre for Process Innovation Ltd (CPI)
- Connected Digital Economy Catapult represented by Sunderland Software City
- Satellite Applications Catapult CoE represented by Business Durham.

▶ CPI has significant national activity in healthcare and life sciences including:

- National Biologics Manufacturing Centre in Darlington
- Biologics Factory of the Future in Darlington
- National Centre for Healthcare Photonics at NETPark
- Medicines Manufacturing Innovation Centre.



Academic excellence

North East England has a reputation for academic-led industry advancements, producing new spin-out businesses and attracting major funding for cutting-edge research.

It is the base for a number of world class higher education and further education institutions, offering a diverse range of educational programmes.

From clinical medicine, biological sciences, chemistry and dentistry through to biomedical engineering, sports science and public health, North East England leads the world in pushing back the barriers of scientific and medical knowledge.

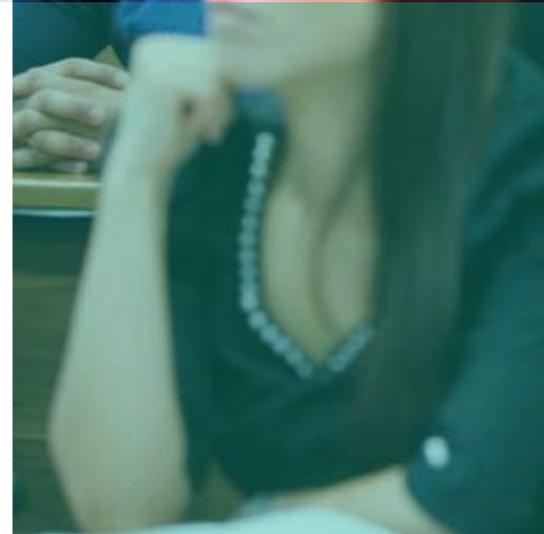
For instance, Newcastle University's Faculty of Medical Sciences is rated as the eighth best medical school in the UK.

The region is also home to significant research expertise at Durham University's Biophysical Sciences Institute, Northumbria University's expertise in sports science, exercise and nutrition and Sunderland University's Pharmacy School.

Durham University and Newcastle University are ranked in the top 20 in the UK - out of 154 universities - for their research power.

Together with Sunderland University and Northumbria University - which reported the biggest climb in recent research power rankings from 80th to 50th in the UK - the four universities offer a strong research and innovation base to support R&D, knowledge exchange and enterprise activity in the life sciences and healthcare industry.

- ▶ Newcastle University's Faculty of Medical Sciences is ranked fourth overall in the UK for research intensity in clinical medicine, fifth in biological sciences and ranked eighth overall among UK Medical Schools and top in England outside the 'Golden Triangle'.
- ▶ Durham University was ranked first nationally in chemistry for research impact, while both biology and physics were both ranked in the top ten in the UK for research impact.
- ▶ Northumbria University is in the top quarter in the UK for its research power in allied health sciences and nursing.
- ▶ The University of Sunderland has a formal, board-level relationship with City Hospitals Sunderland who are in the top quarter nationally for clinical trial accruals.



Clinical best

North East England has a number of hospitals that are recognised across the world as centres of healthcare excellence.

▶ The Freeman Hospital has an international reputation for ground-breaking transplant surgery. The UK's first Institute of Transplantation was opened at the Freeman in 2011 to bring all solid organ transplant services under one roof. More than 80 transplants are carried out every year, the largest programme of its kind in the UK.

▶ The Newcastle upon Tyne Hospitals NHS Foundation Trust is one of only two specialist children's immunology units in the UK, where they are pioneering the use of stem cells to repair fragile immune systems. New bone marrow transplant techniques are also playing their part, with more of these procedures undertaken in Newcastle than anywhere else in the world.

▶ City Hospitals Sunderland NHS Foundation Trust is acclaimed as the national leader in tackling the UK's obesity time bomb, dealing with patients from as young as 16 to as old as 73. Last year, the trust dealt with 900 referrals, going on to perform 600 procedures. The Trust is developing a dedicated bariatric outpatient unit for a rapidly growing service.

▶ A new £12m Pathology Centre of Excellence based at the Queen Elizabeth Hospital in Gateshead is bringing first class testing to the North East. The Centre is fitted with the latest high tech equipment with staff from Gateshead NHS Foundation Trust, City Hospitals Sunderland NHS Foundation Trust and South Tyneside NHS Foundation Trust now working together as a single team.



North East LEP investing funds to open doors to new opportunities

The North East LEP promotes strategic investments by the Government in the life sciences and healthcare sector.

This funding helps North East firms secure first mover advantage to develop new biologics, bioprocessing, formulation products and techniques and photonic therapies.

The Centre for Process Innovation (CPI) has secured £28m from the Local Growth Fund to create a National Formulations Centre and £18m to build a National Centre for Healthcare Photonics at NETPark in County Durham.

Newcastle City Council will open a new bio-incubator facility, having received £17m in funding. It will open for business from 2017.

North East England boasts a wide range of local and regional, private and public funding streams for life science and healthcare companies to access.

The Finance for Business North East programme continues to administer the £142m 'JEREMIE' fund and both the North East LEP and Tees Valley LEP will be launching the £160m North East Investment Fund – known as 'JEREMIE 2' – from 2016 onwards.

Close by in the Tees Valley, the £38m National Biologics Manufacturing Centre (NBMC) in Darlington will shortly be open for commercial clients, with CPI securing a further £20m from Government to establish a 'Biologics Factory of the Future' close to the NBMC.

“North East England boasts a wide range of local and regional, private and public funding streams for life science and healthcare companies to access.”



World leading research meets world class business

Investment in research is leading to breakthroughs in treatments to tackle some of society's most pressing health challenges.

Such a fertile academic environment is the breeding ground for new companies creating a stir in the life sciences and healthcare sector.

Chancellor of the Exchequer, George Osborne, has pledged £20m towards the creation of the £40m National Centre for Ageing Science and Innovation (NASI) at Newcastle University.

This will lead the UK's efforts to improve the health and well-being of older people.

It will develop new technologies and services to support older people to continue to live in their own homes and remain socially active for as long as possible.

NASI will build on Newcastle's premier reputation in ageing research by bringing together, in one centre, scientists and doctors from Newcastle University and its two partner trusts, The Newcastle upon Tyne Hospitals NHS Foundation Trust and the Northumberland Tyne and Wear NHS Foundation Trust.

As well as cementing Newcastle's position as a science hub, the centre will support 1,300 jobs across the city and provide a £22m boost to the region – and will build on the city's global reputation for civic engagement with older people in this field, as one of the most innovative focused 'age friendly' cities.

Mr Osborne paid tribute to "Newcastle's brilliant cutting-edge research." He said: "This research will not only help boost the regional and national economy, bringing jobs and investment, but will improve people's lives by developing technologies to support our ageing population."

Professor Chris Brink, Vice-Chancellor, Newcastle University, said the University would be matching the funding with a further £20m, bringing the project to an overall £40m investment.

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Lives improved through liver disease research

Newcastle University collaborates with NHS trusts and leading universities to improve awareness of Primary Biliary Cirrhosis.

Primary biliary cirrhosis, sometimes called PBC, is a disease in which the bile ducts in the liver are slowly destroyed. Bile, a fluid produced in the liver, plays a role in digesting food and helps rid the body of worn-out red blood cells, cholesterol and toxins.

When bile ducts are damaged, as in primary biliary cirrhosis, harmful substances can build up in the liver and sometimes lead to irreversible scarring of liver tissue (cirrhosis). The UK Primary Biliary Cirrhosis (UK-PBC) is an ambitious project aimed at improving the understanding of PBC and the way it impacts on the lives of patients.

Lead by Newcastle University, the UK-PBC project is a collaboration between Cambridge University, Imperial College London, Birmingham University, NHS Trusts across the UK, patient groups and international companies.

UK-PBC Stratified Medicine is an exciting new project aimed at transforming the capacity to treat PBC and to establish a national trial resource.

More than 5,000 PBC patients are currently enrolled in the project with more joining every week. The drugs for the UK-PBC clinical trials are obtained from Piramal Healthcare in Morpeth.



QuantuMDx develops pocket-sized patient DNA test

The power of DNA analysis in the pocket of a lab coat, with rapid patient diagnosis in 15 minutes. Not a vision of the future but very much the here and now.

The Q-POC handheld device is a state-of-the-art healthcare advancement.

The low cost technology developed by Newcastle-based QuantuMDx can take any sample, such as blood, urine, or even a tumour, and use DNA analysis to diagnose disease in under 15 minutes.

This process normally takes days in a laboratory, but with Q-POC it can be carried out at the patient's side, saving time and money and reducing patient stress.

The device consists of a smartphone-like reader, with credit card-sized disposable cartridges. Tests are currently in development for correct warfarin dosing, cancer testing, infectious and tropical diseases testing.

QuantuMDx CEO Elaine Warburton, said: "Locating the HQ in Newcastle was a conscious decision.

"Aside from being a great city with such friendly people and a real buzz, being situated at a leading genetics institution within the Centre for Life places us at the heart of global DNA-based research.

The availability of high calibre scientific researchers at Northumbria and Newcastle Universities, and the scope for excellent networking opportunities to develop our business internationally, was also a further deciding factor.

QuantuMDx has rapidly expanded over the last two years and now has a staff of 55 based in Newcastle, within several specialist labs.



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Polyphotonix sleep mask innovation prevents diabetes sight loss

Twelve years ago, British artist Richard Kirk became fascinated by a small piece of electroluminescent material.

It was made of organic light-emitting diodes (OLEDs). OLEDs emit light when an electric current is passed through organic molecules or polymers. They have a conductive layer as thin as human hair, which makes them flexible and adaptable.

Despite having no scientific background, Richard instantly recognised the potential of the technology.

He founded the company Polyphotonix, based at the North East Technology Park (NETPark) in Sedgefield, County Durham, in partnership with the Centre for Process Innovation (CPI) and with support from the High Value Manufacturing Catapult.

PolyPhotonix is now on the verge of revolutionising treatment for degenerative sight-threatening conditions caused by age and diabetes.

Noctura 400 is a preventative care treatment that helps stop progressive loss of sight.

“The potential costs, both human and financial, facing health services around the world are deeply sobering.” said Richard. “There’s an urgent need for an effective, repeatable, value for money treatment.”

“The Noctura 400 treatment has the potential to save more than £1bn per year from NHS budgets.”

During the night, eyes adapt to darkness but in patients with diabetes the eye goes into a hypoxic state i.e. starved of oxygen. The light emitted from the Noctura sleep mask stops this from happening.

This in turn prevents the growth of abnormal blood vessels, which are a symptom of the disease and contribute to loss of vision.

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Durham University and P&G set template for joint research

Durham's collaboration with Procter and Gamble, which started in 2009, has resulted in more than 50 joint research projects across the world.

Initially a team of 30 academics and PhD students from Durham University's chemistry and physics departments and the University's Biophysical Sciences Institute (BSI), worked closely with P&G scientists.

This has since become a strategic partnership involving academics from chemistry, physics, biology, mathematics, psychology, engineering and the university's Business School, working with P&G scientists across the world.

Durham academics are now linked with P&G researchers in locations ranging from Newcastle to Frankfurt, Brussels, Beijing and Cincinnati in areas including surface sciences, biophysical and life sciences, manufacturing and consumer psychology.

The university's long-term focus on consumer goods research and development was recognised by P&G with the award of 'Global Business Development University Partner of the Year' in 2012.

More than 200 researchers have been involved in creating new molecules for applications in homecare and personal products, and new methodologies for understanding active ingredients to improve the performance of consumer goods.

Dr David Jakubovic, P&G strategic lead to the Durham University and P&G partnership said:

"Our research programme with Durham University is focused against some of our toughest innovation challenges and our collaboration has delivered world class research outcomes and superior innovation for our consumers."

"More than 200 researchers have been involved in creating new molecules for applications in homecare and personal products."



Newcastle Hospitals Become Pfizer INSPIRE site

Newcastle upon Tyne Hospitals NHS Foundation Trust became the first clinical research organisation in the UK to be awarded INSPIRE site status by Pfizer.

Under its INSPIRE (Investigator Networks, Site Partnerships and Infrastructure for Research Excellence) programme, Pfizer and Newcastle Hospitals Trust will share expert knowledge and experience of medicines research.

This will help bring innovative new medicines to patients in the UK and around the world. There are currently 60 Pfizer INSPIRE sites across the world. Newcastle Hospitals is one of only three sites in the UK to hold this status.

Newcastle Hospitals will be a Pfizer-preferred international site for potential future research studies, which means that patients treated in the Trust's hospitals could have access to the latest advances in medicine through clinical trial programmes.

The INSPIRE partnership between Newcastle Hospitals and Pfizer is aligned with the Government's aims of making the UK a world leader in life sciences.

A key part of achieving this ambition is to embed a research culture within the NHS and create an environment which encourages more research, including clinical trials, into the UK.

Prime Minister David Cameron said: "I am delighted that Pfizer has chosen Newcastle Hospitals NHS Foundation Trust to be one of its international sites for clinical research."

Sir Leonard Fenwick, CBE, Chief Executive of Newcastle Hospitals NHS Foundation Trust, said: "Our INSPIRE status will help Newcastle stay at the forefront of international medical research."

"The INSPIRE partnership between Newcastle Hospitals and Pfizer is aligned with the Government's aims of making the UK a world leader in life sciences."



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