CELEBRATING
5 YEARS

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AI for Longevity Summit 2019

MedCity and Life Sciences in London & Greater South East – the Value of AI

medcityhq.com
@MedCityHQ

The BioPharm Industry

THEN

Large in-house R&D teams – typically rigidly streamed into dedicated areas of focus

Secure gated access; physically, legally and often contractually closed.

R&D often co-located with on-site manufacturing/packaging and distribution

Location of sites dictated by scale requirements/price of land/access (in some cases) to road transport for distribution.

Academic proximity typically a **secondary** consideration

Compound lists proprietary and guarded.

Internally closed I.T systems

NOW

Streamlined R&D teams, new agile Innovation Groups which are heavily externally focussed.

Collaboration on fundamental science and early stage research increasingly common

Interface with SMEs and Academia key

Shared research teams Academia/Industry increasingly common

Pipeline by acquisition/licensing increasingly the norm.

Manufacturing increasingly off-shore through specialised CMOs

Compound lists more open for re-purposing

Premium on proximity ! large pharma co-location in innovation zones open innovation…

Increasingly AI/Big Data partnerships

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Ingredients for growth

Space, Proximity, Infrastructure

Convergence of disciplines and sectors, Knowledge Exchange

Data & Technology

Investment

Access to patients and clinical expertise

Regulatory environment

Policy frameworks

Large and Small Companies

Feeling of being connected and supported

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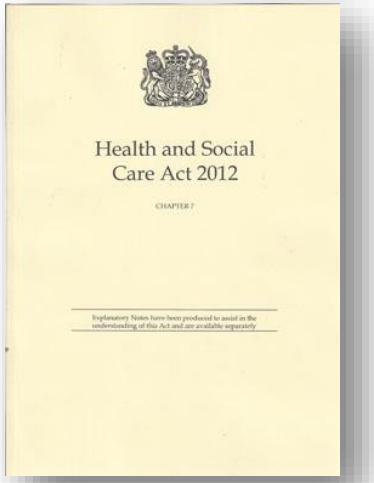
UK landscape

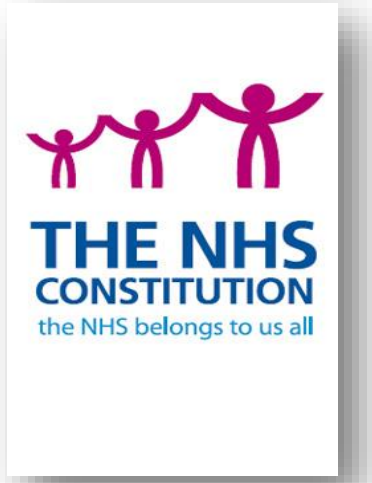
Political commitment to supporting life-sciences industry

2011

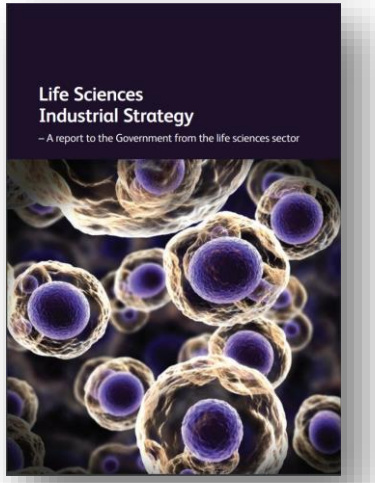
2011/12



2012



2013



2017

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The Greater South East of England and the “Golden Triangle”

Consists of **Cambridge, London** and **Oxford** within the greater south east of England

Strongest biosciences cluster in Europe - **> 3,000** life sciences companies within the regions (see medcitymap.com)

Close proximity to strong **academic** base, **research** institutions, leading **NHS** hospitals and a world-leading **financial** centre

The region is often seen as the **gateway to Europe** by large businesses

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Built on Academic Excellence

QS World University ranking

4 universities in the top fifteen global ranking for life sciences & medicine (in the Greater South East of England)

3 London universities in the top 20 for life sciences & medicine

- University of Cambridge is ranked number two;
- University of Oxford is ranked number three
- University College London is ranked number eleven
- Imperial College London is ranked number twelve
- King's College London is ranked number eighteen

Times Higher Education World Ranking : 2 London HEIs in top 15 for biological sciences;

US News ranking: 2 in top 20 for Neuroscience and behaviour; 3 GSE HEIs in top 20 for genetics;

Centre for World University ranking: 3 GSE HEIs in top 10 for genetics; 2 London HEIs in the top 10 for immunology

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London in numbers

8.17 million patients living in London, rising to 20 million across GSE

140 Specialist Services

32 Clinical Commissioning Groups (CCGs)

39 Acute trusts (secondary, tertiary and quarternary care)

3 AHSCs (Kings's Health Partners, Imperial College Academic Health Science Centre, UCLPartners)

3 AHSNs (Health Innovation Network, Imperial College Health Partners, UCLPartners)

3 Clinical Research Networks

3 CLAHRCs (Collaboration for Leadership in Applied Health Research)

9 Biomedical Research Centres

1 London Diagnostic Evidence Cooperative (based at Imperial)

2 Health Technology Cooperatives (Cardio-vascular disease – G&STT and Enteric Health- Barts)

5 therapeutic areas covered by the Health Informatics Cooperative (Oxford-Cambridge-London)

100k genomes (headquartered at QMUL)

3 Genomics Medicine Centres

In the last 3 years:

Over **3,200** commercial clinical trials took place,

Nearly **22,000** people were recruited

40% of (NIHR portfolio) clinical trials in England took place in London and GSE (2015/16)

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A developing landscape

Centre for Population Genomic Medicine/East London Genes and Health

Cambridge Biomedical Campus

£250m dementia research institute headquartered at UCL

Imperial White City campus

London Cancer Hub

Oxford Bio-escalator

British library lands project between the Francis Crick Institute and the headquarters to the Turing Institute

Rosalind Franklin Institute on the Harwell campus (Oxfordshire)

Barts Life Sciences Cluster Development

St Thomas MedTech Hub

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London and the Greater South East…Bingo

- ✓ Close to major Academic life science research hubs
- ✓ Close to clinical research centres/trials centres
- ✓ Close to transportation
- ✓ Close to multiple SMEs
- ✓ Walkable
- ✓ Proximity to restaurants, transit, pubs and coffee bars
- ✓Venture Capital co-located
- ✓Varied size and maturity of companies
- ✓Capacity to Grow/Scale-Up
- ✓A.I/Big Data in close proximity
- ✓International Linkages
- ✓Proximity to animal/imaging

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Investment into the sector (2017-18)

UK has the strongest pre-clinical/clinical product pipeline in Europe

Country	Preclinical*	Phase I	Phase II	Phase III
UK	351	43	70	15
France	192	23	39	11
Germany	147	34	38	6

£515 million in VC funding

~ £2.4 billion raised in IPOs and offerings on the London Stock Exchange - £2.1 bn was follow on funding which represents a 6X increase on 2016

UK-based biotech companies raised £2.2bn in funding in 2018, compared to £1.2bn in 2017; over £1.1bn of VC capital was invested in UK biotech companies

UK companies listed on Nasdaq:

- NuCana, Nightstart, Verona
- Autolus - $150m June, 2018

More info: bia.me/pipelineprogressing

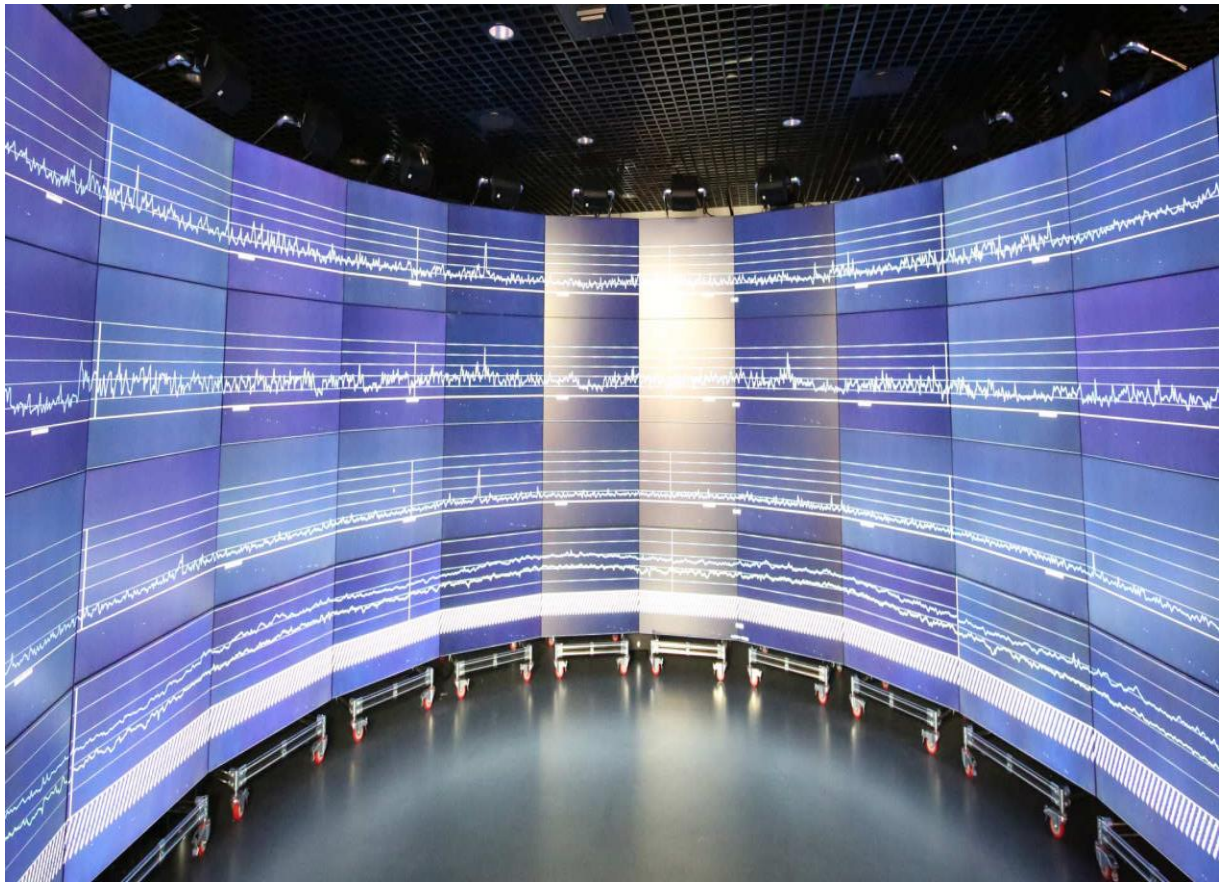
Areas of strength

Rare diseases Zayad Centre for research into rare diseases in children	**Genomics** Genomics England and the 100k genome project
Immunology	**Specialist paediatrics**
Biomedical engineering/ bio materials and dentistry	**Health data research and Digital health**
Neuroscience and neurodegeneration	**Mental health**

Advanced therapies
(cell, gene, regenerative medicine)

> 80% of all UK gene therapy phase ½ trials emanate from London

AI and Data landscape…



Imperial Data Visualisation centre, largest data visualisation centre in Europe.

The **UK ranks first** in the world in the Government AI Readiness Index 2017 Rankings - reflecting its world-leading centres for AI research and strong technology industry.

London is home to more software developers than any other European city, with over 251,000 workers across the capital, ahead of Paris, Berlin and Madrid (Stack Overflow 2018).

A four-year **£37million investment** from the UK Government to create a UK-wide system for the safe and responsible use of health-related data on a large scale.

Seven Health Data Research Hubs across the UK to enable cutting-edge research for health discoveries. Six Hubs have involvement from institutions in London and the Greater South East.

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AI – putting policy into practice

Artificial Intelligence: How to get it right

Putting policy into practice for safe data-driven innovation in health and care

Diagnostics	Knowledge Generation	Public Health	System Efficiency	P4 Medicine
• Image Recognition e.g. • Symptoms Checkers and Decision Support • Risk Stratification	• Drug Discovery • Pattern Recognition • Greater knowledge of rare diseases • Greater understanding of casuality	• Digital epidemiology • National screening programmes	• Optimisation of care pathways • Prediction of Do Not Attends • Identification of staffing requirements	• Prediction of deterioration • Personalised treatments • Preventative advice

Regulatory Framework Simplification

Developing an evidence standards framework for digital health innovations – are we there yet?

Continuous and collaborative development

A collaborative working group consisting of NHS England, NICE, Public Health England, MedCity and DigitalHealth.London came together to look at how to make it easier for innovators and commissioners to understand what 'good' evidence for digital innovations looks like, while meeting the needs of the NHS and patients. This would enable better NHS commissioning and a better understanding of how the NHS makes decisions and the standards expected of SMEs. It would facilitate a dynamic, value driven market.

The evidence standards framework was developed over a six-month period through an agile, user-centric process. This included robust evidence-based framework development by the NICE team, refined iteratively through multiple stakeholder workshops, recruitables and meetings. Innovation development is fast-moving by nature, and the resulting framework has been designed to be pragmatic and flexible rather than 'perfect'.

Version two

Since the first publication of the standards in December, the NICE team has incorporated feedback from over 200 survey responses and published a second, updated version.

Members of the working group have been active in presenting the standards at industry, investor and NHS events, delivering hands-on seminars to accelerator cohort companies. The team have been invited to present the work overseas to the WHO, as well as to countries looking to England's example in setting the direction for the evaluation and adoption of quality digital health technologies. This raises the prospect of the creation of harmonised evidence standards for digital health technologies, which would be invaluable to companies looking for a global market.

Application in practice

It's a common misconception that the hard work ends once guidance, regulation or policies are published. In reality, the work is only beginning at this stage, as it's then that we begin to measure impact through adoption and outcomes.

Embedding the standards is a shared responsibility and a continuous process, involving a digital ecosystem with multiple players. As with the collaborative development approach, this needs to involve industry, commissioners, AHSNs, academic researchers and regulators that are using the framework and can keep refining it.

Having accelerators, in particular the DigitalHealth.London Accelerator and the NHS Innovation Accelerator, use the standards framework to support and guide their cohort of companies in evidence generation has been an important tactic to gain early adoption of the standards within the SME base. The Generator, for example, is an initiative enabling companies within the DHL Accelerator to evidence their products through partnerships with the academic research community. The DHLA programme assigns NHS navigators to each company and, with support from partners including HIN and MedCity, has been using the evidence standards framework to support cohort companies developing evidence generation plans for their products to aid adoption. This has been done on a 13 basis as well as through workshops. In addition to this, the generator supports development of the appropriate research methodologies for products that align with the standards.

The standards in practice

"For all our projects, including our student projects and those we will do with industry partners, we are developing a scoring and categorisation system. In this way any project can be mapped to our priorities, the WHO digital intervention categories, and the evidence standards framework to determine what level of evidence would be required for potential clinical use.

The idea of this is to make it easy for us to report on the various different types of activities that we are doing and also so we can provide evidence where we are on the pathway for the various projects, in terms of how close or far away they are from being potentially usable. We are also trying to map any appropriate project to the NHSE guidance on best practice for AI, to demonstrate how the project meets all of the appropriate criteria. This is the approach being incorporated into everything from the planning phase forward. Of course, lots of the student projects are never destined to themselves end up as products for clinical use but are often explorations of early principles so not all of these elements would be applicable to every project."

Prof Neil Sebire
DRIVE unit, Great Ormond Street

"Transforming Systems worked closely with NIEC and NICE on the evidence case for the Digital Health Technology Standards for Wait Less. It was a very well thought through process which drew our data sources together in a concise way. This has helped us to improve our presentation to commissioners and providers. Having gone through a NICE accredited process has helped to give commissioners confidence about Wait Less' impact. This has opened up several new opportunities for Transforming Systems. As it helps to remove barriers to sale, I believe it should be a key objective for SMEs to go through this process."

Alistair Martin, Chief Commercial Officer
Transforming Systems

"As Digital Innovation Lead for an STP that has a 1/4 of all londoners within the area to support for health, it has been difficult to encourage digital innovation, know what apps to recommend to patients and know what to commission. The financial climate for the NHS is constrained and each CCG has previously done its own commissioning, sometimes swayed by the promises from suppliers without being able to have a clear, robust and dependable 'measuring stick' to assess whether this is a good tool.

The Evidence Standards Framework for Digital Health Technologies is the document that has enabled me to develop a framework where each digital tool we engage/procure we use the framework to localise our own processes which have enabled me to create a Digital App/Tool Board which has membership from the CCGs, Acutes, Councils to robustly assess effectiveness and economic impact. The framework and guide has given me the ability to use this board to filter through all proposals, which ensure that we are doing things 'once and for all NWL'.

Those that are sceptical or find that the guide is ambiguous need to appreciate that this is a framework which is supposed to be localised and built upon. The framework delivers on its objective of providing a solid methodology to leverage the best in digital health for our population."

Konrad Alfred,
Digital Citizen and Innovation Lead
North West London CCG

Contributed by MedCity

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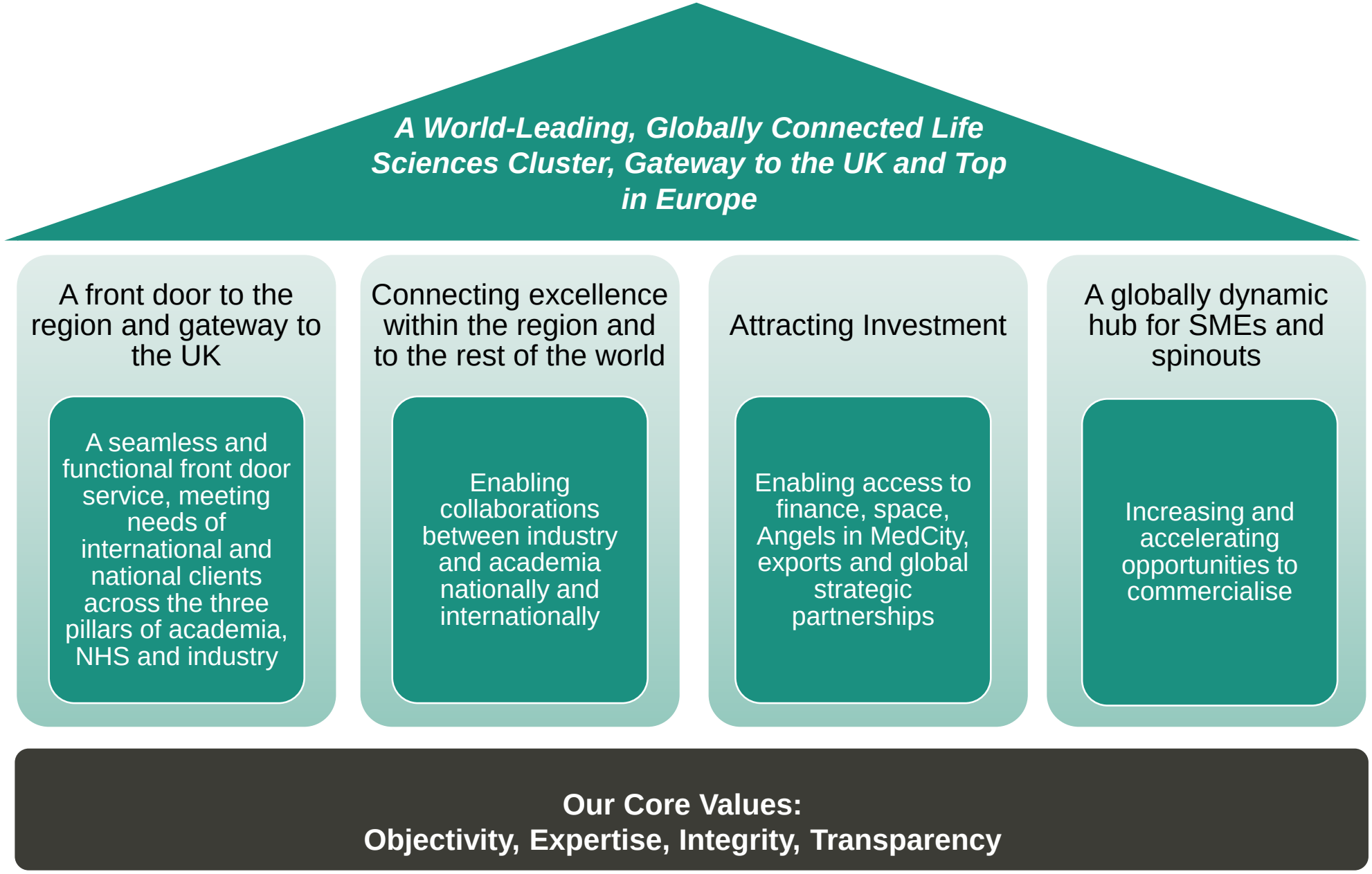
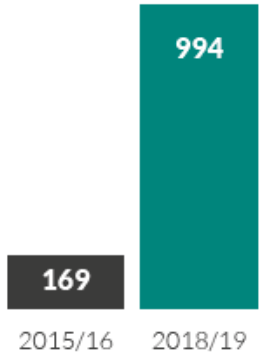
CAMBRIDGE | LONDON | OXFORD


A World-Leading, Globally Connected Life Sciences Cluster, Gateway to the UK and Top in Europe
A front door to the region and gateway to the UK
A seamless and functional front door service, meeting needs of international and national clients across the three pillars of academia, NHS and industry
Connecting excellence within the region and to the rest of the world
Enabling collaborations between industry and academia nationally and internationally
Attracting Investment
Enabling access to finance, space, Angels in MedCity, exports and global strategic partnerships
A globally dynamic hub for SMEs and spinouts
Increasing and accelerating opportunities to commercialise
Our Core Values:
Objectivity, Expertise, Integrity, Transparency

Front Door

MedCity front door service

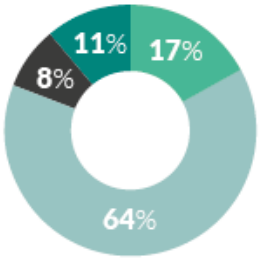
Cumulative number of new clients



GVA (cumulative) of additional direct life sciences jobs resulting from inward investment projects that MedCity has supported

Breakdown of new MedCity clients for 2018/2019

- **Large Corporate** 44
- **SMEs** 167
- **Investors** 21
- **Other** 30 (charities, real estate etc.)



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International Missions

Bio US 2018

50 strong life sciences delegation to Japan & Korea

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Infrastructure and Ecosystem development

British Library development

National project to develop digital health evidence standards

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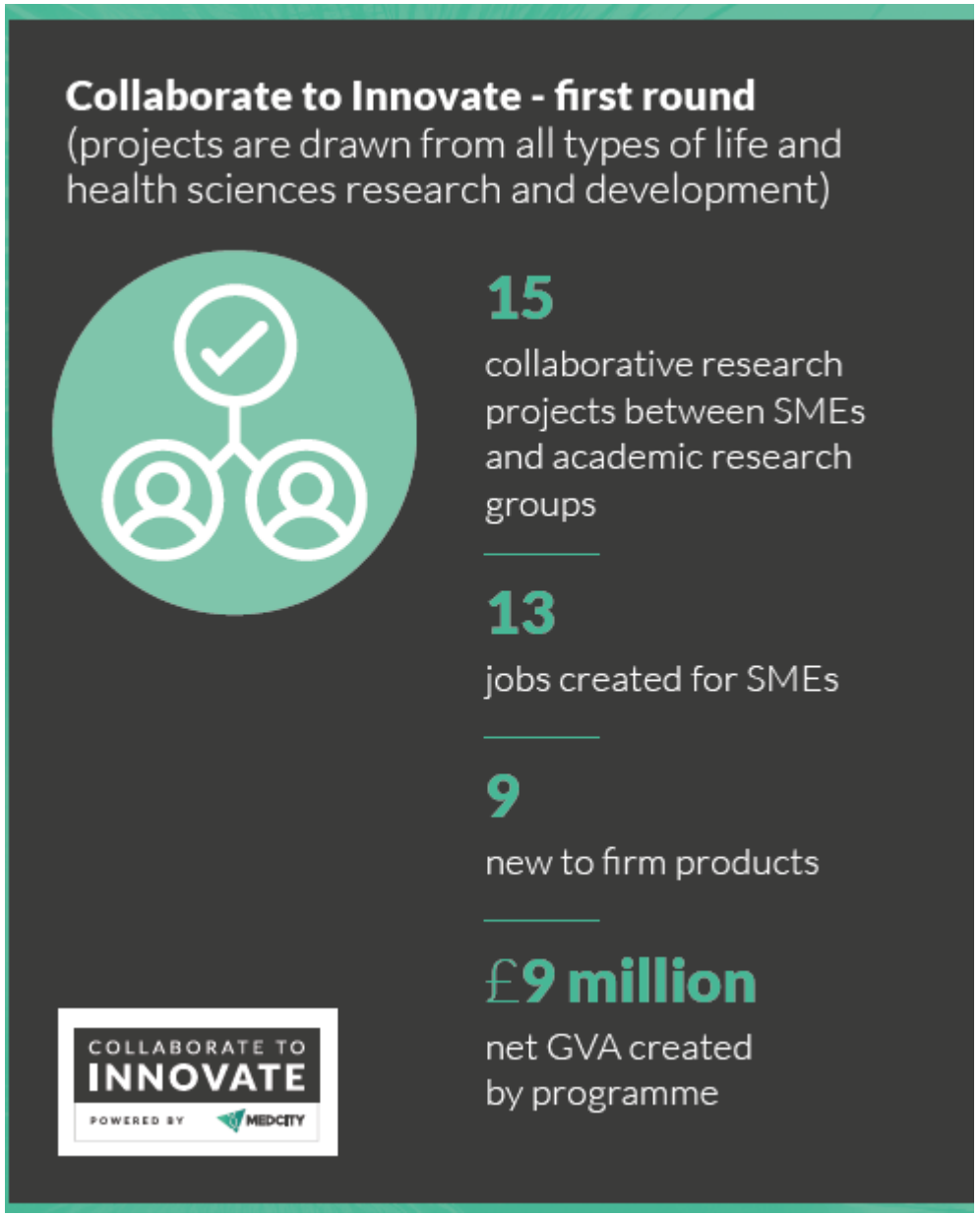

- Collaborative research projects between SMEs and Academics at 4 London universities, up to £100K each
- Focuses on lack of investment in research and innovation by SMEs, due to funding constraints and lack of awareness of the relevant expertise available
- Addresses a well documented market failure
  - SMEs want to work with top London HEIs; but find the process complicated, inefficient, and confusing
- It removes the requirement for matched funding by the SME
- Broad range of companies including LiFT Biosciences who have recently attracted over 100 investment approaches

COLLABORATE TO INNOVATE
POWERED BY MEDCITY

Globally dynamic hub for SMEs and spinouts

DigitalHealth.London Accelerator (August 2016 – January 2019)

The DigitalHealth.London Accelerator is a collaborative programme delivered by MedCity, CW+, and London's three Academic Health Science Networks.

82

82 digital health companies supported through DigitalHealth.London Accelerator

£

More than £64 million raised in investment – 66% who had raised funds said the accelerator helped them do this

+

467 new jobs created, 141 attributed to the accelerator

Supported companies have secured **32 research collaborations**, and **developed 20 new digital health products**

All above figures are self-reported. 61 SMEs from cohorts one and two from August 2016 to January 2019 were asked to complete a survey, which had a 67% response rate.

DigitalHealth. London | ACCELERATOR

Clinical Entrepreneurs

MedCity have supported **22 NHS England Clinical Entrepreneurs** over **3 cohorts** through **mentoring, guidance** and **office support**

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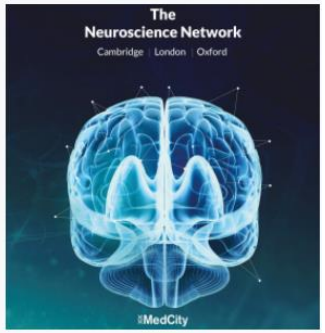
MedCity – Thank You

MedCity's annual review, along with our other reports, can be accessed from

MedCity's website - http://www.medcityhq.com/about-us/our-publications/

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