Informing the Life Sciences Industrial Strategy

Note of discussion at the Academy of Medical Sciences
11 January 2017

The **Academy** *of*
Medical Sciences

The Academy of Medical Sciences

The Academy of Medical Sciences is the independent body in the UK representing the diversity of medical science. Our mission is to promote medical science and its translation into benefits for society. The Academy's elected Fellows are the United Kingdom's leading medical scientists from hospitals, academia, industry and the public service. We work with them to promote excellence, influence policy to improve health and wealth, nurture the next generation of medical researchers, link academia, industry and the NHS, seize international opportunities and encourage dialogue about the medical sciences.

Opinions expressed in this report do not necessarily represent the views of all participants at the event, the Academy of Medical Sciences, or its Fellows.

All web references were accessed in January 2017

Overview

- Participants considered the draft UK Life Sciences Industrial Strategy, developed under the co-ordination of Office for Life Sciences, which was circulated in advance. Support emerged for many of the proposals in the draft. The final Strategy is anticipated by the end of March 2017. This is expected to form a key element of the Government's Industrial Strategy.

- The Department for Business, Energy, and Industrial Strategy (BEIS) and Department of Health (DH) are supportive of the emerging Life Sciences Industrial Strategy. The sector is successful globally and the UK is predicted to maintain an upward trajectory. The Strategy needs to help us prepare for where we will be in 20 years' time - not where we are now– so that we can anticipate and build capacity and capability. UK Biobank was given as an example of where we were ahead of the curve. Participants suggested the following for the future:

  - o Personalised psychiatry which tackles major unmet need and which is important for the equity agenda. Pharma is reticent in this area but the science is beginning to become tractable (e.g. risk genes and biomarkers are emerging that could drive stratification of treatment responsive sub-groups of patients with a syndromal diagnosis of depression or psychosis) with potential role of digital interventions (e.g. apps for cognitive/behavioural treatment delivery and monitoring).

  - o Digital and artificial intelligence are more likely to provide value gain in healthcare in the future. They will be crucial for early diagnostics and maintaining quality of life after drugs start to fail, and reaching the elderly who often live away from hospitals (e.g. in the countryside).

  - o Networks across the UK (rather than focussing only in the South East) to better match patient needs.

- Those developing the Life Sciences Industrial Strategy are looking for examples of countries that have delivered a successful life sciences strategy (with US, Belgium, Israel, Singapore and Switzerland widely regarded as the most successful).

- In the course of the meeting, participants rehearsed the assets that the UK could draw on in the Strategy, and the challenges that it must address (Box A).

Box A – UK assets and challenges

Assets:
- Excellent biomedical research, particularly in discovery science, though the risk from continued flat cash settlements must be addressed.
- Single healthcare system, an opportunity that we haven't yet seized.
- South East is now the third largest cluster in the world.
- Significant pharmaceutical footprint with growing medtech and digital health and a recent resurgence in biotech.
- Transformative investment in infrastructure by National Institute for Health Research (e.g. Biomedical Research Centres and in genomics).
- Cadre of clinical academics.
- Potential to build on regional electronic records linking strengths to analyse the medical histories of 65 million UK citizens.

Challenges:
- UK's exit from the EU (but opportunities to remove barriers to fiscal incentives).
- Health and social care systems that are unsustainable in the current form.
- Downsizing of large pharma in the UK (although there was a suggestion that new investment was imminent as a result of our excellence in discovery science).
- Lack of entrepreneurs compared to the US.
- International competition.
- Science focused in the South East, which is not matched with patient need.

Discussions

Attracting and retaining investment in the UK

- Long-term (patient) capital is key in this sector. There was support for the Government's new Patient Capital Review– led by the Treasury – that will examine how to remove obstacles to getting long-term investment into innovative firms.[1]
- It can be difficult for those looking to invest in the UK to know who to contact. Companies also need 'matchmakers' to link them to relevant academic groups and centres (with an example given of companies struggling in area of bioelectronics). Clusters such as MedCity and Northern Health Science Alliance are aiming to act as a single portal for a certain area. [2,3] **Government needs to provide the right narrative and facilitation, not just fiscal measures, to attract investment**.
- A better understanding of behaviour/culture that have enabled us to flourish in low resource setting – the soft factors – will be important as provision of investment alone could lose creativity.
- Biomedical Catalyst 'de-risks' investment but requirement for 50% matched funding to meet EU state aid rules presents a major challenge. There is an opportunity to address this by **changing the requirement when we leave the EU. Alternatively, or in the meantime, we need to provide support for start-ups to find matched funding**. [4]
- There is a lack of venture capital (VC) funders in the UK, which needs to be addressed, but we also need to **support small UK companies to attract investment from abroad**.
- Access and uptake of medicines by the healthcare systems are important factors for investment decisions by companies. There was a debate on the extent of this problem and the difficulty of quantifying the issue with the current NHS payment system.
- Industry has highlighted the failure to provide a contemporary standard of care that meets FDA and other regulatory standards for market authorisation across the UK as a reason for not investing in late stage clinical R&D. It was suggested, however, that this was not required across the UK, only in centres where trials were taking place.
- Attendees supported the proposal to create single Technology Transfer Organisations (TTOs) across key clusters to address the outstanding challenges of relationship between university TTOs and companies and to share best practice.
- They also highlighted the importance of supporting and exploiting new models of innovation (e.g. Manchester Collaborative Centre for Inflammation Research involving University of Manchester, AZ and GSK).[5]

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[1] https://www.gov.uk/government/publications/patient-capital-review
[2] http://www.medcityhq.com/
[3] http://www.thenhsa.co.uk/
[4] https://www.mrc.ac.uk/funding/science-areas/translation/biomedical-catalyst/
[5] http://www.mccir.ls.manchester.ac.uk/

Building capabilities across the UK and addressing inequalities

People & skills

- We need a net-flow of talent into the UK. The Government of Canada Research Chairs have been successful and could be considered as a model. [6] Attendees supported the proposal for a **recruitment fund**, which could also be used to bring leading researchers and entrepreneurs into the UK.
- The Academy of Medical Sciences is developing a new leadership scheme to promote mobility between sectors. These people would be expected to be future leaders of clusters.
- There should be **more joint industry-academia appointments** (e.g. Professor Ed Bullmore, Professor of Psychiatry, University of Cambridge and VP ImmunoPsychiatry, GlaxoSmithKline).
- The life sciences industries (especially medtech) require chemistry, physics, IT and engineering. For instance, Silicon Valley is largely IT and MRC Laboratory of Molecular Biology is driven by non-life scientists. Attendees welcomed the fact that convergence of disciplines is recognised in the draft Life Sciences Industrial Strategy. This doesn't reduce the need for core skills, for instance medicinal chemistry, *in-vivo* skills, clinical science, and pharmaceutical medicine.
- Data scientists will be crucial but those moving into health want to have a career path/destination. MRC aims to help build a UK-wide health and biomedical informatics capability by **providing innovative training programmes and relevant competencies built into university contracts.**
- Entrepreneurship skills are lacking in the UK. It is rare to see a trained scientist with entrepreneurial and managerial skills. In the US, freedom for universities and small businesses to exploit IP derived from federally funded research (under the US Bayh-Dole Act) stimulated training, mentoring and funding of researchers to exploit IP. **We need to spot and support potential entrepreneurs**. Two examples of success were given:
    - Royal Academy of Engineering Enterprise hub[7]
    - Johnson & Johnson - Jlabs (Cvi)[8]
- Research Excellence Framework has helped to support translation through the introduction of impact measures.

Places

- **Industrial strategy needs to apply across the UK**, not just the South East which, for instance, will not match patient needs now or in 20 years' time.
- Universities outside of the golden triangle are finding success by focusing on particular areas of strength (e.g. Newcastle on ageing) rather than trying to excel at everything. In US, strong biotech has developed around world-leading hospitals with expertise in particular disease areas.
- It was suggested that devices and diagnostics are less tied to the South East so they provide an opportunity for more geographically diverse development.
- Distributed networks and consortia will be another model: the stratified medicine consortia supported by MRC was given as an example.

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[6] http://www.chairs-chaires.gc.ca/home-accueil-eng.aspx
[7] https://enterprisehub.raeng.org.uk/
[8] http://jlabs.jnjinnovation.com/

Supporting the NHS

- An array of new innovative activities are needed across the NHS to excite staff. The 100,000 Genomes Project is a good example that aims to transform clinical care and act as an accelerator. The NHS is fragmented but data, genomics and personalised medicine could be a unifying theme.
- There needs to be a **new model of payment and an innovative tariff system**. Funds provided to hospitals for industrial trials, for instance, or savings made from innovation, do not benefit the unit responsible and it is very difficult to track and quantify the cash flow.
- Most innovations will increase cost. There is a need to develop mechanisms where enhanced access to NHS patients by industry during development of new interventions ensures a discount for NHS when adopted (although it was noted that many GPs are not predisposed to working with industry.)
- There was support for the Accelerated Access Review's recommendation of **ring-fenced funding for leading Academic Health Science Centres**. There could be a DARPA-style challenge to competitively allocate funding to Academic Health Science Networks with innovative proposals for delivery in their local healthcare systems. [9] [10]
- There needs to be **more rigour in innovation adoption and commissioning**. There was a suggestion of getting academics into commissioning bodies.
- It was noted the major income that countries like Sweden derive from 'exporting' the expertise of its healthcare system. Questioned whether the NHS and Healthcare UK is being adequately supported to realise its potential for export.

Patient Data

- This remains a key priority. For example, an open data platform is crucial if we are to allow diagnostics to thrive and enable appropriate valuation of new interventions. We currently have complete coverage of primary care but secondary care is highly fragmented and standardisation of terminology is lacking. **There needs to be support for NHS Trust CEOs who want to be innovative with data.**
- There are some concerns about the operation of NHS Digital. The change of public attitudes towards patient data, seen in devolved administrations, is positive and it is hoped that Understanding Patient Data Initiative[11] will support a more positive conversation in England. Focus on the benefit of joined up healthcare for patients is key and the new consent/opt-out model recommended by Dame Fiona Caldicott was supported. It was noted that GPs also need to be involved.
- There was a debate about an optimum size of a dataset. It was noted that experience of Scotland shows that data from smaller footprints are still valuable. Datasets of 5m people may be uncompetitive with private healthcare providers in US (e.g. Kaiser Permanente) and insufficient to be meaningful for rarer diseases (e.g. many cancers) but multiple groups of 5m could be combined to create a more widely applicable dataset. **Interoperability and standardisation will be essential.**

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[9] https://www.gov.uk/government/organisations/accelerated-access-review
[10] http://www.darpa.mil/work-with-us/public/prizes
[11] https://wellcome.ac.uk/news/independent-patient-data-taskforce-announced

Attendees List

Professor Sir Robert Lechler PMedSci (Co-Chair), President, Academy of Medical Sciences

Professor Sir John Bell GBE FRS HonFREng FMedSci (Co-Chair), Regius Professor of Medicine, University of Oxford

Mr Imran Bhaluani, Private Secretary to the Lord Prior of Brampton

Dr Hannah Brown, Deputy Director, Office for Life Sciences

Professor Christopher Day FMedSci, Vice Chancellor, Newcastle University

Professor Gary Ford CBE FMedSci, Chief Executive Officer, Oxford Academic Health Science Network

Professor Sir Malcolm Grant CBE, Chair, NHS England

Dr Nicolaus Henke, Partner & Director Healthcare Systems & Services, McKinsey & Company

Sir Harpal Kumar, Chief Executive Officer, Cancer Research UK

Dr Fiona Marshall FMedSci, Chief Science Officer, Heptares Therapeutics

Sir Keith Peters FRS FMedSci FLSW, Emeritus Regius Professor of Physic, University of Cambridge

Dr Martino Picardo, Chief Executive Officer, Stevenage Bioscience Catalyst

Lord Prior of Brampton, Parliamentary Under Secretary of State, Department for Business, Energy and Innovation

Dr Rachel Quinn, Director of Medical Science Policy, Academy of Medical Sciences

Sir Michael Rawlins FMedSci, Chair, Medicines and Healthcare products Regulatory Agency

Professor Sir Nilesh Samani FMedSci, Medical Director, British Heart Foundation

Sir John Savill FRS FRSE FMedSci, Chief Executive, Medical Research Council

Dr Ian Shott CBE FREng, Chair of the Enterprise Committee, Royal Academy of Engineering

Professor Sir John Tooke FMedSci, Professor of Medicine, University College London

Professor Christopher Whitty CBE FMedSci, Chief Scientific Adviser, Department of Health

Dr Naho Yamazaki, Head of Policy, Academy of Medical Sciences

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