



House of Commons Science & Technology Committee Inquiry into the Science Budget and the Industrial Strategy

Response by the Wellcome Trust

3 November 2017

Key messages

- UK science is a key priority for the Government – but this must be supported by high-quality STEM education and training. This should start in primary school, and continue through technical, academic and industrial careers.
- The Government should invest in R&D in line with our international competitors. This funding should be delivered in a sustainable and strategic way, covering basic to applied research, and support for innovative companies and world-class infrastructure.
- The UK should maximise the value of its unique research assets. Our rich but fragmented health data resources need to be better aligned and supported by a national opt-out to build public confidence.
- A number of actions are important to support UK science following Brexit. Most urgently, the UK and EU27 need to reach an early, strong deal on continuing UK participation in Horizon 2020.

Introduction

1. It is a time of unprecedented change for the UK life sciences sector. An increased science budget and an emerging Industrial Strategy offer an opportunity to boost the UK's research performance, mitigate some of the uncertainties created by Brexit, and deliver further health and economic benefits to society.
2. In this submission, we set out Wellcome's priorities and the actions that we think are required to build a skilled workforce, support research and innovation, capitalise on the UK's unique selling points, and maintain UK scientific excellence after Brexit.
3. Wellcome is keen to work alongside the Government and others to deliver this. Over the next year, we'll invest over £1 billion in science, medical innovation, the humanities and social sciences, and public engagement – more than ever before. We're proud that the majority of this is spent in the UK as a direct result of Britain's scientific strength and excellent research workforce.

Developing skills

Give every child an inspiring, hands-on STEM education

4. We want STEM career opportunities to be accessible and attractive to young people from all backgrounds, and we welcome the support for this in the Life Sciences Industrial Strategy. This will require an integrated approach, whereby all students receive a hands-on, inspiring science and maths education, including **at least two hours of science a week in primary school, practical science at least fortnightly at all levels, and a balance of biology, chemistry and physics through to 16, with maths to 18**. This should be combined with high-quality, independent careers advice covering the full range of STEM opportunities.

Improve retention rates for STEM teachers

5. High-quality STEM education relies on high-quality teachers. However, recruitment targets for physics, chemistry and maths teachers continue to be missed, and science teachers are more likely to leave the profession than their colleagues.^{1,2} To retain STEM teachers and continually improve their subject knowledge and teaching skills, they must be supported by professional development. Project ENTHUSE, match-funded by £20 million each from Wellcome and the Government since 2008, provides bursaries to teachers and technicians for professional development. This training delivers significant impact, reducing the odds of teachers leaving the profession by 160%.² As recommended in the project's independent quinquennial review, **we ask Government to commit £8 million of matched funding alongside Wellcome for Project ENTHUSE for 2018-2023.**

Build a world-class technical education system for science

6. Technical staff are fundamental to creating and refining the techniques and experiments that underpin cutting-edge research. At the Wellcome Trust Sanger Institute, a world-leading centre for genomics, 66% of the workforce are technical and support staff. These individuals should receive the visibility, recognition and career development that they deserve, and Wellcome is part of the Technician Commitments which seek to achieve this goal.³ Government and the research sector should also strengthen the range of routes into science, including apprenticeships from level 2 (GCSE equivalent) to level 8 (post-graduate equivalent), across universities, research institutes, industry and the NHS. **This should include the development of new apprenticeships to help address shortages in data science and informatics, as recommended in the Life Sciences Industrial Strategy.**

Value diversity in all its forms

7. Research publications remain the principle metric for academic success. In the 2014 Research Excellence Framework (REF), over 13,000 clinical medicine outputs were submitted, yet only 18 were not journal articles.⁴ **REF must set ambitious precedents in rewarding excellence in non-traditional forms**, promoting the value of outputs such as intellectual property, policy reports, open data sets, effective collaborator networks, clinical trials infrastructure, and open and robust protocols – all of which expand our knowledge, and help to deliver health and societal impacts. The REF assessment must also be coordinated with the Teaching Excellence Framework to capture the intrinsic link between research and teaching.
8. Barriers to working across the science and innovation system should also be broken down. **Cross-disciplinary and cross-sector interactions must be encouraged in STEM degrees, PhDs and throughout research careers.** Wellcome is working to build a diverse population of talented individuals and teams through its own programmes, and we welcome the profile given to this issue in the Life Sciences Industrial Strategy. The 2017 Nobel Prize for cryo-electron microscopy, which depended on advances in chemistry, physics and computer science, is just the latest example of what can be achieved when disciplines converge.

Investing in science, research and innovation

Invest in R&D in line with our competitors

9. We welcome the Government's commitment of an extra £4.7 billion for science by 2021, representing the largest increase in the science budget since 1979. Within ten years, this will boost research investment to 2.4% of GDP – a major change in pace, but still lagging behind other research-intensive nations investing at around 3%.

¹ Department for Education (2017) *Initial Teacher Training: trainee census 2016-17* www.gov.uk/government/statistics/initial-teacher-training-trainee-number-census-2016-to-2017

² Education Datalab (2017) *Improving science teacher retention* <https://wellcome.ac.uk/sites/default/files/science-teacher-retention.pdf>

³ <http://technicians.org.uk/techniciancommitment/>

⁴ <https://wellcome.ac.uk/sites/default/files/second-research-excellence-framework-consultation-wellcome-mar17.pdf>

Achieving the 3% R&D investment target should remain a top priority for the UK, and will require long-term commitment from Government, industry and private funders.

Build a sustainable and strategic research funding system

10. The UK benefits from a unique dual-support system which balances competitively-awarded grants to individual researchers, delivered through the Research Councils, with quality-related institutional support from the devolved Funding Councils. This complementary blend of funding has helped to drive excellence in research, and given institutions the flexibility to invest strategically. **It is more important than ever that the dual support system retains this balance, with quality-related support rising in line with the expanding science budget.** This investment provides the foundations which directed investment, such as challenge funding, relies on to achieve its objectives. Wellcome is leading a sector-wide evidence project to better capture and communicate the uses of quality-related funding, and we would be happy to share this with the committee when it's published later this year.

Take a strategic approach to research infrastructure

11. World-class research requires state-of-the-art facilities and cutting-edge equipment. When the UK has taken a strategic approach to infrastructure, it has delivered unparalleled research capabilities, including the UK Biobank's rich data from half a million volunteers, and the largest global capacity for sequencing and analysing genomes. Once established, **UKRI should assume responsibility for planning, oversight and management of UK research infrastructure,** which has historically lacked coordination. This would help to ensure that funding decisions on new and existing infrastructure are strategic, coordinated, affordable and meet the long-term scientific needs of the country.

Transform the UK translation system

12. New knowledge and discoveries should be applied beyond the academic setting wherever possible. As part of this, Wellcome and other organisations recently published Transforming UK Translation⁵ which sets out our commitments to develop the translation system over the next 10 years. We also look forward to the outcomes of HM Treasury's Patient Capital Review looking at how to increase the supply of long-term capital for innovative companies. However, **success rests on the UK's ability to both attract and equip individuals with the entrepreneurial skills and confidence to develop their innovative ideas.** We welcome the recommendations of the Life Sciences Industrial Strategy in this area on training and migration.

Enhance the Charity Research Support Fund (CRSF)

13. Medical research in the UK is backed by one of the most dynamic charity sectors in the world, channelling 8 million people's donations to contribute 45% of all public funding.⁶ This is made possible by the CRSF, which allows charities to provide the direct costs of research in partnership with the Government, who cover the general running costs of universities. However, the CRSF has been frozen since 2010 despite increased charity spending, placing unsustainable pressure on universities and making charitable funding progressively less attractive. **The Government should enhance the CRSF in line with inflation and charity investment.**

Building the UK's unique selling points

Instil a vibrant research and innovation culture across the NHS

14. As the world's largest single-payer health system, the NHS represents both a unique asset for UK research, and a leading market for innovation. Evidence also shows that strong participation in research by individual hospitals improves patient outcomes.⁷ To

⁵ Wellcome Trust *et al* (2017) *Transforming UK Translation* <https://wellcome.ac.uk/sites/default/files/transforming-uk-translation-20170725.pdf>

⁶ Association of Medical Research Charities (2017) *Unlocking the investment power of medical research charities*

⁷ British Medical Journal (2016) <http://gut.bmj.com/content/66/1/89>

create a sustainable healthcare system, research and innovation must become 'business as usual' for the NHS, with staff supported to engage with research and deliver innovations to patients. **We welcome the Government's response to the Accelerated Access Review** and the new fast-track route to get promising breakthroughs to patients quickly. In parallel, **the Health Research Authority and National Institute for Health Research should continue to identify and address barriers to research approval and set up across the health service**, securing the UK's position as the leading location for early-stage clinical trials across Europe.⁸

Build an unparalleled health data infrastructure

15. The UK has an unmatched potential to deliver a data-driven approach to healthcare and research. To deliver this, the fragmented data systems across primary care, secondary care and disease registries must be aligned and interoperable, and the public must have confidence in how their data will be used. **An effective governance framework is essential, including a national opt-out for patients who do not want identifiable data to be used beyond their individual care.** Successful implementation of this opt-out will require people to be informed about the benefits, risks and safeguards around their data, and Wellcome supports Understanding Patient Data as a way to facilitate such discussions between the public, patients and healthcare professionals.⁹

Maintaining UK Scientific Excellence Post-Brexit

Secure access to EU science funding programmes

16. The EU's Framework Programmes (currently Horizon 2020) support high-quality, collaborative research. However, uncertainty about UK researchers' eligibility for Horizon 2020 grants after March 2019 is having a chilling effect on UK science – Wellcome researchers are being excluded from grants and abandoning collaborations, and some have turned down our funding and chosen to work elsewhere. **UK-based researchers and their collaborators need the UK and EU27 to reach an early, strong deal on continuing UK participation in Horizon 2020**, in the next phase of Brexit negotiations.

Develop a swift migration system that supports science talent

17. **Post-Brexit, the UK must develop a quick, light-touch and transparent migration system for researchers, technicians and innovators**, at every stage of their career, and for students, who contribute to the cultural richness of our universities. It must support the range of mobility that is essential to science: from short-term visits and temporary work, to long-term migration with routes to residency. It must be dynamic and responsive to advancements in science and skills shortages. Support should also extend to families and research teams as without this, people will not consider moving to the UK.

Harmonise regulation so research can flourish

18. Harmonised regulation between the UK and the EU will reduce the bureaucratic burden on research, making it easier to collaborate and share resources across borders, and ensuring UK patients maintain access to trials of innovative treatments. This relies on several regulations, such as the Clinical Trials Directive and the Data Protection Regulation. **Each area will need bespoke actions to deliver harmonisation, simply copying legislation through the EU (Withdrawal) Bill will not be sufficient to achieve this.**

⁸ Association of the British Pharmaceutical Industry (2016) *Open for Innovation Sourcebook* www.abpi.org.uk/our-work/library/industry/Documents/Open_for_innovation_ABPI_Sourcebook_2016.pdf

⁹ www.understandingpatientdata.org.uk/