

**Cancer Research UK response to the Business, Innovation and Skills Committee inquiry into the  
Government's industrial strategy**  
September 2016

Cancer Research UK is the world's largest independent cancer charity dedicated to saving lives through research. It supports research into all aspects of cancer and this is achieved through the work of over 4,000 scientists, doctors and nurses. In 2015/16, we spent £432 million on research across the UK, including our contribution to the Francis Crick institute. We receive no funding from the Government for our research and are dependent on fundraising with the public.

Cancer Research UK wants to accelerate progress so that three in four people survive their cancer for 10 years or more by 2034. Research is at the heart of our plan to reach this ambition and see cancers diagnosed early and treated well. This is why it is so crucial that the UK maintains its excellent science base and that cancer researchers across Europe and around the world, can be supported to work together to make the best use of our pooled talent and resources.

It is vital that the Government's industrial strategy enables the UK to grow its investment in science to strengthen the global standing of our research base. In developing this strategy, Government needs to consider the following:

- New fiscal measures that would enable the UK to grow its investment in science by attracting further inward investment.
- The critical balance of resource and infrastructure funding and policies to support growth across the scientific disciplines.
- The global nature of science and the importance of developing an immigration system that supports collaboration and the UK's ability to recruit the best scientific talent.
- Building the NHS' research capability to attract further industry investment

**Protecting investment in UK science**

***Our science base is a national asset and must be protected. To do so requires Government to protect overall levels of investment and the diversity of funding and grow these in the longer term.***

The UK is currently a world-class centre for scientific research<sup>1,2</sup> and, as recognised in the Government's productivity plan, research is a vital national asset. We produce 16% of top quality published research findings, with less than 1% of the world's population<sup>3</sup>, and rank 2<sup>nd</sup> in the world for the quality of our scientific research institutions<sup>4</sup>. Life sciences contribute more than £60bn a year to UK GDP, with annual exports of £29.5bn<sup>5</sup>. This strength needs to be protected and grown in the longer term.

Being a global leader in research is self-reinforcing; the more the UK is known for its research, the more investment and talent it will attract, supporting it to succeed further.

Every pound invested in cancer-related research by the taxpayer and charities returns around 27p to the UK economy each year<sup>6,7</sup>. Government's investment in research supports the UK economy in a number of ways. It attracts private investment from overseas, builds a skilled workforce and contributes towards the generation of income from commercialised products. Research fundamentally improves the nation's health and, as such, delivers savings to Government by reducing the incidence of disease or limiting its impact.

<sup>1</sup> Elsevier, International Comparative Performance of the UK Research Base, 2013

<sup>2</sup> World Economic Forum, Global Competitiveness report 2014-15

<sup>3</sup> Elsevier, International Comparative Performance of the UK Research Base, 2013

<sup>4</sup> World Economic Forum, Global Competitiveness report 2014-15

<sup>5</sup> ONS Balance of Payments data, (data for 2015)

<sup>6</sup> Health Economics Research Group (Brunel University), RAND Europe, and King's Policy Institute, medical Research: What's it Worth? Estimating the economic benefits of cancer-related research in the UK, 2014

<sup>7</sup> <http://www.kcl.ac.uk/sspp/policy-institute/publications/SpilloversFINAL.pdf>

Government's new industrial strategy is an opportunity for the UK to put science at the heart of its plan for growth. Previous successive Governments have acknowledged the key role of science and innovation to drive growth and productivity in the UK and at the last spending review an important commitment was made to protect the budget for science in real terms.

The new Prime Minister has indicated of her strong support for science in a letter to Sir Paul Nurse<sup>8</sup>. Government should now ensure that with a UK exit from the EU, overall levels of investment in UK science and the diversity of funding are protected and grown in the longer term.

In developing the new cross-departmental industrial strategy, the Department of Business, Energy and Industrial Strategy and the Department of Health should set out plans that will enable the UK to grow its investment in science to strengthen the global standing of our research base. These departments should work with HMT and the medical research sector to consider a range of measures to grow investment including tax-breaks and public-private incentives.

Exiting the EU provides the UK with an opportunity to promote research collaborations between academia and industry and further attract inward investment. The extent to which charities and universities can currently partner with industry is limited by VAT rules on sharing of facilities, equipment and buildings. Although calls have been made for Government to address this issue<sup>9</sup> we understand that reform has not been possible because of EU membership. In exiting the EU, Government should review current rules on VAT exemption on sharing of buildings, equipment and facilities for the purposes of R&D, to support industry, academia and charity collaborations and attract further inward investment.

The Department for International Trade should also work to grow science funding in the UK by ensuring that it provides strong representation internationally to effectively communicate the value and opportunity of investing in UK science.

### **Supporting growth across the scientific disciplines**

***Government must preserve the critical balance of resource and infrastructure funding it provides and ensure its policies support growth across the scientific disciplines.***

The life sciences ecosystem is supported by a diverse and unique funding model. The activities and funding of the charity, public and private sectors are complimentary and mutually reinforcing, delivering returns that are greater than the sum of their parts. National policies that support a diverse range of research funders enable local solutions that optimise the input of different partners.

By investing in science through the dual support system, Government leverages additional investment from charities and industry, generating further scientific and economic growth. Indeed, for every £1 spent by the government on R&D, private sector R&D output rises by 20p per year in perpetuity, by raising the level of the UK knowledge base<sup>10</sup>.

In addition to the critical balance of infrastructure and resource funding provided through the dual support system, Government must maintain a balance of funding across the research disciplines to support innovative research.

It is becoming increasingly important to draw together scientists from different countries and disciplines to solve today's biggest health challenges. That's why, in October 2015 Cancer Research UK launched our Grand Challenge, which will see international, multi-disciplinary teams collaborating to tackle some of the biggest problems in cancer research<sup>11</sup>. The award is open to researchers across the globe, who will work in collaboration with UK-based scientists. We have had

<sup>8</sup> <http://www.bbc.co.uk/news/science-environment-36915846>

<sup>9</sup> <http://www.raeng.org.uk/policy/dowling-review/the-dowling-review-of-business-university-research>

<sup>10</sup> Hughes & Haskel, The Economic Significance of the UK Science Base, 2014

<sup>11</sup> <https://www.cancerresearchuk.org/funding-for-researchers/how-we-deliver-research/grand-challenge-award/challenges?wssl=1>

56 applications from 409 investigators, spanning 224 institutes and 25 countries, and have shortlisted nine applications for further development. We anticipate awarding the first grant in late 2016.

Charity, industry and government funders of research need to work together to support multidisciplinary and international scientific collaborations (see case study 1). Such partnerships provide funders with the opportunity to leverage additional support and enhance progress through shared knowledge, resources and capabilities.

The time lag between initial investment in cancer research and eventual health benefits is around 15 years<sup>12</sup>. This highlights the importance of long-term strategic planning give confidence to all funders of UK research, providing sustained investment that will secure future health and economic gains. A strong industrial strategy would help provide this confidence and should also aim to include measures that reduce the time lag.

#### **Case study 1: CRUK-EPSRC multidisciplinary awards**

We established a Multidisciplinary Project Award Scheme in August 2014 to encourage scientists from different disciplines to come together and find new ways to solve the challenges we face in cancer research. The high level of interest in this scheme has shown us that there is a huge appetite among the scientific community to do more collaborative work.

To extend the reach of this scheme, in March 2015, we established a partnership with the Engineering and Physical Sciences Research Council (EPSRC). The new partnership increases the amount of funding for collaborative research to up to £37.5M over five years.

The EPSRC is the main UK funding agency for training and research in engineering and physical sciences. Working with the EPSRC will not only increase support for collaborative cancer research projects, but will also unite the expertise and scientific networks of both organisations, to ensure that the highest quality multidisciplinary work will be funded.

The UK Government needs to continue to build the prestige and global recognition of its research grants and consider how these may facilitate and promote international collaboration and drive international research consortia. There is an opportunity for UK Research and Innovation to play a lead role in developing such grants.

#### **Attracting and retaining scientific talent**

***The UK's ability to attract, efficiently recruit and retain scientific talent must be ensured to maintain the excellence of our science.***

A strong science base requires a skilled workforce. The international make-up of our research community is vital for the sharing of best practice, expertise and skills and to promote important international collaborations. Immigration policy that restricts researcher mobility would jeopardise our ability to conduct and communicate world-class research.

Cancer Research UK recruits post-graduate students and researchers from an international pool to ensure that we are working with the very best minds to conduct the highest quality research. The mix of UK, European and international researchers within our research community is vital for the sharing of best practice, expertise and skills.

The UK plays a key role in training young researchers; many of whom go on to set up labs elsewhere, but maintain important collaborative relationships with research groups in the UK (see case study 2).

<sup>12</sup> Health Economics Research Group (Brunel University), RAND Europe, and King's Policy Institute, 2014, Estimating the returns to UK publicly funded cancer-related research in term of the net value of improved health outcomes

The UK also benefits from recruiting talented researchers who have received specialist training from centres outside of the UK. Such recruitment is particularly important and sometimes necessary in areas of science where we have a national skills shortage such as researchers working in computational biology and big data<sup>13,14</sup>.

### **Case study 2 - Dr John Diffley, Francis Crick Institute**

John Diffley is one of the world's leading experts in studying how cells grow and make copies of themselves - a process that goes wrong in cancer. Dr Diffley's discoveries will form the foundations for new ways to diagnose and treat cancer in the future.

John's world leading research has benefitted hugely from the European Research Grant (ERC) funding he was awarded in 2009. To date, this funding has supported 11 of his peer-reviewed research publications. Last year he was awarded another prestigious ERC Advanced Grant providing him with £1,455,294 for further research.

*'The ERC is a fantastic scheme and has transformed my lab. The research I was able to carry out with the ERC grant enabled my lab to enter a new area of science, which would otherwise have been closed to us. It has had an enormously positive impact on our science.'*

Dr John Diffley

Around 50% of the scientists in John's lab are from non-UK EU countries. Two of the current 15 are funded through the Marie Skłodowska-Curie actions - Research Fellowship Programme. This fellowship, which is part of Horizon 2020, encourages researchers to move between EU countries to conduct their research, sharing their knowledge and skills as they go.

Over the years, John has established strong collaborations with labs across Europe. Some of these have been the direct result of EU funding. Dr Monica Segurado was able to come and work in John's lab thanks to an EU Network Grant, awarded in 2002. Since establishing her own lab in Spain, Monica and John have continued to collaborate and have jointly published research.

In addition to the valuable contribution that international scientists make to our workforce, the movement of researchers between countries develops valuable networks. Networks are crucial for the building of collaborative partnerships which are common place and often necessary in many fields of science including cancer, where nearly 50% all UK research involves international collaboration<sup>15</sup>. In Feb 2016, CRUK researchers were partnering with over 400 different organisations based in EU countries<sup>16</sup>.

These collaborations enable sharing of knowledge and expertise, as well as research materials, equipment and data. They also support training, the running of pan-EU clinical trials and establishment of consortia set up to inform policy. The importance of such collaboration is shown by its impact on the UK's research outputs: nearly 50% of the UK's scientific publications have non-UK authors and the impact of these papers is significantly higher than the average impact of UK papers<sup>17</sup>.

### **Building the NHS' research capability to attract further industry investment**

***Government should build the NHS' research capability to benefit patients and to effectively market the UK internationally as a single research hub; thereby attracting inward investment.***

The existence of historic, universal healthcare puts the UK in a strong position to conduct clinical trials, promote the uptake of innovation and fully realise the value of our wide ranging and comprehensive data sets, for example the cancer registries. By optimising research in the NHS and marketing the UK as a single research hub, we will be in a strong position to attract industry

<sup>13</sup> 'Bio-informatician' and 'informatician' are included on the Shortage Occupation List, valid from 6th April 2015

<sup>14</sup> Medical Research Council and Biotechnology and Biological Sciences Research Council (2014) Vulnerable Skills Survey 2014

<sup>15</sup> <https://www.ohe.org/publications/exploring-interdependencies-research-funders-uk>

<sup>16</sup> Based on data from Researchfish, a self-reporting tool for researchers, including those receiving funding from CRUK

<sup>17</sup> Elsevier, International comparative performance of the UK Research Base, 2013

investment and world-leading researchers, and can provide innovative treatments to patients faster. The UK should take the opportunity to build and capitalise on this national asset when exiting the EU.

Cancer Research UK partners with the NHS in order to bring treatments to patients. Our Centres drive local partnerships and high-calibre collaborations between universities, NHS Trusts and other cancer charities. We also fund the Experimental Cancer Medicine Centre (ECMC) network in partnership with National Institute of Health Research (NIHR) and the Departments of Health in Scotland, Northern Ireland and Wales. The ECMC network provides the infrastructure for early phase clinical trials that often receives support from pharmaceutical partners. In 2014/15, ECMCs in England alone leveraged over £72 million through partnering with industry.

In its Five Year Forward View, the NHS stated an intention to improve its ability to undertake research and apply innovation. In order to achieve this, Government must continue to invest in clinical research infrastructure through the NIHR and ensure that NHS Digital is appropriately resourced to achieve its ambition of realising a truly digital NHS.

Specifically, researchers' access to patient data is crucial to improving our understanding of disease and treatments at a population level. To ensure such access, effective data capture systems are needed and the UK's major data-holding bodies need appropriate analytical capacity.

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