

## Initial response to the spending review consultation, June 2010

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*Groundbreaking advances in medical science over the last 30 years have not only improved health and made the NHS and public services more efficient, but offer an unprecedented opportunity to create new jobs, catalyse sustained economic growth, and help to restore public finances. A long-term commitment across the science base by Government will ensure that the UK can continue to generate world-class medical science that is translated into health, wealth and social benefits.*

### **The UK's world class medical research base**

The UK has an unparalleled competitive advantage in medical science. Our internationally renowned academic medical research centres include four of the world's top ten universities and we are distinguished by over 30 winners of Nobel Prizes for biomedical research.<sup>1,2</sup> The UK generates over 10% of the world's clinical science and health research outputs, and has created nearly one in five of the world's top 100 medicines.<sup>3,4</sup> The formation of the National Institute for Health Research (NIHR) and investment in NHS research infrastructure are finally allowing the UK to harness the unique research opportunities of the NHS. Most importantly, the current partnership and formal funding relationships between Government, NHS, industry, academia and charities leverage significant private and philanthropic investment and promote rapid translation of medical research into health and wealth outcomes that specifically benefit the UK population. The success of this partnership requires continued investment and commitment by Government, for which there is a strong public mandate.<sup>5</sup>

### **Exceptional returns from medical science across society and the whole economy**

The relationship between world-class medical science and national gains in health and wealth is clearly established: excellence in research leads to better medical care, attracts investment and industries, and improves the productivity and cost-effectiveness of health, social and public services.<sup>6</sup> Medical science is a long-term endeavour but it has an exceptional long-term payback: a recent study showed that every £1.00 invested in UK public or charitable research into cardiovascular diseases between 1975 and 1992 produced a stream of benefits equivalent to earning £0.39 per year *in perpetuity*.<sup>7</sup> Our world-class research base has attracted medical science industries with a combined turnover of £7 billion, supporting over 250,000 UK-based high-value jobs.<sup>8,9,10</sup> Translating the outcomes of basic medical research into mechanisms to prevent and treat ill health can tackle the estimated £100 billion annual cost of sickness absence.<sup>11</sup> Evidence generated by UK medical research provides the information needed to underpin and evaluate effective UK public policy, as well as to tackle global health and biosecurity challenges. Furthermore, medical science is increasingly recognised as an instrument of foreign and international development policy.<sup>12,13</sup>

### **Reaping rewards and exploiting new opportunities**

UK medical research has benefited from a recent uplift in public sector investment. This comes at a time of rapid decay in the commercial pipeline for new medicines and an urgent need for new products to fill this widening gap. Yet many scientific advances are now on the cusp of translation into benefits for patients and society. Important opportunities include: delivering more effective treatments through personalised/stratified medicines; regenerative medicines including blood alternatives, cell-based therapies and interventions to restore vision and motor function; and medical devices such as robotic surgery, implants and prostheses.<sup>14,15</sup> Continued public sector investment in selected areas of excellence during times of fiscal constraint will ensure that the benefits of their commercial exploitation do not disappear abroad (as happened with much of the UK's semiconductor industry) or get lost altogether.<sup>16</sup>

A lack of risk capital and declining return on investment is causing larger pharmaceutical companies to outsource R&D into academia and smaller biotechnology companies. The UK is already home to several impressive examples of industry-academia collaborations that can take advantage of these new opportunities (and the planned UK Centre for Medical Research and Innovation will capitalise on this), but only if the quality of our academic research base is maintained.<sup>17</sup>

### **Leveraging private and charitable investment**

Public spending on medical research leverages - rather than displaces - private and charitable funding.<sup>18,19</sup> Figures for 2009-10 show that charities invested £1.1 billion on medical and health research in the UK.<sup>20</sup> A recent study also showed that every £1 increase in public funding stimulates up to £5 investment into research by the pharmaceutical industry.<sup>21</sup> Public, charity and industry funders have different, but important, interdependent roles. Reductions in public funding will be magnified by an associated withdrawal of investment by the charitable and private sector, many of whom are not bound to the UK.

### **Responding to growing international investment and competition**

Finland and South Korea invested in R&D to ensure their recovery from recession in the 1990s.<sup>22</sup> Germany, France, Australia, South Korea, Canada, China and India have recently committed to substantial increases in their science budgets, and the US has allocated \$10.4 billion of its fiscal stimulus additional to medical research.<sup>23,24</sup> A clear, long-term commitment to science by the UK Government is needed now to retain increasingly mobile researchers and investors, and to ensure that we have the absorptive capacity to exploit the outcomes of increased R&D investment overseas.<sup>25</sup>

### **Sustaining a broad knowledge base**

Many of the challenges facing society today, such as ageing or obesity, require expertise from across the full range of medical, natural science, engineering, humanities and social science disciplines. Within the medical sciences, understanding the genetic basis of disease is increasingly reliant on mathematics and computing; medical imaging depends on physics and engineering; and the insights provided by the social sciences are essential in translating the findings of medical research into public health benefits. In medical research, advances are made and exploited by an iterative cycle of ideas between laboratory, clinical and population sciences. The Office for the Strategic Co-ordination of Health Research (OSCHR) has ensured that the allocation of public funding across this cycle is coherent and provides value for money. In short, support is required across the research base to safeguard the valuable scientific advances that benefit patients and society.

### **Supporting diversity in modes of funding**

The ring fence around the research budget must be maintained to ensure confidence in the science base as seen from both within and outside the UK. Medical science is a long-term endeavour and rapid decreases in funding will cause irreversible harm. The complementary strands of the dual support system are vital to sustaining our world renowned universities, which train the next generation of skilled workers, provide a stable core funding base for novel research, and attract international students (estimated to be worth £5.5bn in 2004/05).<sup>26</sup> The UK's history of supporting blue skies research over the long term via the Research Councils has generated significant - and often unanticipated - rewards, notably monoclonal antibodies and embryonic stem cells.<sup>27,28</sup> This funding mode must not be disproportionately reduced by any spending cuts. Funding for 'Grand Challenges' must be carefully scrutinised to ensure that money is not sequestered away from more readily soluble research problems. In our next submission we will examine the principles that should underpin the allocation of funds within the ring fence in more detail.<sup>29</sup> But we stress

here that, in a difficult economic climate, funding should focus on excellence - something which is best judged by Research Councils and universities.

### **Investing in people**

Highly skilled individuals are the UK's most valuable resource, ensuring resilience across our economy and enabling a rapid response to future recovery. Maintaining the pipeline of researchers must be the highest priority in the coming science spending round so that the UK can remain a competitive part of the international research endeavour and be ready to exploit opportunities for support from industry and charities both in the UK and overseas.

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### **The Academy of Medical Sciences**

The Academy of Medical Sciences promotes advances in medical science and campaigns to ensure these are converted into healthcare benefits for society. Our Fellows are the UK's leading medical scientists from hospitals and general practice, academia, industry and the public service.

The Academy seeks to play a pivotal role in determining the future of medical science in the UK, and the benefits that society will enjoy in years to come. We champion the UK's strengths in medical science, promote careers and capacity building, encourage the implementation of new ideas and solutions – often through novel partnerships – and help to remove barriers to progress.

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<sup>1</sup> Times Higher Education (2009). *Top 200 universities*.

<http://www.timeshighereducation.co.uk/hybrid.asp?typeCode=438>

<sup>2</sup> Further information is available from [www.mrc.ac.uk/Achievementsimpact/NobelPrize/index.htm](http://www.mrc.ac.uk/Achievementsimpact/NobelPrize/index.htm)

<sup>3</sup> Department for Innovation, Universities and Skills (2008). *International comparative performance of the UK research base*. The Stationery Office, London.

<sup>4</sup> Association of the British Pharmaceutical Industry (2004). *Innovating for a healthy tomorrow*.

[http://www.abpi.org.uk/publications/pdfs/annual\\_report\\_05.pdf](http://www.abpi.org.uk/publications/pdfs/annual_report_05.pdf)

<sup>5</sup> In a recent survey, 95% of adults and 93% of young people agreed that medical research should be supported even if a lot of public money would have to be invested. Butt S *et al.* (2009). *Wellcome Trust Monitor 1*. London: Wellcome Trust. <http://www.wellcome.ac.uk/About-us/Publications/Reports/Public-engagement/WTX058859.htm>

<sup>6</sup> Academy of Medical Sciences (2010). *Reaping the rewards: a vision for UK medical science*

<http://www.acmedsci.ac.uk/index.php?pid=99&puid=172>

<sup>7</sup> Health Economics Research Group at Brunel University, Office of Health Economics and RAND Europe (2008). *Medical research: what's it worth?* <http://www.acmedsci.ac.uk/index.php?pid=99&puid=137>

<sup>8</sup> Association of the British Pharmaceutical Industry (2007). *Facts & statistics from the pharmaceutical industry*.

<http://www.abpi.org.uk/statistics/section.asp?sect=1>

<sup>9</sup> UK Trade and Investment (2009). *Strength and opportunity*. <http://www.berr.gov.uk/files/file53947.pdf>

<sup>10</sup> Association of the British Pharmaceutical Industry (2009). *Prescription for innovation*.

<http://www.abpi.org.uk/Details.asp?ProductID=350>

<sup>11</sup> Black C (2008). *Working for a healthier tomorrow*. <http://www.workingforhealth.gov.uk/documents/working-for-a-healthier-tomorrow-tagged.pdf>

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- <sup>12</sup> Royal Society (2010). *New frontiers in science diplomacy. Navigating the changing balance of power.* <http://royalsociety.org/New-frontiers-in-science-diplomacy/>
- <sup>13</sup> Feldbaum H & Michaud J (2010). *Health diplomacy and the enduring relevance of foreign policy interest.* <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000226>
- <sup>14</sup> Academy of Medical Sciences (2009). *Submission to DIUS regarding strategic priorities for research.* Academy of Medical Sciences, London.
- <sup>15</sup> Academy of Medical Sciences FORUM (2007). *Optimising stratified medicines R&D: addressing scientific and economic issues.* <http://www.acmedsci.ac.uk/p50evid79.html>
- <sup>16</sup> House of Commons Science and Technology Selection Committee (2010). *The impact of spending cuts on science and scientific research.* <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/335/335i.pdf>
- <sup>17</sup> For example, the Division of Signal Transduction Therapy (DSTT) is a unique collaboration between scientists in the MRC Protein Phosphorylation Unit and the College of Life Sciences at the University of Dundee and five of the world's leading pharmaceutical companies, namely AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Merck-Serono and Pfizer.
- <sup>18</sup> Box S (2009). *Work on innovation – A stocktaking of existing work.* OCED
- <sup>19</sup> Royal Society (2010). *The scientific century: securing our future prosperity.* <http://royalsociety.org/the-scientific-century/>
- <sup>20</sup> Association of Medical Research Charities (2010). *Challenge of Government.* <http://www.amrc.org.uk/challenge>
- <sup>21</sup> Alzheimer's Research Trust (2009). *Forward together. Complementarity of public and charitable research with respect to private spending.* <http://www.alzheimers-research.org.uk/assets/docs/20090917162138ForwardTogetherSep2009.pdf>
- <sup>22</sup> OECD (2009). *Policy responses to the economic crisis: Investing in Innovation for long-term growth.*
- <sup>23</sup> Further information is available from <http://www.researchresearch.com/> and <http://www.hhs.gov/recovery/programs/nih/index.html>
- <sup>24</sup> Butler D (2009). *French research wins huge cash boost.* Nature **462**, 838.
- <sup>25</sup> There is evidence that countries with higher R&D intensity gain more from R&D performed overseas: Guellec D & Pottelsberghe B (2001). *R&D productivity and growth: Panel data analysis of 16 OCED countries*, OECD.
- <sup>26</sup> Vickers P and Bekhradnia B (2007). *The Economic Costs and Benefits of International Students.* <http://www.hepi.ac.uk/files/32EconomicEffectsofInternationalStudents.pdf>
- <sup>27</sup> Health Economics Research Group at Brunel University, Office of Health Economics and RAND Europe (2008). *Medical research: what's it worth?* <http://www.acmedsci.ac.uk/index.php?pid=99&puid=137>
- <sup>28</sup> Further information is available from <http://www.mrc.ac.uk/AchievementsImpact/StoriesofImpact/index.htm>
- <sup>29</sup> Academy of Medical Sciences (2010). *Second submission to the spending review consultation, July 2010.* Academy of Medical Sciences, London.