The Academy of Medical Sciences

Academy of Medical Sciences response to Agenda 2030: One Nation Labour's Plan for Science

July 2014

Introduction

1. The Academy of Medical Sciences welcomes the opportunity to provide feedback on Agenda 2030: One Nation Labour's Plan for Science. The Academy is an independent body that represents the spectrum of medical science and seeks to promote the translation of medical science into benefits for society. Our elected Fellowship includes some of the UK's foremost experts in medical science, drawn from laboratory science, clinical academic medicine, veterinary science, dentistry, medical and nursing care, ethics, social science and the law. The Academy's response focuses on medical science, although the issues raised may be relevant to other disciplines.

2. The Academy collaborates closely with the other National Academies to highlight the value of research and innovation to the UK, and to support researchers, industry and policymakers to make the UK the location of choice for world class research, development and innovation. Together with our sister institutions – British Academy, Royal Academy of Engineering, and Royal Society – we submitted a joint response to the Department of Business, Innovation and Skills' (BIS) consultation on the Science and Innovation Strategy 2014, which outlines the academies' key messages and recommendations. This joint submission and the Academy's own submission to the consultation are available online.[1]

How can we make better use of the UK's resources to support science and innovation?

3. The UK has an excellent research base that is the most productive in the world and includes a higher education sector valued at almost £60bn per annum in jobs, exports and added value.[2] The UK research ecosystem contains a diverse set of stakeholders, including multiple government departments, private companies and medical research charities. The close proximity and interaction of the pan-disciplinary research, innovation and higher education functions of government should be maintained. This ecosystem, and its level of resource, should be supported and strengthened.

4. Investment in research has been demonstrated to have long-term economic and social benefits, and evidence indicates that research activity scales with level of

[1] National Academies (2014). *Joint submission to the Science and Innovation Strategy. Available at:* http://www.acmedsci.ac.uk/policy/policy-projects/government-science-and-innovation-strategy-2014/

[2] Figures quoted by Lord Mandelson, 'The Future of Higher Education', Dearing Lecture, Nottingham University, 11 February 2010. Full text available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.bis.gov.uk/News/Speeches/mandelson-dearing-lecture

investment.[3,4] The rate of return for every £1 invested in research into cardiovascular disease, mental health disorders or cancer (which together account for around 45% of the current disease burden in the UK) is estimated at 37–40p per year in perpetuity.[5,6]

5. Researchers are working hard to make better use of resources by improving the efficiency of publicly funded research; for example, by sharing equipment through partnerships such as the N8 group of universities across the North of England, and by adopting smarter working practices. In 2010–11 the UK higher education sector saved £462 million through efficiency measures.[7] Nonetheless, the impact of efficiency savings should be closely monitored to avoid harm to the research base. Better use of resources could be attained if policy was facilitative and co-ordinated across multiple departments and areas; for example, regulation of health research (including clinical trials and the use of animals in research), taxation (particularly VAT arrangements), procurement, immigration, education and foreign policy.[8] Specific to the medical sciences, better use of resources could be achieved by:
    - Capitalising on the research opportunities offered by the NHS, such as supporting the work of the Health Research Authority to streamline clinical research regulation; enabling appropriate researcher access to healthcare data; and developing and supporting a healthcare workforce that is capable of undertaking research and absorbing research findings into practice – particularly clinical academics.
    - Supporting the National Institute for Health Research (NIHR) in the Department of Health. The NIHR has established a world-class clinical research infrastructure for the NHS, analogous to the 'well-founded laboratory' provided by universities. Within this infrastructure, the Research Councils, including the MRC, as well as industry and charities, can fund specific research projects. The NIHR works in a strong yet complementary manner with the multidisciplinary research, innovation and higher education functions within BIS, as typified by the work of the Office for Strategic Co-ordination of Health Research.
    - Facilitating and supporting collaboration and permeability between disciplines and between academia, industry and the NHS. Much medical research is multidisciplinary, requiring collaboration between many researchers and

[3] Office of Health Economics and the Science Policy Research Unit at the University of Sussex (2014) *Exploring the interdependencies of research funders in the UK.* http://news.ohe.org/2014/07/02/interdependence-funding-medical-research-uk/

[4] Academy of Medical Sciences *et al.* (2014). *Medical research: what's it worth? Estimating the economic benefits of cancer-related research in the UK.* http://www.acmedsci.ac.uk/download.php?f=file&i=29924

[5] Ibid.

[6] Health Economics Research Group *et al.* (2008). *Medical research: what's it worth? Estimating the economic benefits from medical research in the UK.* http://www.acmedsci.ac.uk/viewFile/51b9c5e8a8c41.pdf

[7] Universities UK (2013). *Why government must invest in universities.* http://www.universitiesuk.ac.uk/highereducation/Documents/2013/WhyGovernmentMustInvestInUniversities.pdf

[8] See, for example, the following Academy webpages: http://www.acmedsci.ac.uk/policy/major-policy-strands/using-animals-in-research/, http://www.acmedsci.ac.uk/policy/major-policy-strands/streamlining-research-regulation-and-governance/, http://www.acmedsci.ac.uk/about/objectives/linking-academia-industry-NHS/, http://www.acmedsci.ac.uk/about/objectives/seizing-international-opportunities/

institutions. Enhancing the spread of ideas and bringing together novel combinations of skills allows research challenges to be efficiently addressed.

- Enhancing the UK's ability to leverage significant spend by businesses and medical research charities through government investment. We should maintain and improve this leveraging ability (see below).

6. Public investment in research leverages significant funding from industry and medical research charities. Every £1 increase in public funding for medical research stimulates up to £5 of investment into research by the pharmaceutical industry.[9] In 2011, UK pharmaceutical R&D expenditure was almost £5bn, about the same size as the science ring fence. Similarly, every £1 of government spending via the Charity Research Support Fund (£198m in 2011, administered via HEFCE in BIS) is matched by about £5 of spending from UK-based medical research charities, which constitutes approximately 15% of research income at UK universities (approximately £1.2bn in the past tax year).[10] Long-term support for this fund is critical to continued charity investment. In order to stimulate even greater levels of outside investment, the UK should make a clear, long-term commitment to research that is attractive to charities, businesses and researchers. In this regard, the Academies have recommended developing an ambitious, flexible 10-year strategy for the research base.

7. Furthermore, the UK should increase investment in research and innovation to keep pace with other leading scientific nations. The UK currently lags significantly behind its international competitors in terms of total R&D expenditure, which includes government, business and charity spend (1.72% of GDP in 2012; compared with 2.26% in Germany, 2.79% in the USA and 4.36% in South Korea).[11,12]

8. The 'science budget' should continue to be ring-fenced and, if increased investment cannot be secured, at least protected in line with inflation. Importantly, a number of BIS budget lines that are central to the health of the UK's research base lie outside the ring fence, including teaching support for high-cost undergraduate courses, post-graduate teaching and capital. Moreover, many other government departments and public bodies also invest heavily in research and innovation. This plurality provides resilience, and ensures distinct and interdependent funding streams for health science. However, the UK's research and innovation capabilities must not be damaged by cuts to important elements of funding that fall outside the ring fence.

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[9] Mestre-Ferrandiz J & Sussex J (2009). *Forward together: complementarity of public and charitable research with respect to private research spending.* http://www.ohe.org/publications/article/forward-together-complementarity-of-public-and-charitable-research-28.cfm

[10] The Association of Medical Research Charities*, et al.* (2010) *Government support for charity funded research in universities: a joint statement from universities and charities in the UK.* http://www.amrc.org.uk/sites/default/files/doc_lib/2010_06_30%20Government%20support%20for%20charity%20funded%20research%20in%20universities.pdf

[11] Office of National Statistics (2014). *UK gross domestic expenditure on research and development 2012.* http://www.ons.gov.uk/ons/dcp171778_355583.pdf

[12] OECD (2014). *Main science and technology indicators.* http://dx.doi.org/10.1787/msti-v2013-2-en

Do you believe the previous Labour government's 10 year approach was a success and how can we learn from this in the future?

9. The Academy welcomed the initiative to develop the previous 10-year investment framework for science and innovation.[13] Stable long-term funding has a vital role in attracting and retaining investment by industry and charities, and in retaining talent. A new long-term strategy for science would reassure increasingly mobile researchers and investors about the future of the UK science base.

10. The Academies' submission to the Science and Innovation Strategy 2014 set out the components required of a 10-year framework for the research base.[14] These components include a focus on maintaining a broad and flexible research base to allow the UK to address future challenges; a priority for excellence in how funding is distributed; a ring-fenced research budget protected in real terms and increased to keep pace with other leading nations; the need to develop, retain and attract skilled researchers; the need to support and facilitate researcher mobility, both internationally (via immigration policy) and domestically (via permeability between sectors); and the need to capture the breadth of stakeholders across and beyond government.

How can we unlock greater levels of private sector investment?

11. The Academy acknowledges that the level of private sector investment in R&D is comparatively low in the UK, as indicated in a recent report by BIS.[15] In order to unlock greater investment, we must understand why the level of private sector investment lags behind our competitors. The UK's superior medical research base, our co-ordinated landscape of private, public and charity funders, and the research potential of the NHS give us an unparalleled global competitive advantage. We should seek to maximise this potential to stimulate more private sector investment. We welcome the Life Sciences Strategy and the Innovation, Health and Wealth Strategies as initiatives to address this issue.[16,17]

12. Public sector investment in research underpins and attracts private and charitable investment in R&D. A strong public research base supported by stable, long-term strategy and associated investment is, therefore, a key foundation for business investment.[18] The UK should aim to support a full range of industrial activity, comprising start-up, medium-sized and large multinational enterprises. In the

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[13] Academy of Medical Sciences (2004). *Science and innovation: working towards a ten-year investment framework.* http://www.acmedsci.ac.uk/viewFile/publicationDownloads/p10year.pdf

[14] National Academies (2014). *Joint submission to the Science and Innovation Strategy. Available at:* http://www.acmedsci.ac.uk/policy/policy-projects/government-science-and-innovation-strategy-2014/

[15] Allas, T (2014). *Insights from international benchmarking of the UK science and innovation system.* https://www.gov.uk/government/publications/science-and-innovation-system-international-benchmarking

[16] Department for Business, Innovation and Skills (2011). *Strategy for UK life sciences.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32457/11-1429-strategy-for-uk-life-sciences.pdf

[17] NHS (2011). *Innovation, health and wealth.* http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_134597.pdf

[18] Haskell J, *et al.* (2014). *The economic significance of the UK science base.* http://sciencecampaign.org.uk/UKScienceBase.pdf

medical sector, support for early access schemes and adaptive licensing initiatives will be important.

13. Attracting private sector investment will require facilitative and co-ordinated policy in multiple areas and departments relating to regulation, taxation, procurement, immigration and education. For example, the 5% limit on the amount of commercial activity that can be carried out in a building – before VAT has to be paid on the construction of the entire building – currently discourages collaboration between academia and industry, and should be reviewed. Additionally, the regulation and governance of clinical trials must be streamlined – the work of the Health Research Authority following the Academy's seminal 2011 report is important and must be supported.[19] Other activities that will help to attract private sector investment include developing a strong skills base in the STEM workforce; facilitating good connections and mobility between academia, industry and the NHS; enabling access to NHS data and resources for research purposes; and supporting specific mechanisms, such as those administered by the Technology Strategy Board, for aiding translation of research into business applications.

What more can be done to improve the way science is driven by British universities?

14. Our world-class higher education system underpins the UK's success in drawing the brightest talent from across the world; producing a first class workforce; attracting business; driving knowledge creation and innovation; and enabling us to be a leader in a competitive and inter-connected global economy. The close proximity and interaction of the pan-disciplinary research, innovation and higher education functions of government facilitates collaborative working and permeability between sectors, and increases the awareness of the translational cycle in academic research.

15. The Academy is committed to fostering excellence in research. To this end, while we believe that government should set the overall strategic direction of research, scientists – acting for example through the research councils – are best placed to identify which specific initiatives should be supported. Often described broadly as 'the Haldane principle', this approach has helped ensure that the UK excels in research internationally. A focus on excellence is also exemplified by the dual support system, whereby universities are part-funded by the Higher Education Funding Council for England (HEFCE) according to performance in the Research Excellence Framework, and part-funded by direct project support from the research councils. Dual support has allowed the UK to develop world class, research-intensive universities.

16. Industry has largely adopted a new model of open innovation to form closer partnerships with academia, health services and charities. Our graduates must be equipped with the interdisciplinary research skills necessary to flourish in this environment. The mobility of researchers between industry, academia and the

[19] Academy of Medical Sciences (2011). *A new pathway for the regulation and governance of health research.* http://www.acmedsci.ac.uk/viewFile/publicationDownloads/newpathw.pdf

health service needs to be improved to facilitate closer partnership and the dissemination of talent.[20] We emphasise the need to maintain a flow of highly skilled people, who contribute to UK prosperity through roles in research and a wide variety of other vibrant and important sectors, such as the creative industries and information technology.

What more can the UK do to ensure that science is embedded in our international relationships?

17. Science is now a fundamentally international activity. Researchers frequently collaborate without regard for national borders, as evidenced by the growth in publication of multi-author, multi-national research papers. Overcoming the global challenges that we face, such as mitigating climate change, ensuring security of food, water and energy, and tackling pandemics, will require multidisciplinary and international approaches. The UK has a broad and productive research base, and is well placed to lead, and to benefit from, such efforts.

18. Medical science can make an important contribution to international development. Building medical research capacity in low and middle income countries (LMICs) can help to achieve this goal. The Academy strongly supports long-term, sustainable efforts to build medical research capacity in developing countries and believes this should be a priority for the Department for International Development.[21] The Academy is currently working with the other National Academies to deliver international fellowships as part of the Newton Fund, which will aid research capacity building in LMICs and support science and innovation partnerships that promote their economic development and welfare. Such efforts additionally provide benefits for the UK as they increase opportunities for international collaboration.

19. UK research is an important source of soft power and influence worldwide. Our researchers and institutions participate in robust, far-reaching and long-term networks of collaboration with international researchers, organisations and industries. The UK is a key hub in the global collaboration network; 47.6% of UK research articles in 2012 featured at least one international co-author, and the impact of these publications, measured by citation, is significantly higher than the UK average.[22] This central position provides opportunities to develop wider collaboration and trade. To continue to build stable international partnerships, the UK should be a leader in collaboration. The UK must minimise real and perceived barriers to the flow of talented people by broadly articulating and supporting the need for inward researcher migration, and specifically ensuring that migration and visa regulations do not prevent researchers from accessing the best research across the world.

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[20] FORUM Panel discussion, in Academy of Medical Sciences (2013). *The changing pharmaceutical industry and the opportunity for precision medicine.* http://www.acmedsci.ac.uk/viewFile/51f1407a749d4.pdf

[21] Academy of Medical Sciences (2012). *Building institutions through equitable partnerships in global health: conference report.* http://www.acmedsci.ac.uk/viewFile/53d79ed38b19a.pdf

[22] Elsevier, for the Department of Business, Innovation and Skills (2013). *International comparative performance of the UK research base – 2013.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263729/bis-13-1297-international-comparative-performance-of-the-UK-research-base-2013.pdf

20. The European Union (EU) provides a significant and important source of funding to the UK for research and innovation, and facilitates international collaboration through pan-European partnerships. UK bodies received 15% of the European research budget, more than the 11% it contributes.[23] Participation in EU projects adds value to the UK's own national effort to promote and enrich its research base and research excellence, and to leverage its innovative capacity. Engaging within the EU allows the UK to influence key decisions on research and funding at the European level.

21. The UK should encourage the use of scientific advice in EU government and policy making – both using evidence to inform policy making, and ensuring that EU policies are not detrimental to research (for example, the current review of the EU data protection regulation must enable medical research using patient data, while protecting the rights and interests of individuals). The UK should support the continuation and strengthening of the role of Chief Scientific Advisor (CSA) to the President of the European Commission, to support such use of scientific evidence in the EU. It is important that the Commission provides sufficient resource to maximise the value of this post and that the CSA is appointed through a robust selection process.

What does the UK need to do more to place science at the heart of government and policy making?

22. The Academy recommends that government continue to ensure that evidence and research are placed at the heart of policy making. We are pleased to see chief scientific advisors in all government departments; however, more must be done to ensure that they are adequately resourced and consulted at the highest level of decision making.

23. Government must actively seek and encourage authoritative, independent scientific advice at the earliest stages of policy development. National academies are well placed to assist with this process. Several key principles that underpin scientific advice to government should be adhered to. First, the academic freedom of scientists who provide advice to government should be safeguarded; second, the advice scientists give should be protected from political or other interference in their work; third, the process of government's consideration of scientific advice should be transparent.

What steps would help deliver a joined-up approach to science that plans for the world of 2030?

24. The Academy supports the idea of a long-term, coherent framework for science and research, as articulated in our responses to the consultation on the Science and Innovation Strategy 2014.[24] Many of the steps required to deliver such a framework are outlined in these documents, and are further detailed throughout this letter.

[23] See http://europa.eu/rapid/press-release_SPEECH-14-83_en.htm
[24] Academy of Medical Sciences (2014). *Government science and innovation strategy 2014.* Submissions available at: http://www.acmedsci.ac.uk/policy/policy-projects/government-science-and-innovation-strategy-2014/

25. Any plans for the future should be underpinned by a broad political consensus and supported by the major stakeholders in the UK research ecosystem, including funders, researchers, universities, charities and industry.

What additional policy measures are needed to ensure that the UK has a strong pipeline of STEMs skills?

26. Highly skilled individuals are the UK's most valuable resource, ensuring resilience and enabling our rapid response to future economic recovery. The Academy places particular emphasis on supporting doctoral students, early postdoctoral researchers and clinician–scientists, both as a cost-effective way of sustaining the research base and for their important role in supplying the wider workforce and economy. Maintaining our STEM workforce is crucial but also challenging to plan. Closer monitoring of numbers and career progression of students would be beneficial to aid any appropriate planning for the future.

27. We need a health service that innovates over time to continually improve care and increase financial efficiency. Innovation only occurs through undertaking research and absorbing its findings into practice. A medical workforce that is 'research aware', supported by strong academic leadership, is vital to placing research at the heart of the NHS. It is therefore important to ensure that developing research skills is a key aspect of clinical training and practice.[25]

28. Immigration policy needs to be closely monitored to ensure that the UK is not perceived as unwelcoming to overseas students or researchers, and does not deter the brightest and best individuals. Considerable effort is needed to ensure that there is an understanding among STEM students and researchers internationally that the UK welcomes their talents. We are also concerned by barriers that impede universities from capitalising on the substantial international market for higher education. In this regard, we propose that the current cap of 7.5% overseas medical students should be reviewed.

How can the UK ensure there are inclusive routes into STEM careers?

29. The prolonged high cost of education and often modest financial rewards of STEM careers may discourage some talented individuals from pursuing higher education in STEM subjects and undertaking careers as researchers. Government should ensure that STEM graduates have sufficient incentive to work in STEM industries, and that STEM careers are open and attractive to all talented individuals regardless of their circumstances. The Academy recognises the importance of removing the barriers to careers in STEM for all demographic groups. Notably, we have undertaken work regarding access to STEM careers among women, which we highlight below.[26,27]

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[25] Academy of Medical Sciences (2013). *Response to the Shape of Training Review.* http://www.acmedsci.ac.uk/viewFile/52ab1c85c8742.pdf

[26] Academy of Medical Sciences (2013). *Representation of women within the Academy's Fellowship.* http://www.acmedsci.ac.uk/viewFile/publicationDownloads/136118550861.pdf

[27] Academy of Medical Sciences (2013). *Response to the House of Commons Science and Technology Select Committee inquiry 'Women in STEM careers'.* http://www.acmedsci.ac.uk/viewFile/525d5fc94c201.pdf

30. The representation of women in academic STEM careers is poor, but improving. Although the number of females entering undergraduate and postgraduate courses is increasing, women are less likely than their male colleagues to reach senior positions on the academic career ladder. A 'long hours' masculine culture, insecurity of fixed term contracts, uncertainties about career flexibility and lack of female role models have been identified as barriers to women seeking to progress in their academic careers.

31. Improving the representation of senior female STEM professionals will require broad cultural and structural changes across academic institutions. Initiatives have been set up to encourage the progression of women in academic STEM careers, including mentoring, retraining following career breaks and flexible working. Such efforts need to be encouraged and supported; for example, the mandatory Athena SWAN accreditation for institutions that receive NIHR designation and funding. In order to identify effective practices, comprehensive data should be collected on the representation of women in academic STEM careers across institutions. The Academy is currently exploring initiatives aimed at addressing the underrepresentation of women in academic biosciences.

This response was prepared on behalf of the Academy by Nick Groves-Kirkby and Dr Richard Malham. For further information, please contact Dr Richard Malham (richard.malham@acmedsci.ac.uk; +44(0)20 3176 2152).

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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