Cancer Research UK submission to House of Lords Science and Technology Committee inquiry on Scientific Infrastructure

June 2013

1. Every year around 300,000 people are diagnosed with cancer in the UK. Every year more than 150,000 people die from cancer. Cancer Research UK is the world's leading cancer charity dedicated to saving lives through research. Together with our partners and supporters, Cancer Research UK's vision is to bring forward the day when all cancers are cured. We support research into all aspects of cancer through the work of over 4,000 scientists, doctors and nurses. In 2011/12 we spent £332 million on research. The charity's pioneering work has been at the heart of the progress that has already seen survival rates in the UK double in the last forty years. We receive no government funding for our research.

Infrastructure supported by Cancer Research UK

2. Cancer Research UK funds five core institutes across the UK. These laboratories are funded either directly through core funding or by substantial renewable programme grants with a significant core element. Each institute has a different research focus but overall they seek to attract world class scientists to improve our understanding of cancer and its treatments.

3. We fund 15 centres of excellence in cancer whose goal it is to deliver world-class research, improved patient care and greater local engagement with research. The Centres form a national framework through which we can deliver the greatest impact in the global fight against cancer. Cancer Research UK Centres are partnerships working at a local level with universities, NHS Trusts, cancer networks and other charities, and on a national level with government and industry.

4. Cancer Research UK spent over £183 million in UK universities last year through grants and other awards. We are able to do this because of the medical research infrastructure, expertise and skills in these institutions.

Current availability and status of scientific infrastructure

Is sufficient provision made for operational costs and upgrades to enable best use to be made of the UK's existing scientific infrastructure? Is it used to full capacity; and, if not, what steps could be taken to address this?

Charity Research Support Fund

5. The Charity Research Support Fund (CRSF) forms part of the Quality Related grants issued through Higher Education Funding Council England (HEFCE), its allocations are based on the amount of charitable research a university attracts. The fund supports the indirect infrastructure

costs of research that takes place in universities which allows medical research charities to invest in work taking place in these institutions.

6. It exists because medical research charities spend their money directly on projects in universities that support their stated missions rather than the indirect costs associated with research such as basic infrastructure. Therefore Government funding is required in order to leverage the maximum investment from the medical research charity community.

7. In 2011/12, £227 million of costs were allocated through the CRSF in the UK which, in turn, leveraged £1,137 million spend by charities in UK universities.[1]

8. Similarly, Excess Treatment Costs support charitable spend on clinical research in the NHS by covering the costs of extra procedures required to undertake research. These costs ensure that research can take place, ultimately delivering health gains to patients. The sector values Government's continued support for this form of funding and continue to make calls to maintain the spending to allow charities to access these forms of infrastructure.

Radiotherapy capacity for research

9. Currently there is a concern about the capacity of radiotherapy equipment in the UK and the ability of researchers to conduct clinical radiotherapy research. Typically radiotherapy has been underfunded compared to other areas of cancer research. It is therefore important that the environment and infrastructure is in place to allow more radiotherapy research to take place.

10. Currently 265 linacs are operational in England.[2] The Department of Health reported that increases in demand means that this figure will need to be 412 by 2016. To ensure appropriate radiotherapy capability and the latest techniques are available, existing machines need to be replaced at 10 years. Of the current linacs, 41 are over 10 years old and should be replaced. An additional 61 will reach 10 years by 2016. In total the NHS therefore needs an additional 249 new linacs over the next four years. Responsibility for replacing and investing in new machines lies at the Trust level.

11. This issue poses a problem for the clinical delivery of radiotherapy in England. However it also means that it is difficult for radiotherapy researchers to develop new techniques and treatment plans that could increase the effectiveness of radiotherapy or help improve capacity of radiotherapy services. It is estimated that radiotherapy capacity needs to be over 13% of demand in order to allow for machine repairs and maintenance. Currently demand outstrips the

[1] Association of Medical Research Charities, Enable charitable research funds to be spent only on research, http://www.amrc.org.uk/challenge_value-charitable-investment-in-medical-research_enable-charitable-research-funds-to-be-spent-only-on-research.

[2] Department of Health, Radiotherapy Services in England 2012, p.39

ability of the service to deliver significantly.[3] Capacity would need to be increased further in order to allow the vital radiotherapy research to take place.

Long-term needs, setting priorities and funding

What role should the Government play in ensuring that there is an effective long-term strategy for meeting future scientific infrastructure needs?

12. Research is a complex process, relying on the gradual accumulation of data and information over a number of years.[4] For medical research this process can lead to the development of new treatments, and also to a better understanding of different factors that might cause ill health in the first place. Research can provide evidence to direct public policy, to highlight inequalities in service provision, and to improve quality of life.

13. Cancer Research UK would like to see the Government's vision for medical research, and the leadership role they will take to deliver their vision, outlined in the strategy. It should provide a framework outlining how the different elements in the research environment will be strengthened over the coming years. We welcome the Prime Minister's 2011 Life Sciences Strategy but believe that it still did not provide the overarching vision of research infrastructure that we believe is necessary for the future.

14. We still believe that the following measures from Government could help to provide the long term stability needed to deliver a world class environment for research:

- UK governments should maintain the diversity of funding streams including funding to Research Councils, Funding Councils and National Institute of Health Research funding. They should also continue to demonstrate long-term commitment to supportive funding (such as the charitable support element of QR funding) that enables charities to fund world class research in universities and the NHS.
- UK governments should better advertise opportunities for accessing EU funding, encouraging researchers to engage with all available funding mechanisms.
- UK governments should set a strategic vision for the different funding streams designed to support infrastructure, to reassure researchers and investors of their long-term support.
- UK governments should develop an infrastructure strategy to enable access to, and sharing of, research data.

[3] Ibid, p.18.

[4] Cancer Research UK, Ideal Environment for Medical Research: http://info.cancerresearchuk.org/prod_consump/groups/cr_common/@nre/@pol/documents/generalcontent/cr_076936.pdf

- Funding bodies and research institutions from across the private, public and charity sectors should share best practice on collaborative working.

15. Research is a complicated process that requires long-term commitment and support. There have been numerous recent high level commitments to medical research in the UK. We believe the Government should build on these recent announcements by developing a long term plan for medical research that includes infrastructure spending. In such a tight financial climate, we hope this strategy will show investors, including charities, industry and international funders, that the UK is not only committed to supporting a stable environment for medical research now, but also that it is committed to enabling the life sciences to be a key driver of economic growth in the future.

Government decisions

Is it more important to invest in large, national infrastructure or medium infrastructure?

16. All scientific research contributes to the body of evidence in a particular field whether it is small scale studies or large scale research programmes. Science is conducted at different scales and there must be infrastructure to support the science that is being conducted. Cancer Research UK partners with Government on a range of different types of infrastructure each of which provides a unique and invaluable contribution.

Francis Crick Institute

17. The Francis Crick Institute is an example of a large infrastructure project that will demonstrate the world class nature of the UK research. Scheduled to open in 2015, it will be a world-leading bio-medical research centre in central London. Interdisciplinary working is fundamental to the Institute. It will bring together scientists from multiple fields to work together to understand why disease develops and find new ways to prevent and treat illnesses such as cancer, heart disease and stroke, infections, and neurodegenerative diseases.
18. This interdisciplinary approach extends to the funding model behind the Institute. It is funded by a consortium of six: the Medical Research Council, Cancer Research UK, the Wellcome Trust, UCL (University College London), Imperial College London and King's College London.
    The organisations in the consortium will invest a total of around £650 million to establish the Institute. When it is fully operational, it will employ 1,500 staff, including 1,250 scientists, and have an operating budget of over £100 million per year.
19. The Francis Crick Institute will not only help to improve people's lives by making sure that laboratory discoveries are turned into interventions as quickly as possible, but will also keep the UK at the forefront of innovation in medical research, attract high-value investment, and strengthen the economy.

20. The Francis Crick Institute is a powerful example, not only of the way in which the UK continues to promote top quality, innovative research models, but also of the huge potential which can be realised when multiple funders jointly invest in projects of this kind.

21. The Francis Crick Institute is an example of major investment into scientific infrastructure that demonstrates not only of the way in which the UK continues to promote top quality, innovative research models, but also of the huge potential which can be realised when multiple funders jointly invest in projects of this kind. This model works for this particular area of science where close working across scientific disciplines is needed to focus on specific projects, however in clinical research where multiple centres are required to recruit the patients necessary for clinical trials then networks and smaller infrastructure may be more appropriate. Similarly there is a need to partner different specialities together in smaller centres as opposed to centralising research into a single location.

Experimental Cancer Medicine Centres

22. Established in 2007, Experimental Cancer Medicine Centres (ECMCs) are jointly funded by Cancer Research UK and Government funding through the Department of Health in England as well as receiving funding through devolved administrations. The ECMC Network is a collaborative UK wide initiative, bringing the leading figures in early-phase clinical research together with world class infrastructure, offering patients across the UK access to innovative, new treatment options.
23. Since the establishment of the network, ECMC funded staff have helped to support over 2000 studies, notably early phase trials of new biological therapies and small molecules, with a majority of early phase trials sponsored by industry. To date over 150 companies have collaborated with the Centres. Currently the Centres fund over 175 staff (2011/12).
24. The quinquennial review of the Centres by independent international experts concluded that the ECMC network represented a world class asset for the UK and provided a unique driver for locating early phase cancer studies here. A demonstration of the success of the ECMC network is the Cambridge ECMC, which between 2007-2011 secured £4.7 million of investment from collaboration with industry.[5]

If the current funding level is maintained or reduced, what would be the longer term impacts on scientific infrastructure in the UK?

25. In 2011 the Office for Health Economics produced a report *Exploring the interdependencies between Public and Charitable Medical Research*.[6] In the report the OHE concluded that:

[5] Experimental Cancer Medicines Centre Network, Impact of the Experimental Cancer Medicine Centre Network 2007-2011, 2011.

[6] Office for Health Economics, Exploring the Interdependency between Public and Charitable Medical Research, http://www.ohe.org/publications/article/exploring-the-interdependency-between-public-and-charitable-medical-research-6.cfm

26. “Wholly independent and self-sufficient medical research initiatives are rare. Arguably all research activity depends, to a greater or lesser extent, on other parts of the total medical research “ecology” in the UK, and in many cases, internationally. For example, universities conducting charity-funded projects also receive infrastructure support from the public sector through QR and the CRSF.”

27. The report provides additional evidence on the effects of “Crowding In” and “Crowding Out” and the need for continued funding to support existing infrastructure.

28. “The argument for crowding in is that changes in Government funding flows can affect charities’ funding flows and vice versa. If, for example, Government funding of medical research decreases (increases) and this causes donors to increase (decrease) their own contributions to medical research charities, then Government funding and private donations are substitutes. This effect is identified in the literature as “crowding-out”. If, however, decreases (increases) in Government funding lead to decreases (increases) in private contributions to charities, then the two sources of medical research funding are complements and there is a “crowding-in” effect.”[7]

29. There is further evidence to suggest that cutting funding means that UK science does not fully capitalise on recent investments. In the short term, when fixed costs have already been incurred because of investment in a piece of infrastructure, a cut in variable costs will mean that the full potential of the original investment is not being realised. In the long run, if Government decreases its support of fixed costs, this could have a crowding-out effect on charity contributions because the cost of producing research would increase (as charities would not be able to exploit economies of scale).

Governance structures

What impact does publicly funded scientific infrastructure have in terms of supporting innovation and stimulating the UK’s economy?

30. In 2008, a team from the Health Economics Research Group (Brunel University), RAND Europe and the Office of Health Economics published a study commissioned by the Evaluation Forum that estimated the economic returns to medical research as the sum of monetised health gains and economic spill-over benefits.[8] It used cardiovascular research as its main exemplar. It found that for each pound invested by the taxpayer or charity donor in cardiovascular research, a stream of benefits worth 39 pence is produced each year ‘in perpetuity’. Cancer Research UK and several partners are undertaking follow-on research to develop this methodology further and

[7] Exploring the Interdependency between Public and Charitable Medical Research, p16

[8] RAND Europe, Medical Research: What’s It Worth?: Estimating the Benefits from Medical Research in the UK. http://www.rand.org/pubs/external_publications/EP20080010.html

demonstrate the return on investment specifically in cancer research. The study is due to publish its results in autumn 2013. While this figure is not solely related to infrastructure spending it does give a fair representation of how investment in science provides economic returns.

Are Government policies successful in encouraging industry to co-invest in scientific infrastructure?

31. Government investment into innovative scientific infrastructure has demonstrated the ability to leverage further funding from industry and other sectors. Cancer Research UK's stratified medicine programme demonstrates how investment - in this case from the Technology Strategy Board - can support investment by charities such as Cancer Research UK, and attract investment into UK infrastructure.

Stratified medicine

32. In partnership with the Government funded Technology Strategy Board, Pfizer and Astra Zeneca, Cancer Research UK is undertaking an ambitious programme to lay the foundations for stratified medicine development and treatment in the UK. Stratified medicine will allow patients to receive targeted treatments.
33. The programme is testing tumour samples from 9,000 patients across six different tumour types to help establish the foundations for a national service that will ensure standardised, high quality, cost-effective genetic testing of tumours is available for people with cancer. Ultimately this has the aim of also helping further research into new targeted therapies. The programme requires collaboration between universities, hospitals and commercial industry to support the infrastructure of collecting tumour samples.
34. As a direct result of the programme, two pharmaceutical companies, Roche and Bristol-Myers Squibb, are working with Cancer Research UK to set up trials in the UK that draw on this information. Doctors will be able to use the database to see if any of their patients have specific faults in their tumour identified through the stratified medicine programme, which might make them suitable to join the companies' trials.

For more information please contact Senior Policy Adviser Daniel Bridge, daniel.bridge@cancer.org.uk or 0203 469 8153.