COUNCIL FOR
SCIENCE AND
TECHNOLOGY

# The NHS as a Driver for Growth

## A report by
## The Prime Minister's Council for Science and Technology

**September 2011**

## The NHS as a Driver for Growth

The 21st Century is bringing a revolution in the life sciences, engineering and information technology. This will in turn transform healthcare. Meanwhile the pharmaceutical industry is facing unprecedented challenges, with rising costs of research and development and the future loss of income as many important drugs come to the end of their patented protection.

The UK has immense strengths, both in basic research in these areas and in the professionalism and commitment within the NHS. For example, it is a world leader in the science of genomics and genetics, which have the potential to revolutionise medical practice and it has a proud history in the development of medical imaging technologies, but it has been weaker in the uptake and application of these technologies.

The UK now needs to become world class at developing, testing and rapidly diffusing the best new technologies and practices. For the NHS, with its profound needs both to improve patient care and constantly to reduce the costs of delivery, innovation must be done differently than in the past. This applies both to continuous incremental improvements, and to realising the potential for major savings through disruptive innovation.

There is much good practice and untapped appetite for problem-solving across the NHS, but we believe that today's structures and practices can get in the way of exploiting the opportunities created by developments in science and technology. We have not seen it as our role to add to the wider debate about the ways in which the NHS and innovation contribute to growth in the economy as a whole.[1] Instead, we focus in this note on some practical changes that we believe will help unleash their potential. We do so in the context of other initiatives. The Plan for Growth[2] has set out an ambitious programme of work to enhance the potential of the NHS and the health sector as drivers of growth. Meanwhile, Sir Ian Carruthers has been asked to review how the spread of innovations can be accelerated across the NHS.

It is the CST's view that success in delivering the government's aspirations for healthcare and growth will depend on a fundamental cultural change within the NHS, supporting innovation in ways that increase health benefits while driving out costs across the system. The NHS must be open to earlier and fuller engagement with innovative businesses of all sizes, and to engagement with innovators in sectors like engineering which do not have a long tradition of working with health practitioners. We do not underestimate the difficulties of achieving culture change of this kind in a healthcare system that touches the lives of everyone in the country. It will require strong national clinical and executive leadership to create frameworks to enable, incentivise and support

1 An issue addressed, for instance, by "Medical Research: What's it worth? Estimating the economic benefits from medical research in the UK", available at: http://www.wellcome.ac.uk/About-us/Publications/Reports/Biomedical-science/WTX052113.htm

2 The Plan for Growth, HM Treasury, March 2011, pp. 91-98.

innovation, matched by the local freedoms that will deliver the benefits in practice. Our recommendations for action are highlighted in bold.

## Building the culture

Well designed innovation is fundamental to improving patient care and reducing cost, not at odds with them. To realise the full range of benefits, the NHS needs more often to drive the innovation rather than being the recipient of new proposals. This requires a deep-seated culture of working with partners to frame challenges and develop solutions that meet all of its needs. It requires openness to new ideas coupled with the confidence to be demanding and the ability and desire to take managed risks. It also requires everyone involved to see innovation as an integral part of the wider drive for efficiency. So, for example, new practices should drive out old ones in order to realise the full clinical and financial benefits.

Culture change must be led from the top. CST supports the proposal that the NHS Commissioning Board should be under a duty to promote innovation and research in the provision of health services and we also support the recent commitment to impose a related duty on clinical commissioning groups.[3] **Building on this, we recommend that there should be strong leadership and accountability for innovation and business partnership at the most senior levels of the NHS. In addition, local commissioning bodies should be encouraged to have at least one member with lead responsibility for research, the use of evidence and the uptake of cost effective innovation.**

CST notes that some NHS Trusts are extremely entrepreneurial and imaginative. In some cases they are also developing new partnerships and "clusters" to improve quality and reduce the cost of care. **We recommend that the Government identifies and implements new ways to spread innovation more widely, through the reward structure for both management and front-line staff, and considers incentives for NHS Trusts to collaborate more widely to generate efficiencies of all sorts.**

A sound regulatory framework is a vital basis for medical research. We welcome the steps set out in The Plan for Growth to simplify regulation. We urge the government to implement the recommendations in the recent report by the Academy of Medical Sciences[4] on the regulation and governance of UK health research as soon as possible.

## Procurement

[3] Government response to NHS Future Forum.

4 Academy of Medical Sciences, A new pathway for the regulation and governance of health research, January 2011.

The need for innovation and staff development in the NHS goes far beyond research and front-line delivery services. It will be particularly important, for example, to bring in specialist expertise from beyond the sector if the NHS is to effect a real change to secure innovative procurement.

Good procurement is valuable in its own right, but is also a driver of innovation in the wider economy. It depends on the purchaser setting out requirements in broad terms and asking intelligent questions of the supplier. This can result in innovative products that are both better and cheaper. There is considerable expertise in innovation through procurement in other areas. The approach taken to the development of the Olympic Park is a good example. We believe there are valuable lessons that might be transferred.

CST is doubtful that the specialist expertise in procurement that is a feature of innovative companies such as Rolls Royce exists currently within the NHS. **CST recommends that individuals with advanced skills in procurement of innovative solutions to important problems in the NHS are actively sought and, if necessary, trained.** These people will need to receive salaries competitive with their industry counterparts in order to enable recruitment of a first class cadre of individuals.

A fundamental challenge to innovation in the UK is that it is particularly difficult for SMEs to sell to the NHS. We believe there are still lessons to be learnt from the US where the DARPA (Defence Advance Research Projects Agency) model in defence procurement has delivered sustained success over a number of decades in engaging SMEs with large government purchasers.

CST is working on a project on the potential for government procurement to drive innovation and growth across the economy more generally. We will offer further advice on what might be done specifically for health as part of that.

## Clinical Trials and Personalized Medicine

The current model for clinical trials has been responsible for many of the major advances in healthcare in recent decades and is at the heart of the business model supporting new treatments. But recent and future trends in science and in global markets mean that we need to find new ways to trial new treatments and allow for the wider range of types of potential interventions now available. We are in danger of an outdated UK system driving innovation away. However, it takes two to tango: equally industry needs to work in partnership with health systems to deliver the products that are needed at a price that is affordable.

Recent developments in genome science and human genetics are on the threshold of delivering new diagnostic methods and innovative products to the clinic. Three areas where a transition is occurring now from research to the clinic are first, cancer therapy, second, new diagnostics for neurodevelopmental disorders (impairments of the growth and development

of the brain or central nervous system) and other genetic disorders, and third, for the diagnosis, surveillance, management and potentially, development of new antibiotics for treatment of infectious diseases. Genetics will play a crucial role in the future in identifying drug targets and stratifying patient populations for the commercial sector.

The NHS provides a unique opportunity for the development of public-private partnerships between the NHS, research funders and industry to pursue the molecular and genetic characterisation of disease and to create the tools that would put the UK in a world leading competitive position to turn the results of research into new ways of preventing, diagnosing and treating disease.

These tools include: creating the capability in the NHS (with additional commercial and other partners) to analyse human genomes, develop large scale databases linking genetic markers to diseases and effectively store the necessary data; developing libraries of stem cells from individuals with well characterised disorders; and creating widely accessible chemical libraries for probing such cells.

In this area CST makes a series of linked recommendations that we propose should be key components of the innovation strategy for the NHS:

**First, the NHS should work with research funders to create a pre-competitive partnership with business to help identify the best drug targets and pathways using existing and emerging genomic data.**

**Second, the NHS should work systematically to improve the speed of recruitment to clinical trials for stratified medicines[5]. This is eminently achievable but will require a very considerable re-gearing of molecular pathology and clinical genetics laboratories in the NHS setting.**

**Third, the UK and European regulators should be engaged immediately to identify more appropriate and faster pathways for high-efficacy targeted therapies, in many cases based on genetics. This may mean conditional approval for drugs in phase 3[6] studies and also elimination of the requirement for extensive phase 3 studies in drugs with outstanding efficacy that provide the results expected from stratification.**

**Fourth, the NHS needs to demonstrate much earlier and more complete uptake of cost effective new products and devices. For example, it needs to reconsider the value of high-efficacy stratified medicines, taking into account the wider benefits to patients and their families, the benefits to society outside the NHS, and the longer term benefits associated with the structural changes in health provision brought by**

[5] Medicines tailored for use in people whose illnesses are classified more accurately than is usually achieved at the moment, using a detailed analysis of their biological or genetic characteristics.

[6] Clinical trials have a series of numbered phases. Phase 3 involves large-scale studies that compare new treatments with the best currently available treatment.

**high-efficacy therapies. Where devices are involved, this will require working with a wider range of industry sectors than has been common in the past.**

## Data and information technologies

CST and others have argued for some time that we are wasting the opportunities to find new beneficial therapies which could be obtained by access to the immense resource that is the NHS patient records database. We believe government should set a clear aim of working with patients to realise these benefits, drawing on the public's increasingly sophisticated recognition of the different ways in which personal information is given and used. Indeed, we believe that if the case is made effectively, patients would welcome the use of their data in this way. As the technology of data collection improves, so will the quantity and quality of data. Effective, safe data sharing would support better research and enable new forms of patient care.

For example, better use of patient data would enable more rapid, high value-added clinical trials to be undertaken in the UK. It would allow rapid recruitment of patients, and more effective phase 4, "post-approval" surveillance following the introduction of new interventions. It would also enable much more effective pharmacovigilance, i.e. the identification of side effects of therapy.

We welcome the plans for the secure data service proposed in the Plan for Growth and a number of the new transparency commitments for the NHS set out in your open letters to Cabinet Ministers of 7 July. [7] We recommend that the Government go further to put in place mechanisms to ensure that the linkage and use of personal datasets is achieved in a more co-ordinated, coherent, and transparent way across the public sector.[8] [9]

**Specifically, we recommend that the Government draw on existing examples of effective use of shared data, such as the creation of safe havens (recommended in the Data Sharing Review and as used for instance in the Scottish Longitudinal Study[10]) and identify ways to enable the lessons from these to be captured and reproduced across the UK.**

**The NHS should also build on existing good practice in developing integrated clinical care models.** There are already good examples of practice in developing approaches that integrate patient information with clinical care – for instance, in Tayside, during the past six years the number of amputations due to complications of diabetes has fallen by 40 per cent, while

[7] http://www.number10.gov.uk/news/statements-and-articles/2011/07/letter-to-cabinet-ministers-on-transparency-and-open-data-65383
[8] Council for Science and Technology, Better Use of Personal Information: opportunities and risks, November 2005.
[9] Richard Thomas and Mark Walport, Data Sharing Review, 2008.
[10] http://www.lscs.ac.uk/

the number of diabetics requiring laser treatment to preserve their sight has fallen by 43 per cent.

One of the biggest barriers to rapid delivery of innovative healthcare solutions across the NHS is the lack of inter-operability of basic ICT systems. For example, there is extremely poor or non-existent integration between primary and secondary health care ICT systems. **We recommend the creation of essential operational standards which, as in many areas of technological change, will help provide a secure framework for investment without inhibiting local freedoms and accountabilities.**

## Funding and evaluation

The National Institute for Health Research (NIHR) model works well at the interface between the NHS and academia. Meanwhile the introduction of the Research Excellence Framework (REF) and its explicit recognition of the importance of the impact of research should be taken as an opportunity for the NHS to engage further with academia. But more needs to be done to manage funding at the interface of business and academia during the pre-commercial development of new interventions.

The practical difficulties confronting businesses seeking to turn an invention into a viable product are a major barrier to the development and commercialisation of research findings. In our view, the Technology Strategy Board (TSB) and NIHR, working with partners such as the research councils and the research charity sector, are starting to play a key role in this funding 'valley of death'. **CST recommends that government focuses closely on this as an important funding mechanism and takes the opportunity to enhance support for TSB in relation to the development of health-related technology and innovation as and when further funds become available.**

Teaching hospitals and university medical schools have a very important role to play. Currently, the tariff means that hospitals are funded for the work they carry out at average cost. Teaching hospitals are frequently required to work on more complex cases than their district hospital counterparts and the tariff arrangements disadvantage the proper management of patients with complicated disease. **We recommend that the tariff system should be changed to differentiate properly between simpler and more complex cases. It must support properly hospitals that participate actively in research and teaching. It must encourage collaboration with both the private sector and academia.**

Experimental medical facilities have been developed in partnership between NIHR, the Medical Research Council, Wellcome Trust, Cancer Research UK, the British Heart Foundation and other funders. Greater collaboration with the private sector and academia would also allow maximum use to be made of the large investments that have been made in these to perform sophisticated

Phase 2[11] studies of new drugs (and in some cases of old drugs for new uses). Such studies can make drug development more effective by asking research questions about how the drug works and how its effects can be measured best. A more effective partnership between the NHS and industrial partners would give these facilities much greater impact.

The approach of the National Institute for Health and Clinical Excellence (NICE) is founded on the Quality Adjusted Life Year as the key metric used to evaluate the value of therapeutics and diagnostics. In CST's view, where new and innovative types of drugs are concerned, the data may not exist to allow this approach to evaluation. Some of the most important benefits of novel therapeutics may only be recognised after years of use.

**We recommend that NICE uses the opportunities created under the Health and Social Care Bill, currently before Parliament, to develop an approach for evaluating drugs and diagnostics that can take more account of wider benefits to the health care system and the economy as well as their impact on patients and their families. NICE should also work with industry to define unmet health needs and the design of appropriate clinical studies that could provide the health care system with innovative cost-effective solutions tailored to its needs and where adjudication of value could be achieved more rapidly after regulatory approval.**

## Going global: marketing the UK's strengths internationally

The NHS is highly regarded around the world and there is potential to develop its own business to the benefit of patients and at the same time further enhance the reputation of the UK more generally as one of the top places in the world in which to set up and grow businesses in the healthcare and related sectors. **We welcome the creation of NHS Global and recommend further action to ensure it has the right skills and staff to create a new entrepreneurial culture, and that it is fully empowered to act across the NHS.** In addition, an increasingly entrepreneurial NHS should have the capacity to develop business models and to market NHS training, service models and innovations across the world.

Our aim in this report has been to identify ways of exploiting the huge potential that exists at the interfaces between the NHS and the UK's innovators; we believe that urgent action in these areas will work both to support patient care and a thriving economy.

**Council for Science and Technology**
**July 2011**

**URN 11/1096**

[11] Phase 2 clinical trials follow Phase 1 tests on safety, and test a drug's effectiveness.