# All change please

## Putting the best new healthcare ideas into practice

Professor James Barlow and Jamie Burn

Edited by Gavin Lockhart

policy exchange

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# Executive summary

Even when backed by clear evidence, new technologies and practices inch their way too slowly through the vast web of structures that make up the National Health Service. This is one of the reasons our standards often fall below those of comparable countries. Data collected by the World Health Organisation shows that premature deaths from causes that are preventable with prompt and effective healthcare are higher in the UK than Germany, Canada, Australia and France. A lack of MRI and CT scanners can lead to long waits for diagnostic tests, while shortages in radiotherapy equipment are a factor in our comparatively poor cancer treatment. Among European countries, the UK is consistently below average in the adoption of new drugs for the treatment of certain common cancers. And within Britain, too, there is an unjustifiably wide variation in outcomes of care – the postcode lottery.[1,2,3]

The final report of Lord Darzi's review of the NHS, *High Quality Care for All*, published in June 2008, addresses the need for more and better information about clinical performance and examines ways to strengthen existing incentives to improve practice. But the work could be bolder about reducing costs, reforming procurement systems and simplifying the 40 plus organisations that have been created to improve rates of innovation.

## Problems driving innovation and spreading new ideas across the NHS

### *Organisational capacity for innovation and adoption*

The public service history of the NHS may mean that managers do not focus on the success of their organisation. NHS managers are not judged by how innovative they are or even necessarily by how far they improve services for patients. They are judged by how well they stay within their budget and meet the tasks demanded of them, such as the latest central government target or National Institute for Clinical Excellence (NICE) directive. Thinking of new ways to meet the needs of patients is not a priority – indeed current structures may even discourage it.

The health and social care systems are hugely complex, with messy lines of communication and spheres of responsibility, which encourage power struggles and bunker mentalities. As a result the barriers to the successful implementation of new technologies are greater in the NHS than in our other public services. Successive waves of NHS restructuring have not removed these barriers.

The landscape for procurement is heavily fragmented – the UK healthcare market consists of 426 NHS trusts, ten evolving or actual regional purchasing groups (known as collaborative procurement hubs), the NHS Purchasing and Supply Agency (PASA, created to provide procurement guidance to trusts), six private healthcare organisations, 11,000 healthcare suppliers and two non-pharmacy wholesalers. These organisations buy and sell goods and services worth about £21 billion a year. Improving the effectiveness of their trading relationships and using contractual mechanisms to stimulate innovation require more attention, but despite its centrality in the spread of new technologies, procurement was neglected in the Darzi review.

### *Little financial freedom or incentive to innovate*

Many complain that the financial apparatus of most trusts is inflexible because the control of budgets is devolved to different departments. Financial planning is heavily

1 NHS Institute Delivering Quality and Value Team, "Focus on: productivity and efficiency", NHS Institute for Innovation and Improvement, Coventry, 2005

2 Carruthers I and Philips P, "Safety First: A Report for Patients, Clinicians and Healthcare Managers", Department of Health, London, 2006

3 See Glossary for an explanation of acronyms

restricted by the annual budgetary cycle, so that trusts that do not have the freedoms of foundation trust status (even these may be threatened) are not able to accumulate dis cretionary funds. Trusts do not have accurate costing systems giving them detailed information on what they pay per patient to provide a service.

***Spending resources in the wrong areas***

The UK spends over £8 billion a year on innovating, refining, piloting, evaluating, appraising and diffusing new healthcare ideas, including annual public sector spending of approximately £2.7 billion. But our research suggests that £2.4 billion is spent on the creation of new ideas, £0.1 billion spent on the adoption of these ideas, £0.06 billion on appraisal of these ideas and £0.15 billion on the spread and implementation of ideas. In other words, nearly 16 times more is spent on invention than diffusion. The discrepancy between spending on creation and the appraisal of innovations is striking – the latter receives just 2% of the total public funds. Funds are too heavily weighted towards creation. After all, ideas are of no use if they are not applied. And the alphabet soup of organisations created by the Government to assist hospital trusts lacks a clear, joined-up strategy for spreading these ideas.

***Poor leadership and risk aversion***

The capacity for innovation in NHS organisations suffers from an endemic aversion to taking risks. A study of change capability in the NHS by the Office of Government Commerce in July 2006 gave the NHS a score of only two out of a possible five points for seven out of nine categories assessed. The NHS got low scores in the use of change management methods, staff development approaches and change leadership. Blame for failure outweighs the reward for success. Leadership has been described as being predominantly about "survival in a heavily orchestrated world". Managers in the NHS tend not to act like leaders – engaging staff with the core mission of improving services for patients, and creating a collaborative, innovative environment for organisational development. Instead they focus on meeting directives and managing a budget. If an initiative is not demanded from above, then its financial and managerial burden is not balanced by any reward for success; failure, on the other hand, meets with immediate censure. And even if there is a potential financial or reputational gain, past experience of the difficulties in managing change and realising benefits contributes to extreme caution in assessing risks.

***Weak commissioning***

The general consensus among the professionals whom we interviewed is that health service commissioners are failing to stimulate the uptake of best practice and innovation. Commissioners lack the information, the tools and the expertise to drive complex service change. Some blamed this on the reorganisation of commissioning at a local level, which led to the loss of expertise. There is also a skills gap and a power imbalance between primary care trusts (PCTs) and large hospital trusts, and it is difficult for PCTs to engage with the introduction of complex innovations. Commissioning improvements in one United States health management organisation has saved 5,500 lives and $1.4 billion for five conditions.[4] NHS North West has started piloting this 'pay-for-performance' system to see if similar benefits could be gained in the NHS, but they have not included a penalty clause designed to stimulate the poorest performers.

***Poor procurement***

The Purchasing and Supply Agency was created to provide procurement guid-

4 Hip and knee replacements, heart attack, heart bypass and Pneumonia

ance to trusts and it exists alongside a number of other procurement bodies such as the Centre for Evidence-based Purchasing (CEP) and the commercial directorate of the Department of Health. However, since Trusts are under no obligation to listen to PASA or CEP, their guidance often goes unheeded. According to one interviewee: "If PASA ceased to exist tomorrow, nobody would notice."

There are numerous problems with procurement in the NHS, which threaten to derail policies designed to improve efficiency. For example, there are no common descriptions or codes used by the NHS or its suppliers for items purchased, and the quality of supplier information in the medical device sector is generally poor making it difficult to compare prices. Trusts use different purchasing systems, and different departments within the same trust may use numerous systems. Many orders are placed directly with a company without any tendering system being used and there may be no agreed contract price. Quantities of paper-based invoices and multiple sources of procurement data are generated, requiring huge numbers of permanent employees in accounts departments to match invoices to orders. Neither the trusts nor the central and regional bodies have accurate data on costs. This damages relationships with suppliers, who do not know how many of a product they will sell and must factor this in to their prices. The absence of contracts and the lack of accessible systems for ensuring compliance with contracts make the pricing system variable and vulnerable to abuse. Overall, there are huge inefficiencies throughout the NHS supply chain. Procurement systems and duplication of effort waste more money; between £0.8 billion and £2.1 billion could be saved annually if procurement were improved.[5]

## Ways to drive innovation and spread new ideas in the NHS

There are policy changes which would save thousands of lives and billions of pounds. The Treasury's 2007 Comprehensive Spending Review linked variations in NHS productivity to differences in practice and technology uptake. It stated that "reducing such unnecessary variation could potentially generate net cash savings of £1.5 billion per year by 2010-11".[6] This figure includes potential procurement savings.

## Free organisations to adopt the best ideas

**1. The Government should expand (but not interfere with the day-to-day management of) academic health science centres**

The government should not interfere with the development of academic health science centres (AHSCs). These began in England as a ground-up organisational innovation, which came from the close association between universities and teaching hospitals, and the increased freedoms in the system.

Competitive, world class AHSC's will not come into being as a result of government fiat or designation. The nascent AHSC movement is the product of close association between universities and teaching hospitals on the ground, and is designed to exploit the freedoms conferred by foundation trust status. It is based on the success of North American and European examples, which evolved without central interference.

The best contribution the government can make is to allow a loose interpretation of existing legislation. For example, Imperial College Healthcare NHS Trust has incorporated St Mary's and Hammersmith Hospital Trusts, neither of which are Foundation Trusts, to form an AHSC. Their business case is solid and the Secretary of State has the right to confer trust ownership, so what is the hold up?

5 See page 29

6 HM Treasury, "Pre Budget Report and Comprehensive Spending Review", The Stationary Office, London, 2007

**2. Reduce restrictions on Foundation Trusts**

There is scope for reducing the restrictions on foundation trusts, giving them the freedom to spend funds as they see fit without applying for approval.

Foundation trusts are now able to exploit their intellectual property and enter into commercial ventures that could boost their income and spread best practice. They should be developing long-term business strategies based on their strengths and the service gaps in their local health economy.

## Harness the power of procurement to reduce costs and encourage the best ideas to spread

**3. Scrap the procurement hubs which sit below PASA**

Government should dismantle the collaborative procurement hubs and consolidate all central procurement bodies. The current system of hubs hinders effective procurement. A central procurement body will have the central task of developing common data standards for all NHS procurement systems in collaboration with industry.

**4. Publish costs and a bestseller list of pharmaceuticals and medical devices**

NHS organisations tend to pay a variety of prices for the same materials. Paying different prices for the same product is inefficient and wastes money. Information from current contracts should be collated to produce recommended prices and the companies providing the best products at the best prices. The DH should also introduce a bestseller list of pharmaceuticals and medical devices.

Guidance should be produced based on the reforms of organisations like Nuffield Health that have generated savings of more than 10% of their procurement budget. Hospitals should be encouraged to enter into local agreements to procure common products, to unlock economies of scale without the current interference of the collaborative procurement hubs.

## Focus spending on adoption and diffusion

**5. Refocus spending on appraisal and spread**

The Government is committing significant extra funds to health service research and development, but this money will be wasted if more is not invested in vital spread mechanisms.

**6. Create a best practice tariff**

NHS providers are paid for their activity according to a tariff system. This is calculated annually and was initially based on the average cost of a group of around 50 procedures (known as health resource groups), using the previous year's data. It is therefore based on current practice and does not reflect the real price. Indeed if an innovation improves efficiency by reducing activity, a trust may be penalised because it will receive less under the tariff system.

The latest tariff prices have gone a long way towards providing a price for different procedures, but there is still huge variation in the costs of delivery. Ideally, the tariff should reflect the cost of efficiently providing best practice. Financial incentives can be used to create an appetite for improvement, by linking the NHS tariff to an innovation agenda.

Under the Commissioning for Quality and Innovation programme, commissioners will be able to provide bonus payments for quality improvements in locally determined clinical areas. The experience of Premier Inc in the United States has informed this policy. But the pilot scheme in the North West Strategic Health Authority (SHA) does not incorporate the penalties used in the US for failures to improve performance. This important

sanction should be introduced in England to boost the performance of under-performing hospital trusts.

**7. Include pay-for-performance bonuses in clinician and managerial contracts**
Clinicians' contracts should include a pay-for-performance element, linking in to successful implementation of board and departmental directives. Managerial incentives should be linked to improving outcomes as well as financial performance.

## Report Structure

To understand why it is so difficult to spread new technologies and practices within the NHS, the authors of *All Change Please* interviewed senior healthcare professionals here and in North America. They draw on these comments throughout. In Chapter two we revisit the literature on innovation in health. Chapters three and four discuss challenges facing the NHS, and the Government's response, under the general headings of organisational capacity for innovation; communication and networking; incentives; leadership and culture; commissioning; procurement; and use of evidence. Chapter five provides new analysis of how much is currently spent on innovation and diffusion, and Chapter six presents North American case studies and the lessons they provide. The final chapter makes seven recommendations on how to improve the system.

# 1

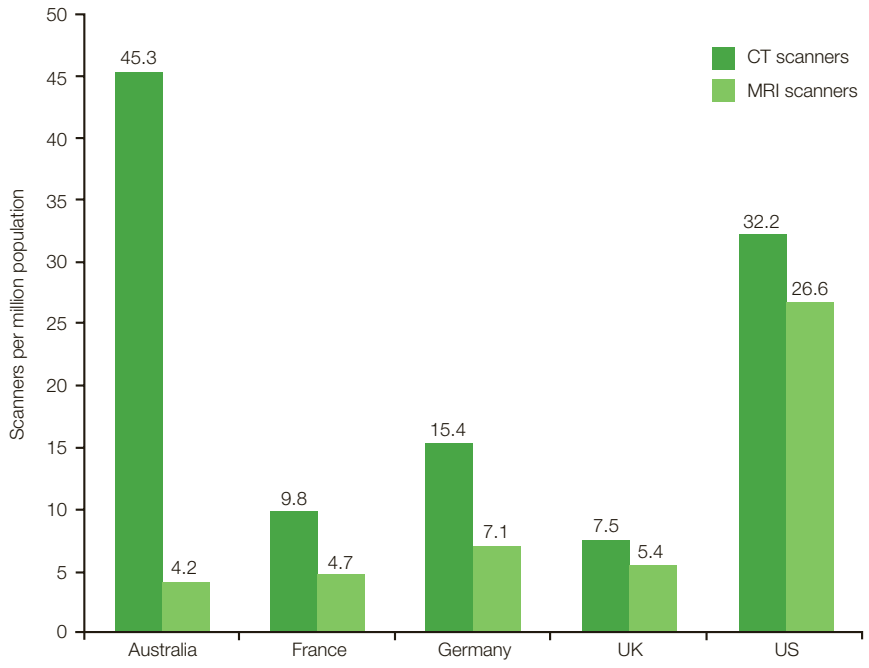
# Introduction

The NHS is 60, an anniversary that has stimulated much debate and soul-searching into its future direction. One criticism often made is that the numerous components of the UK health system don't work together effectively to adopt new technologies and practices. In July the Government published the final report of the NHS review, conducted by Lord Darzi, High Quality Care for All. The review is an opportunity to rethink not only the organisation of health service delivery, but also the NHS approach to innovation. Our report, *All Change Please*, does more than simply set out a case for improvement in health services: it shows how this improvement might happen by investigating how ideas spread through the NHS. It is based on an extensive literature review, more than 80 interviews with decision-makers from healthcare in Britain and abroad, feedback – including a roundtable discussion on our interim findings – and research visits to US and Canadian hospital groups that specialise in innovation.

## NHS performance

Although there may be more innovation than we think in the NHS because it is typically excluded from conventional analyses, in many areas the service is not performing well.[7] We fit only 430 new pacemakers per

**Figure 1: Scanners per million population, international comparison, 2004-05[8]**




7 NESTA, "Hidden Innovation: How innovation happens in six low innovation sectors", NESTA, London, 2007

8 Leatherman S and Sutherland K, "The quest for quality in the NHS: a mid-term evaluation of the 10-year quality agenda", The Nuffield Trust, 2003

**Figure 2: Radiation therapy equipment per million population, international comparison, 2005[9]**

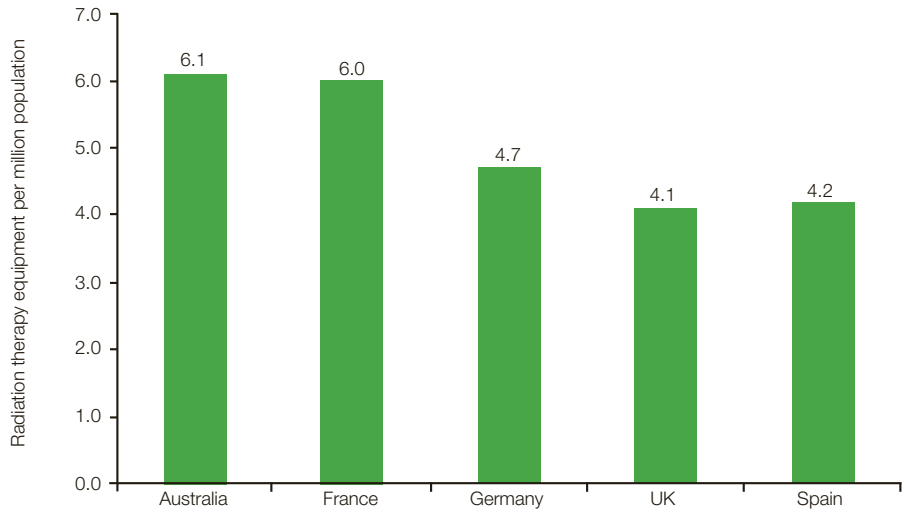
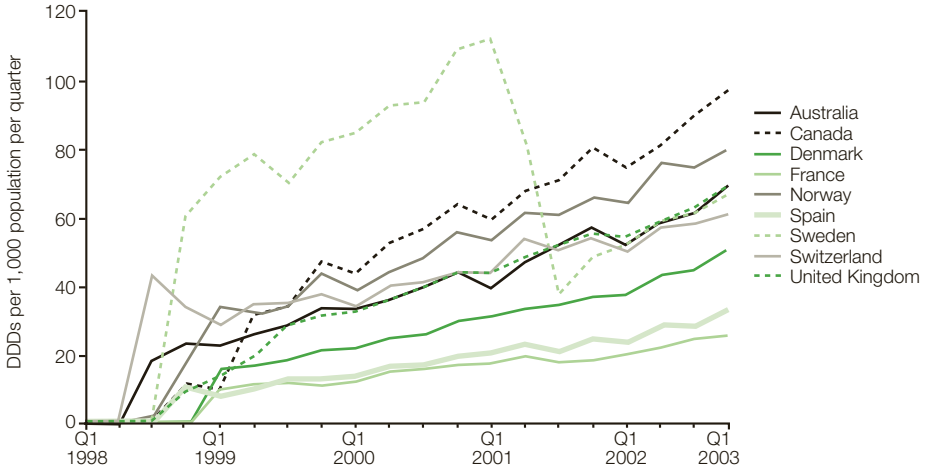



**Figure 3: the number of defined daily doses of sildenafil per 1,000 population**




million of the population a year compared with the 900 per million fitted in France, Germany, Belgium and Spain. Yet cardiac arrhythmia is one of the top ten causes of unplanned hospital admissions.[10] Over 40,000 patients in Germany use insulin pumps rather than self-administered injections to manage their diabetes compared with less than 2,000 in the UK.[11]

Out of 19 European countries, the UK is consistently below average in the adoption of new drugs for the treatment of breast cancer, colorectal cancer, lung cancer and non-Hodgkin's lymphoma. The hugely variable diffusion of different technologies in different countries is a reminder of the gulf that exists between an evidence-based ideal and local reality. Canada, Switzerland and Sweden are generally high users of new technologies; Spain, Denmark and, most especially, Britain are low users.[12, 13]

Diagnostic tests such as scans are a potential source of health system bottlenecks, leading to delays in diagnosis and treatment. Figure 1 shows the number of CT (computerised tomography) and MRI

9 Leatherman S and Sutherland K, ibid

10 McClellan M and Kessler D, "A Global Analysis Of Technological Change In Health Care: The Case Of Heart Attacks", Health Affairs,18(3): 250-255, 1999

11 Fitzpatrick, A, 'The Cutting Edge', Medical Technology and Innovation, MTG, Issue 14, 2007

12 Packer C et al, "International diffusion of new health technologies: A ten-country analysis of six health technologies", International Journal of Technology Assessment in Healthcare, Cambridge University Press Issue 22 p 419-428, 2006

13 A retrospective diffusion study was undertaken of sildenafil, cyclooxygenase-II (COX II) inhibitors, beta interferon, verteporfin, deep brain stimulators, and drug-eluting coronary stents in ten countries—Australia, Canada, Denmark, France, The Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom. Almost all countries experienced rapid adoption of sildenafil with diffusion to a similar level; there was variable adoption and diffusion of COX II inhibitors, verteporfin, and interferon beta; drug-eluting stents penetrated the market in a similar way in all but one country; and two countries had very different adoption patterns for deep brain stimulators

(magnetic resonance imaging) scanners per million population in five advanced countries in 2004-05. The UK reported low figures for both.

Shortages in radiotherapy equipment can cause significant delays in treatment and are a factor in the deficiencies of cancer care in the UK. Figure 2 below provides a snapshot of the availability of radiotherapy equipment in 2005. Between 2002 and 2005, the amount of our equipment increased by 5% from 3.9 to 4.1 pieces per million population. In Australia the increase was 13% and in Spain 14% over the same period.

Figure 3 shows the number of defined daily doses (DDDs) of sildenafil sold per 1,000 population per quarter, until the quarter before the first competitor oral drugs for erectile dysfunction were launched. There were no delays of greater than three months between launch and first adoption of sildenafil in any of the countries included. Although all countries showed a rapid uptake of the drug, the UK was the laggard.

Figure 4 shows the number of DDDs for all COX-II inhibitors, non steroidal anti-inflammatory drugs, sold per 1,000 population. There was a delay between launch and first adoption of COX-II inhibitors in Denmark, France and the United Kingdom, while Switzerland and Canada had a very rapid uptake.

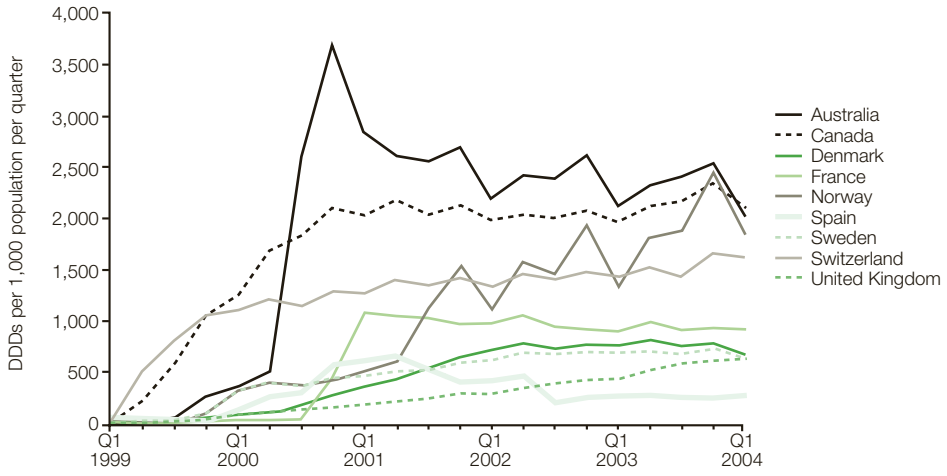
And it's not just a question of slow uptake of new technologies or drugs. New and existing practices do not spread easily even though their benefits may be clear. This can lead to unacceptable variations in quality, cost and access. The Treasury's 2007 Comprehensive Spending Review linked variations in NHS productivity to differences in practice and technology uptake. It stated that "reducing such unnecessary variation could potentially generate net cash savings of £1.5 billion per year by 2010-11".[14]

## The last decade of policy developments

Since 1997 NHS expenditure has almost doubled in real terms. This has been accompanied by substantial organisational reform. The overwhelming driver for this has been political sensitivity to failures in the NHS. Increased funding has therefore been accompanied by firm central direction as to how the money should be spent. Initially, this was predominantly directed towards reducing waiting-lists and waiting-times. But, following criticism of the inflexibility of target-driven management, the Government has become more wary of a prescriptive approach.

The concept of a provider-purchaser split, separating the supplying from the buying of healthcare, was originally introduced by the

**Figure 4: number of DDDs for all COX-II inhibitors sold per 1,000 population**




14 HM Treasury, "Pre Budget Report and Comprehensive Spending Review", The Stationary Office, London, 2007

Thatcher Government and is now central to the operation of the NHS. Its fundamental purpose is to make the health service more businesslike. In theory, primary care trusts (PCTs) have become its most influential component, controlling around three-quarters of NHS expenditure.

Another key reform has been the establishment of foundation trusts (FTs), which have been given extra financial and operational freedom. For example, they are not subject to the rules on delegated limits for capital investment. Initially these are hospital trusts, but the model will be extended to PCTs and other NHS organisations. Foundation trusts are allowed to retain annual surpluses to invest in innovation and organisational development, which should help them to move beyond the short-term planning horizons of conventional trusts. They have also been granted a limited level of borrowing from central funds. Further devolution of NHS budgets is taking place through the introduction of practice-based commissioning, which places more purchasing power in the hands of GP practices or groups of practices.

In 2003, Sheila Leatherman and Kim Sutherland reviewed England's ten-year "quality agenda" (1998 – 2008) at its

**Table 1: Summary of policy initiatives designed to improve quality[15]**

| Key functions | Examples of discrete reforms |
|---|---|
| Standard-setting and monitoring | National Institute for Health and Clinical Excellence (NICE)<br>National Service Frameworks (NSF)<br>Core and developmental standards (set by the Department of Health)<br>Clinical audit |
| Target-setting | Public Service Agreements |
| Clinical governance | Legislation |
| Regulation | **Institutional**<br>- Healthcare Commission (HCC)<br>- Monitor<br>- Audit Commission |
| | **Individual**<br>- National Clinical Assessment Authority<br>- General Medical Council (GMC)<br>- Appraisal and revalidation |
| Patient/public engagement | Patient choice of providers |
| Payment and incentives | Payment by Results (PbR)<br>GP contract<br>Consultants' contract<br>Agenda for change |
| Public reporting | Dr Foster<br>League tables<br>Star ratings (now superceded by the annual health check) |
| Commissioning | NICE commissioning guides |

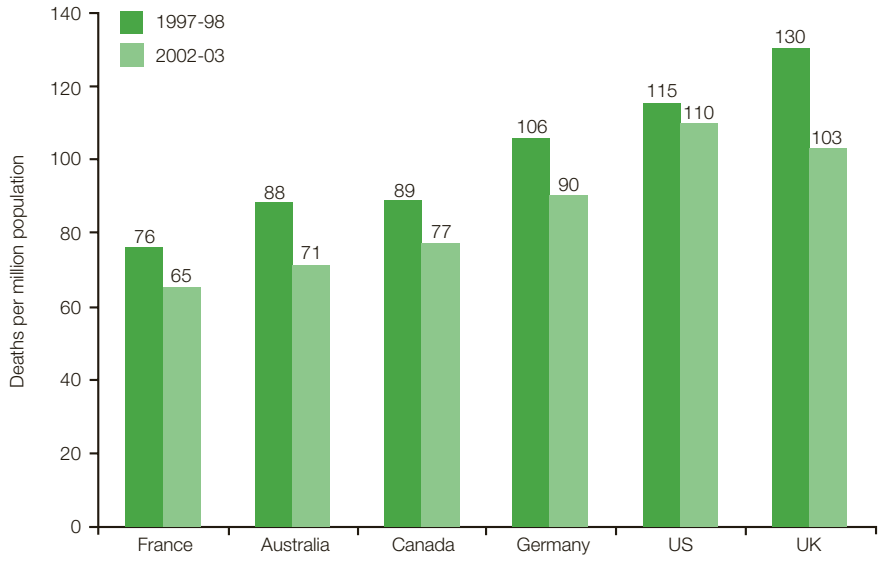
15 Leatherman S and Sutherland K, "The quest for quality in the NHS: a mid-term evaluation of the 10-year quality agenda", The Nuffield Trust, 2003

midpoint for the Nuffield Trust. The policy initiatives this work spawned are summarised in Table 1. They described it as "the world's most ambitious, comprehensive, systemic and intentionally funded effort to create predictable and sustainable capacity for improving the quality of a nation's healthcare system".[16] Five years on, no one could deny that the past decade has seen an improvement in quality in the NHS. Table 1 provides a summary of these initiatives. However, given the ten-year time period, the generous increase in resources dedicated to healthcare, and the ongoing goodwill on the part of the public, patients and health professionals, there are many who question whether progress has been as marked, as rapid or as predictable as could have been expected. The reasons for this lack of expected improvement might be – to quote Leatherman again – "constant flux and reorganisation, tensions between the central, regional and local levels, perennial problems with the coordination of care, duplication of effort and territorialism. Her conclusion was that strong policy conceptualisation and articulation is too often unmatched by the necessary competence in implementation".

In 2008, Nolte and McKee drew on World Health Organisation (WHO) mortality data to compare countries in terms of premature death (under 75) from causes that are potentially preventable with timely and effective healthcare. The results for 19 countries are illustrated in the chart. It shows that the UK started with the highest rate of premature death and made the most progress in tackling mortality rates. Nevertheless, the most recent data shows that UK rates remain considerably higher than those in most comparable countries.[17]

The reasons for change are clear. There is an unjustifiably wide variation in outcomes of care, care is not as safe as it could be, the cost of care is rising at an unsustainable rate and poor patient experience remains a concern.[18, 19]

**Figure 5: Mortality amenable to healthcare, international comparison 1997-98 and 2002-03[20]**




16 Leatherman S and Sutherland K, "The quest for quality in the NHS: a mid-term evaluation of the 10-year quality agenda", The Nuffield Trust, 2003

17 Nolte, E and McKee, M, "Measuring the health of nations: updating an earlier analysis", Health Affairs 27(1), p 58–71, 2008

18 NHS Institute Delivering Quality and Value Team, "Focus on: productivity and efficiency", NHS Institute for Innovation and Improvement, Coventry, 2005

19 Carruthers I and Philips P, "Safety First: A Report for Patients, Clinicians and Healthcare Managers", Department of Health, London, 2006

20 Nolte, E and McKee, M, Ibid

# 2

# Academic literature on spreading innovation in the healthcare sector

## What is "best practice" and what is "innovation "?

The boundaries between the notions of best practice and innovation can be somewhat blurred, a fact recognised by the Darzi review. Best practice is conventionally defined as the most efficient and effective way of accomplishing a task, based on repeatable procedures that are proven to work. When you visit your doctor you want to be sure that he or she is following best practice. Often, achieving it requires agreed, evidence-based protocols to be followed. Depending on the clinical area, a degree of standardisation can lead to better outcomes – as the Darzi review points out.[21]

However, best practice should not be seen as fixed – it needs to evolve as new ideas emerge. And the reality is that in healthcare, the influx of innovation means that best practice in many areas is constantly changing and evolving. According to the Darzi review: "New treatments are constantly redefining what high quality care looks like. We must support innovation to foster a pioneering NHS."[22] It goes on to argue that it is essential to do away with outdated practice so that the adoption of best practice everywhere can be "the platform from which innovation can flourish".[23] Darzi recognises that strategic health authorities (SHAs) and primary care trusts (PCTs) are keen to bring the benefits of innovation to patients more rapidly, a point also taken up in the review's report on primary care, which states that one of its aims is to stimulate more rapid spread of innovation and good practice.

Too often, though, innovation is narrowly defined, focusing solely on the research and development processes leading to new technologies. It needs to be seen as a broader concept, encompassing improvements in the technologies and infrastructure that support healthcare, and in clinical practice and service design. Service innovation, according to the Darzi review, means "people at the frontline finding better ways of caring for patients – improving outcomes, experiences and safety".

In *All Change Please* the authors follow Greenhalgh et al's description of innovation as "a novel set of behaviours, routines and ways of working that are directed at improving health outcomes, administrative efficiency, cost effectiveness or user's experience, and that are implemented by planned and co-ordinated actions". [24]

Within this umbrella definition there are different forms of innovation – some may be technological, such as a new medical device, and others may be changes in care practices or the organisational arrangements for delivering care. The boundaries, however, are often opaque, with new technologies commonly requiring new practices or

21 Darzi A, High Quality Care For All: NHS Next Stage Review Final Report, p29, 2008

22 Darzi A, ibid p49

23 Darzi A, ibid p55

24 Greenhalgh T et al, "Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations", The Milbank Quarterly, Issue 82, p581-629, 2004

organisational forms for their successful introduction. A variety of different strategies to encourage adoption and manage implementation are therefore necessary.

The authors do not touch upon the processes behind the initial creation of innovations. But we recognise that spreading innovation in healthcare systems typically involves a complex interplay between two forces: a "push" from manufacturers, central bodies and commissioners of healthcare and a "pull" from health service delivery organisations.

## Existing research

According to standard theories the adoption and diffusion of new ideas follow a predictable pattern. A slow initial phase, in which innovators and risk-takers adopt a new idea, is followed by take-off when its benefits have been established. This surge in uptake gradually tails off as laggards adopt what is now common practice. In the NHS, a common claim is that there is an extensive lag, colloquially known as the "valley of death", between the early adopters and the majority take-off.[25] Factors that are thought to influence adoption and spread include early publicity about evidence of benefits and more effective networking to build a coalition for adoption in different locations.

Standard explanations for the successful uptake and spread of innovations usually focus on whether or not they possess certain characteristics:[26]

- **Unambiguous relative advantages over existing technologies, products or practices.** This can be demonstrated through the appraisal process, comparing innovations with existing practice. Although it seems obvious that changes which provide higher quality care at lower costs will be sought after, this is often not the case. High start-up costs may inhibit long-term financial gains, and the motivation to lower costs and increase quality depends on whether the adopting organisation is rewarded for the effort it will expend on managing the change and realising the benefits. The capacity to adapt features of the innovation to meet the needs of users may be important.[27]
- **Simplicity and adaptability.** Some innovations require major modification to existing ways of working, and involve collaboration across established organisational groups. Some academics have argued that innovations often comprise a "core" of well-defined irreducible elements and a "periphery" of elements that are negotiable, allowing different routes to adoption. The more flexible the boundaries, the greater the likelihood an innovation will fit well into the existing organisation.[28]
- **Ability to trial or pilot an innovation.** Organisations may look more favourably on innovations that can be introduced on a trial basis before a binding decision to adopt because this reduces the risk and increases the visibility of benefits.[29] A balance needs to be struck between trials necessary to demonstrate the impact and safety of a new product and the excessive repetition of these trials at an organisational level, which is a waste of NHS resources and makes selling products to the NHS an uphill struggle. Too many trials can stifle the market for innovation; a solid evidence base and good dissemination are needed to satisfy the needs of organisational decision-makers.
- **Compatibility with an organisation's existing structures, procedures and values.** The fit between the innovation and the organisation is frequently highlighted as a vital factor underlying successful adoption.[30] An important aspect of this is how an innovation's risks and benefits are distributed within the organisation. The more these coincide with the interests, values and powerbase of the various stakeholders, the easier it will be to build coalitions supporting adoption and implementation.

25 Williams D et al, "Feeling the pain: Disruptive Innovation in Healthcare Markets", Presented at IFIP Basys Conference, Oporto 23-25 June, 2008

26 Rogers E, "Diffusion of innovations" The Free Press, New York, 1995

27 Greenhalgh T et al, "How to spread good ideas: A systematic review of the literature on diffusion, dissemination and sustainability of innovations in health service delivery and organisation" National Co-ordination Centre for NHS Service Delivery and Organisation, p15, 2004

28 Denis J et al, Explaining diffusion patterns for complex healthcare innovations, Healthcare Management Review, 2002; Greenhalgh et al, ibid

29 Greenhalgh T et al, ibid; Fleuren M et al, "Determinants of Innovation within Health Care Organizations: Literature Review and Delphi Study", International Journal of Quality Health Care, Issue 16 p107-23, 2004

30 Fennell ML and Warnecke RB, "The Diffusion of Medical Innovations: An Applied Network Analysis" Plenum, New York, 1988; Rogers EM "Diffusion of Innovations" Free Press, New York, 1995

- **Organisational structures and internal politics.**[31] The internal structure, resources and politics of an organisation can be a powerful influence on how likely innovations are to be adopted and assimilated. This includes the degree of autonomy in internal decision-making regarding the use of resources. The approach to decision-making therefore influences what can be achieved. It needs to be consensual and collaborative, without involving too many people and stifling change through complexity.
- **Organisational capacity and a receptive context for new knowledge.**[32] An organisational culture that encourages involvement, experimentation and learning is influenced by strong leadership, a clear strategic vision and collective attitudes that are conducive to experimentation and risk-taking. In addition, how new knowledge is interpreted, distributed and used within an organisation is a crucial determinant of its innovativeness.
- **Leadership.** Effective leadership is integral to the creation of organisational attributes which positively influence innovation. It involves acknowledging the challenges, supporting managers and medical staff who are taking on an innovation, and fostering learning through trial and error without the fear of penalties. As well as board level leadership, there is strong evidence that adoption is more likely if clinical champions with strong social connections are willing to back the effort.
- **Individual attitudes.**[33] It is often argued that innovations are more likely to be accepted if the adopter has a similar socioeconomic, educational, professional and cultural background to the current users of the innovation. This informs the patterns of spread, which flow through and can be limited by professional boundaries, for example. Clinicians in the NHS vary considerably in their attitudes towards innovations. Interviewees expressed the view that there is a generation gap between older clinicians, socialised and trained under the old system and younger clinicians who are hungry for new ideas and opportunities. But this is a good sign; the attitudes to innovation are beginning to change.
- **Peer and expert opinion.**[34] Opinion leaders can have a strong influence on the beliefs and actions of their colleagues. These may not be the initial enthusiasts, but are the senior professionals who throw their authority and status behind a change, based on their expert judgment. Clinical reputation is an important currency in the NHS and can form the basis of efforts to spread best practice.
- **Communication and social networks.**[35] The influence and membership of professional and social networks can determine how well new knowledge spreads and create normative and institutional pressures for adoption. Frustration with existing practices and technologies may affect how receptive people are to ideas from these channels and how actively they seek them out. However, rigid delineation between professional networks may limit spread if important stakeholders are excluded, so the configuration of networks is important.
- **Competition.** The literature discusses environmental influences that stimulate innovative behaviour and the adoption of best practice. Competition between providers can have important benefits, as well as creating potential pitfalls. This includes competition to establish a reputation for excellence and leadership in different fields and competition to increase the market share, and thus the activity and income, of an organisation. Competition tends to be associated with more innovative behaviour.[36] However, an overly competitive environment may inhibit the willingness to share best practice.

31 Champagne F et al, "Structural and Political Models of Analysis of the Introduction of an Innovation in Organizations: The Case of the Change in the Method of Payment of Physicians in Long-Term Care Hospitals", Health Services Management Research 4 Issue 42, p94–111, 1991; Zaltman G et al, "Innovations and Organizations", Wiley, 1973

32 Pettigrew AM, "Shaping Strategic Change: Making Change in Large Organisations" Sage, London, 1992; Dopson SL et al, "No Magic Targets: Changing Clinical Practice to Become More Evidence Based", Health Care Management Review, Issue 37, p35–47, 2002

33 Pierce JL and Delbecq AL, "Organization structure, individual attitudes and innovation", Academy of Management Review, 1977

34 Rogers E, "Diffusion of innovations" The Free Press, New York, 1995; Fitzgerald L et al, "Interlocking Interactions, the Diffusion of Innovations in Health Care", Human Relations, Issue 55(12) p1429–49, 2002; Locock L et al, "Understanding the Role of Opinion Leaders in Improving Clinical Effectiveness", Social Science & Medicine, Issue 53 p745–57, 2001

35 Coleman JS et al, Medical Innovations: A Diffusion Study, Bobbs Merrill, New York, 1966; Rogers E, ibid; Valente TW "Network Models of the Diffusion of Innovations" Hampton, Cresskill NJ, 1995

36 Rye C and Kimberly J, "The adoption of innovations by provider organisations in health care", Medical Care Research Review, 2007

There is a large body of work examining innovation and the spread of ideas in general. But its lessons are of limited value for healthcare.[37] The literature is found wanting on a number of grounds:

- Its general focus is on the introduction of new products rather than new processes, and on comparatively simple innovations – bounded, discrete and well-defined – where adoption is explained in terms of independent individual decision-making;
- Adoption and spread are often seen as a series of logical sequential stages that can be improved by addressing problems in the various stages – for example the knowledge acquisition stage can be tackled by improving awareness during that stage, whereas in reality this is a feature of the process and dissemination is an ongoing requirement;
- The research is also overly focused on innovations that are centrally orchestrated because they are more visible and research is easier to fund, rather than on ground level innovations that emerge and spread informally;
- Few studies focus on the sustainability of innovations beyond the initial implementation phase because research efforts are not ongoing;
- Finally, there is a lack of research on disengagement from old methods and its part in poor adoption of innovation.

Of course, some healthcare innovations do spread easily. Initial uncertainty about the clinical value of MRI scanning was overcome by the clear superiority of its images (although the number of scanners in England and Wales is still low when compared to other countries).[38] In the case of live polio vaccine, unambiguous evidence for its benefits and early feedback meant that it was rapidly adopted and diffused.[39]

The reality is often more complicated, though. The boundaries of the innovation may be hard to pin down; it might have several objectives; it might involve combinations of technology and organisational change; and the decisions to adopt, or the implementation process, may require the involvement of multiple stakeholders. When innovations require the co-ordinated efforts of numerous organisations from different parts of the care system, or when it challenges existing patterns of interdependence among individuals or groups, implementation is likely to be more difficult. Furthermore, the evidence for its efficacy may be contested by different professional groups or there may be no generally agreed criteria for judging its benefits.[40] In healthcare, where there are tightly demarcated communities of interest such as those of different health professionals, collaborative efforts can be difficult to negotiate.[41]

Healthcare organisations therefore cannot be seen as rational decision-making machines that move through an ordered process of stages. Deciding whether to take up a new idea or innovation involves multiple stakeholders and is a complex, organic and untidy process, all the more so when deployment of the innovation is ill-defined. The efforts involve finding and collecting evidence on innovations, researching their implementation, and deciding what information needs to be disseminated to support effective decision-making.[42]

Although, as Rye and Kimberly put it, "we still do not know as much as we would like, and what we do know, we may not know for sure", there is a growing literature that draws on examples from healthcare settings to explore the dynamics of complex innovations.[43] This literature points us to ways of stimulating the adoption and spread of innovation in the NHS.

37 Greenhalgh, T et al "How to Spread Good Ideas: A systematic review of the literature on diffusion, dissemination and sustainability of innovations in health service delivery and organisation", National Co-ordinating Centre for NHS Service Delivery and Organisation R & D, NCCSDO, 2004; Fleuren M et al, "Determinants of Innovation within Health Care Organizations: Literature Review and Delphi Study" International Journal of Quality Health Care, Issue 16 p107-23, 2004, Rye C and Kimberly J, 2007, ibid

38 Grigsby J et al, "The diffusion of telemedicine" Telemedicine Journal and e-health Issue 8 (1), p79-94, 2002

39 Nelson R et al, "Why and how innovations get adopted: a tale of four models", Industrial and Corporate Change, Issue 13, p679-699, 2004

40 Ferlie E et al, "The nonspread of innovations: the mediating role of professionals", Academy of Management Journal, Issue 48, p117-134, 2005

41 Ferlie E et al, 2005, ibid

42 Perleth M et al, "What is 'best practice' in health care? State of the art and perspectives in improving the effectiveness and efficiency of the European health care systems", Health Policy, 2000

43 Perleth M et al, 2000, p254, ibid

# 3

# Challenges for the NHS

Chapter 2 outlined what the research literature tells us about the potential barriers to innovation in healthcare systems – and hints at solutions for overcoming them. This chapter will look at a number of challenges that have been identified as barriers to the spread of best practice in the NHS. These include:

- Organisational capacity for innovation and adoption
- Communication and networking
- Incentives
- Leadership and culture
- Commissioning
- Procurement
- Use of evidence

## Organisational capacity for innovation and adoption

> *"You can only change the culture with a change in culture at the top (but) a change in culture at the top would be necessary but not sufficient."* [44]

> *"There's a light year between the DH and SHA level…and there's another light year between the SHA and the Trusts."*

Over the last ten years NHS reforms have attempted to change a system operated by top-down central control to one in which decision-making is devolved to a local level as much as possible. But changing the structure of the health service does not change cultures that have developed over many decades, under conditions of tight budget control and a rigid hierarchy of decision-making.

The public service history of the NHS means that managers do not focus on the success of their organisation. NHS managers are not judged by how innovative they are or even necessarily how far they improve services for patients. They are judged by how well they stay within their budget and carry out the tasks demanded of them, such as meeting the latest Department of Health target, or directive from the National Institute for Health and Clinical Excellence (NICE).

The health and social care systems are hugely complex, lines of communication and spheres of responsibility are messy, power struggles and cultural silos are common. As a result, barriers to the successful implementation of new technologies are higher than in other sectors and public services.

Caring for those with long-term conditions requires effective communication and collaboration between different professional teams that span the somewhat artificial divide between health and social care. But where change requires collaboration between organisations within the system, difficulties are multiplied. The costs, risks and benefits of the effort are often spread unevenly, yet every organisation must be satisfied that it is getting a good deal if the project is to succeed.

44 All quotes are taken from the interviews

Successive waves of NHS restructuring have continually disrupted the relationships that transcend these barriers. For example, although the policy has been hugely beneficial overall, the move towards foundation trusts, which are not under the direct supervision of strategic health authorities, has an impact on the overall ability to co-ordinate the system and requires a new collaborative approach. The performance of individual organisations can be expected to improve in a more market-oriented environment, but there are valid concerns that competition will reduce communication of good ideas and thus reduce their spread. None of this means that the direction of reform is wrong, but it means that efforts to bridge the barriers and co-ordinate the functions of regional healthcare need to be redoubled.

***Bloated middle management***

Some interviewees commented that there are too many middle managers who spend too much time in inconclusive meetings and not enough putting decisions into practice. Middle managers have limited powers. To be successful in effecting change they must get the support of clinicians, who are used to complete autonomy and have greater authority than they do. There is often a failure to establish a common goal and secure the commitment of everyone involved before embarking on a change project, which leaves middle managers marginalised and ineffective.

***Conservative clinicians***

> *"There's no question that one of the barriers to innovative medicine in the UK is the medical profession. And they're very, very conservative…I would argue, exceptionally so, to the disadvantage and detriment of their patients."*

Older clinicians come in for particular criticism; they were brought up in a heavily rationed system and their clinical perspective is (correctly) that patient safety is the paramount concern. They can be won over by arguments about quality but tend to be sceptical about policies aimed at improving efficiency. Vested interests can also play a part in medical decision-making. Healthcare is constantly changing, rendering some professional expertise and practices obsolete, and innovations that move care away from specialists or require extensive retraining for senior clinicians, can face the greatest resistance.

***Culture***

> *"You don't get any praise if you get it right, but boy do you catch it if you get it wrong."*

The overriding perception that we gained from interviewees is that the ingrained conservatism and blame culture of the NHS militates against innovators. The responsibility for improvement now lies with those working in the organisations that are responsible for delivering care, but there are cultural constraints within, and barriers between, the different groups. Each NHS trust is made up of different professional groups, and part of the challenge is to get everyone engaged with their organisation's mission and pulling together in the same direction. In the past, the loyalty of doctors has been firmly to their profession, and more specifically to their specialty, and some have argued they are therefore less likely to be motivated to the pursuit of more nebulous "organisational priorities". Tightly-knit professional networks can operate as channels for new ideas. But they can also create cultural divisions between professions, reducing the spread of innovations that affect multiple clinical areas and require close interprofessional collaboration. In the NHS, the more parties that are involved, the less likely change is to happen.

### Case Study 1: Mediracer

Carpal tunnel syndrome (CTS) causes pain and tingling in the hands and affects 3-5% of the adult population. Currently, diagnosis requires referral to a neurophysiologist, which can delay treatment by up to six months.

A Finnish company, Mediracer Ltd, has developed a hand-held device for diagnosing CTS that can be used in outpatient and primary care settings. The diagnostic method is sensitive (94%) and specific (98%) compared to a conventional electrodiagnostic test performed by a specialist. A team in Leicester has adopted the technology and created a one-stop service for the diagnosis and treatment of CTS. In less than two years they secured more than 90% of referrals from the strategic health authority. They have achieved exceptional clinical results and improved efficiency and productivity to the tune of £1.7 million.

The team has attempted to publicise their achievement but have encountered significant opposition from neurophysiologists, who argue that the test is not as accurate as the gold standard. Instead of looking for ways to incorporate the greatly improved pathway and make sure problem cases are referred for further tests, the new technology is being opposed and ignored.

Several things could happen here. Commissioners could take this idea and replicate the pathway in their region, in order to meet waiting targets, improve patient experience and save resources for deployment elsewhere. Alternatively, the government could reduce the tariff for the treatment of CTS in line with the cost savings of this pathway, ensuring that time and support was given to implement the changes. The Leicester team received a Medical Futures award in 2007 for their work. This kind of positive reinforcement should be encouraged because the publicity it generates rewards innovators and serves to market the best ideas. Medical Futures estimates that national savings from the introduction of this pathway could be as high as £72 million.

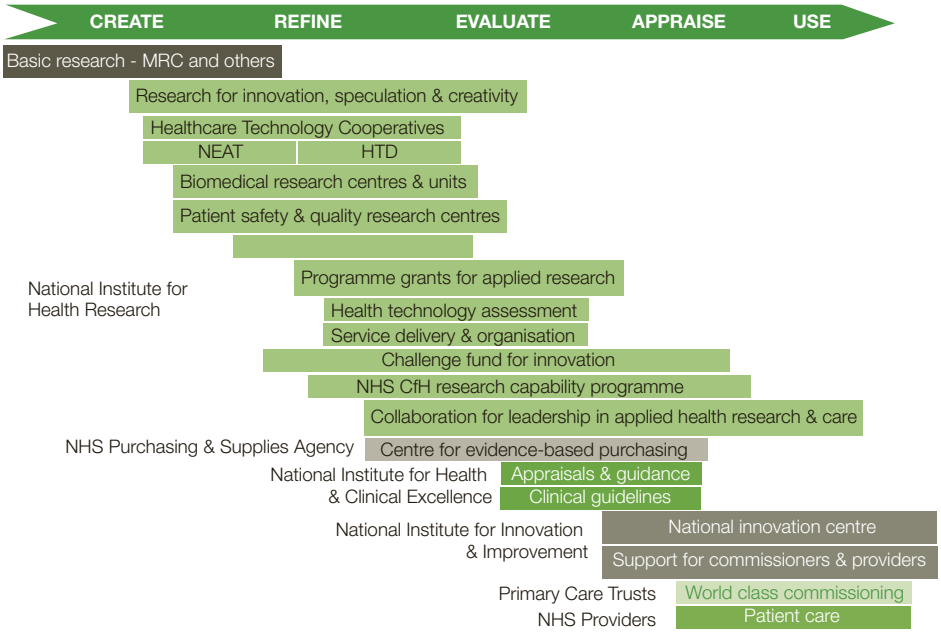
Frontline staff bear the brunt of most big changes. Some innovations require greater effort than before and some may be against the interests of the group charged with implementation – for example, where a technology means a task can be performed by less skilled practitioners. It is well known – and was frequently emphasised by interviewees – that care professionals often resist change that disrupts their current practice or is not clinically led. Policy-led changes and managerial initiatives are often ignored as a consequence.

***Organisational structure***

Figure 6 illustrates how organisations designed to promote innovation and adoption are spread across the process. Essentially, there are too many organisations operating in this environment, over-complicating what should be a relatively straightforward system. What is needed is a comprehensive re-evaluation of the central bodies involved in this area, assessing their activities and funding levels.

Local healthcare organisations generally do not have the capacity to identify, collect and assess every new innovation coming to market, so efficient central mechanisms are required to ensure all patients benefit from important advances. Central organisations should provide guidance and promote innovations where appropriate. These organisations must be clearly mapped out with discrete boundaries, but must be joined up effectively so that there are no gaps or duplication of effort, and so that organisations on the ground find their support accessible and useful. According to our interviews, this is often not the case. The complexity of the organisational landscape inhibits the effective co-ordination

**Figure 6: The Innovation Pathway**




Source: NIHR[45]

of efforts to promote innovations, and the multiplicity of central actors vying for position confuses dissemination by bombarding local groups with too much low-quality direction.

## Communication and networking

*"A lot of this is communication … We've got to find better ways to communicate."*

Innovations often originate and spread within professional communities. But those that require different groups to work together or originate outside a particular group can find it harder to win the necessary support. Communities of practice tend to involve one profession only. Members identify with these groups first and foremost. Their goals are aligned with the interests of their profession's development above and beyond the interests of their organisation. The groups are highly institutionalised, with their own rules, norms and objectives, and it takes a great effort to create functioning multi-disciplinary communities of practice.

Networking arrangements in the NHS do not function as an especially effective mechanism for communication and knowledge transfer. Interviewees felt that closer attention to the different forms of network was needed. For example, doctors tend to have informal horizontal networks that are effective at spreading peer influence and constructing and reframing the meaning of innovations, while nurses tend to have formal, vertical networks that are effective at transferring codified information and passing on decisions from higher authority.

## Incentives

*"What constipates the system is that if you have a prospective plan you can't generate the money for that plan, whereas in any other business you would have a bit of leeway…it's very difficult to get going in the NHS because of that."*

Many complain that the financial apparatus of most trusts is inflexible because the control of budgets is devolved to dif-

45 Available at http://www.crncc.nihr.ac.uk/index/networks/comprehensive/clrns/western/latest_news/mainColumn-Paragraphs/010/document/Sheffield%20080925%20-%20BRfBH%20Update%20presentation.pdf, last accessed 26/11/08

ferent departments. In addition, financial planning is very much restricted by the annual budgetary cycle. Trusts do not have the freedoms of foundation trust status and are not able to accumulate discretionary funds. Indeed, if they generate a surplus it will be taken from them and their budget may be reduced the following year. These factors leave very little headroom for investment in innovation projects that may require significant upfront expenditure or involve a contribution from different departmental budgets; the flexibility and strategic influence of central management is constrained. The focus of management is on initial costs, so expensive innovations are less likely to be adopted even if they may have significant benefits further down the line. The result is a short-term outlook and generally risk-averse behaviour.

The payment and reimbursement system operating within the NHS causes its own problems. NHS providers are paid for their activity according to a tariff system. This is calculated annually and is based on the average cost of a group of around 50 procedures (known as health resource groups), using the previous year's data. It is therefore based on current practice and does not subsidise the cost of innovative and possibly more expensive procedures that would improve quality. Indeed if an innovation improves efficiency by reducing activity, a trust may be penalised because it will receive less under the tariff system.

Trusts do not have accurate costing systems giving them detailed information on what they pay per patient to provide a service. This is undoubtedly the source of variation in the costs of provision, a phenomenon that is well known by the Department of Health from its calculation of tariff prices from average costs. It means that trusts struggle to identify potential savings and are often unresponsive to tariff pressures to reduce costs giving them less reason to drop outdated practices and adopt new ones. This applies especially to new medical devices and diagnostics which are procured at trust level and are less likely to be promoted by NICE.[46] Several interviewees suggested that as a result the NHS was wasting a huge amount of its precious resources that could be spent on introducing the latest treatments and improving quality.

## Leadership

*"Don't rock the boat, don't change anything, just leave things alone, run your own business well and don't get too excited."*

*"We're getting people into Foundation Trusts slowly but surely, who've got real business credibility. But…they take their brain out at the door…they don't really see a long-term strategic future."*

There is an endemic aversion to taking risks in the NHS. Blame for failure outweighs the reward for success. Leadership has been described as being predominantly about "survival in a heavily orchestrated world". Managers tend to devote their time to meeting directives from above and managing a budget, rather than engaging staff with the core mission of improving services for patients and creating a suitable environment for organisational development. If an initiative is not demanded from above, then its financial and managerial burden will not be balanced by any reward for success; failure, however, meets with immediate censure. And even if there is a potential financial or reputational gain, past experience of the difficulties in managing change and realising potential benefits contributes to extreme caution in assessing potential risks. As one interviewee put it,

*"Not to put too fine a point on it, the easiest thing to do is to do nothing. You can't be blamed for not doing anything."*

46 A recent survey found that two thirds of primary care trusts failed to decommission any services in 2007/08 (HSJ, 9/10/08: H. Crump 'PCTs failing to decommission services'). It was suggested that many of the decommissioned services reflected the additional capacity PCTs were building into the acute system to hit the 18-week treatment target and their guaranteed volume contracts with the independent sector.

Achieving real change in complex organisations requires a clear, consistent agenda and a commitment to the long haul. But too many trust leaders focus on what is immediately possible. Short-term outlooks are a serious barrier to the adoption of new practices because it can take time to realise their benefits. The problem stems partly from uncertainties over the future environment because radical policy shifts are perceived as commonplace. There is a fear that the freedom to develop business strategies and create new income streams could be withdrawn at any time. This is not without justification: the ability of foundation trusts to hold on to surpluses, an essential reform that promotes good financial practice, is already under threat in the current economic crisis.

The high turnover of trust CEOs is also part of the problem. This is linked to the comparatively modest annual salaries that they receive for running large and complex businesses and to the perception that the power to make changes lies in the DH and its affiliated central agencies. A recent study found a strong association between poor hospital trust performance and CEO turnover and that pay was not being linked to performance under the current governance arrangements.[47] Policies to remove barriers and improve the adoption of best practice can succeed only if leaders are capable of meeting the challenge. Devolved governance means that the lines of accountability run clearly to the leaders of organisations. A sustained effort to improve local leadership in the NHS is the essential next step.

The literature asserts that leadership on the ground is a crucial driver of innovation, and is currently deficient in many NHS trusts. A study of change capability in the NHS by the Office of Government Commerce in July 2006 gave the NHS a score of only two out of a possible five points for seven out of nine categories assessed.[48] The NHS got low scores in the use of change management methods, staff development approaches and change leadership. A review by Ham et al found a significant deficit in project management skills across the NHS, specifically in management that was hindering effective progress in delivering sustainable service improvement.[49] Nor was the level of innovation linked to the number of initiatives.

## Commissioning

*"Commissioning in the NHS is just bookkeeping."*

The general consensus among interviewees is that commissioners are failing to stimulate the uptake of best practice and innovation. Commissioners lack the information, the tools and the expertise to drive complex service change. Some blamed this on the reorganisation of commissioning at a local level, which led to the loss of senior expertise. The skills gap and power imbalance between primary care trusts and large hospital trusts makes it difficult for PCTs to engage with the introduction of complex innovations.

The decision-making processes in PCTs were subject to particular criticism; they are seen as slow and ultimately indecisive when dealing with changes that have the potential for significant benefits. The perception is that commissioners, like managers, too often focus on the imperative of balancing the budget and resist costly changes. As one interviewee put it, when discussing a potentially beneficial new technology:

*"The health economics are fantastic. The ethics are great…it ticked all the boxes. It was placed in the national service framework and clinical practice guidelines have been produced by NICE. However, the commissioners have delayed implementation by saying they can't afford it in the current budget, and will need several*

47 Ballantine J et al, "The Governance of CEO Incentives in English NHS Hospital Trusts", Financial Accountability & Management, Issue 24:4, p385-410, 2008

48 Change Capability Review, Office of Government & Commerce, July 2006

49 Ham, C et al, "Capacity, culture and leadership: lessons from experience of improving access to hospital services", Health Services Management Centre, University of Birmingham, 2002

*years to plan for its implementation. You know it will happen sooner or later, but three…four years after now, there's only about half the country that's bloody well doing it. And that's because of the commissioning."*

Another concern is that areas in which joint commissioning would be beneficial are being neglected because commissioners are protective of their powers and don't co-ordinate effectively with local authorities and other PCTs. For example, there are 31 PCTs in London, but certain specialist services such as emergency stroke care require only a few high-quality providers. Commissioners need to develop collaborative arrangements involving specialist providers and the emergency services to ensure efficient, common referral procedures and rapid access to the best treatment – a few hours can make the difference between a return to normal functioning and brain damage. However, innovation to achieve this requires alignment of their interests, something that often proves hard.

## Procurement

*"The UK healthcare supply chain is approximately 25 years behind the private sector and has much lower efficiency compared with best private sector practice in the UK."*

While "commissioning" in NHS parlance largely refers to the provision of health and social care services, the term "procurement" tends to be used in relation to goods and non-clinical services. Many of the principles currently being developed as a result of the Department of Health's World Class Commissioning programme are applicable to the more mundane procurement agenda. Until now this has been something of a backwater in the NHS, even though it has often been demonstrated public bodies can stimulate innovation through their procurement policies.

There are numerous problems with procurement in the NHS that threaten to derail policies to improve efficiency. There are no common descriptions or codes used by the NHS or its suppliers for items purchased, and the quality of supplier information in the medical device sector is generally poor. Trusts use different purchasing systems, and different departments within the same trust may even have different systems. Many orders are placed directly with a company without tendering and there may be no agreed contract price. This generates quantities of paper-based invoices from multiple sources that require numerous permanent employees in accounts departments to process. As a consequence, neither the trusts nor the central and regional bodies have accurate data on costs, while suppliers do not know how many of a product they will sell and must factor this into their prices. The absence of contracts and the lack of accessible systems for ensuring compliance with contracts make the pricing system variable and vulnerable to abuse. Overall, there are huge inefficiencies throughout the NHS supply chain, costing the taxpayer billions.

The landscape for procurement is heavily fragmented – the UK healthcare market consists of 426 NHS trusts, ten evolving or actual regional purchasing groups (known as collaborative procurement hubs), the NHS Purchasing and Supply Agency, six private healthcare organisations, 11,000 healthcare suppliers and two non-pharmacy wholesalers. These organisations buy and sell goods and services worth about £21 billion a year. Improving the effectiveness of their trading relationships and using contractual mechanisms to stimulate innovation require more attention, but despite its centrality in the spread of new technologies, procurement was neglected in the Darzi review.

The Purchasing and Supply Agency was created to provide procurement guidance to trusts and it exists alongside a number of other procurement bodies such as the

Centre for Evidence-based Purchasing (CEP) and the commercial directorate of the Department of Health. However, since Trusts are under no obligation to listen to PASA or CEP, their guidance often goes unheeded. According to one interviewee: "If PASA ceased to exist tomorrow, nobody would notice." The regional collaborative procurement hubs are intended to provide hands-on support and generate economies of scale among trusts. However, they cannot enter into contracts with suppliers on behalf of trusts, and have been criticised for actually inhibiting trusts' freedom to develop effective purchasing models among themselves.

Where items can be purchased nationally, they should be because this will produce huge economies of scale. But there is little point in toothless central and regional organisations offering guidance. Currently, trusts do not have to join the collaborative procurement hubs and must pay £200,000 for the privilege if they decide to do so. But joining does nothing to solve the fundamental problem that their purchasing data is not of sufficient quality to cost procedures or forecast demand. If the systems to provide this data were rolled out in such a way that trusts and suppliers had compatible systems, then not only would a huge amount of waste be eliminated within trusts, but also they would gain a platform for strategic planning and collaborating on their own initiative; and central bodies would gain the sound costing data necessary to set accurate tariffs and develop system-wide expenditure planning. One interviewee argued that:

> *"Suppliers have never received a demand forecast from the NHS in 60 years, and they wouldn't know what to do with it if they received it."*

Under the current system trusts struggle to identify potential savings and are often unresponsive to tariff pressures to reduce costs, while the tariff itself is inaccurate because of the lack of good costing data. Stock control can be unreliable, resulting in operations being cancelled for lack of supplies.

It is not surprising that the uptake of beneficial medical devices is patchy when it relies on the fragmented, onerous and antiquated procurement systems at trust level. Procurement, as presently organised, is a major barrier to the spread of new technologies. As one interviewee said,

> *"There's great access to funds and innovation and all sorts of things locally in the UK but [there are] commercial barriers [to things] being adopted through the procurement side."*

In 2004, the healthcare data management company, Healthlogistics, established the NHS e-catalogue standard that exists today and is now on the PASA website. It has customised software for use in the NHS and estimates that adoption of the technology alone could save the system £800 million per year for a cost of just £80 million.

## Use of evidence

> *"[Clinicians] like trialability, they like reversibility, they like observability."*

> *"We've created a culture where people feel that if it's not passed the NICE test then you can't innovate a new service."*

Clinicians have a justifiably careful approach to the interpretation of evidence. Research by the NHS Confederation, the membership body for NHS organisations, on clinical attitudes to change suggests that medical professionals tend to favour an empirical experimental model. But there is a tendency to view anything short of the randomised controlled trial, the

### Case study 2: Procurement best practice

Nuffield Health is the UK's largest healthcare charity, delivering services from over 200 locations, including 30 hospitals. In 2004, in response to the introduction of the NHS tariff and the emerging NHS market for independent sector provision, it introduced Project Prime to develop centralised procurement and more efficient procurement across the group. Before it began, consultants and clinical staff had had a high degree of autonomy and often decided what products to use in the hospitals. As a result, the group found it was introducing up to 700 new stock items a month, usually from suppliers with no formal contract in place. It had 17,000 suppliers and was paying each of them manually. Nuffield Health estimated that it could save 1% of its procurement budget (£1 million) simply by paying the same price for the same product across its hospitals.

As well as central procurement, Project Prime introduced nominated suppliers and standard products; it automated purchase orders to enable product tracking and the effective costing of procedures. It also introduced a "bill of materials" approach, leading to the development of a single list of basic products per procedure where before there may have been several hundred. Coupled with a much more robust system for introducing new products – ensuring clinical and financial checks are made before authorisation – all this has helped to standardise the products used and rationalise the number of suppliers. For example, for prostheses, its category of highest expenditure, the number of suppliers has been reduced from twenty to just three.

Nuffield Health now either asks nominated suppliers to tender for a set amount of products for the entire group through a reverse auction or, with trusted single suppliers, it arranges long-term relationships. Suppliers can offer products for less under these conditions because they have a secure income stream and less waste from overproduction. By contrast, PASA cannot specify how many products will be required in NHS organisations and the collaborative procurement hubs cannot enter into contracts with suppliers because they are not legal entities. As a result, despite its far superior purchasing power, the NHS has to pay higher prices than Nuffield Health, which has saved over 10% of its procurement budget over three years under the new system (£31 million) and have averaged 23% savings on each area of focus. If similar savings were derived from the £21 billion annual procurement spend in the NHS, this would save £2.1 billion per year.

gold standard of evidence, as lacking any credibility. Many have pointed out that this is frequently inappropriate because some innovations, especially those involving modification in the use of a service or technology, are not amenable to this approach and so the evidence base for such changes is usually less clear cut.

The quality and rigour of NICE health technology assessments (HTAs) and clinical practice guidelines (CPGs) are widely praised, but recommendations from the National Institute for Health and Clinical Excellence are not always quickly and uniformly adopted. In part, interviewees felt that this is because the evidence requirements for medical consensus are often too stringent. And even where there is a strong evidence base, clinicians often lack the time and incentive to find it and analyse it.

The sheer quantity of evidence and the finite resources of the health service require it to be efficiently collected, assessed and disseminated. Currently, there are too many sources of evidence, often making it hard to access and understand.

Dissemination is often a passive process and there needs to be a systematic method for promoting evidence-based innovations or best practice through the

system. NICE guidance is supposed to fulfill this role, although it does not have the resources to assess all the new technologies coming on to the market. Commissioners are required to disseminate its new guidelines to their providers. Compliance with the guidance is one of the Healthcare Commission's core standards for regulation. However, as one interviewee said:

*"NICE is often quoted where it bans the use (of an innovation), or it doesn't approve it. What never gets examined is where NICE has suggested an appropriate protocol and it's not being followed in 80% of the Trusts and it's where there is permission but it doesn't happen anyway."*

### Case study 3: Oesophageal doppler monitoring

Severe loss of blood and fluids (hypovolaemia) during surgery is known to increase the length of stay and the chance of post-operative complications. Oesophageal doppler monitoring (ODM) allows a surgical team to monitor, and optimise, blood flow during surgery using ultrasound.

Since 1995, no fewer than seven peer reviewed clinical studies have demonstrated that ODM can reduce recovery times by three days and improve outcomes, and the technology has been recommended by the Centre for Evidence-based Purchasing in the Department of Health. In January 2006, NICE declared that ODM was already standard practice and would not be reviewed, yet despite the fact that this technology has been available for more than ten years and has a clear evidence base, it is used in less than 5% of major operations in the NHS.[50]

The first NHS trust to use ODM widely during surgery, the Medway Maritime NHS Trust in Kent, reported savings of over £1 million a year. The leading manufacturer of the monitor estimates that if the length of stay were reduced by just two days, the NHS could save £400 million per annum.

The NHS national technology adoption hub, based in Manchester, was launched in September 2007 to increase the uptake of new technology. It is attempting to introduce ODM in three hospitals and will use the experience gained to convince other providers of its clinical and financial benefits.

50 "Geographical variation in recovery times", The Clinical Services Journal, April 2008

# 4

# Making change happen

## Lord Darzi's review

"It is relatively easy to set out a vision, much harder to make it a reality."[51] Although we welcome Lord Darzi's review of NHS performance, the final part of which was published in June 2008, the senior health professionals we interviewed felt that it does little to simplify the complex structure of the NHS in promoting innovation. More central bodies have been added, but little attention paid to which can be removed. Since the exact role of the organisations that shape "the NHS quality landscape" is not specified, there may be gaps or overlaps. And with so many different initiatives being rolled out at once, there is a danger of confusion over the lines of responsibility of central bodies.

The Darzi review neglects the shortcomings of hospital procurement systems. Hospital trusts do not understand their cost base and are therefore not sufficiently responsive to pricing pressures or able to identify efficiency measures. The data does not exist for collaborative procurement hubs to make firm commitments to order, preventing them from negotiating the best prices, and they cannot enter into contracts on behalf of trusts because they are not legal entities. Rationalising NHS procurement systems could potentially save billions.

The review proposes further devolution to local level by reducing central diktat, especially blunt process-based targets, and more freedom for local purchasers to set local priorities. Supply-side freedom will also grow by expanding foundation trusts and greater use of the independent sector; patient choice will be extended. However targets have not been abolished – there will be closer monitoring of performance via published information and robust minimum standards to counterbalance reduced central direction. The quality of healthcare is to be raised through a combination of organisational reforms, ensuring information on relative performance is readily available, and the more effective use of incentives. Innovation is seen as a fundamental to quality improvement and the review proposes a number of measures to stimulate it.

Much of the responsibility for realising the proposals will fall upon strategic health authorities and trust managers, especially primary care trusts. The nine SHAs making up the NHS in England were each instructed to develop plans for implementing best practice in their area. These were published in May and June 2008 and provide much of the detail about changes that will be implemented as part of the Darzi strategy.[52] Each SHA has also produced a report outlining how it proposes to implement the recommendations of the Darzi review in light of its own circumstances. All the reports except one discuss how to stimulate innovation in varying levels of detail.

By spring 2009, after further consultation on the support they need, each PCT will be expected to publish a five-year

51 Darzi A, "High Quality Care For All: NHS Next Stage Review Final Report", Department of Health, p15, 2008

52 Available at www.ournhs.nhs.uk

strategic plan for introducing evidence-based pathways. Additional funds and support for local initiatives will be provided centrally.

The problems we have identified are discussed under the following headings:

- Organisational capacity for innovation and adoption
- Communication and networking
- Incentives
- Leadership and culture
- Commissioning
- Use of evidence

## Organisational capacity for innovation and adoption

***Foundation Trusts***

It is with the extension and refinement of the foundation trust model that most hopes lie. As the review puts it: "The freedom of NHS Foundation Trusts to innovate and invest in improved care for patients is valuable and essential."[53]

The Darzi review has made it clear that all acute, mental health and ambulance trusts will attain foundation trust status but no date has been agreed about when this will happen. These freedoms will eventually be rolled out to all NHS providers, making the NHS a commissioning organisation that purchases care from individual providers, who will be responsible for their own good governance and for meeting NHS standards. The vision is one of well-managed, autonomous hospital trusts that are able to respond to incentives and compete against other service providers.

It is inherently better that the day-to-day management of the health service is in the hands of people who are aware of local circumstances and priorities, who are close to their patients and who have the authority to deliver improvement on their own initiative. It is too early to judge how effective foundation trusts will be in stimulating innovation and improvement because they are still developing the systems that will allow them to operate as independent businesses. Foundation trusts are already performing better than normal hospital trusts according to the Healthcare Commission, the outgoing NHS watchdog, most notably in relation to the use of resources.[54] However, it is not clear how far foundation trusts will be allowed to develop their business models, and some of our interviewees felt there was insufficient flexibility in the interpretation of their governance requirements. The recent moves by the Treasury to claw back foundation trust budget surpluses suggests that their freedom of action may be limited.

***Integrated care organisations***

The Darzi report also proposes piloting organisations that bring together health and social care professionals from community services, hospitals, local authorities and others, depending on local needs. This is intended to break down divisions between health and social care provision, and between primary and secondary care organisations in England, divisions that could be made more pronounced by greater autonomy and competition.

Drawing on international models that suggest that organisations bringing together healthcare providers, industry and educational institutions improve the capacity to innovate and adopt best practice, the Darzi Review lends its weight to the development of new organisational models, with matched funding, that would share strategic goals, pool resources, run joint innovation programmes and use their expertise to strengthen clinical practice. NHS hospital brands currently have little resonance overseas; the aim is to foster world leading organisations within the UK, to drive innovation development and early adoption.

***Academic Health Science Centres***

The trend for teaching hospitals to use their new freedoms to form closer partner-

53 Darzi A, "High Quality Care For All: NHS Next Stage Review Final Report", p61, 2008

54 "The Annual Health Check 2006/07: A national overview of the performance of NHS Trusts in England, Healthcare Commission, 2007

ships with affiliated universities is recognised in the Darzi review.[55] This is based on the university hospital networks or academic health science centres (AHSCs) that have evolved in North America. The hope is that integration of research organisations and hospitals, through a combined management structure and of clinical and professional teams according to their area of expertise, will strengthen the capacity for clinical research and create a foundation for translating academic research into clinical practice.

The AHSC model will potentially lead to increased product development, while the combination of research and clinical provision should make academic health science centres an attractive partner for businesses looking for expertise and early market entry. Their research infrastructure, access to a broader skill base, increased resources and the opportunity to conduct trials and apply research could also be used to improve the organisations ability to adopt innovations from elsewhere. Patients should benefit from access to world-class specialist centres and AHSCs should act as a beacon to other NHS providers, demonstrating the utility of new technologies and practices and sharing their experience.

Although flagship hospitals have failed in the past because they were viewed as special cases, developing world-leading organisations to drive specialist innovation in the UK is a worthy ambition. The idea is that their example of early adoption could develop the evidence base and momentum for wider uptake. However, we are concerned that the DH has hijacked the AHSC model. It has set up a committee to designate AHSC status and ensure that only "world-class" centres should gain this standing. But successful academic health science centres in North American were not created by central diktat, as we will see. The DH displays a continuing desire to micromanage the NHS environment. There is also talk of imposing a legal duty on strategic health authorities to innovate, which may mean only that central government seeks to control the agenda of these organisations. As one interviewee put it:

> *"Innovation requires freedom to take risks. It is counterintuitive to believe it can be mandated or that organisations without independent governance and independence of action can embrace an innovation agenda."*

## Communication and networking

It is important to understand the influence of local networks and whether more extensive and inclusive networking could influence the utilisation of the latest medical knowledge. Strategic health authorities have a role to play in co-ordinating these relationships, as do organisational and clinical leaders, while the royal colleges have a strong influence on professional networks and need to co-ordinate efforts to disseminate knowledge and develop professional training.

So far, efforts to use networks have had mixed success, with most emphasis being placed on formal networks and professional peer groups. North West SHA plans three multi-professional clinical networks focusing on urgent care. These will be responsible for supporting the implementation of change programmes, auditing their effectiveness and "horizon scanning for innovation".[56]

Most of the recommendations in the Darzi report are about building local collaborative networks for developing and translating research into practice. There are a number of initiatives already underway. The NHS Institute for Innovation and Improvement is attempting to engender a "culture of innovation" by helping "the NHS to spread and sustain the effective concepts and processes". Its plans involve five networks, including the SHA link directors and NHS Live programmes, which are at various stages of development.[57]

Health innovation and education clusters (HIECs) – recommended in the Darzi

55 The first AHSC in England was announced by Imperial College London in October, 2007, embracing five hospitals in west London. Since the first step there has been a flurry of activity with other major Universities merging management with Foundation Trust teaching hospitals, including Kings College London, Manchester University, Warwick University and Oxford University. Pre-existing plans will now be reviewed by the DH, which wishes to impose central criteria for AHSC status.

56 Darzi A, "High Quality Care For All: NHS Next Stage Review Final Report", Department of Health, p.39, 2008

57 There are also a number of Contact, Help, Advice and Information Networks (CHAIN). The first two, focusing upon Evidence-Based Practice and Work-Based Learning have in excess of 4000 members. CHAIN 3 has over 900 members, who can choose to enrol in one of the sub groups, which cover No Delays, HCAI, Long Term Conditions, Improvement Educators, Lean Thinking, HR & OD. They disseminate so-called 'Improvement Stories', covering areas such as 18 weeks, screening programmes and community mental health projects.

review – are based on the principle that participation in networks improves the capacity of organisations to innovate and adopt best practice. The clusters will bring together partners from primary, community and secondary care, universities and colleges, and health service industries. The make-up of the clusters will not be centrally determined. Applications for assigned status and matched funding for local initiatives will begin this year. Much is made in the SHA reports of the need for local networks linking universities, industry and NHS. For example, North East SHA aims to strengthen ways that local health services, industry, the academic sector and other partners work together to maximise individual strengths. West Midlands SHA wishes to establish three formal collaborations between local NHS commissioning organisations to deliver and fast-track teaching, research and cutting-edge health services. South West SHA intends to develop a compact with local education providers, to form centres of excellence which will promote change.

## Incentives

*"We don't actually reward anybody in the NHS for making people better, we just reward them for seeing them and treating them."*

The 2002 White Paper, *Delivering the NHS Plan*, introduced a system of payment by results in which providers of NHS services are paid according to a centrally set tariff.[58] The intention was that providers compete for commissioning contracts and patients by offering superior quality as opposed to lower prices. It also encourages providers to reduce costs in order to maximise profits against the tariff or minimise deficits, freeing up capital for service development. Payment by results began with the announcement of a preliminary tariff based on average NHS costs for a group of 50 common procedures or health resource groups (HRGs) from the previous year. Because some NHS trusts had costs per HRG significantly higher than the average, full roll-out was staggered and has only recently been completed.[59]

Though better than the previous system, the tariff has not provided incentives for improvements in practice. This is because neither the Government nor the NHS trusts know what individual procedures really cost. The HRGs are the units of financial data available and from them the Government knows that there is significant variation in costs. The explanation is that hospitals do not have the costing systems in place to know what they spend on each procedure, leading to unidentified inefficiencies and a lack of managerial leverage. The inefficient operators also drag up the average costs, reducing pricing pressures. The Department of Health has begun to refine the tariffs, but it is limited by the data available.

In theory the tariff should promote cost reduction. However, the NHS Institute for Innovation and Improvement has looked at nine common conditions, and found a great deal of variation in the cost of treatment, reflecting variations in clinical practice. They sent clinically led teams with analysts, general managers and improvement specialists to the best and worst performers, in order to understand how they differ from one another. This research was used to design care pathways that reflect efficient, high-quality performance. Instead of basing the tariff retrospectively on an average of the variable cost data, the institute is looking into the possibility of publishing a prospective normative tariff, based on a reproducible, fully-costed pathway gleaned from the best performers. It would require national dissemination of the processes and costs, with central support and time allowed for implementation. It should also allow for regional variation in costs and a bonus to reward successful redesign. Organisations would then have a strong incentive to implement best prac-

58 NHS, "Delivering the NHS Plan: Next steps on investment, next steps on reform", The Stationary Office, Norwich, 2002

59 Department of Health, "Reforming NHS Financial Flows Introducing payment by results", HMSO, London, 2002

tice in time for the change in payment.

Making innovation a performance metric for trusts, rewarding leadership in innovation or improving the flexibility of payment by results raises some challenging questions: what would an innovation performance metric look like, can you target professionals on the ground who would actually develop an innovation rather than managers in the boardroom, and can you put in place incentives for sustainable uptake, rather than simply development or initial adoption?

The wider issue is over the extent to which commissioners will have an incentive to encourage innovation per se. To what extent should a PCT commission purely to meet local needs, or should it also take account of the greater good. Of course, dangerous risk-taking should not be allowed or encouraged, but neither do we want to stifle innovation through excessive central control or overly conservative behaviour.

The Darzi review proposes several changes to the payment and reimbursement system:

- The first deals with the tariff, widely seen as an inadequate incentive because it is based arbitrarily on the average cost of current practice. A new model is proposed from 2010-11 reflecting the cost of best practice. The Commissioning for Quality and Innovation Scheme will enable PCTs to encourage the adoption of best practice by overlaying the tariff payments with bonus payments in commissioning contracts. This should allow commissioners to more adequately address local priorities. Commissioners will be required to collect and monitor provider data to determine who is achieving the best outcomes in priority areas. They can then research the processes that are yielding these outcomes, how these differ from practice in poor performers, and use this knowledge to set process measures that indicate the required standard of care. The objective will be to clearly disseminate the best practices and to reward providers with bonus payments above the tariff price for implementing improvements.
- GP practices that provide more responsive services and attract more patients will be subject to a fairer reward scheme under the Darzi proposals. At present, most practices receive historic income guarantees that bear no relation to the size or needs of the patient population that they serve. Protected income payments will now be phased out and resources channelled into providing fair payments reflecting the needs of the local population.
- Finally, the review aims to introduce funds and prizes to support and reward innovation. Regional innovation funds will be held by SHAs and a national independent expert panel will assess local applications and make awards. Three of the individual SHA reports took up this idea.[60]

## Leadership

The Darzi review acknowledges that: "Leadership has been the neglected element of the reforms of recent years. That must now change."[61] Clinicians should play a greater role in governance. It argues that the corollary of holding clinicians accountable for outcomes is increased powers over the services they provide. The review proposes that they – along with nurse managers and clinical directors – are given greater control and responsibility to determine the direction of the services they deliver and to make resource decisions (including HR) within their departments. The vision for improving quality for patients, the management methods for delivering change, improving organisational governance and the communication of goals and realities

60 North East SHA, East of England SHA, South West SHA. East of England SHA (p4, 48, 105-106) plans to create an innovation fund to support new approaches to staying healthy, focusing initially on new approaches to tackling childhood obesity. This will include work in partnership with Health Enterprise East to offer prizes for innovation. South West SHA (p119) proposes to establish a financial regime designed to ensure an operating surplus for innovation and investment.

61 Darzi A, "High Quality Care For All: NHS Next Stage Review Final Report", Department of Health, p66, 2008

with staff will be left to management at board level.[62]

By creating a meritocratic hierarchy of clinical and non-clinical leadership positions, it is hoped that more clinicians may branch off into management, which is commonplace in many other healthcare systems but relatively rare in the NHS. Experienced clinicians with proper management training are in a strong position to understand the strategic priorities of the health service. Senior clinicians need to be given autonomy with accountability if they are to be fully involved carrying out reform.

The plan is to invest in new programmes of clinical and board leadership and the review identifies a number of specific measures for improving leadership. Some clinical awards schemes will become more conditional on activity and quality indicators. There will also be greater scrutiny of managers.

The authors of *All Change Please* have argued that cultural change among healthcare providers requires both a change in culture at the top and a shake-up of the conservative views of managers and the medical profession. This is a necessary, although not on its own sufficient condition for shifting the endemic aversion to taking risks and the frequently strategy-free business environment. There are examples of central support for improving management. The NHS Institute for Innovation and Improvement has recently working with chief executives from ten trusts to create a transformational vision for their organisation focusing on key priorities. After nine months, the organisations formed a network to share their different strengths, using tools, techniques and metrics developed with the institute. The results were substantial, with improvements in mortality, patient experience and the adoption of clinically appropriate new methods. The combination of vision, engagement and transfer of best practice led to this improvement. And the organisations were happy to pool knowledge even though in some cases they were in direct competition.

## Commissioning

> *"It is only the commissioner who has the best interest of the patients in mind (and) who should be able to specify, I want this next drug or device…and Mr. Provider, you provide me with that (in) the competitive market. But, it's also about how the providers can feed the commissioners, because the big ideas are not going to come from the commissioners, but they can drive it."*

World class commissioning is a key weapon in the Darzi armoury. This means challenging providers to use the best diagnostics, the latest medical devices and the best available drugs and to drop outdated practices. The drive to introduce practice based commissioning will also continue, with support in the form of improved information, managerial and financial support. Much innovation in healthcare is supply-side driven – new technologies are developed and brought to the market. Darzi seeks to redress the balance and increase the part played by demand-driven innovation.

Although the tariff sets prices, this does not negate the importance of a contractual relationship between commissioners and providers specifying the range of services to be made available, referral or treatment protocols and performance criteria. Contracts can, of course, contain incentives and penalties and they provide an opportunity to specify evidence-based practices and an efficient care pathway across different organisations.

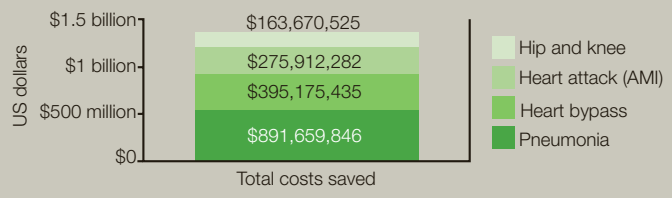
The Darzi review recognises that PCTs are potentially able to use their investment choices to influence service design, increase choice and drive continuing improvement. A concern is that PCTs may be too small

62 Darzi A, "NHS Next Stage Review: Leading Local Change", Department of Health, 2008

### Case study 4: Premier, Inc

A pilot project run on the US Medicare and Medicaid programmes by Premier, Inc, an alliance of not-for-profit hospitals and health systems organisations, provides an example of effective commissioning. Five clinical conditions (Hip and knee replacements, heart attack, heart bypass and Pneumonia) were chosen, each with about 20 quality measures, in a sample of 260 American hospitals. In year one, Premier, Inc's role as commissioner was to determine clinical priorities and evaluate the existing data to determine best practice. The best performers in terms of outcomes were investigated to determine best practice processes in each of the clinical measures. It then negotiated a set of process measures and each hospital agreed to collect data on these measures. For three procedures (hip and knee replacement, heart attack and heart bypass) this pilot scheme saved 5,500 lives.

#### Figure 7: Potential cost savings




Hospitals were given market updates, as well as support for improving their services, in return for providing the necessary data and committing to the quality improvement agenda. In year two, there was mandatory data reporting and the data was fed into a national database, which government regulators sampled and validated, to avoid gaming. The hospitals each set up an oversight group of senior executives to build and execute a hospital plan for the roll out of process improvements, and they acted as a point of contact between commissioner and provider. Premier, Inc provided administrative and financial advice to the hospital-based teams. It also linked up the best performers with groups of other hospitals, achievers were happy to do so even in a competitive market place. In the third year an attainment level was set and the top 5% of the hospitals received a 2% bonus payment above the standard tariff price. Those in the sixth to tenth percentile got a 1% bonus. If by the end of the year performance had not been raised to a set threshold then the 1% bonus would be withheld.

All the hospitals improved their conformity with the performance measures for all of the conditions every quarter. The preliminary results in the fourth year suggest that 91% of the 260 hospitals will achieve the levels of the top fifth of performers before the scheme began, removing virtually all of the earlier variation in performance. This approach is now being piloted in North West England SHA from October 2008, although it has decided not to withhold payment for fear of destabilising services.

Using discharge data, the impact of improving care was determined based on a pay-for-performance model. The improvement opportunity is the potential savings, in lives and money, if reliable patient care could be delivered across the board. The cost, mortalities, and outcomes for patients in 2003 were calculated, assuming the population received care at the same level of quality shown in the study (ie the same percentage of the population fell into the low, medium and high-quality care categories).

to procure efficient and innovative care pathways, and ensure that providers adhere to the commissioning requirements. And although steps are being taken to ensure transparency in the assessment of how local practice compares with best practice, the sensitivity to accusations of a postcode lottery in NHS provision means that concerns remain over the quality of the data and how transparent it will be.

Imaginative, proactive commissioning requires changing the culture of risk in pur-

chasing. Mechanisms for sharing the risks and rewards of innovation play a significant role in stimulating innovation in other industries. Longer planning and budgetary cycles and increasing provider autonomy through foundation trusts will help. But it is by no means clear that risk and reward sharing is understood within the NHS and social care organisations, or by suppliers of new technologies. This will need a move towards value chain costing, an emphasis on objective criteria such as health gain and value for money to support decision making. Questions also remain over the ability of commissioners – and suppliers of innovative services and products – to understand value chain costing.[63]

## Use of evidence

The Darzi review acknowledges that more could be done to make evidence accessible and to spread knowledge throughout the system. It remains essential that there is full recognition of the problems of developing evidence in cases where innovations are complex and there is flexibility over what is interpreted as 'acceptable' evidence in these cases. We also agree with the Healthcare Industry Task Force that there should be more effort in co-ordinating trials to avoid unnecessary duplication, perhaps by strategic health authorities.

The NHS benefits from central evidence collection, assessment and dissemination. The National Institute for Health and Clinical Excellence was created in 1999 to identify, collect and assess innovations, establish best practice and provide authoritative guidance for NHS providers and commissioners. However, NICE has limited resources and cannot assess every new technology or provide evidence-based, up-to-date clinical practice guidance across every discipline. In fact, NICE only assesses about 5% of innovations. And where there is an absence of NICE guidance, there is no impetus to improve at a local level.

Initially, there was no implementation strategy for NICE guidance, but it quickly became apparent that interventions to raise awareness, motivate people, develop practical support and monitor uptake of their recommendations was necessary. The Department of Health's health technology assessment and clinical practice guidelines have helped to establish and disseminate the benefits of new technologies and procedures. National Service Frameworks, which outline clearly defined standards of care for specific conditions, are another important mechanism for communicating best practice.

The authors welcome this emphasis on supporting NICE's role as an innovation gatekeeper – providing the best quality guidance on the evidence for innovation. Horizon scanning and decision-making processes for new drugs and treatments coming on to the market are to be strengthened through partnership with industry. A faster appraisal process for new drugs will be introduced, allowing NICE to issue its guidance within a few months of a drug's UK launch. For medical devices, which are often not assessed by NICE and whose uptake is not mandatory, the review proposes that new clinical technologies should be subject to a single evaluation pathway and their uptake will be benchmarked and monitored.

## Information in the system

The review believes that those involved in both providing and consuming healthcare need sufficient information to make informed decisions if improvements in quality are to be achieved. Patients must be able to choose between care providers on the quality of care they deliver.

This involves benchmarking the performance of NHS providers and using "disruptive information", such as league tables, to stimulate change. More effective clinical audit and collection of comparative data informs commissioners where the problems are and where to find best practice. It challenges underperforming clinicians to learn better methods and shines the spotlight on the best performers. Patients who have clear, up-to-date information on best

63 Value-chain costing is defined in Barron's Accounting Dictionary as "an activity-based cost model that contains all of the activities in the value-chain (design, procure, produce, market, distribute/render and post-service a product or service) of one organisation

practice for their condition and on where different services are available can begin to make informed choices – providing another pressure to improve the quality of care. The proposed NHS Constitution guarantees patients access to information on quality and choice of NHS provider.[64] All registered NHS healthcare providers will be required to publish "quality accounts" on the NHS Choices website. These will report safety, patient experience and outcomes. The Care Quality Commission will provide independent validation of provider and commissioner performance and will publish its assessment of comparative performance. New indicators of clinical effectiveness are being produced as part of the quality and outcomes framework. In the spirit of local devolution, PCTs will be able to select quality indicators that reflect local priorities for monitoring.

***Standards, metrics and targets***

In the past, governments have relied on targets to bring about change in accordance with their political priorities – with some success. However, this conveys the message that these priorities are the sole criteria for success or failure, creating pressures that undermine a long-term strategy for organisational development. Setting a target that is appropriate to patients' needs, easy to communicate, challenging but not impossible to deliver, and that has only the desired consequences is difficult. Sometimes the need to convey a simple political message has overridden the need for a more sophisticated approach on the ground. It is often argued that there are too many inappropriate targets and that one target can work against another. Some targets have had to be revised because what was clear and simple turns out to be unsuitable for the complexity of clinical service delivery. Nor do they provide a mechanism that positively reinforces innovation.

Although there remains a role for certain targets, the Darzi review places more emphasis on using transparent quality standards to achieve improvements in services. As the review puts it: "Greater clarity on standards, and where to go to find them, will support the commissioning and uptake of the most clinically and cost-effective diagnostics, treatments and procedures."[65] A series of organisational reforms are proposed to help achieve this objective:

- A National Quality Board (NQB) will provide ministers with a strategic overview of clinical priorities for quality improvement, to help improve the metrics for measuring quality and report annually to parliament on performance compared to other countries. The board will work with NICE to establish more independent quality standards, and address current gaps in the system.
- A new Care Quality Commission will be established, (replacing the Healthcare Commission and the Commission for Social Care Inspection), to monitor compliance with the standards and help providers to identify areas in need of improvement. "Quality observatories" will be established in each strategic health authority to monitor and lead local improvement efforts, enable local benchmarking, develop metrics and identify opportunities for frontline staff to innovate and improve. A new position of clinical lead will be created in SHAs to provide clinical leadership on quality.

## Conclusions

Successful implementation of some of the good ideas contained within the Darzi review will depend on whether the DH lives up to its side of the bargain, providing support and allowing reasonable risk-taking. The rest will depend on strong leadership at a local level, and the time to develop new ways of working without undue political interference or major changes in direction. But one problem not addressed in Darzi is that too much investment is made in creating new ideas, rather than putting them into practice. This issue is discussed in Chapter 5.

64 Patients with long-term conditions will also be empowered through a system of personal healthcare budgets and an agreed personal care plan.

65 Darzi A, "High Quality Care For All: NHS Next Stage Review Final Report", Department of Health, p49, 2008

# 5

# Spending on diffusion and support

Britain spends more than £8 billion annually on creating, piloting, appraising and diffusing new healthcare ideas, including public sector spending of approximately £2.7 billion.[66] Our research suggests that only 6% (£153 million) of this is spent on spreading innovations either through dissemination activities or implementation support. Although there is debate about the appropriate allocation of spending in these categories, it is striking that 16 times more is spent on the creation of innovations (about £2.4 billion.) Also, despite the growing influence of NICE guidance, the Government contributes relatively little to either dissemination or implementation. Funding for adoption of new methods will increase by about £70 million, but there are no plans to reassess funding levels for guidance. This is perverse because early adoption is a local phenomenon and will not in itself lead to widespread change or sustainable change in the target organisation – especially if technologies or processes are piloted with short-term funding. Generally speaking alternative sources of investment (such as charities and venture capital funds) are heavily weighted towards the creation of innovations, so government backing for the adoption and spread of innovations is paramount.

## Spending on innovation – from creation to spread

The authors reviewed health innovation funding to reach a broad estimate of the total allocation of public money. The figures in this section are derived from a wide range of public sources on the designation of funding – such information that is publicly available is limited. The figures are intended to reflect current annual funding levels, although in some cases estimates are based on previous years and secondary sources.

We estimate that of the approximate total of £8 billion, about £2.7 billion is spent by the central Government on the innovation process. This involves support for creation, adoption, appraisal and the spread of improvements from the private, public and charitable sectors. This is necessarily an estimate – and, of course, how one defines creation, adoption, appraisal and spread will make a difference to the allocation of funds in each category. Every effort was taken to ensure accuracy, but there are inevitable ambiguities in the definition of broad-ranging activities. The figures in this section are intended to illustrate the distribution of public sector funding, in order to assess the priorities and efforts of government at the macro-level. Cumulatively, this data should provide a reasonable reflection of the contribution of central government to health innovation.[67]

Significant support for the private sector is also provided by some £150 R&D million in tax credits for commercial health and life sciences enterprises. These tax credits are vital for the balance sheets of biotech and specialised device and diagnostic companies. However

66 Public funding estimates from Policy Exchange analysis. Industry estimates and charity funding estimates from, Research and Development Directorate, "Best research for Best Health: A new national research strategy", Department of Health, 2006

67 For detailed assumptions used in the generation of figures in this section, see Appendix 2

although they help to develop research capacity for commercial products and services, they are focused at the research and commercial development (refinement) end of the spectrum, providing little input into the NHS or service delivery improvements.

Of the £2.7 billion from the public sector, approximately 88% was spent on creation, 4% on first-time adoption, 2% on appraisal, and 6% on diffusion.[68] This heavy front-end weighting raises questions about whether the Government has got the balance right in ensuring that beneficial innovations are adopted. This does not necessarily mean that it should set up a central organisation to tell everyone how to innovate and what to adopt; more funding could be invested in leadership, for example. As we have seen, the system-wide incorporation of improved products and services throughout the NHS is limited and funding levels do not seem to reflect the disparity between Britain's high performance in creation and low levels of adoption.[69]

***Funding sources***

The funding discussed is predominantly from the central budget, although some matched funding and subscriptions from NHS Trusts have been included. EU funding for research and development has been designated public funds because, although the decision-making power rests elsewhere, its source arguably is the British taxpayer. Tax credits to private companies are also designated public funds because they involve waiving public income.

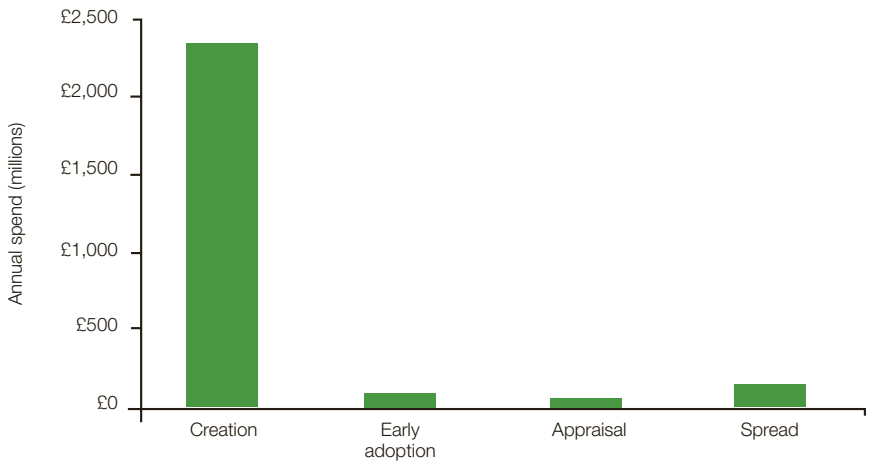
***Creation***

A range of activities from curiosity-driven research to product development is included in this category. The Government's role in supporting the knowledge-based economy and the wealth creation that stems from generation of intellectual property justifies attributing a substantial level of government funding to these activities in the healthcare sector. Britain has strong research universities as well as world-leading biotechnology and pharmaceutical industries. Charities such as the Welcome Trust also contribute significant resources. However, creation is of limited value if it doesn't also generate health benefits for the population; successful development benefits from early access to the domestic market.[71]

***Early adoption***

Early adoption refers to the first application of a new product, technique or process in an NHS setting. It typically involves some government funding to contribute to the

**Figure 8: Total Health Innovation Resource Estimate for England in 2008-09.[70]**




68 Policy Exchange analysis

69 The authors recognise that some relevant funding platforms such as the World Class Commissioning Programme have been omitted. This was due to the broad remit of such programmes and the difficulty of attributing relevant funding levels.

70 Policy Exchange analysis

71 Cooksey D, "A review of UK research funding", HM Treasury, 2006

evidence base, such as a pilot scheme or feasibility study. Generally speaking, government funding in this area is for short-term studies of the utility and application of health service innovations. Pilot studies have an important role in developing the evidence base and may lead to publications that begin to generate an awareness of new developments. However, many of those interviewed for this research claimed that the findings from a very large proportion of pilot projects never see the light of day and anyway replicate pilots elsewhere. Innovators at a local level are being encouraged through funding mechanisms such as prizes. The problem with these activities – apart from instances of wasteful duplication – is that pilots or small- scale local trials cannot promote change throughout the healthcare system.

***Appraisal***

Appraisal is dominated by the NHS National Institute for Health Research (NIHR). Its health technology assessment research and service delivery research are conducted according to the NICE methodology and are used to produce comprehensive guidance. The funding levels involved reflect the fact that the majority of new technologies are not assessed through this mechanism – the majority of pilot projects or trials of new technologies or approaches are never formally appraised.

In the public sector, only around £62 million is targeted at appraisal of health services and their improvements, for example through NICE guideline development. These resources are critical to determining the benefits of innovation and the value created through pilots, individual initiatives and service changes.

The National Institute for Health and Clinical Excellence has 280 full-time staff, an annual budget of £35 million and offices based in London and Manchester. Its work is supported through a series of directly commissioned national collaborating centres and university-based academic units funded through the NIHR, so about 2,000 individuals (excluding stakeholders) are involved in developing guidance at any one time. In 2005, NICE produced 62 clinical guidelines, 142 technology appraisals, 256 interventional procedures, 12 public health interventions and two public health programmes.[72] But this is a drop in the ocean compared to the level that would be necessary for a continuous, systematic approach to appraisal – early NICE guidance already needs updating.

NICE tends to focus on new drugs rather than medical devices, (covered by guidance from the Centre for Evidence-based Purchasing) or evaluation of service delivery innovations. Arguably, NICE should spend more money on appraisal because evidence-based guidance carries weight within the NHS.

***Spread***

Recommendations from the appraisal process should ideally be communicated to decision-makers who will then be responsible for adopting the changes that address regional priorities. Other central efforts designed to improve spread focus on the organisational capacity for innovation, primarily improving leadership and commissioning. We also included support, such as procurement guidance and funding of local communication networks, as spread-related activities.

The NHS allocates approximately £153 million dedicated to system-wide diffusion of improvements through bodies like the NHSI, PASA and NICE's proposed NHS 'evidence portal', which will take over from the NHS library and provide a single, web-based source of evidence.

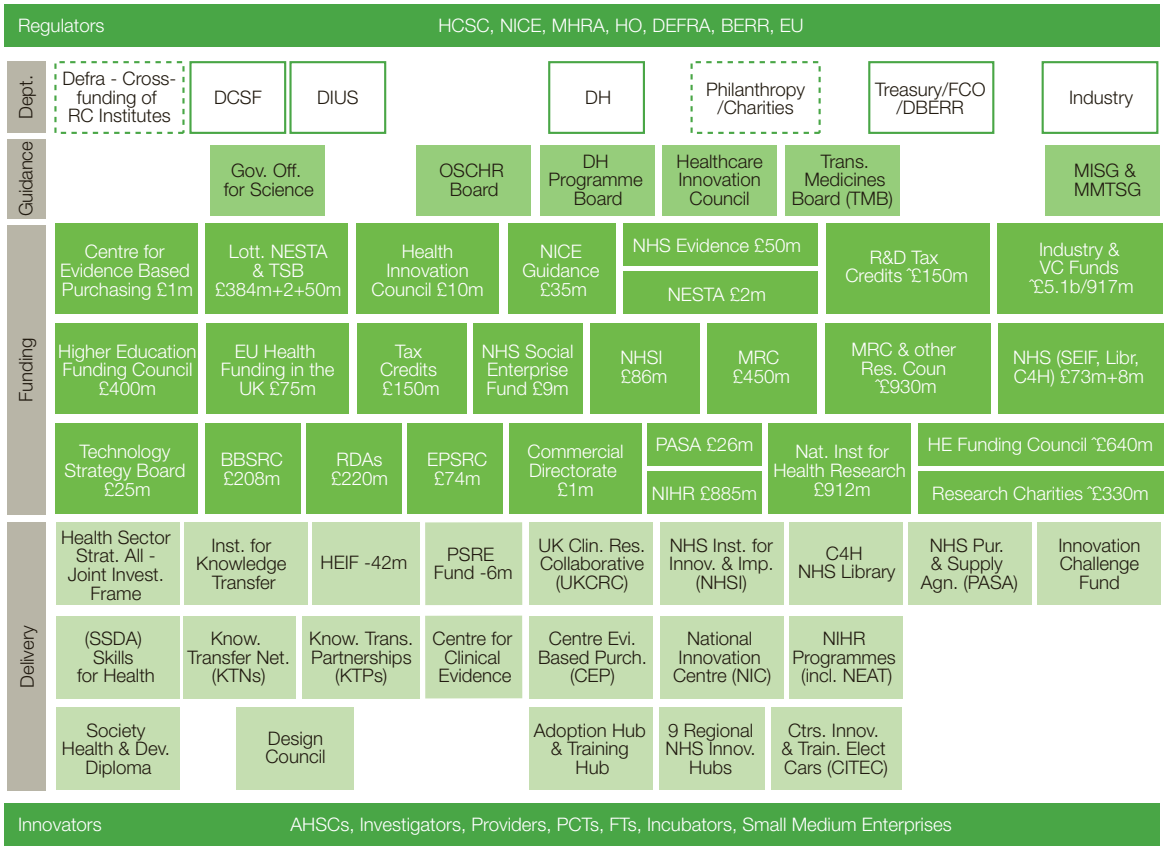
72 NICE, "Submission to the House of Lords Science and Technology Committee", 2005

## Table 2: Estimated spending by organisation per annum. [73]

| Funding source | Funding body | Creation (£m) | Early Adoption (£m) | Appraisal (£m) | Spread & Implementation (£m) |
|---|---|---|---|---|---|
| EU | | £75 | | | |
| HMT | RDAs | £220 | | | |
| | Tax Credits | £150 | | | |
| DTI/DEFRA | Technology Strategy Board | £25 | | | |
| DIUS | NESTA | £2 | | | |
| | Higher Education Funding Council | £400 | | | |
| | BBSRC | £208 | | | |
| | EPSRC | £74 | | | |
| | MRC | £450 | | | |
| DH | NIHR | £763 | | | |
| | Challenge Fund for Innovation | | £7 | | |
| | Research and Patient Benefit Project Grants | | £25 | | |
| | Programme Grants for Applied Research | | £6 | | |
| | Health Technology Assessment Programme + Horizon Scanning | | | £17 | |
| | Service Delivery & Organisation Programme | | | £10 | |
| | Infrastructure and Technology | | £25 | | |
| | Research Networks | | £32 | | |
| | NICE Guidance | | | £35 | |
| | NHS Evidence | | | | £50 |
| | PASA | | | | £26 |
| | Centre for Evidence-Based Purchasing | | | £1 | |
| | Commercial Directorate | | | | £1 |
| DH & Wellcome Trust | Health Innovation Council | £10 | | | |
| NHS | NHS Social Enterprise Investment Fund | | £9 | | |
| NHSI | Design and Production of Solutions for the NHS eg commissioner/ management tools | | | | £41 |
| | Dissemination to Support Adoption and Spread | | | | £7 |
| | NIC and Innovation hubs | | £10 | | |
| | Management Training Schemes | | | | £21 |
| | Infrastructure | | | | £7 |
| **Total spend** | | **£2,377** | **£113** | **£62** | **£153** |

73 Policy Exchange analysis

## Figure 9: 2008-09 Spending by Organisation[74]

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# 6

# Lessons from North America

This section discusses two hospital case studies that provide lessons for the governance arrangements of academic health science centres, the development of closer ties with academia and industry at the provider level and ways to benefit from the commercialisation of research. The research team visited the Academic Hospital Network and Sunnybrook Health Science Centre in Toronto, Canada and the Cleveland Clinic and University of Pittsburgh Medical Centre in America. The defining features of both are the close affiliation of leading hospitals and universities and the freedom they are given to exploit their strengths. They compete for status, market share, the best staff and alternative funding streams such as philanthropic endowments, venture capital and commercial funding for innovations.

## Healthcare and Innovation in Ontario

> *"A lot of ideas come from the bottom up or from closer to the point of service and get driven by leaders who have influence."*

> *"It's becoming more collaborative all the time, where organisations realise that an investment in collaboration is going to result in individual improvement as well, so it's in the best interest of the system, and it's in the best interest of the individual institutions."*

Ontario has a publicly funded healthcare system providing its citizens with universal access to high quality healthcare, free at the point of use. There is a purchaser-provider split: local health integration networks (LHINs) act as commissioners on behalf of the state government, purchasing services from autonomous providers. It has a decentralisation reform programme that mirrors our own; objectives include reducing waiting times, improving service quality and increasing care in the community.

Toronto has strong autonomous hospital providers, which are closely integrated with academia and industry and have suffered relatively little policy interference. Its experience offers lessons for the development of our business-oriented foundation trusts as well as the new academic health science centres. The research team saw close parallels between the knowledge economy and provider-base of Toronto and the emerging situation in London, where Imperial College and King's College are establishing AHSCs.

Because they are operating at full capacity, hospitals in Toronto tend not to compete for patients. Nor do they compete for publicly funded research grants because these are very limited. However, leading hospitals do compete for large philanthropic donations on the basis of their brand, reputation for innovation and high-quality provision. They also compete for the best staff, many of whom are attracted by the larger salaries of private healthcare in the US. The limitations of capacity and the drive for excellence has led to different

hospitals specialising in different services – except in the case of cardiac surgery, which is a popular source of donations.

However, the problems in Toronto are very different from those in England. The Ministry of Health is concerned that hospital CEOs have trouble saying no to innovations. This is perhaps because there is no body performing the role of NICE, determining which innovations represent value for money and because such a high premium is placed on innovation. The LHINs are supposed to co-ordinate providers in the best interests of the local health economy but there is also a lack of collaboration, such as in sharing information and best practice, and particularly in co-ordinating procurement and support services. This underlines the importance of the commissioning bodies in our emerging system and suggests that organisational freedom must be subject to checks and balances, particularly in the areas of support services and information policy.

***Sunnybrook Medical Centre***

> *"We believe…that you can make the biggest difference if you actually focus your efforts down, and in an academic health science centre have a very clear match between your clinical expertise and your research strengths."*

Sunnybrook's strategic plan is based around four priority areas (trauma, certain cancers, heart failure and stroke care, and high-risk maternal and neonatal care). Its strategic thinking takes a "whole industry" approach to healthcare provision, seeking the business potential of its research excellence and exploiting practical opportunities to deploy innovations. It claims to be the most successful healthcare organisation in Toronto at commercialising its research in terms of patents, disclosures and spin-offs.

Clinician-scientists are a major part of Sunnybrook's strategy for integrating research activity and clinical practice. Researchers and clinicians interact regularly – sharing resources, knowledge and engaging in collaborative activities. Product development is assisted by Sunnybrook's technology transfer office, which has established a link with its counterparts at the University of Toronto and therefore has a wide range of experts who can spot the commercial potential of specialised research. As one interviewee put it:

> *"Most of the time the scientists don't even know what they've got, they don't even know that they've got a commercial idea, that's what I call the hidden nuggets, and it's like being in a goldmine, you've got to uncover these nuggets."*

Funding comes from a number of sources, including income from a big pharmaceutical company, Sanofi-Aventis, which has established its world HQ for cancer vaccines at Sunnybrook. Sanofi-Aventis pays C$500,000 in rent per annum, and has enabled the medical centre to get a C$12 million grant to upgrade its research facilities. A further $600,000 in research funds is available, which is used at the centre's discretion to support research with commercial promise, plus C$500,000 in royalty streams from successful product development. This income has a huge impact on the sustainability and growth of the centre. The Sunnybrook Working Ventures Medical Breakthrough Fund is a venture capital fund set up to attract investors for promising research and was one of the first of its kind in Canada. It has been followed by two further VC funds. These attract private investment, so that the best ideas receive the backing they need to develop into beneficial products.

As well as nurturing and developing new ideas, Sunnybrook draws on research conducted elsewhere to adapt its own practices. Interviewees suggested that this is facilitated by open lines of communica-

tion with other local AHSCs. It is widely accepted that AHSCs have a role in disseminating the products of their research, as well as implementing them themselves. In part this is motivated by a desire to preserve and enhance the reputation of the organisation. This is not to suggest that improvements are always taken up, especially in smaller community hospitals and other organisations which have very different innovation environments, the view is that it is easier to embed innovations in an AHSC.

The culture in Sunnybrook is characterised by the desire to create the future of healthcare. There is pride in the collective achievement and history of the organisation, as well as a clear sense of direction and of what is expected of staff. The view of one interviewee was that it is not necessary to drive staff to innovate – they are attracted to Sunnybrook because they want to lead the field and see it as a place where they can realise their ambitions.

***University Health Network***

The University Health Network (UHN) in Toronto is a C$1.2 billion organisation made up of three hospitals. It provides general community services and highly specialist care, and caters for the most complex mix of patients in Canada, making it the leading institution in Canada by that measure. UHN has long been a leader in clinical innovation – it was the first centre in the world to administer insulin, it was an early adopter of bone marrow transplantation and it has led pioneering research into stem cell treatment for cancer.

It has five multi-specialty programmes: organ transplantation, cancer, heart disease, neuroscience and muscular-skeletal arthritis. Programme managers enjoy a high degree of autonomy and decision-making. An executive director or a clinical vice-president is placed in control of C$150-170 million budget and is given responsibility for managing that field, along with the programme medical director, who is usually an international authority in the area with expertise in both research and clinical care. The programme medical director's responsibility is to develop the strategy for the programme, including the amount of clinical care offered and the associated research and the education.

UHN has three research councils: trauma (focused on cardiac transplant immunology), cancer (focused on oncology) and neuroscience. There is a common governance framework. This structure is overseen by a public board, which governs according to a balanced scorecard approach.[75] UHN easily meets most Ministry of Health performance targets and chooses to set its own more strenuous targets to maintain the momentum of quality improvement. There are 30 indicators on the corporate scorecard for quality improvement. Progress is monitored every year and is used to set a strategy map that identifies the critical success factors for the following year.

Vice-presidents are responsible for achieving targets for which they receive a generous bonus (15-20% of their salaries). The programme management team is held strictly to account for failure. Around half the VPs will receive their full bonus in any given year and for the rest it's a case of "try harder next time or you're fired". Industrial engineers with experience in process improvement back up the quality team. In Toronto it is common for experienced clinicians to gravitate towards well-paid managerial positions within hospitals. There is a perception that the chief executive, and not the ministry of health (MoH), represents the top of the tree in career terms.

UHN is actively developing internal skills and capacity for quality improvement and process redesign. A dedicated unit is working its way across the organisation, educating staff and standardising procedures to improve efficiency. This effort

75 A balanced scorecard approach is a performance measurement framework that adds non-financial measures to traditional financial metrics

is a response to MoH targets, which aim to reduce waiting lists by making better use of existing capacity. They have already achieved a 25% increase in throughput for targeted diagnostics by improving the booking system and methods for patient tracking. It plans to stagger the start times for operating theatre staff to reduce congestion at the beginning of the day, which has been identified as the cause of delays.

UHN capitalises on its brand and representatives to provide project management services, tele-pathology and other support services for smaller hospitals in Ontario. This benefits other hospitals which lack the expertise or capacity to provide services effectively, and provides UHN with an income stream to invest further in research and organisational development. Emphasis is also placed on the return on the investment in research to provide income. UHN has created around 15 companies over the past three or four years to commercialise its research. It also has 20 to 30 licensing deals with existing companies, boosting its income and funding further innovation.

Overall, Toronto is a success story – the result of strong leadership and individuals with a vision and the freedom to pursue their objectives. On the other hand provider autonomy and competition has discouraged co-operation, especially regarding the development of shared support services. There are signs that this is changing with the introduction of commissioning organisations and stronger policy direction.

## Healthcare and innovation in the US

While the structure of healthcare in Ontario bears significant similarities to the UK, the situation in America is fundamentally different. Here, the ultra-competitive, commercial and financially abundant environment has produced "survival of the fittest" strategic thinking. One can criticise many aspects of the system, but the top hospitals are among the most innovative in the world and merit consideration. The pressures driving innovation include the regulation of the Joint Commission, an independent, not-for-profit body that accredits and certifies more than 15,000 healthcare organisations and programmes, patient choice and the associated pressure from the influential *US News and World Report* hospital rankings and other voluntary benchmarking exercises, such as the National Surgical Quality Improvement Programme (NSQIP) that was set up after criticism of standards in hospitals run by the Department of Veterans Affairs.

Compared with many other industrialised nations, the American healthcare system as a whole ranks near the bottom on important measures of performance. It lags behind other countries in the adoption of information technology that could improve quality and efficiency. In addition, it does a poor job of co-ordinating care for patients with chronic illnesses, a growing population.[76] But medical innovation is a thriving market in the US. It can be industry-led where new products enter the market place without a targeted and proven use and are snapped up by doctors who want to make a name for themselves as early adopters. In such a receptive market money can be wasted on inappropriate innovations. The ideal is for beneficial innovations to spread quickly once proven, while minimising those that don't offer value for money.

### *The Bayh-Dole Act*

The development of commercialisation arrangements and the steep increase in provider-driven innovation is closely associated with a single piece of legislation: the Bayh-Dole Act 1980. The federal government typically funds a lot of cutting-edge medical research, giving it ownership of the associated intellectual property (IP). However, it did not necessarily spot the potential applications or invest heavily in patent protection, and opportunities that could have repaid the tax-payers' invest-

76 Commonwealth Fund, "Health Policy Reform: Beyond the 2008 Elections", Columbia Journalism Review, Supplement to the March/April issue, 2008

### Case study 5: the National Surgical Quality Improvement Programme

Hospitals that sign up to the NSQIP follow a set methodology for data collection to benchmark their surgical outcomes against other providers. The programme takes a sample of 40% of all the operations performed by general surgeons, colorectal surgeons and vascular surgeons and follows the outcomes of surgery. This data is entered in a national database and is used to set standards for metrics such as length of stay, wound infections and mortality rates. It also identifies outliers relative to national performance, so that hospitals are alerted to areas of weaknesses that may be endangering patients. Involvement in schemes like this is popular because success is publicised and helps to attract patients; the data also contributes to the highly influential US News and World Report hospital and department rankings.

ment were lost. This changed with the introduction of the Bayh-Dole Act, which gave inventors and institutions appropriate incentives to co-operate with industry in the development of products. A researcher may understand the science of a product and a clinician may understand its utility, but they do not necessarily understand the market potential and business development or how to legally protect their idea. Commercialisation offices, also known as technology transfer offices, have sprung up, bringing in expertise to unlock the benefits of research and bridge the gap between the major AHSC providers and industry. An estimated 3,500 products have been brought to market, including several hundred new drugs. The Economist magazine has stated that the Bayh-Dole Act was "possibly the most inspired piece of legislation to be enacted in America over the past half-century.[77]

The legal situation regarding IP varies from country to country, but a number have introduced comparable legislation, most notably Germany, while India and China are considering doing so.

## Cleveland Clinic

> *"There's competition internally, competition externally. There's competition with other organisations. I think competition makes everybody better."*

Established in 1921, Cleveland Clinic is one of the leading providers in the US and has been described as a "crucible for experimentation and innovation".[78] With 12 hospitals, 30 surgical centres, 38,000 employees, 2.8 million visits a year and revenues in excess of $4.4 billion, it is a hugely successful organisation. Its greatest strength is its heart and vascular institute, which has been number one in the US News and World Report since records began 13 years ago. Although situated in a city that is suffering from a declining population, the clinic is flourishing because of its global reputation for providing the highest quality care.

Cleveland Clinic is a clinician-led organisation and a commitment to patient care and clinical innovation are its raison d'être. Delos M. "Toby" Cosgrove, the CEO, is a world-renowned cardiac surgeon with 30 patents to his name. He has performed 22,000 procedures at the clinic and made a huge contribution to its finances. He believes that his clinical background helps his leadership: "It's hard to have an army led by someone who's never been to war." He has created a new post of chief experience officer whose job is to track patients' experience and communicate problems to clinical staff as well as representing the patient at board level.

Cleveland Clinic is in the process of reforming its governance structure: instead of having separate departments for surgery, medicine and research it is introducing institutes that bring together clinicians and researchers with a common interest in an area of the body. The idea is that researchers gain knowledge of clinical need

77 Economist, 12/14/02

78 Buescher B and Mango P, "Innovation in healthcare: an interview with the CEO of Cleveland Clinic", McKinsey & Company, 2008

and clinicians gain access to the emerging knowledge in their field. Recruiting staff who can straddle both, so-called clinician-researchers, is a priority and a new medical school is being developed on the site to provide dual training. These efforts are designed to maximise the translation of research into clinical practice. This is an area that has been repeatedly identified as a priority for healthcare in England because of our strength in academic research and relative failure to capitalise on its application for health and wealth.

***Commercialisation***

Research is integrated with commercialisation arrangements. The clinic seeks to hire the best staff and encourages them with incentives such as annual innovation awards and by requiring them to make research trips to other organisations working in their field.[79] If a clinician or researcher has a good idea, there is a comprehensive infrastructure in place to take it forward. Inventors are actively sought out and are given access to the resources and expertise to develop a product. The clinic recoups its investment from licensing deals and successful spin-off ventures that take a beneficial product to market; the inventor is rewarded with 40% of the proceeds.

The Cleveland Clinic Innovation Centre (CCIC) was set up to bridge the skills gap six years ago. It provides the clinic with a source of income and allows it to attract inventors because they can be confident that their ideas and clinical research efforts will be duly rewarded. It also plays a crucial role in the development and spread of ground-up innovations. Since it began work, 253 inventions have been generated from 135 inventors within the clinic. Cleveland Clinic is also using its expertise in cardiac care by creating the Global Cardiovascular Innovation Centre, which is partially state funded and has attracted a cluster of biotechnology companies from the US and abroad to Cleveland, with benefits for the local economy and the generation of lifesaving treatments.

Innovations are assessed on technical merit, market potential and patentability. A company will only invest if patent analysis can demonstrate exclusivity, business analysis that there is market potential and clinical analysis that it has a strong potential to meet a health need. This is because investment is high risk: very few products will make it to market and turn a profit; it costs in the region of $600 million dollars to take a drug to market, for example. CCIC adds value to promising ideas by performing the early risk assessments and building a business case for investors. It also invests in the development of prototypes and uses the research capacity of the clinic to perform proof-of-principle experiments. In addition to licensing deals, CCIC has developed 27 spin-off companies, with a further nine in the pipeline. Creating spin-offs increases the risk but greatly enhances the rewards if successful. Of the 27 companies created, only one has failed to date. Of course, the benefits are not only financial. A recent technology that made it to market is estimated to have saved 55,000 lives in its first year.

### University of Pittsburgh Medical Centre

UPMC is an integrated network of primary, secondary and tertiary services, closely affiliated with commissioning and university research. It consists of 21 hospitals and some 400 medical sites, and with 48,000 employees is western Pennsylvania's largest employer. UPMC is a not-for-profit organisation generating $7 billion in revenue last year, $500m of which was surplus.

Its success is based on the advantages conferred by integrating different levels of care, which removes many of the barriers to the adoption and transfer of innovations. The managerial, clinical and commissioning expertise within the organisation enables it to successfully identify, assess and imple-

79 There is a cash prize of $50,000 to the Innovator of the Year

ment beneficial innovations. It has developed an efficient arrangement of specialist services and has introduced services that are traditionally hospital-based into primary care settings through its access to internal specialist support. Innovations adopted in leading teaching hospitals can be more easily transferred to less innovative community hospitals if a network is in place.

The sheer scale of its organisation and mix of expertise enables it to draw in industry partners for the commercialisation of research and the early adoption of innovations. UPMC has four joint venture funds with different companies worth $170 million, tapping its expertise in information technology deployment in healthcare. The network provides funding for new ideas to get off the ground, using its commissioning expertise to assist in market assessment, its managerial expertise to develop roll-out strategies, and its provider base as a test bed to demonstrate that they work in a healthcare environment. As one interviewee put it

*"We can be a large-scale reference site. So as they go to market, if their potential customers are wondering, how does this technology work in the market place, they can come here to UPMC and see it. They can talk to our clinicians about why we like it, or what are some of the issues in deploying it. What's hard about it, what's not? How do we save money on it? So we help the companies actually develop their business [case]."*

Whether an innovation is internally or externally derived, UPMC has a clear assessment process. First it identifies a senior champion within the organisation, with the expertise to assess the product and make the case for implementation. This leader is provided with funds and facilities to pilot it and conduct research. The next step is to model the cost and impact of implementation, including the cost of procurement and making the necessary changes, and identifying areas where money will be saved in the future. From all this an implementation plan is developed.

### Case study 6: Digital pathology

The University of Pittsburgh and UPMC have been conducting research into digital pathology for the past 15 years, and are considered a world leader in the field. Currently, tissue samples from biopsies are sent to a pathology lab, where technicians stain them and analyse them under a microscope. Digital pathology images the slide so that it can be viewed on a computer screen anywhere in the world and analysed using computer-aided diagnostic tools. This eliminates delays and the expense of shipping the sample. UPMC are already providing transplant pathology services for an affiliated hospital in Palermo, Italy, which no longer has to employ pathologists or ship samples back to America.

The market for digital pathology products is estimated to be worth $2 billion and although there are other companies developing products, they are all in the early stages. General Electric, the world's third largest company, has a long-standing interest in digital imaging and entered into a 50-50 partnership with UPMC. Each is providing $20 million and the IP from their research to date to set up a new company called Omnyx. They expect to have a product on the market by 2010. Rather than licensing its intellectual property to GE, UPMC will potentially benefit from 50% of the profits. Although this represents a greater risk, there is also potentially a far greater reward. GE has gained a strong clinical involvement, in addition to the research expertise, helping them to work out how to develop the product and how the product should be configured to appeal to the end users.

## University of Pittsburgh Medical Centre and the application of IT in healthcare

*"This was not about an electronic medical record; this was about improving quality for patient care."*

UPMC was an early and successful adopter of electronic medical records and now has over a decade of experience in IT systems in healthcare. Early attempts to implement an electronic medical record in the US were a failure because of a lack of enthusiasm among clinicians. UPMC developed a strategy to engage physicians, ensuring that clinical representatives were involved from the start in the development of applications that would affect their practice. The most senior physician in each department was made the lead trainer on behalf of CERNER, the technology supplier. The advantage was that physicians felt in control and could recognise the positive impact the technology could have on the quality of patient care, as well as the efficiency of their practice. In one hospital, within two weeks of going live all staff were using the system.

The lesson is that IT has to adapt to clinical practice, rather than the other way round, a mistake made by the National Programme for Information Technology (NPfIT) in the UK, which has attempted to impose a standardised solution for every hospital in the NHS. In contrast, UPMC has developed different applications for its academic, community and paediatric hospitals to reflect their different needs. Its biggest success is the UPMC children's hospital, where physicians use the system for nearly all their documentation.

Physicians were won over by the quality argument. It is too hard to assess current practice with a paper-based system because the data is not available to analyse quality of care. And UPMC's experience is that with these systems in place, medical errors can be dramatically reduced through compliance with core measures of best practice.

However, the development of multiple systems creates issues regarding the transfer of data from one system to another. To solve this, UPMC has deployed dbMotion, a company which provides software to facilitate health information exchange. Its solution gives caregivers and information systems secure access to an integrated patient record, even where the information sources have no common technology. This means that there is no real barrier to separately procured and built systems forming a single health information network; it is already being used in national health systems in Israel and Belgium.

IT systems have been at the heart of UPMC's recent financial success. As it gets clinical information, financial information and human resource information systems to talk to each other, it can begin to develop a complete picture of its operations and identify the causes of inefficiencies. This has huge advantages for developing management strategies, such as how to save time, reduce the cost of delivery and inconvenience to the patient. The time between a clinician referring a patient to a radiologist or asking a nurse to deliver a medication and the order being carried out has been cut in half.

### Case Study 7: International Best Practice Transfer case study: Newcastle FT

*"FTs are now signing up open-ended commitments, signing their lives away and their money away to a scheme that may never be delivered."*

Introduction of the NHS electronic medical record has been painfully slow and expensive. The programme sought to purchase one application, so that all clinical practice must be standardised to fit it.

In a departure from the normally risk-averse health culture in the UK, Newcastle Foundation Trust has decided to opt out of the national programme and go it alone at greater expense, using UPMC's experience and a custom-made system.

The systems it is introducing are designed by CERNER to be fully compatible with the NHS "spine" requirements and will interface with primary care organisations. The business case has been approved by Monitor, the FT financial regulator. And it is designed to go beyond the limited capabilities of the national system allowing automated billing and productivity measurement as well as incorporating data on their key quality outcome indicators. Its confidence is such that it is building a new hospital without a paper records department.

## Conclusion

The environment in the NHS is very different from the United States and Canada. Venture capital funding is far less common and endowments are relatively insignificant as a proportion of income. Alternative funding streams are limited, and the NHS is a notoriously hard market to crack for new ventures. The NHS arguably has a far better infrastructure for the spread of best practice and innovation than the Canadian and American systems discussed. It has powerful central organisations, such as NICE, setting standards and assessing new technologies, and protecting against the danger of too much innovation causing waste. But North America has a far more receptive market for the uptake of innovations because of strong leadership, organisational autonomy and the pressures to attract alternative funding.

Creative individuals cannot be expected to draw up a business case, establish start-up companies and navigate their way through product development, while busy on research or clinical practice. This is why, in the NHS, "hidden innovation" stays exactly that, hidden. International examples of academic health science centres suggest that they are more innovative in terms of their research, and are also effective at developing the skills within the organisation to commercialise the products of this research. Within an increasingly marketised NHS environment, AHSCs will potentially lead to increased product development, targeted at health needs in the UK, while the combination of research and clinical provision should make them an attractive partner for businesses looking for expertise and early market entry. There are many successful governance models in North American organisations. The lessons for foundation trusts and AHSCs are that organisations should be free to determine their own configuration, while a combination of strong clinical and managerial leadership is a recipe for success.

# 7

# Recommendations

## Ways to drive innovation and spread new ideas in the NHS

Policy Exchange's vision is for greater competition between integrated providers. The NHS should continue to learn from abroad and allow centres of excellence such as academic health science centres, foundation trusts and health innovation and education clusters, to develop in different localities. Britain's success in biomedical research and development comes partly from having independent universities with the freedom to focus and compete in a global environment. The hospital sector needs similar freedom to develop these proposed centres of excellence. These hubs of excellent practice would help hospitals to develop a brand that plays to academic and clinical strengths. These should lead innovation in different services and play a role in the dissemination of best practice nationwide via consultancy, or alternatively extend their franchise and expertise to different localities, potentially providing remote specialist diagnosis.

## Free organisations to adopt the best ideas

**1. The Government should expand (but not interfere with the day-to-day management of) academic health science centres**
The research team welcome the development of AHSCs, which should attract the best clinicians and embed the principles of academic rigour and critical inquiry. This should encourage these centres to maintain their global position and status through innovation. They should begin to develop alternative funding streams through philanthropic endowments for their research work, commercialisation of their research, consultancy on the implementation of new technologies and practices and provision for international patients.

Competitive, world class AHSC's will not come into being as a result of government fiat or designation. The nascent AHSC movement is the product of close association between universities and teaching hospitals on the ground, and is designed to exploit the freedoms conferred by foundation trust status. It is based on the success of North American and European examples, which evolved without central interference.

The best contribution the government can make is to allow a loose interpretation of existing legislation. For example, Imperial College Healthcare NHS Trust has incorporated St Mary's and Hammersmith Hospital Trusts, neither of which are Foundation Trusts, to form an AHSC. Their business case is solid and the Secretary of State has the right to confer trust ownership, so what is the hold up?

The Medical Research Council earns about £200 million per year in commercial funds from exploiting its intellectual property, which it uses to fund medical research. But in December 2007 the Treasury claimed £92 million from the fund to help to pay for general government

spending. The Government must commit not to raid this revenue in the future. AHSCs must be allowed to develop as the leading organisations in the hospital sector and not have their commercial benefits expropriated; those that fail commercially should not expect or seek government bail-outs for their mistakes.

The Darzi review proposed a constitution for the NHS, but it continues to commit the fallacy of treating the NHS as a single organisation. For example, SHAs have been given a legal duty to innovate is unlikely to be legally enforceable due to its vagueness. This will only lead to SHAs micromanage innovation in their area; genuine innovation is driven by front line professionals solving problems and developing ideas. What is needed is a clear statement that the Government is legally bound not to raid foundation trust budgets to enable long-term planning, as well as a statement setting out the rules of the game for the long term. In the authors' view, this should support the generation of new revenue streams and commercial behaviour.

**2. Reduce restrictions on Foundation Trusts**

Monitor's interpretation of the legislation and regulation around academically committed foundation trusts should take full account of the contribution they make to national standards and not just the narrow local community focus that may be appropriate for purely service oriented organisations. There may also be scope for reducing the restrictions on foundation trusts, giving them the freedom to spend funds as they see fit without applying for approval. The authors support the full roll-out of foundation trust status, with new leadership where necessary, in order to increase the financial flexibility of hospital providers. The situation could be improved further by linking budgets to the three-year plan cycle so that leaders can invest to save in the longer term.

Foundation trusts are now able to exploit their intellectual property and enter into commercial ventures that could boost their income and spread best practice. They should be developing long-term business strategies based on their strengths and the service gaps in their local health economy and working with their RDA and universities to develop a coherent strategy for attracting biomedical and medical technology enterprises to the area. Arguably, providers will begin to adopt best practice, if they have the incentive to do so and are given better access to information on where best practice exists. Ambition can be encouraged by providing funding for, and publicly endorsing, innovative business strategies, while allowing for failure where an acceptable risk is involved.

## Harness the power of procurement to reduce costs and encourage the best ideas to spread

**3. Scrap the procurement hubs below PASA**

Government should dismantle the collaborative procurement hubs and consolidate all central procurement bodies. The current system of hubs hinders effective procurement. A central procurement body will have the central task of developing common data standards for all NHS procurement systems in collaboration with industry. It will review all NHS suppliers and NHS Trusts to agree a set a common product code and description for any product available to the NHS (suppliers will benefit from greater security of orders and demand forecasts, as well as guarantees of preferred order status). Local managers will need to standardise a procurement system across each trust.

**4. Publish costs and a bestseller list of pharmaceuticals and medical devices**

NHS organisations tend to pay a variety of prices for the same inputs. Information

from current contracts should be collated to publish recommended prices and the companies providing the best products at the best prices.

The DH should introduce a bestseller list of pharmaceuticals, medical devices, clinical practices, delivery models and management. Apart from increasing awareness of new, popular products, this can serve as a signalling device – if an innovation has been widely adopted then it is likely to be useful to your group as well. This list would not only contain cumulative adoption figures but would break them down according to user group, GPs or neurosurgeons, for example.

Guidance should be based on the reforms of organisations like Nuffield Health. To unlock economies of scale, hospitals should be encouraged to enter into local agreements to procure common products. Savings of more than 10% can be achieved using common data standards rather than the current imposition of collaborative procurement hubs. Where there are a number of potential suppliers Trusts should consider using mechanisms such as reverse auctions which reduce tendering costs and produce a genuine price. In order to do this, trusts will have first to assess the quantities required, and commit to procuring that amount, to provide security for the companies bidding and reduce costs. This guidance should be provided as part of NHS Evidence, a one-stop website for evidence-based information.

**5. Refocus spending on appraisal and spread**

Shift a proportion of annual spending from innovation to developing clinical guidance, dissemination, diffusion research and implementation support. Our research suggests that insufficient public money is spent on spreading innovations through guidance, dissemination activities and implementation support. Twelve and a half times more is spent on the creation of innovations than these activities combined. While industry may contribute to the diffusion of technologies through marketing efforts, generally speaking alternative sources of investment are heavily weighted towards the creation of innovations, so government efforts are paramount in facilitating spread.

Also, despite the role of NICE in promoting innovation in the NHS, the Government contributes around half as much to the appraisal of innovations as it does to early adoption, and adoption funding is set to increase by around £70 million. This is perverse because early adoption is essentially local and will not in itself lead to widespread change, or even sustainable adoption in the target organisation as pilot schemes usually have only short-term funding .

Evidence-based guidance spreads relatively rapidly within the NHS, with clear dissemination responsibilities placed on PCTs and adoption monitoring by the Healthcare Commission. Extra funding could be used to increase NICE appraisals of medical devices and changes in service delivery, as well as ensuring effective horizon scanning and the development of comprehensive clinical guidance. Funding is too heavily weighted in favour of the generation of knowledge and innovative products, yet the value of these activities is diminished if they do not lead to widely dispersed health benefits.

## Improve the funding system

**6. Create a best practice tariff**

The authors welcome the commitment to introduce a new best practice tariff from 2010-11. Financial incentives can be used to create an appetite for improvement, by linking the tariff to an innovation agenda. The latest tariff prices have gone a long way towards "unbundling" the tariff, but there is huge variation across the country in the costs of delivery. Ideally, the tariff should

reflect the cost of efficiently providing best practice. In order to do this, it must be based on a standardised, normative cost, derived from research on efficient, high-quality performers.

The NHS Institute for Innovation and Improvement has mapped out and costed nine transferable best practice processes, in areas with the greatest variation in costs. A sample of these should be used to set a pilot normative tariff for roll-out over two years, bringing organisations into line with the most efficient, high-quality practices. A more integrated funding methodology needs to be developed. Other jurisdictions with prospective payment-by-results systems have adopted tariffs that reflect complexity, co-morbidity and academic activity. There is also a need to ensure national commissioning for specific national programmes rather than passing all through regional commissioners.

Under the Commissioning for Quality and Innovation programme, commissioners will be able to provide bonus payments for quality improvements in locally determined clinical areas. The experience of Premier Inc in the United States has informed this policy. But the pilot scheme in the North West SHA does not incorporate the penalties used in the US for failures to improve performance. This important sanction should be introduced in England to boost the performance of under-performing hospital trusts.

**7. Include pay-for-performance bonuses in clinician and managerial contracts**

Clinicians' contracts should include a pay-for-performance element, linking in to successful implementation of board and departmental directives. Managerial incentives should be linked to improving outcomes as well as financial performance.

# Glossary

***Academic Health Science Centres (AHSCs)***
Combinations of Universities and Hospitals with joint managerial and governance structures and integrated research and clinical practice departments

***(Acute) Hospital Trust***
Hospitals are managed by acute trusts

***Adoption***
The decision to introduce an innovation at an organisational level

***Appraisal***
The analysis of medical and health economic evidence using a defined methodology and criteria, to inform the decision on whether to adopt a medical innovation

***Bayl-Dole Act***
The Bayl-Dole Act, which took effect in 1980, forever changed the relationship between biotech and academia by giving federally funded universities control over scientific discoveries. This allowed academic institutions to engage in technology transfer, or the turning over of discoveries to the commercial sector

***Benchmarking***
The process of comparing the cost, time or quality of what one organisation or individual does against what another does

***Best Practice***
The best technique, method, process or activity for achieving a common outcome

***Best practice tariff***
National tariff price accurately reflecting the cost of best practice

***Biotechnology***
Technology based on biology

***Biopharmacology***
A branch of pharmacology that studies the use of biotechnologic drugs

***British Medical Association (BMA)***
The independent trade union and professional association for doctors and medical students

***Cardiac arrhythmia***
A term for any of a large and heterogeneous group of conditions in which there is abnormal electrical activity in the heart

***Care Quality Commission***
The NHS quality regulator replacing the Healthcare Commission and incorporating regulation of social care services

***Carpal Tunnel Syndrome (CTS)***
A condition in which the median nerve is compressed at the wrist

***Centre for Evidence-based Purchasing (CEP)***
CEP is part of the Purchasing and Supplies Agency (PASA) and collates evidence to inform procurement of new products

***CERNER***
The US healthcare information technology supplier

***Clinical Practice Guidelines***
These are recommendations, produced by NICE, based on the best available evidence, on the appropriate treatment and care of people with specific diseases and conditions

***Collaborative Procurement Hubs***
Bodies providing advice to groups of NHS trusts, normally within the same strategic health authority or regional boundary, designed to improve collaboration in procurement and supply chain decision-making, in conjunction with NHS PASA and other organisations including Office of Government Commerce (OGC) and Regional Developments Agencies

***Commercialisation***
The process of introducing a new product into the market

***Commissioning***
The act of granting certain powers or the authority to carry out a particular task or duty

***Commissioning for Quality and Innovation Scheme (CQUIN)***
Scheme which aims to encourage all NHS organisations to pay a higher regard to quality by introducing incentive payments for better performance against agreed metrics

***Communities of practice***
The process of social learning that occurs and shared sociocultural practices that emerge and evolve when people who have common goals interact as they strive towards those goals

***Comprehensive Spending Review***
Governmental process in the United Kingdom carried out by HM Treasury to set firm and fixed three-year departmental expenditure limits and, through public service agreements, define the key improvements that the public can expect from these resources

***Connecting for Health***
The body charged with rolling out the NHS information technology programme

***Creation***
The generation of knowledge through academic research, translational research and clinical research, culminating in product development and commercialisation

***CT Scanners***
Originally known as EMI scanners after the company that developed them, Computerised Tomography is a medical imaging method using x-ray images to create a three-dimensional image

***Culture***
Patterns of human activity within institutional structures that give these activities significance and meaning

***Cultural silos***
The separation of different groups within the health service community, leading to tension and a failure to collaborate

***Demand forecast***
Setting the level of demand with a supplier for a given period

***Diagnostics***
Technologies for the identification of health problems

***Diffusion***
The process of an innovation's spread via multiple adoption within a system

***Digital pathology***
The study and diagnosis of disease through examination of tissues and bodily fluids from digital images

***Disruptive information***
Information that disrupts ingrained working practices by making problems public

***Dissemination***
The process of communicating the benefits of an innovation

***Evaluation***
Scientific trials designed to assess the risks and benefits of a health technology and produce evidence for appraisal

***Foundation Trust***
Foundation trusts are run by local managers, staff and members of the public and have been given more financial and operational freedom than other NHS trusts

***Healthcare Commission***
The outgoing quality and standards regulator for the NHS

***Healthcare Industry Task Force (HITF)***
A group led by Lord Warner, Parliamentary Under-Secretary of State for Health, Lord Sainsbury, Parliamentary Under-Secretary of State for Science and Innovation, and Mr Mike O'Brien, Minister of State for Trade and Investment intended to deliver recommendations for the benefit of patients and to stimulate science and industry in the UK to improve manufacturing, investment and exports

***Health Innovation Education Clusters (HIECs)***
DH sponsored clusters bringing together partners from primary, community and secondary care, universities and colleges, and health service industries

***Health Resource Groups***
Groups of case mixes (procedures of similar complexity and costs) that are used as a means of determining fair and equitable reimbursement for care services rendered in tariff prices

***Health Technology Assessment (HTA)***
HTA analyses technology through the synthesis or systematic review of scientific evidence, and is used by NICE to inform its technology appraisals

***Horizon scanning***
Anticipating and preparing for future challenges, trends and opportunities

***Implementation***
The process of sustainably embedding an innovation throughout an organisation

***Incentives***
Any factor (financial or non-financial) that enables or motivates a particular course of action, or counts as a reason for preferring one choice to the alternatives

***Innovation***
A novel set of behaviours, routines and ways of working that are directed at improving health outcomes, administrative efficiency, cost effectiveness or user's experience, and that are implemented by planned and co-ordinated actions

***Local Health Integration Networks (LHINs)***
The 14 LHINs in Ontario, Canada plan integrate and fund health care services and oversee nearly two-thirds of the $37.9 billion health care budget in Ontario

***Medicaid programme***
Free medical programme in the USA for low income individuals and families

***Medical research council (MRC)***
National Research Council promoting research into all areas of medical and related science with the aims of improving the health and quality of life of the UK public and contributing to the wealth of the nation

***Medicare programme***
Medicare is a social health insurance programme in the US for people over 65 or with a disability that makes standard private (actuarial) insurance unaffordable

***Middle Managers***
A layer of management or senior administration in an organisation whose primary job responsibility is to monitor activities of subordinates while reporting to upper management

***Ministry of Health (MoH)***
The Ministry of Health and Long-Term Care is the Government of Ontario ministry responsible for administering the healthcare system and providing services

***MRI Scanners***
Magnetic Resonance Imaging

***National Institute for Health and Clinical Excellence (NICE)***
The National Institute for Health and Clinical Excellence (NICE) is the independent organisation responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health

***National Institute for Health Research***
Manages the Department of Health's Research and Development budget

***National Institute for Innovation and Improvement (NHS Institute)***
The National Institute for Innovation and Improvement supports the NHS by developing and spreading new ways of working, new technology and leadership guidance

***National Procurement for Information Technology (NPfIT)***
An initiative by the Department of Health in England to move the NHS towards a single, centrally-mandated electronic care record for patients and to connect 30,000 GP surgeries to 300 hospitals, providing secure and audited access to these records by authorised health professionals

***National Quality Board***
Board reporting to ministers providing a strategic overview of clinical priorities for quality improvement, to help improve the metrics for measuring quality

***National Surgical Quality Improvement Programme (NSQIP)***
A voluntary programme for monitoring and benchmarking surgical outcomes in the US

***Networks***
Connections between individuals and institutions, providing a forum for communication

***NHS Confederation***
The NHS Confederation is the independent membership body representing 95% of the organisations in the NHS as well as a growing number of independent healthcare providers

***NHS Direct***
Healthcare information service for patients

***NHS Evidence***
A single portal for the dissemination of medical appraisal evidence for the NHS, which is currently being established as part of NICE

***NHS Live***
A free, national learning network supporting staff, patients and their communities to realise local ideas for improvement

***NHS National Technology Adoption Centre***
A new organisation which works directly with NHS clinicians, managers and commissioners to overcome barriers to the adoption of beneficial technologies that are failing to spread

***Non-Hodgkin's lymphoma***
A type of cancer derived from lymphocytes, a type of white blood cell, excluding Hodgkin's lymphomas (Hodgkin's disease)

***Normative tariff***
Sets costs in accordance with a prescribed standard, which is modelled on efficient, evidence-based practice

***Oesophageal Doppler Monitoring***
Uses an ultrasound probe placed in the oesophagus to monitor blood flow during surgery

***Office for the Strategic Coordination of Health Research (OSCHR)***
Coordinates medical research in the UK, overseeing the activities of the MRC and NIHR

***Patient choice***
Patients now have a free choice upon referral of any provider that meets NHS standards and the tariff price

***Patient pathway***
The patient's path from first GP visit to the conclusion of treatment

***Pay for Performance***
An emerging movement in health insurance/commissioning, in which providers are rewarded for the quality of their healthcare services

***Piloting***
Refers to early adoption of an innovation, where a short trial period can be used by an organisation or healthcare system to assess the evidence for, or guide, future adoption

***Premier Inc.***
An alliance of not-for-profit hospitals and health systems organisations in the US, charged with managing the pay for performance pilot for the Medicare and Medicaid programmes

***Primary Care Trust (PCT)***
PCTs manage primary care provision and control 80% of the NHS budget, commissioning care to meet local needs

***Procurement***
The purchasing of products or services, here referring to the purchasing activities of NHS Trusts to assist with their function

***Purchasing and Supplies Agency (PaSA)***
An executive agency of the Department of Health designed to ensure that the NHS in England makes the most effective use of its resources by getting the best possible value for money when purchasing goods and services

***Quality Observatories***
SHA units proposed by Lord Darzi to monitor the quality of performance in the NHS regions, informing SHA service improvement policies and supporting commissioners

***Radiotherapy***
The use of high energy x-rays and similar rays (such as electrons) to treat diseases for example, to destroy cancer cells

***Refinement***
The process of developing a product for market

***Reverse auctions***
A tool used in industrial business-to-business procurement whereby the role of the buyer and seller are reversed, with the primary objective of driving purchase prices downward. In an ordinary auction buyers compete to obtain a good or service. In a reverse auction, sellers compete to obtain business

***Royal colleges***
The royal colleges represent different medical professions and are responsible

for representing their members and maintaining professional standards

***Silo budgeting***
Separate budgets controlled by different people leading to an inflexibility accessing funds

***Simulation modeling***
Computer models of care pathways which can be used to estimate the impact of different variable values on outcomes

***Spread***
See diffusion

***Stock control***
Aims to minimise the cost of holding these stocks whilst ensuring that there are enough materials for production to continue and be able to meet customer demand

***Strategic Health Authority (SHA)***
SHAs manage regional commissioning and (most) provision, setting local strategic priorities

***SHA Link Directors***
Each SHA has nominated a director (known as a link director) to work with the NHS Institute on enabling service improvement. For each link director, the NHS Institute have identified a corresponding NHS Institute director to promote a closer working relationship between organisations

***Targets***
The current healthcare targets were published in July 2004 by the Department of Health in National Standards, Local Action: Health and Social Care Standards and Planning Framework 2005/2006-2007/2008, and set out the Government's priorities for improvements, which healthcare oganisations are expected to deliver

***Tariff***
The tariff sets the national price for groups of procedures, based on the cost data provided by NHS trusts

***User***
The clinical, managerial or administrative personnel charged with using a new technology, or operating a new process

***US News and World Report***
US News and World Report Best Hospitals provides a list of the best hospitals in the US based on their reputation, mortality rates and a mix of care related factors

***Value Chain Costing***
An activity-based cost model that contains all of the activities in the value-chain (design, procure, produce, market, distribute/render and post-service a product or service) of one organisation

***Wellcome Trust***
Charity funding innovative biomedical research, in the UK and internationally, spending over £600 million each year

***World Class Commissioning***
The world-class commissioning aims to deliver a more strategic and long-term approach to commissioning services, with a clear focus on delivering improved health outcomes. There are four key elements to the programme; a vision for world-class commissioning, a set of world-class commissioning competencies, an assurance system and a support and development framework

# Appendix 1

## Description of Government bodies designed to promote NHS innovation

***The National Innovation Centre (NIC)***

The NHS National Innovation Centre (NIC) aims to speed up the development of pre-commercial technologies likely to benefit the NHS. It provides a resource for innovators to develop their ideas and access NHS funding. NIC calls on the resources of key national and international organisations to provide tailor-made plans for rapid and successful intellectual property development. It also co-ordinates the activities of the regional innovation centres, or hubs, liaises with the healthcare industry and, where appropriate, develops ideas that come from outside the NHS.

Commercialisation of innovations arising from within the NHS is managed by the nine innovation hubs in England, most of which are funded by the Department for Innovation, Universities and Skills (DIUS) and the Office of Science and Technology (OST), via the Public Sector Research Exploitation (PSRE) fund, and by the Department of Health (DH).

The hub network was set up to support NHS trusts and primary care trusts (PCTs) by identifying and developing innovations that will benefit patients and society as a whole. This is made possible through the network's activities and services and by adoption of the DH guidance. The hubs offer legal and commercial support to NHS staff who have a pre-market product. In doing so, each hub serves the NHS organisations in its area by identifying, protecting and developing intellectual property sourced from within the NHS.

***The National Institute for Health research and the Invention for Innovation (i4i) Programme***

The i4i programme was launched in July 2008 to improve the identification and accelerate the development of promising healthcare technologies and products. It brings together two existing programmes – new and emerging applications of technology (NEAT) and health technology devices (HTD). It funds the development of basic research linked to a clinical need, from proof of concept and research and development, to small-scale production and trial. It establishes closer links between the existing funding streams and a range of ideas generators, such as the research councils, the NHS national innovation centre, the technology strategy board, healthcare technology companies and organisations that can take products to market.

In other countries, such as the US, the Government is less involved in the development of innovations because organisations at the provider level and within industry are motivated to fulfil this role.

***The National Horizon Scanning Centre (NHSC)***

Horizon scanning is defined by the Office of Science and Technology (OST) as: "the systematic examination of potential threats, opportunities and likely future developments, including (but not restricted to) those at the margins of current thinking and planning."

The NHSC aims to provide advance notice to the Department of Health in England and national policymakers, including NICE, of selected new and emerging health technologies that may require evaluation, consideration of clinical and cost impact or modification of clinical guidance before launch in the NHS. Its activity includes pharmaceuticals, medical devices, diagnostic tests and procedures, therapeutic

interventions, rehabilitation and therapy, public health and health promotion interventions. For any non-pharmaceutical technology, the notice period before UK marketing is approximately 12-18 months.[80]

Effective horizon scanning is centrally important because it allows assessment of safety, efficacy, value for money and cost effectiveness, and it informs and primes the development of implementation strategies. However, the quality of forward planning in the NHS has been heavily criticised, particularly in the case of non-pharmaceuticals, for which NICE does not commonly introduce guidance and trusts must rely on the NHSC and purchasing organisations alone.

***National Institute for Health and Clinical Excellence (NICE)***

The National Institute for Health and Clinical Excellence (NICE) is the independent organisation responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health. In particular NICE guidance covers: health technology assessment and guidance on the use of new and existing medicines, treatments and procedures within NHS clinical practice, and clinical practice guidelines on the appropriate treatment and care of people with specific diseases and conditions within the NHS.[81]

NICE now runs NHS Evidence, which is a new web-based service set up in response to the Darzi review to help professionals access appropriate evidence-based information. This replaces the NICE implementation directorate.

***Purchase and Supplies Agency (PASA)***

NHS PASA is an executive agency of the Department of Health. It

- provides strategic guidance on procurement to the NHS where procurement is taking place at a regional or local level;
- provides practical guidance, education and training to those involved in procurement throughout the NHS;
- promotes creativity from suppliers and encourage small and medium-sized enterprises (SMEs) to do business with the NHS;
- promotes sustainable development within the NHS and its supply chain to reduce the negative environmental and social impacts of procurement decisions and increase the positive ones;
- encourages the introduction of beneficial, innovative products and technologies into the NHS;
- supports the national priorities of the NHS.

***Centre for Evidence-based Purchasing (CEP)***

CEP provides impartial and objective information about medical technology to help the NHS make better purchasing decisions. It provide reports and guidance to help decision-makers build business cases to underpin purchasing choices by summarising evidence, undertaking equipment evaluations and collating product specifications and market intelligence.

***Health Protection Agency (HPA)***

HPA provides independent testing and support services to the National Health Service, local authorities, health professionals, national and international bodies, industry, and universities. It has three national centres as well as teams that provide services at a regional and local level and aims to apply knowledge of patient safety to practical applications which have a clinical, public health or financial benefit.

***Knowledge Transfer Networks (KTNs)***

Knowledge transfer networks are funded by the Technology Strategy Board to help businesses innovate by providing them with networking and partnering opportunities, giving them up-to-date knowledge

80 http://www.pasa.nhs.uk/PASAWeb/NHSprocurement/CEP/NHSC.htm

81 http://www.nice.org.uk/

on markets, technologies and routes to funding and giving them a voice to influence our strategy and government regulation and standards. Their main role is to put companies and innovators in contact with the knowledge and funding that they need to bring new products and processes to market.

***The NHS Institute for Innovation and Improvement***

The NHS Institute for Innovation and Improvement supports the NHS in transforming healthcare for patients and the public by developing and spreading new ways of working, new technology and world-class leadership. It is looking at spreading best practice throughout the system, including current best practice within the NHS. This involves directly observing how services are being delivered and engaging with people on the ground to produce a system in which best practice is spread efficiently. A priority is to work on the tools that make evidence more widely available and used.

In each region, there are innovation hubs funded by the Department of Trade and Industry and reporting to the Innovation Centre; there are also adoption hubs funded by the Department of Health and reporting to the NHS National Technology Adoption Centre, and there are procurement hubs reporting to the Purchasing and Supply Agency. In addition, there are Healthcare Technology Co-operatives that are DH funded and conduct research into technology solutions for specific needs.

***The NHS National Technology Adoption Centre***

The NHS National Technology Adoption Centre (adoption hub) was launched in Manchester in September 2007 to promote the increased uptake of innovative technology in the NHS. Its role is to help organisations navigate the complexity of the "NHS adoption landscape" by sourcing new technologies, increasing their uptake and improving understanding of how new technologies are adopted by the NHS.

It aims to review up to 200 technologies that have already received regulatory approval and have been clinically and/or economically praised but have not been easily adopted. For 15 of these it will manage the implementation process, and will identify changes to the pathway or service needed to unlock the full benefits of the innovation.

For each successful technology the centre will produce a clear "adoption map"' of how to manage the adoption process. It will also develop a full business case justification for introducing the technology and implementing any associated changes. It will engage clinicians especially, at an early stage, to win support and promote wider dissemination and uptake.

# Appendix 2

## Funding calculations

| Funding source | Funding body | Assumptions | Reference | Date | Notes |
|---|---|---|---|---|---|
| EU | | | Statistics annex to European Commission Annual Report | 2007 | |
| HMT | RDAs | £2,200m invested in regions; 10% on healthcare products and services. Distribution of funding varies according to regional priorities but they are predominantly focused on wealth creation activities. | HMT Budget 2007 | 2008/09 | |
| | Tax Credits | R&D tax credits in 2008 estimated at £1000m - healthcare at 15%. No information was found to inform the distribution so we assumed an even split along industry activities, although we would expect higher levels in creation. | HMT 2007 Pre-budget report and Comprehensive Spending Review - exceeding 10,000 credits; http://www.hmrc.gov.uk/randd/#1 | 2008/09 | |
| DTI/DEFRA | Technology Strategy Board | Assumes same level of funding as 2004-2006. Total project costs awarded over this period divided to give estimated annual spend in bioscience and health. | Technology Strategy Board Annual Report 2006 | 2006 | |
| DIUS | NESTA | | NESTA Annual Report | | |
| | Higher Education Funding Council | This is a prospective value and is likely to be inflated. The total research spend is £1458.5m | Best Research for Best Health; Recurrent grants for 2008/09: Final Allocations | | |
| | BBSRC | 54% of £386m related to medical innovation | Delivering Excellence with Impact: BBSRC Delivery Plan 2008 - 2011; http://www.bbsrc.ac.uk/organisation/spending/analysis.html | 2008 | Rising to £471m by 2011 |
| | EPSRC | 11% of current grants are healthcare related (£369m). The annual budget is £740m. Since some of this will be centre costs and grants may include non-healthcare components, the annual spend on health was estimated at 10% of this figure. | http://gow.epsrc.ac.uk/ListSectors.aspx | | |

| | | | | | |
|---|---|---|---|---|---|
| | MRC | | http://www.timeshighereducation.co.uk/story.asp?storyCode=185523&sectioncode=26 | | |
| DH | NIHR | NIHR funding in other categories has been deducted from total spend of £879m. | http://www.nihr.ac.uk/about_funding.aspx | 2008/09 | |
| | Challenge Fund for Innovation | The Challenge Fund for Innovation aims to promote and accelerate the transfer of knowledge and innovation between the NIHR and the NHS | Best research for best health implementation plan 6.4 Invention for innovation programme | 2007/08 estimate | £4m in 2006/07 rising gradually to £13m in 2009/10; therefore assumed to rise £3m per annum |
| | Research and Patient Benefit Project Grants | | Transforming Health Research Project Report | 2006/07 | |
| | Programme Grants for Applied Research | This is projected to increase rapidly to £75m | Transforming Health Research Project Report | 2006/07 | |
| | Health Technology Assessment Programme + Horizon scanning | | Innovation Nation | 2008 | |
| | Service Delivery & Organisation Programme | | NHS Institute Business Plan 2008/09 | 2008 | This includes spending commitments totalling £34.1m from PCTs and excludes income of £2.4m |
| | Infrastructure and technology | | NHS Institute Business Plan 2008/09 | 2008 | Excludes income of £.7m |
| | Research Networks | | NHS Institute Business Plan 2008/09 | 2008 | Including £8.1m from commissioners |
| | NICE Guidance | NICE HTA is done in conjunction with the NIHR and Universities. The NICE budget is assumed to relate entirely to its own staff and guidance production remit. | http://www.parliament.the-stationery-office.co.uk/pa/cm200607/cmhansrd/cm070723/text/70723w0046.htm | 2007/08 | |
| | NHS Evidence | The budget for NHS Evidence is assumed to be equivalent to the NHS Library, which has been moved from the NHSI to NICE and been rebranded. | The National Knowledge Service Plan 2007-2010 | 2007 | |

| | | | | | |
|---|---|---|---|---|---|
| | PASA | Includes procurement hubs and CEP | PASA Annual Report and Accounts 2006/07 | 2006/07 | |
| | Centre for Evidence Based Purchasing | | PASA Annual Report and Accounts 2006/07 | 2005/06 | Pre-merger - subtracted from PASA budget to reflect their different roles |
| | Commercial Directorate | | http://www.theyworkforyou.com/wrans/?id=2008-02-04d.182937.h | 2007/08 | Parliamentary response |
| DH & Wellcome Trust | Health Innovation Council | £60m over 3 yrs - 50% provided by the Wellcome Trust has been deducted as non-public funding - private source states that IC is focused on invention | Innovation Nation | 2008 | |
| NHS | NHS Social Enterprise Investment Fund | £27m over 3 years for social enterprises in health and social care | NHS Institute Business Plan 2008/09 | 2008 | Includes £18.7m from commissioners and excludes £2.4m income |
| NHSI | Design and Production of Solution for the NHS eg commissioner/ management tools | | NHS Institute Business Plan 2008/09 | 2008 | This includes spending commitments totaling £34.1m from PCTs and excludes income of £2.4m |
| | Dissemination to Support Adoption and Spread | Includes £1.25m projected for the Adoption Centre and NHS Live website | NHS Institute Business Plan 2008/09 | 2008 | Excludes income of £.7m |
| | NIC & Innovation hubs | | NHS Institute Business Plan 2008/09 | 2008 | Including £8.1m from commissioners |
| | Management Training Schemes | | NHS Institute Business Plan 2008/09 | 2008 | Includes £18.7m from commissioners and excludes £2.4m income |
| | Infrastructure | | NHS Institute Business Plan 2008/09 | 2008 | Includes £1.2m from commissioners |

Even when backed by clear evidence, new technologies and practices inch their way too slowly through the vast web of structures that make up the National Health Service. This is one of the reasons our standards often fall below those of comparable countries. Data collected by the World Health Organisation shows that premature deaths from causes that are preventable with prompt and effective healthcare are higher in the UK than Germany, Canada, Australia and France. A lack of MRI and CT scanners can lead to long waits for diagnostic tests, while shortages in radiotherapy equipment are a factor in our comparatively poor cancer treatment. Among European countries, the UK is consistently below average in the adoption of new drugs for the treatment of certain common cancers. And within Britain, too, there is an unjustifiably wide variation in outcomes of care.

To understand why it is so difficult to spread new technologies and practices within the NHS, the authors of *All Change Please* interviewed more than 80 senior healthcare professionals here and in North America. Professor Barlow and Jamie Burn discuss challenges the NHS faces spreading the best ideas through the health system. They provide new analysis of how much is currently spent on innovation and diffusion, and make seven recommendations on how to improve the system.

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