NHS
East Midlands

# Promoting and embedding innovation

*Learning from experience*

UNIVERSITY OF BIRMINGHAM

Iestyn Williams, Debra de Silva and Chris Ham
Health Services Management Centre

Innovation in the NHS is now being driven regionally by strategic health authorities.

Learning how other national and international organisations have approached, planned and embedded innovation will help SHAs foster a culture of innovation.

This overview outlines key evidence about what has worked well and what has been challenging elsewhere in adopting and disseminating innovation.

It has been jointly commissioned and produced by NHS East Midlands and the University of Birmingham Health Services Management Centre.

# Contents

# *Key messages*

Innovation is a complex term that encompasses a range of interventions. Judgements about the extent of 'innovativeness' or 'newness' depend on the context. The innovation process in health and social care is rarely linear, but it is helpful to think of its components as: discovery, adoption, diffusion and routinisation. This review outlines key learning points about how to spread and embed innovation in healthcare.

The evidence base on diffusion of innovation is growing but remains patchy and methodologically limited.

> **"We still do not know as much as we would like, and what we do know, we may not know for sure."** (Rye and Kimberly 2007: 254)

A number of local and national mechanisms have been put in place to facilitate innovation in healthcare and we are learning more about what works well to promote and embed innovation. For example, determinants of innovation identified in the literature include:

- factors relating to the **innovation** itself such as relative advantage, complexity, compatibility, trialability and maturity
- characteristics of the adopting (or non-adopting) **individual** such as cognitive capacities, attitudes perceptions, and behaviour patterns
- characteristics of adopting **organisations** such as size and structure, organisational climate, extent of resources and infrastructure, absorptive capacity, and 'connectedness'
- features of the wider **environment** such as: external regulatory or market environment, national priorities and targets, external networks, and the demands of patient and advocacy groups

A variety of tools and strategies for enhancing innovation are available, although there are varying levels of evidence of impact. Potentially useful tools for spreading innovation include formal published evidence, decision and dissemination support tools (such as guidelines), organisational and inter-organisational networks, leadership development, and evaluation and review. Essential factors for embedding innovation in the NHS can be summarised as follows:

- Successful innovation requires inter-functional and inter-organisational co-ordination and **collaboration**.
- No single implementation tool is likely to be sufficient to bring about sustained innovation.
- No single approach will be successful in all settings. It is the **interaction** among the innovation, the intended audience and the context that determines the adoption rate.
- Innovations need to be **adapted** as well as adopted into the local context.
- A receptive climate for innovation will develop incrementally and over varying periods of **time**.
- A multi-determinant and **multi-layer** approach is essential.
- End users and other stakeholders should be engaged as **active** change agents rather than passive recipients of innovation.
- Financial and other **incentives** can support adoption of new ideas and services.
- **Campaigning** approaches which 'market' new ideas have been beneficial elsewhere.
- Centralised approaches to spreading new ideas should not be discounted but local **buy-in** and adaptation are important.

It is important to build up capacity and **capability** within frontline organisations. The development of cross boundary networks or 'communities of practice' is important to spread. Similarly, leadership at all levels is an important facilitator of innovation. High levels of organisational 'connectedness' will facilitate more rapid and longstanding innovation.

Against this background, and in the light of the detailed findings presented in the rest of this report, SHAs may wish to consider the following 'menu' for spreading innovation:

1. ***Build on previous NHS experience of what has and hasn't worked***

Previous experience in the NHS Modernisation Agency and the National Primary Care Development Team under Sir John Oldham has shown the benefits of working through quality improvement collaboratives and professional networks to stimulate and spread innovation. Collaboratives and professional networks are not a panacea but when used skilfully can contribute to developing new ways of working and service improvement (see p32).

2. ***Engage frontline staff and mobilise commitment to change from within***

The NHS Institute's work on social movement theory is a practical example of how to engage frontline staff and mobilise commitment to change from within the NHS. This work is closely related to the use of collaboratives and professional networks, and it finds expression in the notion of 'communities of practice' as a means of promoting innovation. SHAs could establish and support a number of communities of practice to facilitate co-production of quality and service improvement in the next stage of reform.

3. ***Adopt a campaigning approach to support action on key priorities***

IHI's 100,000 lives campaign on patient safety illustrates the impact that a campaigning approach can have in areas where there is good evidence of what works and where there is a compelling case for concerted action to enable change to happen quickly (see p23). The promotional techniques, planning and use of nodes and networks could be adopted and adapted in the NHS, both at a national level and within SHAs.

4. ***Support leaders and innovators through training and by creating slack***

Senior managers, clinical leaders and frontline staff involved in innovation are likely to benefit from training and the time and space to 'get off the treadmill' and develop their ideas. This might involve a regional programme of training and support but it is also likely to entail enabling key individuals to visit other organisations in the UK and elsewhere to learn from their experience. Organisations like The Health Foundation provide funding for development opportunities of this kind.

5. ***Make it easy to find and share knowledge about innovations***

Like many large and complex organisations, the NHS is weak in sharing information and helping staff find out what has been tried elsewhere and whether it works. Drawing on the experience of the US Agency for Healthcare Research and Quality, the NHS could create a website to address this or include local case studies on existing Web of Knowledge sites, making it easier to discover and share knowledge about innovations, and spread intelligence about best practice (see p26).

6. ***Learn from organisations that have a track record of innovation***

The US Veterans' Health Administration illustrates how organisational turnaround and improvement can occur through a linked programme of interventions. These include leadership from the top, structured communication through internal newsletters, emails and meetings, the use of collaboratives and the adoption of a formal framework of spread (see p28). This framework made use of a checklist for spread that could be applied with modification within the NHS. Cincinnati Children's Hospital is another example that underlines the role of organisational culture in promoting innovation.

### 7. *Value and celebrate innovation and innovators*

The NHS could do more to explicitly value and celebrate innovation and innovators. For example, there could be local and regional innovation awards, with the winners being rewarded both through recognition and via practical support (such as the opportunity to take part in national and international innovation networks or visit examples of innovation elsewhere). Over time the award winners would themselves become a community of practice around the process of innovation. Valuing innovators also involves tolerating the 'maverick' ways of working that people in these roles often exhibit, rather than seeking to ensure conformity with a corporate culture.

### 8. *Foster links with private sector organisations*

While many innovations in the NHS arise 'from within,' the private sector and organisations outside the NHS family are also an important source of new ideas, as illustrated by the example of Birmingham OwnHealth (see p19). As the NHS adopts a more systematic approach to the uptake and spread of innovation, it will be important to involve the private sector to avoid becoming too insular. This is unlikely to happen spontaneously so SHAs have a role in facilitating private sector involvement as well as links with universities, third sector organisations and other sources of fresh thinking.

### 9. *Recognise and nurture innovation brokers or change champions*

Innovation often occurs not through invention, but through applying technologies and approaches developed in one sector to another sector. It is necessary not only to foster links with private sector organisations but also to recognise and nurture innovation brokers. These are individuals who can bridge different sectors and build new networks and communities. Networks help to convert individual deviance (aka innovation) into collective deviance, and therefore to embed them more firmly in organisational routines.

### 10. *Use competition and incentives to drive innovation*

NHS leaders, whether managers or clinicians, have an inherent desire and drive to be seen to be at the leading edge of performance. A system of awards and recognition of innovation will appeal to this desire, but something more may be needed. Organisations like the Veterans' Health Administration and the Institute for Clinical Systems Improvement in Minnesota have used information about the comparative performance of hospitals and clinics to stimulate improvement and innovation (see p18). In some cases this has been linked to modest financial rewards but in the main these organisations rely more on the desire of leaders to do well and to be seen to be doing well. The NHS could appeal to this desire through the systematic and transparent use of data on comparative performance.

This menu of approaches shows that it is critically important that senior leaders are fully involved in whatever approach is taken. For innovation to gain a grip within and across the NHS, it is not sufficient for front line staff and clinical leaders to be developed and supported. Change within micro systems must be linked to change within organisations and regions as a whole.

# Overview

**The existence of innovation, in any setting, implies progress and improvement. As such, its importance to healthcare design and delivery has long been assumed. By contrast, actual achievement of innovation is far more complicated and contested. This is partly because, on closer inspection, the concept itself is both vague and something of a moving target: How do we decide what is a novel and valuable intervention? And when do innovative practices themselves become outdated and in need of replacement or re-design? How can innovation be routinely adopted and embedded into practice?**

**In the NHS uptake of new products and practices proceeds at a disproportionately slow rate (Sheldon 2004, Black 2006) and instances of good practice often fail to spread across professional, organisational and geographical boundaries. This apparent failure has led to a succession of government initiatives culminating in the recently imposed legal requirement to innovate placed on English Strategic Health Authorities (Darzi, 2008). However, in order to respond to this requirement, SHAs need to operate with a sound and detailed appreciation of the evidence base.**

**This report presents findings from a literature review into the determinants of innovation within health and social care. After outlining the methods used to collate information, it examines how innovation can be embedded into NHS practice and in particular the role of local actors in the process.**

## Innovation

Although the term 'innovation' necessarily incorporates a range of phenomena, it remains important to identify its key defining characteristics. However, this can be difficult given the multiple definitions employed in the literature. It is generally agreed that the term innovation implies not just *invention* but also *implementation* (or adoption). It is also clear that extent of innovation can only be understood in relation to context. In other words the same intervention may not be innovative in different or changed circumstances. This renders objective assessment of degrees of 'innovativeness' problematic. The term is linked to notions of 'newness' 'recentness' or 'differentness' which themselves might be more amenable to objective measurement (Rye & Kimberly 2007), but ultimately judgement is required when deciding what is or isn't innovative.

For the purposes of this review we define innovation as any practice or product that represents a conscious and significant departure from current behaviour (Rye & Kimberly, 2007). This element of *discontinuity* distinguishes innovation from a broader range of types of improvement. Helfrich et al (2007: 281) employ the definition 'ideas, practices or technology that are perceived as new by the adopter.' Freeman et al (2006: 2) go further in suggesting that, order to be innovative, the intervention must 'fundamentally change the characteristics of the organisation, its systems of production or market.' This doesn't mean, however, that all innovations will present themselves as dramatic breakthroughs in relation to intractable problems. As a process, innovation can also be gradual and incremental (Hwang & Christensen, 2007) but nevertheless constituting a step-change over time (see for example Buchanan et al 2005).

Innovations are as likely to be simple and low cost as they are to be complex and expensive.

> **"An innovation can be big or small. Brand-new or just a bit different, it doesn't matter. An innovation can be clearly complex or seemingly simple... The type, industry and style of innovation are irrelevant; an innovation's impact determines its qualification."** (realinnovation.com)

Innovative interventions range from those that primarily affect core clinical tasks (usually packaged in the form of a new drug or procedure) to managerial and organisational innovations that impact on a spectrum of actors in the system (Parnaby & Towill, 2008). Indeed, the distinction between clinical and organisational innovation needs to be qualified with the proviso that any new intervention impacts on individual, group and organisational behaviour. Further subcategories include 'social innovations' - interventions aimed at strengthening communication and teamwork (Djellal & Gallouj, 2007) - and innovations in governance (Hartley & Moore, 2008). Finally, there is a growing attention to the transformational potential of 'disruptive' innovations – radical new interventions that threaten established models, practices and interests (Hwang & Christensen, 2007). The concept of innovation thus encompasses a range of activity.

Although much of the literature focuses on hospitals, innovation settings range from clinical practice in primary and secondary care, through social care, and into the home and community. Similarly, the 'end users' of innovations include not just clinicians but other actors such as nurses, regulatory agencies, payers and patients (Gelijns et al, 2001).

## Methods

The primary aims of the literature review reported here are to:

1. Synthesise the evidence on the determinants of innovation in health
2. Present case studies of innovation failure and success from national and international contexts
3. Identify key lessons and learning for the NHS

Given the breadth of literature with potential relevance, a targeted approach to searching was employed. We conducted a 'review of reviews' in the first instance. Formal reviews on topics relevant to the issue of innovation were the primary source of evidence. These were supplemented by policy, practice and research in areas of specific interest. Other literature types include selected case studies, opinion pieces and theoretical contributions.

The review is international in scope and includes documents published in the English language in the period 1999-2009 relating primarily (although not exclusively) to public sector contexts. Searches were conducted of health and social care-related databases (Medline, EMBASE, CINAHL, PubMed, Cochrane, Health Business Elite, HMIC, National Library for Health, Social Services Abstracts, TRIP (Turning Research Into Practice), ASSIA) using a range of search terms (for example 'innovation', 'adoption' 'coverage' 'implementation' 'diffusion' 'dissemination' 'improvement') in addition to hand-searching of bibliographies. We also contacted more than 30 international experts to ask for recommendations and case studies. Retrieved documents and information were sifted according to both rigour and relevance.

# Reflections

The literature on innovation diffusion and spread is vast but suffers from a number of gaps and weaknesses (Greenhalgh et al 2004, Länsisalmi et al, 2006, Leeman et al 2007, Mitton et al 2007). It is important to outline these briefly before summarising the literature.

Much of the empirical evidence relates to traditional, medical innovations and as a consequence there is less learning to draw on in relation to more complex interventions.

It is only relatively recently that researchers have sought to understand the organisational and system factors that impede or facilitate innovation (Fitzgerald et al, 2001). Longer-standing literature is geared towards analysis of the individual innovation adopter.

Studies employ different definitions of terms such as 'innovation,' 'adoption' and 'spread'. This makes comparison of findings difficult (Fleuren et al 2004, Ellis et al 2005, Williams & Dickinson 2008).

The literature on innovation in healthcare is couched in sometimes divergent language. It is therefore important to clarify some of the major schools of thought and their perspective on, and contribution to, the topic. Appendix 2 outlines core theories and frameworks surrounding innovation.

*Sustaining* and *de-commissioning* (as opposed to adopting and diffusing) are the least well understood stages of the innovation pathway (Greenhalgh et al 2004, Buchanan et al 2005).

No formal reviews of the evidence on innovation in social care were identified. Although some case study data covers social care settings (Osborne 1996, Henderson 2001, Stevens et al 2005) this remains a significant gap.

Few studies employ a systematic design and even fewer explore underpinning theories (or models) of change (Faulkner et al 2003, Haines et al 2005).

> **"Critical research is key for improving what we know about the impact of innovations on healthcare delivery and people's lives and for using them in the most appropriate way. That implies clarifying the contexts in which innovation proves clinically and socially valuable or not."** (www.hinnovic.org)

The literature underpinning this review is thus partial and limited. There is a need to extrapolate learning from contexts which in some instances are quite different from the NHS. The identification of lessons for innovation within the NHS are thus tempered by these considerations of rigour and relevance.

# The innovation pathway

The innovation pathway (or cycle) can be characterised as containing a series of stages as outlined below. However, it is important to note that in reality, the evidence suggests that innovation rarely corresponds to a linear model (Fitzgerald et al, 2002).


The process through which healthcare user organisations discover innovations remains somewhat ad hoc despite investments in horizon scanning (Knudsen & Roman, 2004) and research and development. The recently set up NHS innovation hubs, along with guidance over intellectual property rights, are a response to a similar lack of cohesion and standardisation in identification and development of innovations from *within* the NHS (DH, 2002). Innovation has traditionally been associated with breakthroughs in clinical practice, so much of the responsibility for identifying innovation has rested with senior medics (Berwick, 2003). However, this arrangement is unsatisfactory, particularly given the expanded range of innovation sought. There is a growing consensus that a range of potentially beneficial innovations are 'out there' – the challenge is primarily one of identification and implementation (Hargadon, 2003).

## Discovery

Innovations may be internally developed or adopted from external sources in processes referred to by Adams et al (2006) as 'opportunity identification', 'opportunity analysis', 'idea genesis', 'idea selection' and 'concept development'. External channels of innovation identification include policy transfer from international health care systems, from other public sector settings, and from industry. The three key health-related commercial spheres are the pharmaceutical industry, the medical device industry and the biotechnology industry. These industries vary in terms of their market structure and maturity and this variation can impact upon their 'fit' with the needs of health care users (Gelijns et al, 2001).

## Adoption

For the purposes of this review, *adoption* is understood as the discrete organisational decision to accept or reject an innovation (Rye & Kimberly 2007). Clearly, within the NHS such decisions may be taken at different times by a range of individuals and organisations including commissioners, provider organisations and national bodies such as NICE. Adoption may also take place implicitly without a formal decision (Fitzgerald et al, 2002).

At the adoption stage of the pathway there is a requirement for clarity of roles and function. Research suggests that this clarity is not always present (Williams & Bryan, 2007). The adoption phase is also the point at which formal evidence and guidance regarding an innovation's costs, benefits and risks should be brought to bear.

## Diffusion

Following adoption, diffusion is the process of *adaptation* required to accommodate the new product or practice within the particular healthcare environment (Berwick, 2003). Innovations that are successfully diffused will inevitably mutate so as to fit with context. Although from the perspective of orthodox evidence-based medicine this may constitute dilution or deviation, adaptation is welcomed by those who consider healthcare systems to be complex and varied and therefore not suited to simplistic solutions (Berwick, 2003). It is also important to avoid inappropriate diffusion – for example through the introduction of costly and/or ineffective practices (Rye & Kimberly, 2007).

## Routinisation

Routinisation requires the innovation to be made sustainable and can be defined as the process through which innovations are maintained for an appropriate period (Greenhalgh et al, 2004). This requires new ways of working to become embedded into practice, performance management regimes and cultural norms – in other words to become part of the corporate culture (Buchanan et al, 2005). The likelihood is that 'sustainability' will manifest itself as 'succession' or 'adaptation' as the innovation mutates and gels with the organisational environment.

## Substitution

In a service which is continually innovating, diffusion and routinisation cannot be considered the sole end-points. Equally important is the process of identifying products and practices that should either be discontinued or replaced. However, this is an area of activity which is invariably overlooked in both policy and research (Williams & Dickinson, 2008).

# Innovation in the NHS

Innovation is central to the reform agenda in health and social care, both nationally and internationally. Despite an estimated annual spend of some £3 billion on medical devices (www.technologyadoptionhub.nhs.uk) the English NHS is considered to lag behind innovation in non healthcare sectors as well as healthcare systems elsewhere (Sheldon 2004, Black 2006, Liddell et al 2008). This view has been confirmed by recent reviews of NHS reforms and performance (Wanless 2004, Cooksey 2006, Darzi 2008). The Cooksey review, for example, recommended increased funding for introducing evidence-based technology adoption within the NHS and Darzi (2008) specifically identified innovation as a source of concern for the NHS. The requirement for a greater focus on dissemination of evidence is also reflected in the recently formed 'NHS Technology Adoption Hub' and the Implementation Programme within NICE (NICE, 2008).

There are commonly considered to be a number of key reasons for this underperformance:

*Disconnection between evidence and practice:*
The slow uptake of innovation is considered to be one aspect of the more general challenge of implementing evidence-based practice within healthcare (Grol & Wensing, 2004). Shortfall in this area is driven by factors such as fragmentation in commissioning and procurement practices in the NHS; a lack of interaction between industry and the public sector (HITF 2007, Liddell et al 2008); and the patchy or sub-optimal use of repositories of evidence-based reviews and guidance.

*Low awareness of innovations:*
There remain relatively few easily and universally accessible routes to information on innovation. Those that exist are not always accessed fully by health care professionals. This is especially so in the area of organisational and process innovations (Grol & Wensing, 2004).

*Shortage of expertise and methods:*
The specific skills and expertise required for discovery and diffusion of innovations fall outside of those traditionally embodied by healthcare professionals. It is insufficient to rely on external change agents to achieve radical and/or continual change and improvement (Greenhalgh et al, 2004).

*Characteristics of the NHS:*
Despite successive reforms, the NHS remains a relatively centralised organisation. At the same time, overall expansion and internal differentiation have increased without equivalent integration of constituent parts. This is considered to have lead to both fragmentation and duplication in services (Glouberman & Mintzberg 2001, 2001a). The sheer size and complexity of the NHS can itself prevent innovation (Greenhalgh et al, 2004). Furthermore, the hierarchical structure of the NHS and the regulation and performance management of its component parts can lead to risk aversion amongst those working within it.

As well as the problems of complexity and fragmentation, the NHS remains an organisation characterised by expensive, specialised and powerful professional groups and high cost institutions and models of care. As a result, resistance to change can become encoded into professional paradigms and practice. When combined with the concerns of regulators about putting patients at undue risk, this can bring about stasis and inertia (Christenson et al, 2000).

Since 1997 a number of 'building blocks' have been put in place in response to these perceived problems (SteelFisher, 2005). For example, the National Institute for Health and Clinical Excellence (NICE) has become a focal point for health technology assessment and clinical guideline development, focusing on appraisal of licensed products and practices and the production of evidence-based practice guidelines. A key aim of NICE is to engender innovation through the rapid dissemination of cost-effective new interventions (SteelFisher, 2005). Although NICE is seen as a world leader in guideline development and dissemination (WHO, 2004), the length of time NICE takes to review the evidence has led some to criticise it for delaying access to new treatments and innovations (Summerhayes & Catchpole, 2006). Furthermore, the institute's outputs to date have not tended to include advice on innovative or 'disruptive' technologies and it has only recently begun to provide implementation support for its appraisal recommendations (NICE, 2008).

NICE's equivalent in the area of social care - the Social Care Institute of Excellence (SCIE) aims to spread evidence of good practice and support transformation of social care services (www.scie.org.uk). This is carried out through research-based publications and resources. A strategy to build an infrastructure to support innovation across both health and social care has been put in place and given impetus by the recent Darzi review (2008). This includes the Health Innovation Council which is charged with providing an overview of all other features of the innovation landscape and with embedding innovation into all aspects of health and social care. The council will work particularly closely with primary care trusts and practice-based commissioners.

English 'innovation hubs' aligned to Strategic Health Authority boundaries also work to champion the cause of innovation, and to identify and support innovation and innovative practices which originate within the NHS.

Additional dialogue between government and industry over the regulation and supply of complex medical products has been pursued in an attempt to better align the agendas of producers and adopters (HITF, 2007)

The recently constituted NHS Technology Adoption Centre is a national body which aims to support the speedy adoption of innovative technologies and is a direct response to slow uptake within the NHS. The centre is in the process of reviewing practice in this area and conducting 'implementation projects' on a sample of technologies (www.technologyadoptionhub.nhs.uk). As part of its research call on technology adoption, NIHR SDO is commissioning an evaluation of the Centre's work (www.ecas.org.uk).

Another key resource for facilitating innovation is the NHS Institute for Innovation and Improvement (NHS Institute) which supports the identification and spread of innovation and improvement within the NHS via programmes of support, training, networking, awards and consultancy (Maher et al 2008, Mugglestone et al 2008). Following on from the work of the NHS Modernisation Agency, the NHS Institute draws explicitly on the improvement literature around social movements (Bate et al, 2004) and experience-based design (Bate, 2007) and has been working with the Centre for Evidence-based Purchasing to create implementation strategies to encourage technology adoption within health and social care (HITF, 2007).

Other relevant networks for sharing knowledge and experience around innovation and improvement include the Care Services Improvement Partnership Learning and Improving Networks (http://networks.csip.org.uk), and the Health Technologies Knowledge Transfer Network (Ansell, 2007).

Recognition of risk aversion within the NHS underpins Darzi's (2008) recommendation that incentives are put in place to support and reward innovation and to build stronger partnerships between health organisations, universities and industry. In conjunction with the statutory duty to innovate, and the Commissioning for Quality and Innovation (CQUIN) payment framework, these developments represent system-wide interventions to facilitate innovation (DH, 2008).

Allied to these developments is the commitment to high-level research on topics of innovation, technology adoption and change management via the National Institute for Health Research (NIHR) (www.nihr.ac.uk).

A further recent development is the National Knowledge Service (www.nks.nhs.uk) set up with the aim of drawing together the work of a range of health and social care knowledge-producing agencies including NICE, SCIE, NHS Institute, Care Service Improvement Partnership, Public Health Observatory, National Patient Safety Agency, Medicines and Healthcare Products Regulatory Agency, NHS Research and Development Programme, Health Protection Agency, Information Centre for Health and Social Care, and the Healthcare Commission.

The service will incorporate:

- The Best Current Knowledge Service: involving assessment of knowledge needs within the NHS and collection of existing data
- The National Library for Health: a personalised web portal offering access to up-to-date evidence and information
- The National Knowledge Management Network: aimed at sharing skills and good practice between knowledge management workers
- The National Clinical Decision Support Service: involving assessment and procurement of decision aids and delivery of the national IT programme.

These developments are significant and have proven to be useful in some instances. However, the extent of their coherence and impact has yet to be fully established. There remains a strong argument for greater linkage and planning across organisations and resources that include innovation among their core aims.

# Determinants of innovation

A range of disciplines and research traditions have a bearing on the topic of innovation in healthcare. However, despite differences in emphasis and categorisation, a clear picture emerges of the main factors influencing innovation and innovation adoption in healthcare. The relative importance of these separate categories of determinants is less clear. This section details the range of determinants identified in the review. These are grouped into four categories:

- characteristics of the innovation
- characteristics of the adopting individual(s)
- characteristics of adopting organisation(s)
- features of the wider environment

As each category is described, comment is provided on the strengths of evidence of effectiveness and impact.

## Innovation features

Much of the evidence on aspects of innovations which influence their adoption and spread derives from the diffusion of innovation literature. Key characteristics include:

*Relative advantage:* the extent to which the innovation is – or is perceived to be – better than current practice (Sanson-Fisher, 2004). Clearly, this is not a fixed property of the innovation and is linked to the extent to which evidence, experience and persuasion is mobilised to convince end users of its benefits.

*Compatibility:* the extent to which the innovation fits with current beliefs, practices and cultures (Kimberly & Cook, 2008). Research indicates that the more radical (and therefore disruptive) a technology is to current ways of operating, the more support is required for its implementation (Greenhalgh et al, 2004).

*Complexity*: the extent to which an innovation is – or is perceived to be – simple to adopt. Whereas some medical interventions appear to have predictable implications for implementers, organisational innovations, for example, are likely to engender greater resistance and therefore require greater implementation support (Ferlie et al, 2005). This is sometimes referred to as the 'usage characteristics' of the innovation (Rye & Kimberly 2007). The more complex the innovation is - for example, in requiring coordinated use by multiple organisational members - the more likely it will have to be *adapted* (rather than simply *adopted*) to a given context (Helfrich et al, 2007).

*Trialability*: the extent to which an innovation can be introduced initially on a small scale in order to observe outcomes prior to full implementation. There is support for the idea that benefits manifest within the adopting organisation or system are valued more highly than those generated in formal studies. Ability to pilot an innovation is thus a significant predictor of spread (Berwick 2003, Helfrich et al 2007). This is linked to the notion of 'observability' (Rogers, 2003) – the visibility of the innovation and its benefits.

In many ways, the properties of a given innovation cannot be separated from the approach to its introduction. Perceptions of an innovation's relative advantage, complexity and observability, for example, are shaped by the implementation and feedback strategy adopted, the presence of adoption champions, and the availability of locally-generated evidence and information.

Similarly, the extent of 'vendor support' for implementation (Rye & Kimberly 2007) and the *maturity* of the innovation (Phillips et al, 2006) also influence the extent to which established channels of sourcing, supply and implementation are likely to be in place.

# Individual features

Much of the early literature on barriers and facilitators to innovation in healthcare focuses on the role played by individuals (often clinicians) leading to the development of resources such as clinical guidelines and decision-support technologies (Williams & Dickinson, 2008). This work has been augmented more recently with a focus on organisations and systems. However, there remain important considerations at the individual level, which need to be considered.

The classic diffusion of innovation model (Rogers, 2003) categorises individuals as:

- *Innovators:* those individuals formally or informally entrusted with the seeking out of creation of innovation
- *Early adopters:* individuals who are both less risk averse and less inculcated into prevailing norms and practices than their peers and who are prepared to link with innovators in order to facilitate introduction of new practices and products. Early adopters are usually 'leaders' of some form and therefore have the potential to increase the receptiveness of others to innovation
- *The early majority:* this is a sizeable group who are prepared to adopt a new innovation as presented by charismatic leaders, subject to considerations such as relative advantage and complexity.
- *The late majority:* this is an equivalent sized group who will adopt an innovation when it appears to be the status quo.
- *Laggards:* this small group of individuals retain a preference for previous practices despite the innovation becoming common practice.

This typology is a construct that is not evident for every innovation in every context (Berwick, 2003). In particular, it has been developed in relation to products (for example devices, treatments) rather than process-based innovations (Buchanan et al, 2007). However, it remains a useful framework for considering the interaction of innovation characteristics and individuals on the spectrum of receptiveness to change. Another typology articulated by Pope et al (2006) distinguishes between 'opportunists,' 'pragmatists,' 'idealists' and 'sceptics'. In their study of the introduction of Treatment Centres, they detail how settlement was required between these different actors in order for the new practices to become embedded.

Individual cognitive capacities, attitudes perceptions, and behaviour patterns have all been shown to be important determinants of adoption of new products and practices (Grol & Wensing 2004, Williams & Dickinson 2008). Furthermore, increases in both the range and volume of available information have led to a reported 'overload' among healthcare professionals (Clancey & Delaney, 2005). Clearly, the resulting inertia and lack of motivation will hamper innovation. Even those more inclined towards innovation will calculate the perceived benefits of the new practices against risk – both to themselves and to service users. If individuals believe their work will be adversely affected as a result of the innovation, or if it is perceived to be difficult to implement, there is an increased likelihood that they will reject the new technology (Williams & Dickinson, 2008). Similarly, negative experiences of previous innovations will increase risk aversion (Parnaby & Towill, 2008) as will general concern over the stability and future of the workplace and the individual's role within it (Buchanan et al, 2005).

Finally, the literature suggests that 'task uncertainty' (for example due to lack of information about the adoption process and what this entails) is likely to make adopters risk averse (Karsh, 2004).

Research into how breakthroughs happen has shown that innovation occurs not through invention but through the application of technologies and approaches developed in one sector to another sector. At the heart of this process are 'technology brokers' who bring together ideas, people and objects. These individuals have the ability to bridge otherwise distant worlds, and also to build communities and networks. This is important because at the outset innovation is mere deviance. Communities and networks help build support for innovation and thereby to convert individual deviance into collective deviance. Underpinning innovation is the need for networks to cross organisational and functional boundaries (Hargardon, 2003).

Individual-level factors will thus affect levels of acceptance and extent of active participation in innovation. The implication is that individuals should be engaged as active change agents rather than passive implementers (Greenhalgh et al, 2004). Successful innovation strategies will need to be presented in a frame which is intelligible and appealing to the individuals and groups involved.

# Organisation features

The importance of organisational context is consistently cited in the literature (Savitz et al 2000, Berwick 2003, Fleuren et al 2004, Greenhalgh et al 2004, Buchanan et al 2005, Helfrich et al 2007, Rye & Kimberly 2007, Williams & Dickinson 2008). There is a growing realisation that many innovations – and especially those that are complex – are primarily adopted *by the organisation* and therefore the primary determinant of adoption is fit between the technology and the adopting organisation's aims, structure and climate (Shortell & Kaluzny, 2006). From this perspective, individual perceptions and beliefs are often merely an extension of organisational context.

**Characteristics of the most innovative organisations**

- Strong, clearly expressed shared values
- A strong, clearly communicated sense of history
- Intense customer focus
- Cultures that encourage openness and playfulness
- Celebrate successes constantly
- Clear focus on trends, even those that do not seem to directly affect current businesses
- Cross functional teams
- An appreciation of the individuals working with them and everything they can bring to the organisation

Important aspects of the organisation include:

*Structure:* It is generally accepted that organisations assimilate innovations more readily when they are functionally differentiated (ie constituted of semiautonomous departments and units), and specialised (Greenhalgh, 2004). By contrast, centralisation – with decision-making concentrated at the top of the hierarchy – is likely to negatively impact upon innovation (Fitzgerald et al, 2002). Innovative organisations avoid rigid hierarchies in favour of decentralised decision making and are likely to have clear lines of responsibility combined with open, multifunctional networks of co-working and information exchange (Buchanan et al 2005). Excessive emphasis on adherence to rules and procedures (formalisation) will also militate against innovation (Fitzgerald et al, 2002). Structural complexity can inhibit adoption of innovations, especially where communication across layers and departmental and inter-organisational boundaries is not actively promoted.

*Organisational climate:* An important predictor of innovation is the extent to which employees perceive that innovation is an organisational priority that is encouraged, facilitated and rewarded (Helfrich et al, 2007). A significant predictor of innovation is the existence of innovation antecedents (Rye & Kimberly 2007) as prior success breeds receptiveness to further improvement (Greenhalgh et al 2004, Buchanan et al 2005). Receptiveness to innovation will be reflected in incentive structures and performance management regimes but also depends on structure and process: does the organisation foster links with innovators and early adopters? Does the organisation foster social exchange or develop habits and structures of isolation? (Rye & Kimberly 2007). A more receptive climate will mainstream the necessary training, technical expertise, support, reward and resources and formalise these in organisational policies (Buchanan 2005, Helfrich et al 2007).

A key determinant of organisational climate is the approach adopted by senior management who are responsible for articulating a vision for innovation and supporting the activity of innovators (Adams et al 2006, Liddell et al 2008). A good example of this is described in case study 1 overleaf. Senior managers need to be prepared to tackle difficult problems, to change their own behaviour, and to encourage high trust relationships (Buchanan et al 2005). Prioritising innovation will potentially have a negative impact on other drivers and imperatives such as accessibility, efficiency and safety (Helfrich et al, 2007).

*Resources for innovation:* The need for set-up and continuation resources has been repeatedly emphasised in studies (Shapiro & Devlin 2000, Greenhalgh 2004, Liddell et al 2008). The evidence suggests that 'slack resources' are required for ongoing innovation (Rye & Kimberly 2007). This 'cushion' enables time and funds to be channelled into new projects. Innovation also takes energy, therefore requiring the release of human resources from other tasks (Berwick, 2003).

*Absorptive capacity:* Strategies for increasing absorptive capacity (or the ability to pick up and run with innovation) include environmental scanning, effective leadership, strong formal and informal mechanisms for the exchange of knowledge, and skills in identifying and evaluating innovation (Knudsen & Roman 2004, Williams & Dickinson 2008).

*Connectedness:* The extent to which boundaries between different professional groups or organisations have been overcome will influence extent of 'connectedness' within and between organisations (Rye & Kimberly, 2007). The more 'connected' the constituent parts of an organisation or organisations, the more likely innovation is to be introduced and spread.

Clearly this is a fairly intangible concept and one which is difficult to measure. However, the literature consistently supports the view that proximity and regular contact across traditional professional and organisational boundaries will facilitate innovation (Williams & Dickinson, 2008) and that relationships of respect and trust can counterbalance other negative factors (Fitzgerald et al, 2002). There are numerous examples of collaboratives, networks and other 'connectivity' initiatives developed to spread and embed innovation. Case study 2, 7, 8 and 9 overleaf provide illustrations of different forms of connectivity.

*Size:* The evidence is equivocal with respect to the optimal size of organisations attempting to innovate (Shapiro & Devlin 2000, Greenhalgh 2004). It is unlikely that this is a reliable independent variable and will depend on factors cited above including slack resources, functional differentiation and regulatory regimes. Inasmuch as size is a proxy for these other determinants, larger organisations will be better placed to embrace and absorb innovation.

Overall there are a number of important aspects of organisational climate that are consistent with innovation. These are summarised by Kanter (1988: 172):

**"It is most likely to grow in organisations that have integrative structures and cultures emphasizing diversity, multiple structural linkages both inside and outside the organisation, intersecting territories, collective pride and faith in people's talents, collaboration and teamwork."**

# Case study 1: innovative organisational culture

## Innovation overview

Cincinnati Children's Hospital Medical Center is a not for profit academic medical centre with 475 beds and 15 offsite centres. The hospital has embedded an organisational culture of ongoing innovation, with a focus on improving the lives of children and families, reducing admissions and reducing costs.

## Adoption and spread

The hospital took a long term view of spreading innovation. Innovation and improvement was a topic of conversation at every board meeting and senior management meeting. The CEO and Board set strategic priorities for improvement based on feedback from frontline staff and families. Frontline champions were allocated time and funds to visit and learn from other organisations. Each senior leader was responsible for at least one improvement team and compensation was tied to achieving team goals. Financial analysts determined the impact of innovation projects. Measurement tools were developed at the outset of projects and used consistently throughout.

One goal was to spread innovative asthma care. The most successful adoption strategies included:

- Identifying the population and creating a registry
- Self management skills training for families and children
- Collecting data and feeding it into practices
- Collaboration among practices
- Using a web based registry as a tool for spreading good practice
- Practice level clinical leadership
- Reimbursement for performance (eg financial rewards for practices that adopted innovation)

## Key lessons

- People may be more ready to adopt innovation when it is linked to reimbursement.
- Clear measurement strategies and easy to use measurement tools are essential.
- Spreading innovation is a long term goal, not a short term 'project.'
- Having innovation on every meeting agenda keeps this at the forefront of the organisation.
- Strong leadership is essential to create buy in throughout the organisation.
- Allocating funds and ring fencing time to learn from others works well.
- Assigning champions gives people a sense of responsibility for innovation.

## NHS applicability

Creating a culture of innovation will be essential as SHAs take on their new statutory duty to promote and embed innovation. Lessons that may be applicable in the NHS context include discussing the scope for innovation regularly at senior meetings and being aware that it can take significant time to embed innovation because this requires new ways of thinking and attitude change. A pitfall for SHAs to avoid is seeing innovation on a 'project' basis rather than as an entire way of working and thinking. One factor that may not be readily transferrable relates to reimbursement. It is unlikely to be feasible for SHAs and PCTs to reimburse practices and PCTs for performance, although existing financial incentives such as QoF points or LES agreements may be useful. SHAs may wish to think more creatively though, about how to incentivise PCTs, practices and partner organisations for innovative thinking. Awards schemes, networking functions and away days, innovation 'league tables' and provision of extra training may be incentives worth considering.

More info: www.cincinnatichildrens.org

# Case study 2: partnership with the private sector

## Innovation overview

Birmingham OwnHealth is a partnership between a PCT (the commissioner), a private sector provider (Pfizer Health Solutions), and NHS Direct (subcontracted by the private sector). The programme uses NHS Direct nurses and call centre facilities to proactively support people with long term conditions with the aim of increasing self management and reducing unnecessary use of health services, especially unplanned admissions. People with conditions such as diabetes and heart disease are sourced from GP lists and invited to enrol in the telephone care management programme. Participants receive regular telephone calls which involve checks on symptoms, motivational interviewing and information to support self management. The programme was developed by Pfizer Health Solutions in the US, and adapted for use in the UK. The programme reported measurable improvements in motivation to change, healthy behaviour and dietary change and a trend towards reduced use of hospital services.

## Adoption and spread

The programme was spread to England from the US via one small pilot site in Greater London, before being trialled and expanded in Birmingham. Having a private company eager to push the programme forward was important in the adoption of telephone care management in England. The policy context was accepting of telecare at the time the programme was initiated (2005), and new funds had been made available from central government as well as within individual PCTs to trial innovative technologies.

Birmingham OwnHealth set up an evaluation from the outset with clear measures of success, including value for money. The aim was to collect information that would allow the programme to be extended after its trial period and be rolled out to other parts of England. A communications strategy was also developed so that partner organisations, frontline personnel and other organisations were provided with regular updates. Press releases were issued and programme leaders attended conferences to share their experiences. The team did not wait until they had outcomes to report; they aimed to disseminate information about the set up, training and implementation of the programme to generate interest and excitement.

## Key lessons

Success factors from this programme include:

- Drawing on the expertise of providers outside the NHS
- Real partnership: PCT commissioned private sector who in turn trained NHS Direct nurses
- Investment in training: nurse care managers went through a 4-5 week training programme
- Building in evaluation and communication plans from the outset to support spread

## NHS applicability

An implication for SHAs and PCTs is that there is much scope for diffusing innovations already developed in other countries or regions. However it does take time to adapt the models and language used elsewhere. In this example, the decision support software used by nurse care managers was redeveloped and patients wanted to meet their care manager in person to put a face to a name (compared to US models which were wholly telephone based). There was also much more extensive liaison and integration with GP services required. The key learning point for SHAs is that innovation requires adaptation, not merely adoption of what has been done elsewhere.

More info: www.birminghamownhealth.co.uk

# Environment features

Depending on innovation-type, a range of broader factors can influence adoption and spread. These include the external regulatory or market environment (Rye & Kimberly, 2007). In the NHS this might include national priorities and targets, the agendas and practices of commissioning organisations, and the behaviour of competitors (for example in healthcare provider markets) (Liddell et al, 2008). As previously described, number of macro-level mechanisms have been put in place to generate an environment conducive to innovation in the NHS. However the effects of these initiatives have yet to be demonstrated and further evaluation is required.

International experience sometimes mirrors and sometimes is widely divergent from England. For instance, in Australia there is no formally-constituted national body tasked with fostering innovation from either a technological or management perspective. A number of groups (largely University-based) purport to encourage innovation in specific areas and there is an Australian Resource Centre for Healthcare Innovations which aims to disseminate information on service innovation. However practitioners or managers sometimes feel that the healthcare system is fragmented and that this is reflected in how innovation is disseminated. England may benefit from a more cohesive system and therefore there may be greater potential to spread innovation more quickly.

External determinants include external networks such as formal and informal professional networks (Fitzgerald et al, 2002) and co-operation and coproduction by service users themselves (Bovaird 2007, Williams 2008). This category of determinants underlines the importance of a supportive environment for innovations which may bring about disruption and risk (Tyler et al, 2007).

Case study 3 illustrates some of the pitfalls of not accounting for wider environmental and contextual factors when rolling out innovation.

# Summary

Determinants of innovation operate in relation to the innovation itself, the adopting individual, the organisational context and the wider context. For complex innovations there is likely to be interaction between a multiplicity of these attributes and it is not always straightforward or even possible to identify which is impeding or facilitating adoption at any one time (Bradley et al 2004, Buchanan et al 2005). It is intrinsically difficult to predict which factors will facilitate innovation as by definition innovation involves unpredictability, controversy and the evolution of new knowledge and context-specific practices (Caldwell & O'Reilly, 2003). This suggests the need for case-by-case planning, analysis and evaluation. Putting complex interventions into complex systems cannot be moulded into simplistic formulae or 'cloning' of strategies that have been successful elsewhere. Prescriptions for increasing or facilitating innovation are therefore necessarily partial. With this proviso in mind, the next section summarises the evidence on effectiveness of resources and strategies for embedding innovation in the NHS

# Case study 3: the need to invest time and funds

## Innovation overview

Quality improvement initiatives have been suggested as a way to ensure innovation and continuous improvement in healthcare and other sectors. Germany, Japan and the US have undertaken a great deal of work to assess how quality improvement methodologies from industry may be transferred to healthcare. For example, in the US a national demonstration project on quality improvement was set up. Twenty-one health care organisations from across the country teamed up with an equal number of industrial quality management experts to form local project teams.

Each team produced a formal statement about the issue to be tackled, a work plan, and an agreement to report on progress eight months later. Each project tackled different areas, but all applied the principles of continuous measurement, small incremental steps and regular reporting and feedback.

## Adoption and spread

At the same time as the US demonstration projects, the NHS also invested in a major three-year pilot programme of 'total quality management' initiated by the Department of Health with 23 sites, ranging from departments within units to entire districts. Formal quality improvement initiatives can be expensive. It was estimated that the cost for an average multiple site acute unit reached £350,000 to £500,000 per year for the first two to three years. The impact appeared negligible and only two out of the 23 sites made good progress.

## Key lessons

The key lessons from the Department of Health pilots is that:

- There was a generally unreceptive context to innovation and improvement in the NHS. Staff and teams felt that there was little stability within their organisations and that any new programme was just the 'latest scheme' and would soon be replaced with something else.
- One demonstration site was more successful due to a perceived threat from a local teaching hospital. US pilots also found that 'near death experiences' or challenges to teams and units can provide motivation to pursue quality improvement or innovation initiatives. Teams need to see a reason for taking part.
- One of the main reasons for 'failure' was that NHS pilots did not invest in training and support for change on the same scale as private sector organisations that routinely implement quality improvement. Education and training are expected to make a substantial contribution in total quality management and continuous quality improvement.
- A lack of clinical engagement was seen as another reason for poor performance of the NHS pilots. Attendance of hospital consultants at training events ranged from 30% in some sites through to 1-5% at others.

## NHS applicability

The implications for SHAs are that there are known pitfalls to avoid when rolling out a culture of innovation, including a lack of clinical engagement, not adapting innovations and initiatives to the local organisational culture and context, lack of motivation among teams to take part, lack of training, underestimating the financial investment required and not assigning staff time or backfilling to allow teams to concentrate on nurturing and spreading innovative ideas. Innovation takes time, people and money.

More info: Joss R, Kogan M. *Advancing quality: TQM in the NHS*. Open University Press, Buckingham, 1995.

## Theories of change

One of the reasons for innovation failure is the reliance on methods of implementation without connection to a broader theory of *why* or *how* particular methods will bring about change and improvement. This highlights the need to link methods of innovation implementation to a clear understanding of how organisations and sectors operate and therefore how they respond to new practices (Leeman et al, 2007). Increasingly, there is a recognition that theories highlighting complexity, non-linear diffusion, and social construction of organisations help us to understand why the experience of innovation varies to such a large extent across different contexts. Whilst no one theory can translate into a blueprint for action, it can provide an important starting point in establishing how a programme of change is intended to be successfully implemented.

In The Netherlands, the government is testing whether promoting frontrunners and taking a 'collaborative' approach will speed innovation. The Dutch government has transformed the health system from a public service into a private service under public control to introduce more market competition. There is a desire to build and spread innovative practice. This has been done in three stages. Leaders from health and other industries were invited to provide innovative ideas, quality improvement circles of adoption were installed along with performance indicators and clusters of hospitals are working together to try new approaches. There have been reported improvements in logistics and safety. The entire model is built on the theory that demonstration of success is a driving wheel that stimulates others to adopt innovations.

## Evidence

**"Research is the raw resource that fuels the health economy and is the engine of change in our health system."**
(www.cihr-irsc.gc.ca)

Formal analysis – for example presented as HTA and Cost Effectiveness Analysis (CEA) is an important resource for those seeking to identify the evidence-base for new products and (to a lesser extent) practices. Such analyses are particularly useful at the adoption phase of the innovation pathway.

Case study 4 provides an example of how evidence has been used successfully in the US to embed and sustain innovative practice.

However, methods which focus on evidence as a source of inspiration for innovation have a number of limitations. Firstly, studies and methods are mostly geared towards evaluation of discrete technologies in terms of effectiveness, safety and value for money (Gelijns et al 2005, Sorenson et al 2007). By contrast, complex organisational interventions are far harder to evaluate.

Secondly, generation and synthesis of evidence alone is relatively limited in its capacity to facilitate innovation adoption (Lehoux et al 2008, Williams et al 2008). This is mainly because adoption requires context-specific information about costs (for example whilst the costs of MRI units are not seen as influential in their adoption, the cost of site preparation is (Rye & Kimberly 2007)), social and clinical appropriateness, implementation, local obstacles and hurdles, and how changes to current practices can actually be enacted.

Formal reports of evidence and analysis rarely include implementation guides and tend to privilege explicit knowledge at the expense of practical and experiential (tacit) knowledge. Finally, the reality of healthcare is such that many innovations are introduced before a formal evidence-base is in place.

Overall, the generation of formal research evidence is a necessary but insufficient element of innovation. There is a need to move from knowledge 'transfer' to knowledge 'exchange' in order to overcome individual, organisational and system-level barriers.

Given that an experimental design approach to evidence generation is inappropriate for innovation adoption, there is a need for alternative methods of data collection and analysis. Data drawn from the adopting (or at least similar) organisations may be more persuasive than peer reviewed journal articles and systematic reviews (Bradley et al 2004, Leeman et al 2006). Evidence of what works and in what circumstances needs to be recorded and shared using a variety of methods and channels. Data to support start-up, implementation and review of innovations must be 'credible and persuasive' to those who make budget decisions (Bradley et al, 2004).

This is again connected to the need to engage those involved as active rather passive change agents:

> **"To be effective, information needs must be translated into information seeking behaviour and then into information use, connecting information to real action which matters to patients."** (Swinglehurst, 2005: 199)

Simply making evidence available will not engender its usage and approaches to knowledge exchange should incorporate the necessary reconstruction of evidence within the organisational context (Dopson, 2007). Waterman et al (2007) advocate the use of action research – an iterative process of data collection and implementation support – for diffusing complex interventions. This approach acknowledges the value of active and ongoing engagement of those in the adoption context, and the need for a high level of adaptation to context, especially for complex innovations.

# Case study 4: focus on what works

## Innovation overview

The 100,000 Lives Campaign was run by 20 staff at the US Institute for Healthcare Improvement (IHI). It influenced improvement in more than 3000 hospitals, accounting for 75% of all acute care beds in the US, by focusing on quick wins and six areas of known improvement. The aim was to save 100,000 lives by improving safety in hospitals. The innovation was how the improvement topics were rolled out to diverse organisations and how there was widespread buy in and adoption of the campaign. Rather than suggesting that hospital teams develop their own innovations, a more centralised planning approach was taken: the IHI team decided on the goals based on evidence of good practice, told participating hospitals how to achieve them and provided tools to help hospitals implement the changes.

## Adoption and spread

The programme involved disseminating six key action areas to senior leaders; using regular emails, promotional newsletters, workshops and events to gain buy in; setting up networks or nodes rather than working individually with each organisation; and planning good monitoring and data collection strategies from the outset. Having a well known target to work towards and constantly providing progress reports towards this helped the programme snowball.

## Key lessons

- Having a 'campaign' or defined joint programme aim can draw organisations together.
- Focusing on tried and tested methods as a starting point can help ensure rapid spread.
- Focusing on high level leadership worked well because the aim was to gain buy in at an organisational level.
- Extensive promotion took place, including with the public to ensure that all stakeholders were aware of the goals and could put pressure on those that were not taking part.
- Working with champions and thought leaders was important, as was involving local, regional, and national organisations and stakeholders from health, social care and the third sector.
- The message was simple, the tools distributed were easy to apply in day to day practice and the goal was universally accepted: saving lives.

## NHS applicability

An important lesson for SHAs, which now have a legal duty to drive innovation, is that sometimes centralised roll out of innovation and improvement can be beneficial, particularly in areas where there is good evidence about what works. Innovation is not solely about encouraging teams or organisations to consider new ideas or methods, it is about rolling out improvements widely. Some of the promotional techniques, campaign planning and use of nodes and networks from the IHI model could be applied within the NHS to roll out regional innovation and improvement programmes. In the context of divested authority and budgets, SHAs may focus on innovation at the level of supporting other organisations, but this example suggests that there is much to gain from a more centralised approach that pushes forward adoption of principles on a larger scale rather than solely focusing on encouraging organisations to innovate themselves.

More info: www.ihi.org/IHI/programs/campaign

# Dissemination tools

Other tools and strategies exist to support the adoption of good practice, evidence and innovation including: written guidelines, conferences, educational outreach, and electronic decision support systems.

In New Zealand, the Ministry of Health holds an annual event and gives awards for innovations. Health and social care agencies, universities, voluntary organisations and service user groups are all rewarded publicly for innovations in planning, service delivery and evaluation. The awards provide a tangible motivation and the event provides networking and 'training' opportunities.

In general, dissemination tools are designed to improve the diffusion (or implementation) phase. Such evidence as exists shows only modest impact of each of these tools (Innvaer et al 2002, Lavis et al 2003, Grimshaw et al 2004, Grimshaw et al 2006, Mitton et al 2007).

Although research suggests some additional benefits of multiple application of dissemination techniques (Solberg et al 2000, Lavis et al 2003, Chaillet et al 2006) it is not known which components of multifaceted interventions are the most effective (Davies, 2002).

There are a number of possible reasons for the modest impact of such strategies on adoption and spread. Firstly, the model remains one of *transfer* rather than *exchange* of knowledge, preventing end users from exchanging tacit knowledge and perceptions regarding an innovation. There may be little room to make sense of or 'replicate' the information within the specific local context (Landry et al, 2006). Secondly, guidelines, decision support systems and educational outreach do not in themselves create incentives to innovate (Williams & Dickinson, 2008). Their impact is therefore dependent upon by the receptiveness of individuals, organisations and broader systems (Solberg et al, 2000).

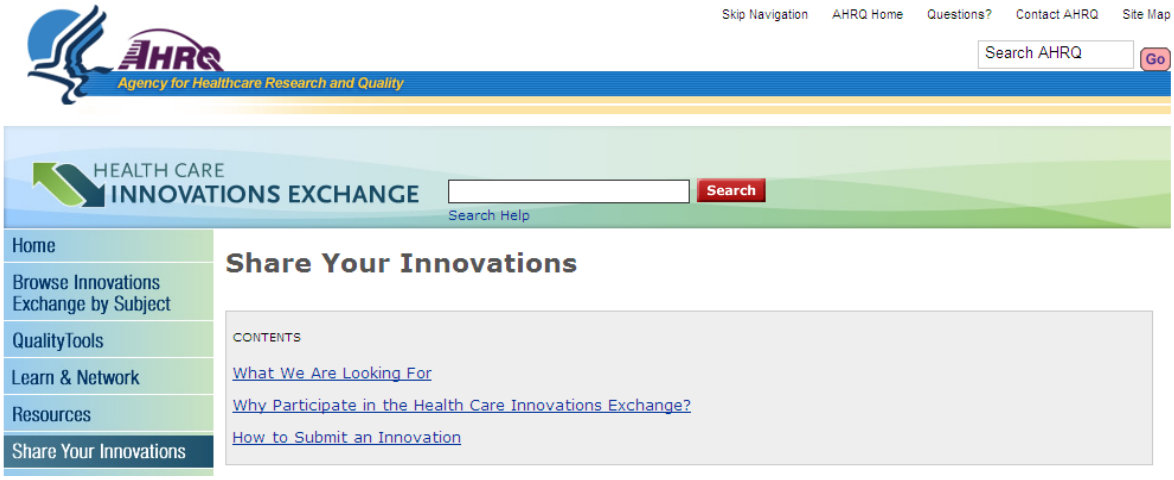
Berwick (2003) points out that the more end users know about the benefits of an innovation the more they are likely to adopt it. However, he also notes that dissemination tools are often incompatible with current processes, felt needs and belief systems. To be more effective, innovation dissemination tools need to be more flexible, adaptable and co-produced with end users.

Over the past decade, thousands of healthcare innovation projects have been publicly funded in Finland. Many have focused on technology innovation, but there is now a more explicit policy focus on innovation in service delivery. Dissemination and uptake has been identified as an obstacle so the national Service Innovations in Health and Social Care' programme has been set up to develop dissemination tools. One such tool is 'Service Scale,' an online database to summarise quantitative performance indicator data from recent innovations. When possible, data on access, volume, costs, quality, productivity and effectiveness is presented. The aim is to promote accountability and transparency and introduce more competition. The developers believe that this will support uptake of new innovations, as organisations will want to keep up with each other. Other innovations in Finland include developing strategic partnerships between organisations funding innovation projects in health and social care with a forum for strategic discussion and co-ordinated or joint funding rounds, and a potential 'InnoVillage' will be created over the next five years. This will consist of a virtual 'town' with innovation bank, innovation workshops, InnoCollege, InnoMarket and national and regional networks of experts, managers and decision makers. The programme will use new social media IT technologies and focus on building networks of innovators.

# Case study 5: sharing good practice online

## Innovation overview

The US Agency for Healthcare Research and Quality (AHRQ) has set up the 'Healthcare Innovations Exchange' website. This is designed to be a national electronic learning hub for sharing health service innovations and bringing innovators and adopters together. It can be used to draw on the experiences of others when planning innovation locally.




## Adoption and spread

The website includes a searchable database featuring innovation successes and failures, expert commentaries, and lessons learned. It was set up specifically to share innovation and help improve the quality of care. The website also contains a series of tools and networking functions.

## Key lessons

- The case studies are short to keep the interest of busy managers and clinicians.
- Contact details are provided in case readers want further details from local services.
- The website helps people and organisations network - a key part of spreading innovation.
- Submissions to the database are voluntary so are of varying quality.

## NHS applicability

The database contains thousands of case studies, spanning primary and secondary care and specific clinical topic areas. While all of the case studies are from the US, they have the potential to spark ideas or help in planning and avoiding pitfalls in the NHS context. The database is well used, especially for networking purposes. Something similar could be set up on a regional or national scale for health and social care in the UK, building on the other formal knowledge transfer networks already available. What makes this innovation different to existing NHS networks and knowledge sharing frameworks is that the emphasis is on case studies and learning from the experience and passion of others. It is something that an SHA may wish to trial in its region, before considering national expansion.

More info: www.innovations.ahrq.gov

# Adoption resources

Our analysis illustrates the need for locally-specific capacity and capability to be put in place. However, there is relatively little empirical data relating to the optimal level or area of resource required to facilitate innovation. This reflects both a gap in the research literature but also the intrinsic difficulty of identifying what is needed in different situations. Despite these uncertainties, the NHS Institute (and its predecessor the Modernisation Agency), outlines key elements of an innovation infrastructure and strategy in a number of publications based on its experience of innovation and improvement (MA 2002, 2004, Buchanan et al 2005, Mugglestone et al 2007, Maher et al 2008).

**Key elements of innovation infrastructure**

- A steering committee with a suitably broad and senior membership
- Expert, dedicated project management capacity
- Access to expert facilitators
- Procedures for problem-solving and conflict resolution
- Senior management time and support
- Training for staff, both in terms of generic innovation and in relation to specific interventions
- Effective team working
- Technical and other support mechanisms
- Quality management systems

Research indicates that access to external change agents can be useful in generating buy-in to new practices (Leeman et al 2007, Williams et al 2009). Finally, the financial resources required to set up the new ways of working; provide marketing, training and education; resolve implementation problems; promote spread outside of the initial context of introduction and; ensure succession and routinisation should all be carefully planned and costed for (Bradley et al, 2004).

The work of the NHS Institute suggests that a range of implementation methods can have a substantial impact on outcomes (Gelijns et al 2001, Coughlan et al 2007). Important areas to consider include incubation (developing 'rough versions of an end product or quickly simulating how a process can work through a variety of methods including "walkthroughs", role plays etc' (Mugglestone et al, 2007: 22)) and prototyping (learning faster through exploratory early intervention and failure, leading to innovation development and refinement).These strategies can be added to more conventional modelling and piloting in the pursuit of a 'learning by doing' approach to innovation.

Case study 6 outlines how the US Veteran's Affairs health system used technology and innovation checklists as adoption resources.

Case study 7 describes how quality standards and guidelines have been used to roll out innovation in one US region.

# Case study 6: technology to embed innovation

## Innovation overview

The US Veteran's Affairs Administration provides public sector healthcare for US military veterans and has developed a culture of innovation. In 1990 it was seen as a health service of last resort and the US Congress was considering disbanding it. In less than two decades the organisation is rivalling private sector services on quality performance measures and patient satisfaction. Strong leadership was essential in this turnaround (see p33), but technology was used extensively to help adopt and spread innovation. For example, the organisation used 'Advanced Access,' a scheduling system that allows patients who telephone arrange an appointment on the same day. Average appointment waiting times nationally fell from 60 days in 2000 to 25 days in 2004.

## Adoption and spread

The Veteran's Affairs system innovated based on strong leadership, instilling a culture of change, using local spread teams and a myriad of other improvements. We focus here on just one of the cornerstones of the system: an electronic health record which provides clinicians and care teams reminders based on guidelines, clinical best practice and lessons learned from throughout the system. The electronic health record prompts clinicians to collect data and run tests and provides suggestions about preventive care. It also allows constant performance checking of routine data. This system has helped to spread best practice so that clinicians adopt improvements day to day. Veteran's Affairs teams used various methods to disseminate their innovations throughout the organisation, including internal newsletters, emails, monthly meetings and in some cases a formal 'collaborative' process (following the methodology of breakthrough collaboratives). Most importantly, there was a formal framework for spread adopted which planned how to spread ideas.

## Key lessons

- The Veteran's Affairs system adopted the philosophy that only through centrally mandated change would improvement and innovation spread.
- As long as leaders of organisations or areas could demonstrate an improvement in waiting times and access, it did not matter how they made the improvement. Areas and leaders had the freedom to action ideas in different ways – but the goals were centrally driven.
- Everyone in the Veteran's Affairs system new that reducing waiting times was a priority.
- Each region designated a 'spread team' with high level leadership.
- Providing information about how to initiate and sustain advanced access to care was essential, as were champions who could promote the innovation and address sceptics.

## NHS applicability

The Veteran's Affairs approach may have applicability to the NHS because it is also a large, nationally diverse system. A learning point for SHAs is that there is much to be achieved from centrally driven innovation, with flexibility amongst local initiatives to achieve the overarching goal. Another learning point for SHAs is the use of a 'checklist for spread' including questions such as: is innovation in this area a strategic priority for the organisation, is there a senior executive who will be responsible for the spread, is there a team that will take responsibility for spread day to day, will leadership supply the tools needed for success (personnel, equipment, finances, information technology), is the innovation scalable throughout the health economy, is there a clear communication plan? Using a scoring system or checklist such as this may help SHAs to prioritise new initiatives and business cases and ensure that initiatives have adequate resourcing and planning for spread and adoption.

More info: www.ihi.org/IHI/programs/campaign

# Case study 7: ‘quality improvement’ clubs

## Innovation overview

The Institute for Clinical Systems Improvement was set up in Minnesota for the explicit purpose of spreading innovation and improvement. The Institute is funded by large hospitals and HMOs. These organisations realised that often with innovation, a champion comes up with a new idea, it is implemented in one clinic or hospital to good effect, but then no other units or sites adopt it. The Institute was set up to overcome this, fostering spread both within and between organisations. It is an organisation that hospitals and clinics voluntarily sign up to join – and in order to join groups must pledge to focus on innovation and spread.

## Adoption and spread

The Institute concentrated on developing protocols, clinical best practice guidelines and concrete metrics to measure every organisation in the state. The initial spread strategy was to start with the highest performing and most well known organisations and challenge other providers to emulate them. Clinics and hospitals became Institute members in order to associate with other high profile organisations in the region.

In order to join the Institute, providers must adhere to certain quality standards, commit to undertaking four quality improvement projects each year (two on topics selected by the Institute), and demonstrate senior leadership buy in. The Institute acts like a ‘quality improvement club’ whereby members must make a commitment to adopting and spreading innovation as part of their membership.

## Key lessons

- The Institute developed clear performance measures.
- The Institute rewards attempts to improve, not just improved performance measures. If there is no change in performance measures, organisations are not penalised. They just have to demonstrate ongoing attempts at improvement and innovation.
- There is mandatory training for all ‘improvement leaders’ in organisations that become members. Training involves a one day meeting three times each year, monthly teleconferences, coaching sessions and ‘homework.’

## NHS applicability

It is uncertain whether such an initiative would work within the NHS. There may be little impetus to join a quality improvement network or institute of this nature, especially as substantial time and funds may need to be committed to innovative projects. The NHS does not necessarily have the same focus on prestige so joining an improvement initiative just to be alongside the ‘big players’ may not be applicable.

One important learning point for SHAs is the value of champions for adoption and spread. To ensure that innovations tested at one site were rolled out to others, organisations used a ‘sales model’ whereby each pilot site had a champion who went to other sites to persuade others to adopt the innovation. This approach was found to work well in organisations with strongly autonomous physicians who resist change mandated from central leadership, and may have some applicability in the NHS. The organisations found that in order to ensure spread, changes must be prioritised and promoted by clinicians and other frontline staff and that these staff must be released from their day to day duties in order to spread the value of their innovations via word of mouth.

More info: www.icsi.org

# Networks

There is a growing literature focussing on the value of networks and other collective models in the pursuit of improvement in health care.

Case study 8 describes the US 'collaborative' model which has been widely documented and applied throughout the UK and Europe. Collaboratives are more than merely professional networks. In this section we use the term 'network' more broadly to encompass organisations and teams coming together to share good practice and help ensure the adoption and spread of innovation.

Although the evidence is largely drawn from case studies, networks are consistently cited as an important facilitator of innovation diffusion and spread (Fleuren et al 2004, Knudsen & Roman 2004). For example, Greenhalgh et al (2004: 601) argue that 'interpersonal influence through social networks … is the dominant mechanism for diffusion' and this is especially so in cases where adoption requires collaboration across organisations. There are a number of reasons why investing in network development might be fruitful for innovation. The range of different network types is too extensive to go into here (see Goodwin et al, 2004). However, we describe some key features.

*Networks facilitate tacit as well as explicit knowledge exchange:*
Through a focus on interpersonal exchange and facilitated interaction, network approaches can engender the 'predisposing, enabling and reinforcing' required for innovation (Grol, and Wensing, 2004: 58). Unlike traditional dissemination techniques, networks foster *exchange* rather than linear *transferral* of information. This links to the opportunity for sense-making whereby shared organisational narratives of 'what we are doing with this innovation' can emerge (Greenhalgh et al, 2004: 611-612).

*Networks can help develop receptive contexts:*
Work by the NHS Modernisation Agency and NHS Institute sought to move beyond traditional planned programmes of change to an approach based on social movements theory (Bate et al, 2004, see Appendix 2 for more detail about this theory). This is in recognition of the importance of local, grassroots mobilisation to sustained change. Innovations are likely to take hold where they are consistent with local context and climate. For this reason, the primary focus should be on methods for engendering a culture receptive to change and innovation. Networks (or 'communities of practice') are important elements of local mobilisation and will therefore be key to the creation of these receptive contexts for change.

*Networks facilitate learning & problem solving:*
Sharing experience and expertise and responding to obstacles as they arise would appear to be important functions of a network developed around innovation diffusion (Williams & Dickinson, 2008). However, previous experience suggests that such networks require sufficient institutional support to ensure momentum and longevity without becoming overly bureaucratic or hierarchical (Bate & Robert, 2002).

*Networks can build a 'coalition for change':*
The importance of collective support for innovation is underlined in the literature. Networks can be critical to the exchange of knowledge required to familiarise end-users with the features of a proposed innovation (Fitzgerald et al, 2002). This links to the potential to increase observability whereby networks enable the behaviour of early adopters to be visible to the broader group (Berwick, 2003). Greenhalgh et al (2004) found that innovation can be triggered by the knowledge that similar organisations have previously followed a similar course.

*Networks can address problems of scale:* Smaller organisations with less slack resources or a poorer innovation infrastructure can compensate by tapping into inter-organisational networks to draw on the information, experiences and resources of others (Berwick 2003).

*Networks can be innovations in themselves:* There are examples where networks might constitute an innovative model of service delivery (see Case Study 8). In chronic care where traditional models of health service delivery are poorly equipped to meet patient need networks including patients and service users have been found to lead to better self-management (Hwang & Christensen, 2007).

*Networks can connect users and producers:* Research in this area unanimously cites the importance of interaction between producers and users of innovation, especially in situations where the innovation does not originate from within the NHS 'family' (Hargadon, 2003) and in very new areas of innovation (for example tissue engineering) where there is an enhanced need to anticipate and overcome potential obstacles (Gelijns et al 2001, Phillips et al 2006).

Despite the potential benefits of networks, a number of concerns are identified in the literature. In particular, these relate to the history, structure and composition of the network in question. Networks are not entirely self-creating or self-sustaining and often rely on a prior history of collaboration and strong leadership to ensure circumvention of professional divisions (Greenhalgh et al 2004, Dobbins et al 2007). Innovation networks are likely to be most effective when comprising multiple stakeholder groups.

Networks organised according to profession or speciality are unlikely to facilitate effective exchange and diffusion across organisational and professional boundaries (Fitzgerald et al, 2002). Indeed, some authors argue that professional networks in particular can *impede* innovation (Ferlie et al, 2005). Innovation networks should therefore be designed to capitalise on the 'weak ties' between traditionally divergent groups that enable new ideas and experiences to be exchanged (Berwick, 2003). To ensure optimal involvement, the importance of a multidisciplinary work group to oversee the network has been suggested (Leeman et al, 2006).

Highly 'cosmopolitan' (externally networked) arrangements are preferable but more difficult to implement. For example, interaction within and across formal boundaries relies on compatibility of performance management structures and incentives (Greenhalgh et al 2004, Williams and Dickinson 2008). Furthermore, knowledge and involvement of the users and beneficiaries (patients and carers) of proposed health care change is also important, especially where co-production of care is involved (Batalden & Splaine, 2002).

# Case study 8: collaboratives

## Innovation overview

The US Institute for Healthcare Improvement (IHI) developed the 'breakthrough series collaborative' model to help organisations implement innovation rapidly. The process involves organisations coming together to learn from each other and focus on a particular (clinical) topic area. The group generates a list of possible ways to improve the specific topic, rates these for feasibility and likely impact, then focuses on the highest ranking changes. Each collaborative has about 20-40 organisations which implement their own change initiatives, and lasts for 9-12 months.

## Adoption and spread

Collaboratives aim to spread innovation using rapid cycles of planning, implementing, evaluating and disseminating. Each organisation reports back regularly to others to foster the spread of learning. Email, teleconferences, websites, dissemination meetings and leadership training are all used to promote adoption and spread. In the US, Breakthrough Collaboratives have spread widely, with hundreds of organisations now involved in this approach. The UK, Sweden, Norway, France and the Netherlands have all tried this method.

## Key lessons

- Collaboratives avoid a 'project' mentality. The collaborative or the topic area is not seen as a project, but rather as the new way that things will be done from now on.
- The main focus is on clinical subject matter. Improvement and innovation is seen as a part of the work process, not as a separate or special function. Collaboratives are less successful when the methodology takes precedence over the goal of improving services.
- In the US, a leader with a national reputation in the selected topic is used to chair the collaborative. A planning group then sets the goals and clear outcome measures that all organisations will use to monitor progress. In England shared outcomes measures have not always been used or planned in advance, and this made evaluation problematic.
- In the US, each participating organisation pays an enrolment fee to demonstrate commitment to change and senior leadership support. This has not always been implemented in other countries – and this may be one reason why collobaratives are sometimes seen as 'just another project' when the underlying philosophy and approach is not understood or followed by those seeking to implement it.

## NHS applicability

Collaboratives have been set up in England for cancer services, orthopaedics, mental health, primary care, emergency services, coronary heart disease, and medicines management. While it may be tempting for SHAs to use a collaborative model to foster and embed innovation, evaluations and action research projects have found that UK collaboratives did not show such rapid success as US equivalents. In some cases, teams in England felt the methodology was perceived to prescribe how to go about change and inhibit the natural flow of progress or the 'NHS way' of doing things. The NHS may have treated collaboratives as though they are 'networking meetings' but they are actually about demonstrating commitment by dedicating leadership time and funding to a topic area, sharing ideas, and taking part in rapid quality improvement. The implication for SHAs is that when trialling innovative models of dissemination from elsewhere, it may be important to understand the underlying principles of those models, not merely the mechanics. Adaptation to the local context is essential, but sometimes the adaptation is so great that the model loses the fundamental characteristics that made it worthwhile.

More info: Numerous specific US case studies are available at www.ihi.org

# Leadership

A final area of activity which gains much support from the empirical literature is the nurturing of leaders or innovation 'champions' (Shapiro & Devlin 2000, Rogers, 2003). Fitzgerald et al (2002) distinguish three types of opinion leader:

- Those who channel information across organisations and networks, linking with innovators, experts and practitioners.
- Those bestowed with expertise (often clinical ) and local credibility.
- Those with strategic management and political skills.

Most studies indicate that the most common means of effecting change through leadership involves exercising of charisma and demonstrating commitment to innovation (Leeman et al, 2007). Leaders will drive innovation set up, monitor implementation, and provide feedback and guidance to stakeholders (Rogers, 2003) as well as assisting with presentation of a financial 'business case' to the adopting organisation (Bodenheimer, 2007). Frequently these activities will involve shaping the form in which innovation is adopted and adapted locally (Fitzgerald et al 2002). Essentially, these tasks require a brand of leadership that is consultative, facilitative and flexible as well as being commensurate with a networked approach to change and improvement.

However, to the extent that innovation requires disruption and discontinuity, leaders will also have to exercise entrepreneurialism and an ability to manage the authorising environment so that practices which run counter to established operating norms and procedures are introduced and embedded (Mulgan & Albury 2003, Phillips & Garman 2006). Case study 9 provides an example of gaining a balance between continual innovation and routinisation.

In order to create shared expectations around innovation, leaders must contribute to a climate in which occasional mistakes are accepted as inevitable and task orientation is encouraged (Caldwell & O'Reilly, 2003). Clearly, this requires the overarching support of senior management and reinforcement in organisation policy and mission.

Case studies suggest that several leaders at multiple organisational levels are present in innovative organisations (Helfrich et al, 2007). In particular, the research underlines the importance of nurturing both clinical and managerial champions. However, these can be difficult to select prior to introducing innovation as leadership candidates often emerge spontaneously. Furthermore, as with networks, opinion leaders may emerge that inhibit as well as facilitate diffusion, suggesting the need for a co-ordinated approach to innovation which doesn't rely excessively on individuals (Locock et al, 2001).

The revamping of the US Veteran's Health Administration is example of innovative leadership. Kenneth Kizer, an emergency medicine practitioner with health policy experience came to the organisation as an 'outsider.' He recognised that changing *perceptions* of the organisation was just as essential as improving performance. A number of significant changes were made, but these are perhaps less important here than the strategies to ensure adoption and embedding. Kizer's policy documents and blueprints for change were written in inspiring 'marketing' language, arguments were tailored to different stakeholders to gain buy-in, there was a focus on engaging clinicians and primary care, and there was a renewed emphasis on performance management through data monitoring and incentives. A history of investment in research helped the organisation focus on key core improvements but success was based having on a change agent with time and budget to improve (Oliver 2007).

# Case study 9: using a ‘big bang’ approach

## Innovation overview

The Humboldt-Del Norte Independent Practice Association was formed in one US county to give clinicians more ‘clout’ when negotiating contracts with HMOs. The Practice Association includes 240 physicians and 140 other practitioners and mental health workers spanning 26 practices and five community health centres. The Practice Association wanted to spread use of a registry for people with diabetes, to improve quality of care and ensure that people’s symptoms were controlled. Registries were not common among primary practitioners in this county so the Association took a ‘big bang’ approach – installing the concept into as many practices as possible. There has been a significant improvement in diabetes care.

## Adoption and spread

The Association did not begin to spread the concept of registries using a small pilot. It led practices to want to adopt and embed this initiative using rationale, passion and tailored arguments. The Association leaders called a meeting attended by as many practices as possible and outlined how the registry might work, with a focus on the benefits to practices and patients. The registry was rolled out to as many practices as possible simultaneously and any issues were worked out in different practices at the same time. The registry was designed to be easy for practices to use, with data automatically loaded from practice records. Medical assistants at each practice were taught to use the registry and the Association funded web access and computers if necessary.

The messages used to promote the registry were tailored to meet the concerns of different groups of practices and GPs. For example some were focused on saving money or being paid more under pay-for-performance schemes, others were concerned with making their own work life easier and others were eager to improve patient satisfaction or improve the quality of care. Identifying these three core messages helped the Practice Association target all of the primary care practices in the county simultaneously. A leadership council met weekly to learn from the practices and solve any issues and a nurse practitioner visited all of the practices to talk about their individual successes and challenges.

## Key lessons

- The Practice Association used a ‘campaign’ approach rather than a ‘collaborative.’ The aim was to spread an innovative way of working (campaign), rather than to test out potential new approaches. The leaders were clear about what they wanted to achieve.
- Adequate time and funds were dedicated to educating practitioners and support staff about the innovation, and there was regular follow up to address any issues and learn from successes.
- Messages targeted towards the values and needs of each practice were developed from the outset. It was not assumed that one message would be equally motivating for all.

## NHS applicability

SHAs may find this example interesting because the Practice Association is similar in many ways to a practice-based commissioning group. The learning point is that the spread of innovation can take place within PBC groups and other localised networks as long as there is leadership, adequate resourcing, and ongoing support. This group relied on the passion of a champion to identify and innovation and spread the idea. What is interesting for the NHS is how key stakeholders were targeted and the value of thinking about the incentives and motivating factors for different audience groups – and spreading appropriate messages to those groups. Innovation requires buy-in.

More info: www.hdnipa.com

# Evaluation

The research suggests that however imperfectly applied, it is imperative to incorporate evaluation into the ongoing process of innovation diffusion and routinisation (Chapman et al, 2004). The implementation aspect of innovation makes it unsuitable for experimental evaluation design (Booth & Falzon, 2001). When measuring inputs and outputs of innovations, the former are likely to include quantifiable financial, human and physical resources alongside the more difficult to measure tacit knowledge (Adams et al, 2006). In order to capture the range of individual, group and organisational level processes and outcomes a combination of approaches might be adopted. For example, qualitative individual reflections, evaluation of group process through 'action research' and quality assurance in relation to organisational processes (Booth & Falzon, 2001). Crucially, evaluation should not be confined to the pilot or early introduction phase at the expense of ongoing evaluation of processes and outcomes.

Freeman et al, (2006) suggest that evaluation objectives should include:

- Extent of fit between the innovation and context
- Stakeholder perceptions and experiences of the innovation
- Extent of change to services and outcomes
- Extent to which new practices have become embedded
- The effects (and unintended consequences) of the innovation on services, services users, and the wider system
- Learning that can be transferred to other settings and how this relates to the broader literature on innovation

Issues to bear in mind when drawing up a list of outcome measures include not just benefits to the organisation and patients, but also the distribution of positive net benefits, for example between organisations, functions and user groups (Coyte & Holmes 2007, Rye & Kimberly 2007). Authors caution against 'reverse access' problems where for example disadvantaged groups continue to access less effective or harmful innovations (Rye & Kimberly, 2007). Ultimately, outcome measures should reflect the underlying objectives of the innovation process (Dickinson, 2008) and measures should be carefully screened according to appropriateness and relevance (Kimberly & Cook, 2008).

# Summary

The determinants of innovation can be seen as encompassing *predisposition* (for example, previous experiences, staff attitudes), *enablement* (for example through the generation of resources, leadership and networks) and *reinforcement* (for example through review, reward and adaptation) (Riesma et al, 2002). Successful strategies for innovation will thus attend to each of these dimensions and the interplay between them.

There is no 'magic bullet' that will ensure organisations innovate. This is largely because the NHS is a complex system involving multiple interactions between groups across boundaries. Change, transformation and improvement cannot be delivered through solely structural solutions or through the adoption of a recipe or formula that has been successfully implemented elsewhere. Although experience in other settings and contexts offers the potential for learning, pre-programmed action will not necessarily lead to innovation outcomes (Caldwell & O'Reilly, 2003).

Greenhalgh et al (2004) have systematically reviewed evidence about 'what works' in spreading and embedding innovation. The authors found that, even in instances where innovation has become the norm, implementation was messy, non-linear and often involved set-backs and resistance. A series of factors can inhibit or facilitate change at all levels of systems and organisations. In particular, empowerment of users, inter-organisational networks, dedicated time and resources, and leadership and management can all help to facilitate diffusion. This review also identified the importance of evaluation and sustainability to the ongoing pursuit of innovation.

In the words of Greenhalgh et al (2004: 598)

> **"People are not passive recipients of innovations. Rather (and to a greater or lesser extent in different persons), they seek innovations, experiment with them, evaluate them, find (or fail to find) meaning in them, develop feelings (positive or negative) about them, challenge them, worry about them, complain about them, "work around" them, gain experience with them, modify them to fit particular tasks, and try to improve or redesign them - often through dialogue with other users."**

Innovation thus always entails some degree of adaptation in response to other contextual and temporal factors. Strategies need to be sensitive to 'context, complexity, ambiguity, uncertainty, competing stakeholders and to the range of potential interlocking influences' (Buchanan et al 2005: 203).

# Key success factors

Evidence about the individual, organisational and environmental determinants of innovation adoption and spread provides guidance for NHS organisations wanting to enhance uptake and diffusion.

The work of the NHS Modernisation Agency between 2001 and 2005 contains a number of relevant lessons. The NHS Modernisation Agency found sustaining and spreading innovations a key challenge, particularly those involving changes to service delivery (Buchanan, Fitzgerald and Ketley 2007). In addressing these challenges, it is clear that innovations in service delivery can rarely if ever be copied. Rather, they must be adapted and customised to fit differences in organisational contexts and variations in receptiveness to new ways of working. A number of factors influence the uptake of innovations in service delivery, including leadership by chief executives and senior managers, clinical engagement and ownership of new ways of working, training and development to support changes in practice, the time and resources available to implement innovations, and alignment with performance management and incentive systems. The work of the NHS Modernisation Agency shows that some innovations were taken up and spread rapidly – the 'see and treat' programme in hospital A&E departments is an example – but in most cases there were variations in both the speed and depth of uptake. The complexity of organisational change in healthcare means there are no magic bullets or shortcuts in improving the uptake of innovations in the NHS.

Although a clear message from this review is that there is no magic formula for institutionalising innovation, a number of factors emerge as consistent tenets of good practice. These can be expressed as a series of broad recommendations:

*Create avenues for identifying innovations:*
The review identified a number of channels and resources available to local organisations and stakeholders seeking to innovate. The evidence suggests that the further nurturing of individuals who seek out innovations (alongside more established corporate research and development) is important to the ongoing identification of new ways of working. This will require the allocation of slack resources to identify and trial new practices.

Healthcare organisations can discover potentially beneficial interventions by, amongst other things:

- putting in place a formal system for searching the relevant scientific, organisational and management literature
- joining broader networks to learn about good practice elsewhere
- nurturing in-house innovators – this requires commitment of slack resources to innovative individuals as well as tolerance of innovator unorthodoxy

*Engage with theories of change:*
A common mistake identified in the review is the tendency for interventions to be introduced without any overarching conception of how they will be diffused and how they will bring about intended benefits. It is important that learning and insight into how change and transformation are brought about are applied to local strategy and practice.

*Conduct a local determinant analysis:*
Innovation strategies should take into account a thorough understanding of existing infrastructure, relationships and practices as well as potential obstacles. In particular, the aspirations and conditions of professional groups should be assessed along with channels of communication and joint working.

*Employ multi-level organisational change:*
A successful innovation strategy will take a planned approach to the application of tools and techniques and the integration of these into routine operations. This will entail a system-wide analysis of the groups and functions implicated in the intervention.

*Ensure senior management support:*
Although initial innovation discovery (and in some cases adoption) may not be through formal channels, effective resourcing, diffusion and spread will require active senior management support. Ongoing support – irrespective of changes to personnel – will also be required to continue beneficial new practices.

*Develop leadership and champions:*
The literature consistently highlights leadership at all levels as an important facilitator of diffusion. Clinical leadership can be crucial to engendering support from the broader medical community.

*Build a coalition for change:*
Facilitating the emergence of networks to spread innovations will help to generate a critical mass of support for interventions demonstrated to have benefits.

*Build an innovation infrastructure:*
Creating an infrastructure with expertise and resources devoted to innovation is critical to ongoing change and improvement. These should cover the specific implications of scale and spread across settings.

A compelling illustration of how a co-ordinated strategy for change can be crucial to innovation is presented by the National Primary Care Development Team (NPDT) which launched in February 2000 (Oldham, 2004). This is a collaborative model which has delivered considerable large-scale improvements to patients with long term conditions. Key principles of the approach adopted are:

- the systematic transfer of knowledge
- creating receptive climate
- aligning policy, strategy and resources towards spread

Crucially the 'systematic transfer of knowledge' did not take place in a mechanistic or one-dimensional way and instead involved ongoing pursuit of learning and knowledge exchange. Key elements of a 'receptive climate' were robust measurement systems and the provision of coaching. Finally, the model of spread adopted is characterised by phases or 'waves' which enabled implementation but not at the expense of responding to local needs and priorities.

*Create a receptive organisational climate:*
Key dimensions of a receptive climate for innovation include: alignment of organisation strategy, regulation and regimes of reward and promotion; encouragement of risk and creativity, and high trust relationships.

Creating a culture of innovation will help successful innovations move beyond 'project' phase and become embedded into practice. This requires organisations to regularly discuss innovation and to embed innovation into performance management and incentive schemes. SHAs might consider options such as: awards schemes, networking functions and away days, innovation 'league tables' and provision of extra training.

*Attend to all aspects of the adoption process:*
Previous innovation strategies have neglected the issue of spread, sustainability and exnovation (ie decommissioning services as new innovations take hold). These should be planned from inception.

Generic 'factors to be considered when spreading innovation could be captured in a checklist or scoring system in order to ensure adequate planning and resourcing. This would contain questions such as:

- Is innovation in this area a strategic priority for the organisation?
- Is there a senior executive who will be responsible for the spread?
- Is there a team that will take responsibility for spread day to day?
- Will leadership supply the tools needed for success
- Is the innovation scalable throughout the health economy?

*Ensure sufficient time:*
The rationale for innovation has a number of strands including improving productivity and efficiency, reducing cost, increasing quality and responsiveness, reducing variation in practice, and increasing access to health services. Although much of the debate has hitherto centred on how the innovation pathway in the NHS can be travelled more *rapidly*, a more reasonable aim would be to achieve an *appropriate* pace of adoption and spread (Rye & Kimberly, 2007). Optimal implementation timescales will vary according to the nature of the intervention and the context of its introduction. Rushing change can lead to fatigue and ultimately failure (Buchanan et al, 2005). The desire for speedy innovation processes should also not overlook the need to avoid diffusion beyond effective areas (over-adoption) or adoption that creates or exacerbates inequities of access and outcome.

*Reinforce gains:*
Support and reward for successful implementation (as well as gains in for example joint working and leadership) will help to create the conditions for continued diffusion. Gains should be routinely communicated to all stakeholders.

*Draw on resources:*
The importance of committing local resources cuts across all dimensions of innovation. Time, energy and money will be required to incentivise and facilitate identification, adoption and spread. Building an innovation infrastructure requires commitment of resources.

Tapping into national resources such as: repositories of evidence and knowledge, networks, training and implementation tools will assist with locally driven innovation projects.

*Effectively manage knowledge:*
An organisational knowledge management strategy is a prerequisite of successful spread and continuation of innovation. This should address explicit and tacit knowledge forms.

It is imperative that benefits of innovations and pitfalls to avoid in their diffusion are routinely and widely communicated. One option is the creation of an 'innovation website' where organisations upload short case studies of what they are doing and how they're doing it.

A regional network of 'innovation champions' from all local organisations could be set up. Members would receive training and time to promote innovation in their organisation and to use the network to spread and 'sell' best practice.

These developments could be supplemented by a short guide with advice on how to adopt and spread innovation that is distributed around the region.

*Adopt and adapt:*
Adaptation of the intervention to suit local context should be encouraged and differentiation should be made between legitimate reinvention and blanket resistance. The basic programme of diffusion and spread will need to take account of the complexity of the innovation and the adopting environment as well as anticipating changes in the external environment. Overall, the timing, sequencing and pacing of change will be crucial to sustainability.

Although innovations will come from outside of the 'usual channels', in order to be successfully spread they will be adapted to fit with the demands and constraints of local context. Both early and late adopters should be encouraged to foster an adaptive approach. This means that timelines may need to be flexible, opportunities for reflection built into the diffusion process, and end-users engaged throughout.

*Encourage sense-making:*
The proposed changes to practice should be framed in ways which make sense and appeal to key end users. The innovation process should provide multiple opportunities for reflection and learning at all levels of the organisation and system.

*Engage with end users and stakeholders:*
End users of the innovation should, where possible, be involved at the design phase. The category 'end users' increasingly includes patients, service users and the public. Widespread engagement will help to avoid excessive reliance on individual 'innovators', 'early adopters' and 'champions'.

Campaigning approaches can be useful for getting information about innovation and improvement out to a wider range of stakeholders. The more engaging a campaign, the more likely the spread of innovation. This may include promotional techniques, campaign planning and the use of nodes and networks.

*Monitor, review and evaluate:*
Ongoing monitoring and review is essential. There is no gold standard of data collection in this context and approaches applied should be sensitive to locally-defined needs, conditions and aims.

Without data collection it is impossible to identify or demonstrate benefits of new practices. A clear framework for evaluation of implementation and outcomes should be devised prior to initiation.

SHAs have a statutory duty to innovate and to spread innovation. This requirement is fundamental to the sustainability of the NHS. By drawing on lessons of what works well elsewhere and research evidence of good practice, we hope that SHAs will be able to develop an action plan or menu of approaches to foster and embed innovation locally, regionally and nationally.

# References


Ansell, C. (2007) Fostering Innovation and collaboration. *Medical Device Technoiogy* January-February.

Batalden, P. & Splaine, M. (2002) What will it take to lead the continual improvement and innovation of health care in the 21st century? *Quality Management in Health Care* 11(1): 45-54.

Bate, P. (2007) Bringing the design sciences to organisational development and change management. *Journal of Applied Behavioral Science* 43(1): 8-11.

Bate, P., Bevan, H., & Robert, G. (2004) *Towards a million change agents. A review of the social movements literature: implications for large scale change in the NHS.* NHS Modernisation Agency, London.

Bate, P., Robert, G., & Bevan, H. (2004a) The next phase of healthcare improvements: what can we learn from social movements? *Quality and Safety in Health Care* 13: 62-66.

Bate, S.P. & Robert, G. (2002) Knowledge Management and Communities of Practice in the Private Sector: Lessons for Modernising the National Health Service in England and Wales. *Public Administration* 80: 643-663.

Berwick, DM. (2003) Disseminating innovations in health care. *JAMA* 289(15): 1969-1975.

Black, N. (2006) The Cooksey review of UK health research funding. *British Medical Journal* 333: 1231-1232.

Bodenheimer, T. (2007) *The science of spread: how care innovations become the norm*. California Healthcare Foundation.

Booth, A. & Falzon, F. (2001) Evaluating information service innovations in the health service: 'If I was planning on going there I wouldn't start from here' *Health Informatics Journal* 7: 13-19.

Bosua, R. & Scheepers, R. (2007) Towards a model to explain knowledge sharing in complex organizational environments. *Knowledge Management Research and Practice* 5: 93–109.

Bovaird, T. (2007) Beyond engagement and participation: user and community coproduction of public services. Public Administration Review, September-October 846-860

Bradley, EH., Webster, TR., Baker, D. et al (2004) Translating research into practice: speeding the adoption of innovative health care programs. *Commonwealth Fund, Issue Brief*, July 2004.

Buchanan, D., Fitzgerald, L., Ketley, D. et al (2005) No going back: a review of the literature on sustaining organisational change. *International Journal of Management Reviews* 7(3): 189-205

Buchanan, DA., Fitzgerald, L., Ketley, D. (eds) (2007) T*he sustainability and spread of organisational change.* Routledge, Oxfordshire.

Caldwell, DE. & O'Reilly, CA. (2003) The determinants of team-based innovation in organisations: the role of social influence. *Small Group Research* 34: 497-517.

Chaillet, N., Dubé, E., Dugas, M. *et al* (2006) Evidence-based Strategies for Implementing Guielines in Obstetrics. A Systematic Review. *Obstetrics and Gynecology* 108(5): 1234 – 1245.

Chapman, JL., Zechel, A., Carter, YH., Abbott, S. (2004) Systematic review of recent innovations in service provision to improve access to primary care. *Br J Gen Pract* 54(502): 374-81.

Christenson, CM., Bohmer, R., Kenagy, J. (2000) Will Disruptive Innovations Cure Health Care? *Harvard Business Review* September-October: 102-112.

Clancy, T.R. & Delaney, C. (2005) Complex nursing Systems. *Journal of Nursing Management* 13: 192–201.

Cooksey D. (2006) *A review of UK health research funding*. London: Stationery Office.

Coughlan, P., Suri, J. & Canales, K. (2007) Prototypes as (design) tools for behavioral and organizational change: a design-based approach to help organizations change work behaviours. *Journal of Applied Behavioral Science* 43: 122-34

Coyte, P.C. & Holmes, D. (2007) Health Care Technology Adoption and Diffusion in a Social Context. *Policy, Politics and Nursing Practice* 8(1): 47-54

Darzi (2008) *High Quality Care For All: NHS Next Stage Review Final Report*. London, DH

Davies, B.L. (2002) Sources and models for moving research evidence into clinical practice. Journal of Obstetric, *Gynecologic and Neonatal Nursing* 31(5): 568-552

Department of Health (2002) *The NHS as an innovative organisation: a framework and guidance on the management of intellectual property in the NHS*. London, DH

Department of Health (2008) *Commissioning for Quality and Innovation (CQUIN) Payment Framework*. London, DH

Dickinson H. (2008) *Evaluating outcomes in health and social care*. Policy Press, Bristol

Dickinson, H. & McLeod, H. (2006) Health and social care improvement Methodologies: 'what works'? A review of the literature. Health Services Management Centre, University of Birmingham.

Djellal, F. & Gallouj, F. (2007) Innovation in hospitals: a survey of the literature. *European Journal of Health Economics*. 8(3): 181-193.

Dobbins, M., Rosenbaum, P., Plews, N. et al (2007) Information transfer: what do decision makers want and need from researchers? *Implementation Science* 2: 20.

Dopson, S. (2007) A View From Organizational Studies. *Nursing Research* 56(4): 72–77.

Ellis, P., Ciliska, D., Sussman J. et al (2005) A systematic review of studies evaluating diffusion and dissemination of selected cancer control interventions. *Health Psychology* 24: 488–500.

Faulkner, A., Mills, N., Bainton, D., Baxter, K., et al (2003) A systematic review of the effect of primary care-based service innovations on quality and patterns of referral to specialist secondary care. *British Journal of General Practice*. November 2003 878-884.

Ferlie,E.B. & Shortell,S. (2001) Improving the quality of health care in the United Kingdom and the United States: a framework for change. *Milbank Quarterly* 79: 281-315.

Fitzgerald, L., Ferlie, E., Wood, M. & Hawkins, C. (2002) Interlocking interactions, the diffusion of innovations in health care. *Human Relations* 55: 1429-1449.

Fleuren et al (2004) Determinants of innovation within health care organisations: literature review and Delphi study. *International Journey for Quality in Health Care* 16(2): 107-123.

Freeman, T., Dickinson, H., McIver, S., McLeod, H. (2006) *Innovation in service delivery: a literature review on the characteristics of innovation and improvement.* Health Services Management Centre, University of Birmingham

Gelijns, AC., Zivin, JG. & Nelson, RR. (2001) Uncertainty and Technological Change in Medicine. *Journal of Health Politics, Policy and Law* 26(5): 913-924.

Gelijns, A.C., Brown, L.D., Magnell, C. et al, (2005) Evidence, Politics and Technological Change. *Health Affairs* 24(1): 29-40.

Glouberman, S., & Mintzberg, H. (2001a). Managing the care of health and the cure of disease - part I: Differentiation. *Health Care Management Review*, 26(1): 56-69.

Glouberman, S., & Mintzberg, H. (2001b). Managing the care of health and the cure of disease - part II: Integration. *Health Care Management Review*, 26(1): 70-84.

Goodwin, N., 6, P., Peck, E. et al (2004) *Managing Across Diverse Networks of Care: Lessons from Other Sectors*. National Coordinating Centre for NHS Service Delivery and Organisation R and D (NCCSDO).

Greenhalgh, T., Robert, G. and Bate, P. et al, (2004) *How to Spread Good Ideas: A systematic review of the literature on diffusion, dissemination and sustainability of innovations in health service delivery and organisation*. Report for the National Co-ordinating Centre for NHS Service Delivery and Organisation R & D (NCCSDO)

Grimshaw, J.M., Thomas, R.E. and MacLennan, G. et al, (2004) Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment* 8(6).

Grimshaw, J., Eccles, M. and Thomas, R. et al (2006) Toward evidence-based quality improvement. Evidence (and its limitations) of the effectiveness of guideline dissemination and implementation strategies 1966–1998 *Journal of General Internal Medicine* 21: 14–20.

Grol, R. (2001) Successes and failures in the implementation of evidence-based guidelines for clinical practice. *Medical Care* 39(Suppl. 2): 46-54.

Grol, R. & Wensing, M. (2004) What drives change? Barriers and incentives for achieving evidence-based practice. *MJA* 180: 7-60.

Haines, A., Kuruvilla, S. & Borchert, M. (2004) Bridging the implementation gap between knowledge and action for health. *Bulletin of the World Health Organization* 82: 724-732.

Hargadon, A. (2003) *How breakthroughs happen*. Harvard Business School Press.

Harrison, S. (1998) The Politics of Evidence-based medicine in the United Kingdom. *Policy and Politics* 26: 15-31.

Health Industries Task Force (2007) *Innovation for health: making a difference.* Report of the Strategic Implementation Group.

Helfrich, CD., Weiner, BJ., McKinney, MM. & Minasian, L. (2007) Determinants of implementation effectiveness: adapting a framework for complex interventions. *Medical Care Research and Review* 64: 279-303.

Henderson, J. (2001). Learning, changing and managing mental health. *Journal of Interprofessional Care*; 15 (4) 82.

Hwang, J. & Christensen, CM. (2007) Disruptive innovation In health care delivery: a framework for business-model innovation. *Health Affairs* 27(5): 1329–1335.

Innvaer, S., Vist, G., Trommald, M. and Oxman, A. (2002) Health policy-makers' perceptions of their use of evidence: a systematic review. Journal of Health Services Research and Policy 7: 239-44

Kanter, A. (1988) When a thousand flowers bloom: structural, collective and social conditions in organisations. Research in organisational behaviour 10: 169-211

Karsh, B-T. (2004) Beyond usability: designing effective technology implementation systems to promote patient safety Quality and Safety Health Care (13): 388-394

Kimberly, J. & Cook, JM. (2008) Organizational measurement and the implementation of innovations in mental health services. Administration and Policy in Mental Health and Mental Health Services Research 25: 11-20

Knudsen, HK. & Roman, PM. (2004) Modeling the use of innovations in private treatment organizations: The role of absorptive capacity Journal of Substance Abuse Treatment 26: 51–59

Länsisalmi, H., Kivimäki, M., Aalto, P. et al (2006) Innovation in Healthcare: A Systematic Review of Recent Research. *Nursing Science Quarterly* 19: 66-80

Lavis, J.N., Robertson, D. and Woodside, J. et al (2003) How can research organizations more effectively transfer research knowledge to decision-makers? *Milbank Quarterly* 81: 221-48.

Leeman, J., Jackson, B. & Sandelowski, M. (2006) An evaluation of how well research reports facilitate the use of findings in practice. *Journal of Nursing Scholarship* 38(2): 171-177.

Leeman, J., Baernholdt, M. & Sandelowski, M. (2007) Developing a theory-based taxonomy of methods for implementing change in practice. *Journal of Advanced Nursing* 58(2): 191–200

Lehoux, P., Williams-Jones, B., Miller, F., et al (2008) What leads to better health care innovation? Arguments for an integrated policy-oriented research agenda. *Journal of Health Services Research and Policy* 13: 251-254

Liddell, A., Adshead, S. & Burgess, E. (2008) *Technology in the NHS: transforming the patient's experience of care.* Kings Fund, London

Locock, L., Dopson, S. Chambers, D. et al (2001) Understanding the Role of Opinion Leaders in Improving Clinical Effectiveness. *Social Science and Medicine* 53: 745–57.

Maher, L., Plsek, P. & Bevan, H. (2008) *Making a bigger difference: a guide for NHS front-line staff and leaders on assessing and stimulating service innovation*. NHS Institute for Innovation and Improvement.

Matheson, N.W. (1995) Things to come: Postmodern digital knowledge management and medical informatics. Journal of Medical Informatics Association 2(2): 73-78.

McDaid, D. & Cookson, R. (2003) Evaluating health care interventions in the European Union. Health Policy 63: 133-139

Mitton, C., Adair, C.E. McKenzie, E. et al, (2007) Knowledge transfer and exchange: review and synthesis of the literature. The Milbank Quarterly 85(4): 729–768

Modernisation Agency (2002) Spreading and sustaining new practices: sharing the learning from the Cancer Services Collaborative (CSC). NHS Research into Practice Programme Summary Report No.3

Modernisation Agency (2004) Complexity of sustaining healthcare improvements: What have we learned so far? NHS Research into Practice Report No.13

Moore, M. & Hartley, J. (2008) Innovations in Governance. Public Management Review (10)1: 3–20

Mugglestone, M., Maher, L., Manson, N. & Baxter, H. (2004) Accelerating the improvement process. *Clinical Governance: An International Journal* 13(1): 19-25

Mulgan, G. & Albury, D. (2003) *Innovation in the public sector.* www.cabinetoffice.gov.uk

National Institute for Health and Clinical Excellence (2008) Developing guidance-related support tools. Process and Methodology Manual. Information for internal NICE teams. http://www.nice.org.uk/

Oldham, J. (2004) *The small book about large systems change*. (electronic)

Oliver A (2007). The Veterans Health Administration: an American success story? *Milbank Quarterly* 85(1):5-35.

Osborne, S. P. (1995). The genie of the lamp? The role of voluntary organizations in innovation in social care services. *Social Services Research* (4): 56.

Parnaby, J. & Towill, DR. (2008) Enabling innovation in health-care delivery. *Health Services Management Research* 21: 141-154.

Pawson R. & Tilley N. (1997) *Realistic evaluation*. London, Sage.

Peck, E., & Dickinson, H. (2008) *Managing and leading in inter-agency settings*. Bristol, Policy Press.

Phillips, AS. & Garman, AN. (2006) Barriers to entrepreneurship in healthcare organisations. *Journal of Health and Human Services Administration* 28(3/4): 472-483.

Phillips, W., Johnsen, T., Caldwell, N. & Lewis, MA. (2006) Investigating innovation in complex health care supply networks: an initial conceptual framework. *Health Services Management Research* 19: 197-206.

Plsek, P. & Greenhalgh, T. (2001) Complexity science: the challenge of complexity in health care. *BMJ* 323:625-8.

Pope, C., Robert, G., Bate, P. et al (2006) Lost in translation: a multi-level case Study of the metamorphosis of Meanings and action in public sector organizational innovation. *Public Administration* 84(1): 59–79.

Riesma, RP., Pattenden, J., Bridie, C. et al (2002) A systematic review of the effectiveness of interventions based on a stage-of-change approach to promote individual behaviour change. *Health Technology Assessment* 6(21): 1-234.

Rye & Kimberly (2007) The adoption of innovations by provider organisations in health care. *Medical Care Research and Review* 64(3): 235-278.

Rogers, E.M. (2003) *Diffusion of Innovations*. NY Free Press.

Sackett, D.L., Richardson, W.S., Rosenberg, W. & Haynes, R.B. (1997) *Evidence-based medicine: How to practice and teach EBM.* Churchill Livingstone, Edinburgh.

Sanson-Fisher, RW. (2004) Diffusion of innovation theory for clinical change. *MJA* 180 15: 55-56.

Savitz, LA. & Kaluzny, AD. (2000) Assessing the implementation of clinical process innovations: a cross-case comparison. *Journal of Health Care Management* 45(6): 366-370.

Shapiro, J. & Devlin, M. (2000) *Quality assurance or improvement? Driving innovation in primary care*. Health Services Management Centre, University of Birmingham.

Sheldon TA, Cullum, N Dawson, D. et al (2004) What's the evidence that NICE guidance has been implemented? *BMJ*. 329: 999-1004

Shortell S.M. & Kaluzny A.D. (2006) *Health care management organization design and behavior*. Thomson Delmar Learning, New York.

Solberg, L.I., Brekke, M.L. and Fazio, C.J. et al (2000). Lessons from experienced guideline implementers: Attend to many factors and use multiple strategies. *Joint Commission Journal on Quality Improvement* 26: 171-188

Sorenson, C., Kanavos, P. & Drummond, M. (2007) Ensuring value for money in health care: the role of HTA in the European Union. In *Financing sustainable health care in Europe* Luxembourg Ministry of Health. Blackwell Publishing, Ltd.

SteelFisher, GK. (2005) *International innovations in health care: quality improvements in the United Kingdom*. The Commonwealth Fund.

Stevens, M., Liabo, K., Frost, S. et al (2005) Using research in practice. A research information service for social care practitioners. *Child Family Soc Work*10: 65–75.

Summerhayes, M. & Catchpole, P. (2006) Has NICE been nice to cancer? *European Journal of Cancer* 42(17): 2881-2886.

Thomas, P., McDonnell, J., While, A. et al (2005) Increasing capacity for innovation in bureaucratic primary care organisations: a whole system participatory action research project. *Annals of Family Medicine* 3(4): 312-317.

Tyler, S., Downe, S. & Day-Stirk, F. (2007) Sustaining innovation. *Midwive: the official journal of the Royal College of Midwives* 10(5): 238-240.

Walker, RM. (2003) Evidence on the management of public services innovation. *Public Money and Management* April: 93-102.

Wanless, D. (2004) *Securing good health for the whole population: Final report.* London, Stationery Office.

Waterman, H., Marshall, M., Noble, J. et al (2007) The role of action research in the investigation and diffusion of innovations in health care: The PRIDE Project. *Qualitative Health Research* 17: 373-380.

Williams I (2008) *Telecare: a rapid review of the evidence*. Health Services Management Centre, University of Birmingham.

Williams, I. & Bryan, S. (2007) Cost-effectiveness analysis and formulary decision making in England: findings from research, *Social Science and Medicine* 65: 2116–2129.

Williams, I. & Dickinson, H. (2008) *Knowledge for adoption: a review of the literature on knowledge-based facilitators of technology adoption in health care*, Health Services Management Centre, University of Birmingham.

Williams, I., McIver, S., Moore, D. & Bryan, S. (2008) The use of economic evaluation in NHS decision-making: a review and empirical investigation. *HTA* 12(7): 1-175.

Williams, I., Dickinson, H., Robinson, S. & Allen, C. (2009) Clinical Microsystems and the NHS: A sustainable method for improvement? *Journal of Health Organisation and Management* (forthcoming).

World Health Organisation (2004) WHO review of NICE in the United Kingdom. *WHO Drug Information* 17(4).

Zahra, A.S. & George, G. (2002) Absorptive Capacity: A Review, Reconceptualization and Extension. *Academy of Management Review* 27(2):185–203.

# *Appendix 1: key resources*

The following documents were identified as particularly useful in providing syntheses of the published evidence:

- Berwick (2003): although not a formal review, this paper provides an invaluable synthesis, critique and application of the diffusion of innovation literature in health care.
- Fleuren et al (2004): this paper identifies a list of fifty determinants of innovation adoption and records the prevalence of these in published studies.
- Greenhalgh et al (2004): the most thorough recent review of literature on innovation in health care.
- Buchanan et al (2005): a review of the literature on the sustaining of organisational change.
- Rye & Kimberly (2007): this paper reviews the evidence on the adoption phase of innovation by provider organisations in health care.
- Williams & Dickinson (2008): a recent review of the literature relating to technology adoption in health care.

The following international experts provided suggestions and guidance towards case studies and literature:

Toni Ashton, University of Auckland, New Zealand

Don Berwick, Institute for Healthcare Improvement, US

Tom Bodenheimer, University of California, San Francisco, US

Terkel Christiansen, University of Southern Denmark, Denmark

David Clemments, Health Services Research Foundation, Canada

Philip Davies, Department of Health and Ageing, Australia

JM Evans, University of Dundee, Scotland

MM Godfrey, Dartmouth Medical School, US

Maria Hofmarcher-Holzhacker, Institute for Advanced Studies (IHS), Austria

Susan Law, Health Services Research Foundation, Canada

Hans Maarse, Maastricht University, The Netherlands

Martin Marshall, The Health Foundation, UK

CJ McCannon, IHI, US

John Ovretveit, The Karolinska Institute, Sweden

Ronald Paulus, Geisinger Health System, Pennsylvania

Jim Primrose, Ministry of Health, New Zealand

Uwe Reinhardt, Princeton University, US

M Ryvicker, Visiting Nurse Service of New York, US

Sophia Schlette, Bertelsmann Stiftung, Germany

LM Schwartz, Veterans Affairs Outcomes Group, US

Steve Shortell, University of California, Berkeley, US

Alan Spinks, Ministry of Health, New Zealand

Juha Teperi, Ministry of Social Affairs and Health, Finland

Ken Thorpe, Center for Entitlement Reforms, US

Paul Wallace, Kaiser Permanente, US

# *Appendix 2: theories & frameworks*

The literature on innovation in health care is couched in sometimes divergent language. It is therefore important to clarify some of the major schools of thought and their perspective on, and contribution to, the topic. This appendix provides a brief description of some of the key frameworks and perspectives employed in the literature.

## Evidence-based policy

The drive for evidence based policy and delivery – an extension of the early application to the narrower field of clinical practice – has become a pervasive framework for driving up standards and reducing inequities in health care (Sackett et al 1997, Harrison 1998). One of the key features of an evidence-based approach to innovation and improvement is the emphasis on explicit knowledge generation – for example through techniques such as Health Technology Assessment (McDaid and Cookson, 2003). The assumption that increasing and improving the knowledge base of professionals and decision makers will bring about corresponding improvements to practice is at the heart of the evidence based approach. Put crudely, this leads to an emphasis on the 'what' rather than the 'how to' dimension of improvement and as such can assume the existence of relatively simple, linear processes of knowledge dissemination into practice. In many ways, the functions of NICE – at least in its original form – can be seen as a reflection of the evidence based approach to change (Williams et al, 2008).

## Diffusion of innovation

The diffusion of innovation model draws attention away from the generation of evidence by focussing on the 'social systems' that support or prevent diffusion (Rogers, 2003). Although less linear than the evidence-based model, this approach is still better equipped to understand how relatively discrete, medical innovations are introduced and embedded rather than managerial and organisational innovations (Buchanan et al 2007). According to Rogers, adoption and spread tends to conform to a predictable pattern in which 'innovators' and 'early adopters' bring about a 'tipping point' which precedes more widespread adoption. This perspective is useful in drawing attention to the important mediating role played by innovative individuals and local champions in facilitating broader spread. Rogers (2003: 414) refers to the 'charismatic individual who throws his/her weight behind the innovation, thus overcoming the indifference or resistance that a new idea often provokes in an organisation.' However, the diffusion of innovation model does not hold in all circumstances and it is unlikely that the nurturing of innovation-seeking individuals will in itself resolve all of the difficulties facing organisations seeking to innovate (Dickinson & McLeod, 2006).

## Organisational theory

There is no single, definitive account of how health care organisations are structured and constituted. However, it is increasingly agreed that health care organisations are complex and multi-level and involve the interaction of a range of groups (Fitzgerald et al 2002, Pope et al 2006, Dopson 2007). There is also a growing consensus that different organisational forms – measured in terms of, for example, structure, scale, culture and practices – are an important consideration in creating the context for innovation and improvement (Fitzgerald et al, 2002). This represents an important reorientation towards the issue of how to create a micro-climate that is conducive to change and innovation. Here 'organisational form' is taken to mean the underpinning structures which are manifest in work processes, expectations and taken-for-granted assumptions of staff. The primary strength of this approach is its attention to the means by which we might address the organisational determinants of innovation which restrict the flow of evidence and inhibit the embracing of innovation by individuals.

## Actor–network theory

Actor-network theory draws attention to the existence of heterogeneous actors connected through a diversity of networks and social relationships (Fitzgerald et al, 2002). From this perspective the diffusion of ideas and practices is mediated by the configuration of networks within a given context. The value of this model is in highlighting the non-linear and dynamic nature of change processes and the need to appreciate the local specificity of each micro-context. It also foregrounds notions of negotiation and settlement between networks and the need to 'make sense' of new practices before they can be successfully introduced. So for example, successful adoption will depend on the capacity of individuals to buy into a changed organisational narrative with each innovation that is introduced (Peck & Dickinson, 2008).

## Social movements

Whereas diffusion of innovation informed much of the work of the Modernisation Agency, the NHS Institute is based more on the social movements approach which focusses less on engaging exceptional individuals and more on widespread stakeholder engagement (Bate et al 2004, Bate et al 2004a). Key to this approach is the shift from top-down approaches to (in this case) innovation adoption and spread, towards a bottom-up, grassroots, approach in which change is shaped and owned by the individuals charged with implementation (Dickinson & McLeod, 2006).

# Clinical microsystems

There is growing momentum behind a focus on re-engineering the smallest natural units of health care organisation and delivery (Williams et al, 2009). 'Clinical microsystems' are the smallest replicable units within an organisation that contain their own human, financial and technological resources (Batalden & Splaine, 2002). Ferlie & Shortell (2001) note that the microsystem concept has emerged as a focus in recent health quality improvement work. The benefits of this approach include the emphasis on achieving support for change from the full range of stakeholders in the microsystem (as opposed to a diffusion of innovation approach which targets innovators and early adopters) and the reiteration of the need for an organic, bottom-up approach to improvement incorporating incremental development towards eventual service transformation.

# Knowledge management

Knowledge Management can be considered to be any systematic process designed to 'acquire, conserve, organize, retrieve, display and distribute what is known.' (Matheson, 1995: 74). As such a knowledge management strategy can encompass a range of approaches and mechanisms including: the supply of evidence and information; transfer or dissemination of best practice; networks and communities of practice; development of information systems and decision tools; skills development; and sense-making and story-telling.

The importance of a more sophisticated approach to the spread and exchange of knowledge is encapsulated in the principle that if the knowledge required for an innovation's use can be codified and transferred from one context to another, it will be adopted more easily (Greenhalgh et al 2004, Williams & Dickinson 2008). An important consideration here is the distinction between *explicit* and *tacit* knowledge (Greenhalgh et al 2004, Bosua & Scheepers 2007). Whereas explicit knowledge can be codified in HTAs and guidelines, tacit knowledge is made-up of practical wisdom, experience and expertise and is therefore less amendable to formal articulation.

The main implication of the distinction between explicit and tacit knowledge is that generating innovation requires acknowledgement of the social and contextual nature of knowledge. Methods for passing on tacitly held knowledge (for example competencies) include mentoring, shared experience and story telling (Peck & Dickinson 2008, Williams & Dickinson 2008). Overall, knowledge management is seen as key to increasing an organisation's absorptive capacity – that is, the extent to which an organisation is able to identify, assimilate, share, re-codify and act on new knowledge (Zahra and George, 2002).

# Case study 10: clinical microsystems

## Innovation overview

The concept of clinical microsystems was originally drawn from the US, where it was created by Dartmouth Hitchcock Medical Centre. A microsystem is a group of frontline staff and support personnel working together to improve patient care. Microsystems have clinical and business aims, linked processes, a shared information environment and performance outcomes. They evolve over time and are often embedded in larger organisations. Most wards, primary care teams and other frontline teams could be classified as a clinical microsystem, and this method of adopting and spreading innovation relies on the team being reflective and willing to trial new approaches.

## Adoption and spread

Tools to help people working in microsystems understand their work and identify areas for change have been developed by Dartmouth Hitchcock Medical Centre and the NHS National Clinical Microsystems team. For example, there is a 'microsystem framework' which contains a set of ideas and tools designed to help people working in microsystems perform more effectively as a team and improve service standards. The framework encourages team members to think objectively about how their team is structured and how it works and to understand the systems and processes that connect them. They can then use this information to identify areas for improvement, and to introduce changes in a systematic and well-managed way. Innovation is further adopted and spread by arranging dedicated time for microsystems to consider development areas and to meet with others every month or quarter to review progress and share lessons learnt.

## Key lessons

- Microsystems already exist throughout the NHS so the tools and ways of thinking associated with this method build on existing work patterns.
- Studies have identified nine success factors of successful microsystems: leadership, culture, organisational support, patient focus, staff focus, interdependence of the care team, information and information technology, focus on process improvement, and focus on performance patterns.
- Clinical Microsystems that are most effective for adopting and spreading innovation have four characteristics in common: using benchmarking information on processes and outcomes, using 'data walls' to display key measures for staff to view and use to assess performance, using protocols and guidelines for core processes, encouraging innovative thinking and tests of change.

## NHS applicability

The NHS Institute for Innovation and Improvement's successful 'Productive Community Ward' programme and toolkit is based on the principles of clinical Microsystems. SHAs can learn from the success of these approaches by drawing on key lessons such as targeting frontline teams to adopt innovation rather than focusing on managerial levels; encouraging PCTs and practitioners to build innovation and improvement into the everyday work of existing teams; using evidence about best practice to define localised protocols and guidelines; and introducing simple new monitoring strategies such as photos and performance graphs displayed in staffrooms or on wards to keep the improvement agenda visible. Using resources such as the NHS Institute's 'productive' series may be appropriate as the Institute has spent significant time and resource developing these materials and they have been piloted and implemented extensively throughout England. Rather than attempting to 'reinvent the wheel' SHAs could invest in applying existing tools to local areas.

More info: www.clinicalmicrosystem.org

# Case study 11: business process re-engineering

## Innovation overview

In the 1990s business process reengineering (BPR) became popular as a way of encouraging change. This approach rejects incremental change in favour of a top-down 'all or nothing' approach. New processes and protocols are created from scratch within a short time-scale. This is part of planning and implementing innovation, because it is a structured approach to facilitating new ways of thinking about routine processes.

## Adoption and spread

This method was popular in some parts of Europe and the US. Two acute hospital trusts, King's Healthcare and Leicester Royal Infirmary took part in pilot projects in the mid-1990s.The projects aimed to spread new ideas by providing centralised guidelines, regular project team meetings and a 'start from scratch' approach whereby nothing was deemed as 'sacred' or unchangeable. Senior teams came up with a starting point and frontline teams were instructed to make rapid change to ensure the new vision worked in practice. The aim was to totally reinvent organisational systems.

## Key lessons

- Evaluations found some evidence of change resulting from reengineering, but not on the large scale hoped. Change was more incremental.
- It was essential to have clinical buy-in.
- There was a resistance to 'top down' approaches without scope for individual clinicians and teams to 'make their own mark.'

## NHS applicability

This approach has been trialled in the NHS but did not work well to facilitate major innovation. It tends to have focused on an acute context rather than primary care, and to have followed somewhat rigid methodologies to 'force' innovation. One danger is that, if not applied correctly, this approach may assume that systems and processes need to be completely redeveloped rather than building on existing good practice. Another issue is that although widespread innovation was the goal, there was resistance to such fundamental change and the programmes resulted only in incremental change.

The lesson for SHAs is that it is important to have a balance between system wide reform and step-wise innovation. It is also essential to invest the time, energy and funding into ensuring appropriate engagement at all levels, from frontline staff, to service users, to senior management. Innovation is not about processes, it is about people.

## Realistic evaluation

Given the apparent need for an appreciation of the interplay between intervention, context and outcomes, it is useful to briefly introduce the concept of 'realistic evaluation' (Pawson & Tilley, 1997). Although primarily a method for evaluation interventions, a realistic approach has a number of possible benefits for our understanding of innovation. From this perspective, it is not a specific intervention that either works or does not work. Rather it is the underlying mechanisms and implementation, and the relationship of these to the broader environment that bring about observed effects. Realistic evaluation facilitates the development of a theory of what works, in which respects, for which subjects, and in which kind of situations (Pawson 2005), and leads thereby to informed, qualified and contextualised recommendations for policy and practice elsewhere. When applied to the issue of innovation this approach would encourage the identification of contextual patterns and regularities in innovation adoption and spread, in order to formulate informed and contextually relevant prescriptions for moving forward.

## Summary

Although distinct, many of these approaches are either compatible or else have some relevance depending on the nature of the innovation scenario. As over-arching frames, they often provide the underpinning structure for the research (and subsequent analysis) conducted by their adherents. The theoretical literature in this area charts a gradual move from linear models of interventions and outcomes to an appreciation of non-linearity and complexity (Walker, 2003). The taxonomy provided here is not exhaustive and could, for example, have been extended to include complex systems theory (Plsek & Greenhalgh, 2001) and design science (Bate, 2007). The objective is not to cover every aspect of theory but to indicate how the practice of innovation will usually be informed – however implicitly – by a theory or model of how public sector practices are constituted and changed.