Open Research Online

Factors affecting the adoption of quality assurance technologies in healthcare

Journal Item

For guidance on citations see FAQs.

Version: Not Set

oro.open.ac.uk

Factors Affecting the Adoption of Quality Assurance Technologies in Healthcare

John Storey
The Open University

Abstract

Purpose – In the light of strong policy emphasis on quality and safety in the nursing care of patients in hospital settings, this paper focuses on the factors affecting the adoption of innovative quality assurance technologies.

Design/methodology/approach – Two sets of complementary literatures were mined for key themes. Next, new empirical insights were sought. Data gathering was conducted in three phases. The first involved contact with NHS Technology Hubs and other institutions which had insights into leading centres in quality assurance technologies. The second phase was a series of telephone interviews with lead nurses in those hospitals which were identified in the first phase as comprising the leading centres. The third phase comprised a series of face to face interviews with innovators and adopters of healthcare quality assurance technologies in five hospital trusts.

Findings – There were three main sets of findings. First, despite the strong policy push and the templates established at national level, there were significant variations in the nature and robustness of the quality assurance toolkits that were developed, adapted and adopted. Second, in most of the adopting cases there were important obstacles to the full adoption of the toolkits that were designed. Third, the extent and nature of the ambition of the developers varied dramatically – some wished to see their work impacting widely across the health service; others had a number of different reasons for wanting to restrict the impact of their work.

Originality/value – The general concerns about front-line care and the various inquiries into care quality failures emphasise the need for improved and consistent care quality assurance methodologies and practice. The technology adoption literature gives only partial insight into the nature of the challenges; this paper offers specific insights into the factors inhibiting the full adoption of quality assurance technologies in ward-based care.

Keywords – Technology, Adoption, Adaptation, Quality Assurance, Quality Audi

Introduction

Quality of care has accelerated to the top of the health agenda in recent years; it is currently a topic of major public concern. This is a phenomenon shared by many countries (Squires 2010). In the UK, quality assurance for clinical care was stipulated

as a priority for board directors of hospital trusts on at least equal par with financial focus (Appointments Commission/DH 2010). It has been given a high profile as a result of the Public Inquiry chaired by Robert Francis QC into failings at the Mid Staffordshire NHS Foundation Trust in central England which builds on his earlier inquiry which reported in 2009 (Francis 2009). The publication of the Public Inquiry will focus even more attention on these matters. Concerns about quality also periodically emerge as one of the top priorities in healthcare as a result of outbreaks of hospital acquired infections such as *C Difficile* or MRSA. These can threaten the reputation of a hospital and lead to the dismissal of its top managers. Serious untoward incidents, such as the application of the wrong clinical procedures also give rise to major scandals. Inadequacy of care and neglect of patients can cause injury and acute concern among patients and the wider public. For these and other reasons, technologies designed to help provide clinical assurance go to the core mission of healthcare organisations. While other factors are at play such as the recruitment and training of nurses, staffing levels and prevailing cultures, systematic quality assurance methodologies have been deemed worthy of special focus. They allow methodical, consistent and evidence-based protocols to be applied to day to day care on the hospital wards. These technologies draw on tried and tested approaches as practised in high risk industries such as airlines and oil and chemical processing.

Yet, despite the rationales above and in spite of extensive national policy pressures and inducements to introduce quality assurance technologies, their take up has remained patchy. This would appear to be a considerable conundrum: an evident priority, a strong policy pressure and a high level of public concern, yet little evidence of the adoption of innovative solutions. It may be argued that this reflects a wider pattern of the 'non-spread of innovations' in the National Health Service (NHS) (Ferlie et al. 2005). As such it represents an opportunity to reveal some of the key underlying forces at play.

It has been noted that the NHS is missing out on the huge potential advantage afforded by its national character as a result of its relative failure to readily adopt innovations developed by its leading centres. Lord Darzi referred to the 'reluctance within the NHS to adopt new products and processes' (Darzi 2008). The phenomenon extends beyond the UK; it may be a sector characteristic rather than a national characteristic. The 'change-averse' nature of healthcare has also been noted by Christensen et al. (2000).

Whatever the source of the problem, the difficulties in rolling-out consistent care quality approaches in health services will continue to attract attention. The purpose of this paper is to shed light on the nature and extent of the challenge. In a context where there is a high level of public anxiety, a strong central policy push, and a set of readily-available methodologies, what factors might explain why diffusion and adoption of good practice in this critical domain is so tentative, perfunctory and incomplete?

We seek to attend to this research agenda by drawing on two types of literature and a number of case studies. The first set of literature that might be expected to illuminate the problem is that concerned with diffusion and adoption of innovations across industry sectors in general (Meyer and Goes 1988; Rogers 2003) and more specifically on adoption processes and barriers in healthcare (Greenhalgh et al. 2004;

John Storey (2013) Factors Affecting the Adoption of Quality Assurance Technologies, JHOM 27(4)498-519.

Gravel et al. 2006; Adams et al. 2011; Johnston et al. 2000). The second set of literature is that which has concerned itself directly and specifically with quality assurance methods in healthcare (Donabedian 1980; Harvey 1991; Balogh 1998; Balogh 2001; D'Avolio 2008). The case study evidence will focus on five cases selected on the basis of theoretical sampling. They each had made some attempt to adopt or adapt a systematic quality assurance technology and their experiences in so doing are used as sources of insight into the processes and factors at play.

But, before examining these sources of evidence we begin with the policy context. This is important because it establishes a powerful inducement for hospitals to adopt quality assurance methodologies. Failure to adopt under such circumstances becomes all the more perplexing and, in turn, potentially revealing.

The policy context

Various attempts have been made to introduce quality assurance tools and systems over the past twenty to thirty years. There was an upsurge in interest in their development and use in the late 1980s and early 1990s (Harvey, 1991; Koch 1992; Balogh 2001). In the UK, Health Care Acquired Infections (HCAI) such as *Staphylococcus aureus* (MRSA) became of increasing concern during the 1990s and its reduction became a national NHS target. One significant response to the rising concern was the creation of 'modern matrons' in 2001 with a specific remit to lead clinical teams in preventing and reducing such infections (Currie 2009). These matrons were meant to be 'highly visible, accessible and authoritative figures' (Department of Health 2001) who would focus on the task of cleanliness and related HCAI concerns. To help supplement such initiatives, continued efforts have been made to introduce new versions of quality assurance toolkits for clinical care.

The macro policy context is illustrated by the specific initiatives and campaigns led by the Department of Health to encourage and guide practice in relation to healthcare quality assurance. One example is the Department of Health's package of measures labelled 'High Impact Interventions'. This initiative was a Department of Health sponsored campaign designed to focus attention on the reduction of infection risks. It sought an evidence-based approach to key clinical procedures. The High Impact Interventions approach was originally launched in 2005 as part of the *'Saving Lives'* initiative. Each intervention in relation to a particular care bundle comprises a set of clinical guidelines, an audit sheet and a means to collect and collate the results. There is a statutory requirement that registered providers must audit compliance to key policies and procedures for infection prevention (Health and Social Care Act 2008). Despite this, in the year 2010 to 2011 only 11 hospital trusts out of 350 were able to record zero incidence of MRSA. A second example is the Department of Health's influential document entitled *'Standards for Better Health'* which became operational in April 2005. These standards were used as the basis for the inspection and audit regime used by the then Healthcare Commission and which in turn provided the basis for the Care Quality Commission's work.

Another highly relevant Department of Health sponsored initiative in this area was *'Essence of Care'* which was first launched in 2001 and has since been updated and refined. The 2010 update uses 12 benchmarks designed to 'help practitioners to take a structured approach to sharing and comparing practice, enabling them to identify the

best and to develop action plans to remedy poor practice' It aims to 'support localised quality improvement, by providing a set of established and refreshed benchmarks supporting front line care' (Department of Health 2010). They provide benchmarks for care in core areas including: respect and dignity, the care environment, communication with patients, food and drink, the prevention and management of pain, record keeping, hygiene and so on. *Essence of Care* can be variously used as a check list, an audit tool, a benchmark, an educational tool, a root cause analysis tool when examining incidents, and or as a means of providing evidence of compliance with Care Quality Commission (CQC) criteria. More generic guidance on quality measurement has come from the National Institute for Innovation and Improvement (Pencheon 2008) and the King's Fund (Raleigh 2010).

These kinds of centre-led initiatives have provided the backcloth for local efforts in developing healthcare assurance technologies designed to meet local needs. We turn now to a consideration of the literature which has addressed the wider question of the limited adoption of innovative technologies in healthcare organisations.

The literature on the adoption of innovation in health service organisations

There have been a number of significant systematic reviews of the literatures on diffusion and adoption of innovations in healthcare and it is not intended that a further review be attempted here (Greenhalgh et al. 2004; Greenhalgh et al. 2004; Robert et al. 2009). The Robert et al (2009) study focused in particular on 'technological innovations' which they defined as 'a device, procedure or organisational support system that is perceived as new by the stakeholders' (2009:6). They found that the dynamics of innovation are more complex in multi-professional organisations such as hospitals. They also note that clinicians and associated professionals enjoy considerable autonomy and discretion and that these freedoms can both impede as well as promote innovation.

But the processes involved in how or why NHS organisations decide to adopt, or not adopt, technological innovations were found to remain unclear from the studies that were reviewed (Robert et al 2009: 122). They identified shortcomings in many studies of technology adoption including most notably the perspective which viewed these as one-off events rather than a process; the conceptualisation of organisations as unitary actors; the relative neglect of politics and power in healthcare organisations and the perception of individuals within organisations as passive recipients of innovations. The authors called for more rigorous qualitative studies to develop better explanatory models of the organisational factors at play. They cite Fitzgerald (2002: 1433) who contended 'we need to know more about how adoption decisions are made within multi-professional groups and within large and complex organisations (Fitzgerald et al. 2002).

An earlier systematic literature review of diffusion of innovations in health service organisations noted the range of variables at play (Greenhalgh et al. 2004). Again the emphasis was upon adoption as a process rather than an event. Factors identified as seemingly relevant in shaping the course of action included, inter alia, the nature of the innovation itself, the characteristics of the adopters; the role of champions and opinion leaders; and the organisational context. Types of innovations that were more

easily adopted tended to be those which were perceived to have a clear and unambiguous advantage; were compatible with the values norms and practices of the adopters and their organisation; were perceived by key players as easy to use; allowed users to experiment, refine and adapt. The adopters themselves tended to have higher tolerance of ambiguity; have intellectual ability; and to have particular learning styles. The adoption process was found to be messy rather than linear, users seek reassurance at multiple stages of adoption. In addition, the organisational context has to be receptive and allowing. Key factors at play here include a culture that supports capturing and sharing new knowledge; leadership which promotes knowledge sharing; organisations which support training and a climate which is conducive to risk taking.

Provider organizations are the agent adopters of innovations and understanding the factors that inhibit or facilitate this process is important when addressing the key three issues of cost, quality, and access (Rye and Kimberly 2007). A recent study of technology adoption in the NHS noted that centralised dissemination of evidence had little impact and what mattered more was 'practice-based and peer-mediated' local dissemination processes (Kyratsis et al. 2012).

These reviews of adoption within healthcare can be seen as located within the broader category of research on technology adoption and diffusion more generally. Hugely influential here has been the work by Rogers (2003). He most notably identified the 'attributes' of innovations that help explain their rate and extent of adoption. The key attributes were: relative advantage (using a range of measures such as impact and cost); compatibility with existing practices; complexity (the degree to which the innovation is perceived as difficult to understand or use), trialability (the extent to which an innovation can be experimented with and experienced in practice), observability (the degree to which results are evident to others), re-invention (the perceived scope for modification and adaption). Rogers construed these attributes from his review of a wide range of literature reporting empirical studies. These six attributes have been widely used by many subsequent researchers of innovation. We too draw upon them as plausible factors to be explored in the setting of quality assurance technologies in the NHS.

The literatures outlined above, while powerful and influential in addressing the process of innovation diffusion and adoption have curiously been rarely used by the rather separate literature attending to quality assurance technologies in healthcare. Yet this latter literature domain has some separate strengths and relevance to our mission which make it worthy of attention and use. It is described in the next section.

The literature on healthcare quality assurance technologies

As mentioned, this literature tends to remain separate from, and to rarely cross-refer to, the wider innovation adoption literature. It also tends to be more prescriptive. It has a fairly clear purpose and agenda: to construct and specify 'standards' of service delivery; to enable conformance with top-down imposed reporting requirements; to provide nurses and other clinical practitioners with clear protocols and guidance which can enable them to strive for consistency of practice; provide a basis for continuous improvement and staff development.

John Storey (2013) Factors Affecting the Adoption of Quality Assurance Technologies, JHOM 27(4)498-519.

An influential source contends that quality assurance has three main component elements: structure, process and outcomes (Donabedian 1980). 'Structure' refers to the physical components of care including the organizational aspects. This includes, for example, whether a hospital ward has the appropriate physical resources to hand. 'Process' refers to behaviours and actions. This includes performance of care procedures, the preparation of care plans and evaluation processes. 'Outcomes' refers to changes to patient care and also to changes in clinicians' knowledge, skills and attitudes.

Elaborating on this list of purposes, Marker suggests that a quality assurance technology should enable: standards development, performance appraisal, audit of performance achieved, learning and development, active problem identification and risk management (Marker 1987). If these are the component *tasks and functions* to be accomplished, then in addition the *methods* have been also identified. These are said to include, most notably: the establishment of general principles, surveys of patients and staff, problem identification, and experimentation (Green 1986).

Assurance and assessment requires some notion of the standards of care being sought. Standards have to be defined and written. These statements specify the criteria for assessment. This in turn allows for *levels of attainment* ranging from high to low, or excellent to minimally acceptable. Assigning such levels may be achieved through *measurement* which in turn may mean specifying the ways by which numbers (i.e. scores) are attributed to behaviours, structures and outcomes (Green 1986).

This literature suggests that the problems to be overcome include identifying which key activity or other variable is to be measured, which instrument to use in order to measure that activity, and issues concerning sampling intervals and inter-rater reliability (Koch 1992). It has been suggested that each of the above component elements may be conceived of as parts of an *ongoing cycle* – from definition of standards, through assessment of practice and on to planned changes in response to the analysis (Balogh 2001).

The ultimate purposes are said to include patient safety, organisational survival, conformance with external regulation, continuous improvement, and, potentially, the aggregation of results to allow inter-organisational performance. Medical informatics may seek to utilise clinical assessment data to enable statistical analysis of clinical outcomes and performance measurement at organisational and clinical unit levels (D'Avolio 2008).

The above specification of characteristics of many quality assurance programmes offers a framework against which case examples can be compared. In the main, they constitute a normative approach where a higher authority defines and writes the standards and then proceeds to arrange assessment and audit of behaviour and performance against these standards. But there are variants to this (Koch 1992). For example, the focus may shift to an experimental and evidence-based approach where nurses and other clinical practitioners may be involved in trialling different practices and noting their outcomes. Or the emphasis may be placed on problem identification so as to avoid untoward incidents, medication errors and infection risks. In practice, it has been noted that the main body of nursing literature concerns the setting of standards and ways of assessing and measuring performance against these standards

(Harvey 1991; Koch 1992). Regulation and professional standards represent two ways to seek quality assurance. But a third and potentially alternative - or complementary - way that is sometimes advocated, is competition. This market-bases aspect of driving up standards in healthcare is of course controversial and it is not the subject of this present study.

A further issue concerns who 'owns' and sponsors the quality assurance technology. In past decades, district health authorities were often the owners and users because quality assurance was part of their performance management, inspection and audit regime. The authorities used a variety of tools some of which were essentially management control devices and others which leaned towards a nurse-focused developmental tool (Harvey 1991).

Health care quality assurance tools are typically composites derived from multiple inputs – including, for example, direct observations through formal inspections by matrons and others, examination and audits of written records, and the use of staff and patient questionnaires.

A further consideration is what happens to the data that is collected? More specifically, who has access to the data? In some systems the data is clearly part of the clinical governance and performance management system. Hence, it is made available in condensed form to the Trust Board and is used as a basis for reporting to external regulators and the Department of Health. In other cases, the results are seen as more confidential and are fed-back in a restricted way to the individual wards so that appropriate action can be taken to correct for any shortfalls against the standards. Nurses are reported as feeling stress and anxiety about assessment and reporting (Harvey 1991) and considerable effort is at times invested in seeking to assuage such anxieties.

The above review of clinical quality assurance literature suggests that there are a number of significant variants and that each of these could be considered as important design choices for product development innovators. Table 1 below summarises these variations. We term these 'design choices'.

John Storey (2013) Factors Affecting the Adoption of Quality Assurance
Technologies, JHOM 27(4)498-519.

Table 1: Clinical Quality Assurance Tool Design Choices

1. Wide or narrowly focused tool?	For example, narrow focus on infection control or wide span covering many aspects of care quality reporting
2. Top down or bottom up development?	Imposed or various degrees of co-development and staff engagement
3. A control, quality assurance focus or improvement/development focus?	Performance measurement or improvement/learning focus
4. Range of data sources to call upon?	Observation, interviews, questionnaires, written care records etc
5. Frequency of audit?	Annual or more frequent
6. Complex and holistic or simple to use?	Elaborate and all-embracing or specific and tightly focused
7. Nurses only or wider?	Is the design purpose to improve nursing practice or is the aim to provide wider reporting and assurance processes
8. Methods of audit?	External auditors, matrons from other wards/care groups?
9. Transparency of data when collected?	Feedback only to specific ward or wider?
10. Encourage some internal competition or not?	This relates to the question about transparency of results
11. Challenging targets or minimum standard thresholds?	Conformance with a set standard or more?
12. Extent of ambition – own department and division, whole hospital, whole trust or beyond?	Perceived scope of influence: immediate work team or an intent to innovate and develop and product for use across multiple organisations?
13. Involvement with commercial partner?	Nature of relationship with commercial partner; remit given to that partner

This schema of design choices drawn from the healthcare quality assurance literature
can be located within and alongside the wider literature on the diffusion and adoption
of innovations discussed earlier in order to provide a richer agenda for research. The
apparent problem of embedding and sustaining high levels of quality in front-line
services may be tackled anew by drawing on both of these different bodies of
literature.

As noted in the introduction, there are signs of high levels of concern about the
quality of care. There is uncertainty about the sources of the problem and so the
difficulties in disseminating consistent care quality approaches will continue to attract
attention. The research and the practical challenge is the clear identification of those
factors that might explain *why* diffusion and adoption of good practice is so
problematic. The context is one of high public anxiety, a strong central policy push,
and a set of readily-available methodologies. Drawing on the two literatures outlined
above and a study of five cases we seek to shed some new light on this challenge. In
the next section, the research methods adopted for the study of the cases are
described.

Research methods

The empirical part of the research was designed to allow insights drawn from the two literatures outlined above to be utilised as resources in the quest to answer the research question concerning what factors might explain why diffusion and adoption of good practice in quality assurance is so problematic. The converse question was also addressed – i.e. what factors seem to enable the adoption of these technologies.

A qualitative case study method was at the core of the design (Yin 1994). Case selection was obviously a key consideration. This task began with the identification of leading examples of quality assurance technologies by contacting a number of innovation hubs. The aim at this stage was to gain a broad picture of who was doing what in this area of activity. This was a general intelligence gathering stage. Basic details were collected about which hospital trusts had most notably developed and implemented innovative clinical assurance technologies. This initial identification work comprised the first phase and as a result of this work two hospital trusts were selected for attention as examples of innovative quality assurance technologies.

In the second phase of work, the two nominated trusts (A and B) were contacted by telephone and their quality assurance innovators interviewed. At this stage, data was collected about the nature of the innovation, its purpose, the factors which prompted its development, its take-up within the trust and its take up by other trusts. Running in parallel with this, commercial companies which had also played a part – usually by providing software development - were also interviewed. At this stage also, information about the wider picture of developments in health care quality assurance nationally was sourced from three independent experts with backgrounds at senior level in quality assurance practices in the NHS. At this stage also three hospital trusts were identified as *adopters* of the innovative technology developed by Trust A. For reasons that will become clear in the case descriptions, there were no adopters of the innovation developed by Case B.

In a third phase, a series of telephone interviews was conducted with the three hospitals trusts which been identified as adopters of the package designed by Trust A. Arrangements were then made for site visits and face to face interviews with all five Trusts. This site-based research comprised the fourth and main phase of the work. Ten face to face interviews were conducted at this stage – two interviews per hospital trust. In each instance the 'technology champion' (developer or principal adopter) was the first interviewee. This was normally the most senior nurse who had overall responsibility for quality assurance throughout the trust. The questions which guided the semi-structured interviews were (1) what factors had prompted the attempt to introduce an innovative quality assurance package? (2) what were the main characteristic features of the package and how did these differ from previous practice? (3) what were its advantages and disadvantages? (4) what was the process in its introduction and who played a part in this process of development, adoption and/or adaption? (5) what factors helped or hindered the development and adoption of the innovation?

The other interviews in each of these trusts were with other senior nurses who had responsibility for *using* these innovative technologies. The questions which guided these interviews were drawn from the clinical quality assurance design choices as

shown in Table 1 above. Thus, this phase of the interview was designed to capture data about what choices had been made with respect to the breadth of focus of the tool, the data that was fed-in to the tool, the frequency of audit, the complexity of simplicity of the tool, the methods of the audit, the transparency and use of the data collected, responses of nurses who were assessed with the tool and perceptions of its outcomes. Thus, while the first set of interviews were based around a design perspective – i.e. what choices were made on a range of identified criteria, the second round of interviews focused on the perspective of those senior nurses who had a responsibility to use the technology in their quality assurance work. The interviews were conducted in a manner conducive to allowing informants to reveal their priorities and their concerns in as open a manner as possible.

The interview data were supplemented with demonstrations of the quality assurance packages on the hospital trusts' intranets. Additionally, documentary sources including extracts from the technology packages alongside reports describing the technologies which had been prepared for clinical governance committees and boards were collected and scrutinised. In two of the cases, internal evaluation reports on the workings of the quality assurance systems were also analysed.

Data were recorded in hand-written form by entering responses into pre-printed pro-forma interview sheets which had the main question areas set-out in the left column of a series of data sheets. The first few interviews were recorded but it became evident that the respondents were guarded in their responses. The topic areas were seen as sensitive and respondents were less forthcoming and open than they were when handwritten notes only were being used. This has not always been the case with other respondents in other studies; the sensitivity seemed to reflect the role location of these respondents. They were in senior and responsible positions but they were not at top policy making levels where consideration of options and experience in expansive reflective debate is more the norm. Rather, they were the custodians and executors of their hospital trust regulatory regimes and they seemed to want the security of having made the right choices which they could defend. Their expressions of uncertainty and critique tended to be heavily laden with qualifications and apologies that this as their 'personal opinion' or 'personal view' and was often accompanied by a degree of discomfort.

There was an added advantage in the use of handwritten responses onto pro-forma sheets in that subsequent data analysis was made much easier because responses had been organised as it was entered during the interview. The two literatures were found to have adequately covered the main range of issues and back-to-basics content analysis as recommend by some researchers was not required (Patton 1990). This method of data collection and organising was only used for the main phase, the interviews with NHS national level experts and with the commercial providers of technology were more traditional free-flowing in format so as to enable novel and unexpected themes to emerge. As the number of interviews of this latter type was relatively few, the data analysis was manageable using more grounded approaches (Glaser and Strauss 1967).

Findings: Development and adoption processes issues in the case organisations

John Storey (2013) Factors Affecting the Adoption of Quality Assurance Technologies, JHOM 27(4)498-519.

The two literature domains outlined earlier are different but complementary and they are each drawn upon to inform the case analyses which follow. First, it describes the general context within which clinical assurance toolkits are introduced. Second, it sets out the framework of issues to be considered. And third it indicates the range of design choices which have to be made by both developers and adopters/adapters.

In this section we now turn to an examination of each of the five case studies. The cases taken together reveal:

(i) That despite the templates established at national level as described above there are significant variations in the nature of the toolkits that were developed;
(ii) That in many of the cases there were important obstacles to the full adoption of the toolkits that were designed;
(iii) That the extent and nature of the ambition of the developers varied dramatically – some wished to see their work impacting widely across the health service, others had a number of different reasons for wanting to restrict the impact of their work. Despite the variations in scope of ambition, the overall rate of 'adoption' remained low. The analysis below seeks to reveal why.

In the majority of cases, the healthcare quality assurance technologies examined in the cases researched for this project were found to have been developed by *nurse leaders* in conjunction with experts in IT and others and the main purpose and target group was mainly quality assurance for nursing on wards and departments. There were a few variants where the target groups included doctors and professions allied to medicine such as occupational therapists. Again, in the main, though not exclusively, the underlying frameworks had originated and/or been prompted by initiatives at the national level and sponsored by the Department of Health.

The technologies were essentially *local adaptations* of national, top-down initiatives. This pattern is by no means unusual in the context of the NHS: to a very large extent, priorities are normally established at the centre. Rarely is it the case that a trust within the NHS sets off on a path which has not been signalled from above. The variations in their strategies, motivations and actions are revealing.

Case A, City NHS FT

In this and each of the cases, we present the findings organised around the five main questions listed earlier: (1) what factors had prompted the attempt to introduce an innovative quality assurance package? (2) what were the main characteristic features of the package and how did these differ from previous practice? (3) what were its advantages and disadvantages? (4) what was the process in its introduction and who played a part in this process of development, adoption and/or adaption? (5) what factors helped or hindered the development and adoption of the innovation?

First, the driving factors. City NHS FT developed a clinical assurance toolkit in response to a number of background factors and triggers – a key one being the aforementioned '*Standards for Better Health*'. The Trust as with other Trusts needed some means of organising its response to these externally led requirements. Around

the same time, the Trust experienced a higher than expected incidence of infections. A further prompt was the arrival of a new head of nursing who had been involved in a nation-wide project relating to clinical governance and nursing practice. So, the initial prompts to action were multiple and reinforcing.

Second, the characteristic features of the innovation package. The twin central features of the toolkit were first, that it combined within one place a holistic, total view of clinical assurance issues and second that it allowed multiple sources of data to be used as evidence of performance against these measures. The toolkit was evolved over the next three years and then an electronic version was developed in collaboration with the IT department. This electronic version has now been in operation for 4 years and it is used in all wards and all departments of the Trust. There is a central generic version and a number of specialised variants to meet the special needs of certain areas including inpatients and outpatients, maternity, day cases, operating theatres, critical care and the radiotherapy suite. The toolkit is mainly nursing focused at this point in time.

The toolkit is characterised by a systematic itemisation of standards and against each standard a list of expected sources of evidence is listed (for example, evidence from matrons' spot checks, from staff surveys, from records audits and from patient surveys). Each detailed standard is clustered under an organising heading (e.g. skin and wound management along with nutrition and hygiene care are clustered under a 'patient care' standard). Each cluster or group of standards is then rated using a traffic light grading system. Red indicates urgent corrective action is required, yellow indicates further work needed with medium to low priority, green indicates that the ward or unit is functioning well on this standards, blue signals an area of excellence meriting wider sharing of good practice across the trust.

The new quality assurance package combined a number of measurement techniques. These included: a matron's spot check of each ward or department; a checklist of questions for matrons to use in order to assess the awareness of different levels of staff about practical matters related to patient safety; a quarterly medicines management checklist; an audit of paper records showing, for example, whether patient observation charts were up to date and up to standard; staff perception questionnaires and patient questionnaires.

The advantages were reported as the bringing together into one place and time a range of measures and standard practices which were previously fragmented or only partially completed. Sub-systems such as induction, training and development and standards reporting were seen as integrated. The disadvantages were perceived as few and these related to having to learn new ways of working. The results are used for multiple purposes including for practice improvement, and for upward reporting for clinical governance reporting as well as for accountability to external regulatory agencies such as the Care Quality Commission (CQC).

The processes involved in its introduction and which of these helped or hindered were the next questions. The early phase of activity was driven by a small team. This comprised a handful of selected nurses and a staff member from the audit department. They developed a paper-based version of the toolkit by taking *Standards for Better Health* as a starting point. One aspect of their work was to translate these standards

into a form which allowed nursing care to be assessed on a regular basis. An important priority was to consider what kinds of evidence could be used in order to show compliance with the standards.

The factors which helped the effective adoption and widespread use were reported as the way in which the innovation was seen as offering a solution to a known set of problems (infection rates, the need to show compliance with a multiplicity of standards etc). The adoption of the toolkit within the various departments and sites of this trust has been extensive. This can be explained by the support and indeed pressure from the higher levels of trust governance and also by the unusual supporting infrastructure in the shape of a 'practice development unit' which facilitates change of various kinds across the trust. The trust says that the system allows quality monitoring and continuous improvement by drilling down into the individual scores of the component elements of the standards even where the overall result for a standard is good. It is also claimed that the data allows for disentangling of whether a practice is being performed or not, how well the practice is being performed, and with what quality outcomes such as the number of medication errors.

The current champions of the toolkit within the trust report that they continue to adapt it to reflect priorities at both national level and local levels. They say it is an 'organic' and not a 'static' tool.

Despite the readiness of the originators to share their ideas (through workshops, by receiving visitors from other trusts and through the placement of their paper-based version with the NHS innovation hubs and a company specialising in NHS technologies), there has been little sustained attempt to exploit the innovation by selling it on to other trusts. There seems to be a genuine willingness to help other trusts adopt this or similar technologies if they wish to do so, but there is no apparent desire to actively market the ideas. As we will note later when looking at other cases, this openness to the spread of new ideas is not always replicated. The focus in City NHS FT is clearly upon quality improvement for the home trust and this runs alongside a willingness to help other NHS organisations make similar improvements.

Despite this openness, the number of trusts which have made the decision to adopt this toolkit has been few (approximately half a dozen, whereas the commercial IT partners expected scores of adopters). Moreover, even those few which have adopted the toolkit have done so far less fully than was the case with the originating trust. We can now turn to an examination of three adopting cases.

Case B, Riverside NHS FT

Senior nurses in Case B had visited City NHS FT in order to make an assessment of the toolkit and they had subsequently made a conscious decision to adopt the technology. This case of the toolkit's adoption was the clearest example that was found of a wholesale adoption with very few attempts to alter the package to any significant extent. The exact same set of standards was used along with the same methods of collecting the data to assess performance against these standards. It should, however, be noted that a key factor in the adoption decision appears to have been the fact that one of the senior nurses in Case B had previously worked in Case A

and thus had direct experience of the technology. When charged by her line manager to develop a clinical assurance tool she recommended the City NHS FT product. A small team visited the originating site and was sufficiently persuaded to make the adoption decision.

A further important feature of this case was that Riverside was experiencing much more difficulty in ensuring active take-up and use of the toolkit across the trust than was the case in City. The senior nurse who had recommended adoption was a strong believer in, and advocate of, the toolkit. However, it was notable that adoption was really only secure in that division of the hospital where she had a direct responsibility and authority for clinical governance matters. The other divisions were slow to adopt the technology. In part, this was because they had their own legacy systems which, in a more fragmented way, collected similar data. They were reluctant to change over to a new system. This reluctance and scepticism extended to senior levels in these other divisions. Likewise, there was little sign of support from senior managers and directors in the trust. In seeking an explanation for the lack of progress in the adoption of the toolkit when compared with the first case it may also be suggested that the lack of the supporting infrastructure of a practice development unit meant that the champion of the toolkit was more of a lone voice. Ironically, experience with an existing system represented an obstacle.

As a senior figure in just one of the three divisions, the technology champion had the authority and credibility to ensure its adoption within her division but not within the other divisions of the hospital trust. This left the technology champion with a dilemma. One option was to restrict her aspiration for full adoption to her own division while leaving the other divisions to their own devices. Alternatively, aware of the organisation-wide use in her original trust she could seek to campaign for its wider adoption in order to exploit its full holistic potential – which included, as mentioned, board level reporting and external reporting to regulators such as CQC in addition to service improvement on the wards. The champion was aware of these options and seemed unsure as to which path to take. The main priority was effective utilisation within her own division. When pressed, it was apparent that there was no real interest in seeking wider diffusion into other NHS organisations.

The champion argued that the toolkit was useful in bringing 'everything of significance together in one place' - and that it was simple to use. All relevant information needed to ensure conformity with expected standards was said to be made available through this tool. Despite these advantages she observed that 'We are struggling to have it accepted at Trust level'. Hence, this is a clear example of *partial* adoption. Senior managers and directors were 'not yet fully behind it'. It was seen as 'just another initiative'.

In response to these points of resistance one temptation was to evaluate it in a manner which emphasised its acceptability to staff. There was a possibility that rigour in such circumstances could be sacrificed as second order to acceptability. The results of the assessments are 'posted on the walls in order to show nurses how well they have done' (Modern Matron). At the same time, where results indicate that sufficient resources are not to hand, these data are used in order to take a more convincing case to management in order to secure these resources. This could involve staffing levels

and skill mix issues, single sex accommodation issues, lack of appropriate beds, as well as other equipment and materials.

Part of the resistance from other divisions stemmed from an attachment to existing systems such as the national *Essence of Care* package discussed earlier. The technology champion in Case B was faced with a senior nurse colleague who had invested time in, and tended to favour the use of *Essence of Care* and was reluctant to see deviation or distraction from this extant programme. Thus, the existence of competing systems presents a problem to adoption. In the face of this, the toolkit champion was seeking periodically to seek additional sponsorship and 'to light fires' around the trust in order to garner support for a system which she believes encompasses and improves upon *Essence of Care*.

Meanwhile, the uncertain and partial current level of adoption and support meant that only the paper version could be justified – investment in the electronic version was seen to require greater prior commitment. It was argued that there was a need to 'convince both hearts and minds if it was to be done well'.

It was also argued that the toolkit allowed staff to make constructive suggestions for improvement and change without appearing to be 'whinging' – it gave legitimacy to critical reflection.

There was no real appetite among the toolkit champions to press for wider adoption across the NHS. The motivation and the focus were very clearly upon divisional level improvement and assurance, followed by trust wide improvement and assurance. There was no perceived incentive to seek anything further outside the trust.

Cases C and D: Two Partial Adopters

These two cases can be seen as variants of Case B. The package they adopted was derived from Case A but in these latter two cases they had encountered even greater difficulties in embedding the innovation in their trusts. In consequence, they had settled for partial implementation both in the sense of only applying it to certain divisions and wards and also in the sense of only utilising parts of the package.

The lessons to be learned from these two cases of partial adoption are that adoption requires political influence within the organisation. A simple appeal to a 'better approach' was not enough in either case. In both instances, the local champion was only able to extend the new practices within their immediate sphere of influence. In one instance this meant rolling-out the package within just two divisions of a five division trust. In the other instance, it meant wider coverage across multiple divisions and sites but only for infection control – the remit of authority carried by this local champion. In both instances, attempts to win influence and sponsorship by senior management had proven futile.

Yet the efforts extended were considerable. In Case C the development of the tool extended over 20 months with a small team comprising matron representatives and ward sisters from each division. This input was seen as crucial in building a sense of ownership of the toolkit across the trust. A three day event was organised involving matrons, infection control nurse, and other senior nurses and they reviewed a range of

sources to help assess the adequacy and suitability of the acquired toolkit. The
standards were mapped against other source such as 'Standards for Better Health',
'Essence of Care' and other methodologies. National standards were balanced
alongside local needs.

The exercise helped reduce the breadth of coverage so that the standards measured
were judged to be the critical ones. Hence, the current version is shorter and simpler
than that originally developed by Case A. Likewise, the amount of feed-in data is
reduced compared with Case A. Criteria for inclusion covered external reporting
requirements, whether proposed standards could be assessed with relevant evidence,
and relevance to nurse practice improvement. A practice development unit helped to
launch the package. Yet despite all these efforts adoption was only achieved in parts
of the trust and it was rejected by other parts.

Case E, Capital University NHS FT – an Alternative Model

This case is notable in a number of key ways. First, this trust had designed and
developed its own sophisticated version of the Case A toolkit. In this way this case is
very different from Case B. It is also very different in that it has developed an
electronic toolkit which is seen as strategically very important and central to the
success of the trust as a whole. There was high-level and indeed top-down
championing of the tool. Following on from the two previous points and perhaps most
significant of all, the quality assurance toolkit developed in this case was regarded as
so strategically important by the senior team that it was seen as offering a competitive
edge. As such, far from wanting to see its wider adoption across the NHS there was a
concern to keep it in-house as part of the organisations core capability. The fear was
not a loss of IP in the sense of lost potential revenue from the technology itself, rather,
far beyond that, the issue was that the toolkit had been 'taken to another level' beyond
that developed by Case A (which Trust E was certainly aware of and had considered)
and that, as such, it gave Trust E a *commercial edge* in a competitive metropolitan
marketplace.

This competitive advantage was perceived to stem from the improved and assured
high quality of care which would result from the use of this 'enhanced' clinical
quality assurance toolkit as it was embedded in a wider system of continuous
improvement. Issues of earning license fees and the like from the IP of the package
itself was of no interest to the developers within this trust. The focus was on earning a
high reputation for good quality of care among its 'customers' – that is, GP
commissioners, and patients.

In line with this stance and this philosophy, Trust E was focused on using the toolkit
as part of its improvement technologies package; the intent was to improve practice.
The scores were seen as simply a guide and a trigger for a set of interventions that
could then improve practice in an evidence-based manner. Accordingly, the original
idea of using the label 'Performance Scorecard' was discarded in favour of 'Quality
Improvement Framework'.

As with Case A and B, Capital University Trust had developed a core generic toolkit
but additionally had developed tailored versions to fit the needs of specialist services

such as intensive care, midwifery and A&E. These units had to demonstrate conformance with the principles of the toolkit but they were also allowed to use different measures in certain aspects such as appropriate nutrition and hydration of patients – that is, parts of the 'care bundle' along with monitoring of falls and infections.

Reflecting the elements discussed in the literature section, measurements were taken which covered structural features of the service offered (environment and staffing for example), process features (such as behaviours) and outcome measures. Key measures include hand hygiene, attention to sores and pressure damage, food and hydration, catheters and their use, measures of courtesy to patients and so on. As with the other cases, the focus was on nursing care. Following improvement methodology principles, this trust was using the data to track variances and to interrogate those in order to find patterns and root causes. Cross ward and care group comparisons were made and from this data reports were made through the clinical governance structure. As with the others a traffic light scoring system is used.

The scope of the assessment is narrower than the toolkits used by cases A and B. Trust E has a clear focus on the assessment and improvement of *nursing practice*. This package, as mentioned, is less wide-ranging than that found in Case A 'We get that other data from other places in our trust without using the Quality Improvement Framework' (Operations Director). The wider set of data is brought together in a Trust wide scoreboard from a range of sources. But, 'Our toolkit is very focused on nursing practice'. It was also noted that 'In addition to our nursing care data, the CQC is also interested in other additional data that is found elsewhere in the trust, our data feeds-in to that overall picture, it does not seek to be the total answer to the need for compliance data'. The tool embraces and covers the elements found in the Department of Health's *Essence of Care* set of guidelines and provides a means to show compliance with particular aspects of the CQC standards – those focusing on the care bundle but not those relating to patient choice or care planning etc which are covered elsewhere. The aim was said to be to keep the package simple, user-friendly and focused. The need for simplicity was said to arise because of the large size and complexity of the organisation and the high rate of staff turnover.

A commercial partner offers IT development and support for the package; it most definitely does not have the authorisation to market it to other trusts. The infection control template was needed urgently for reporting purposes and a tender was issued which this commercial provider won. The data which populates the template remains in the ownership of the Trust.

The data is described as 'real time'; it is not reliant on an annual audit. The senior nurse and her team have direct access to the results for all wards on all sites. Monthly returns on most measures can be viewed in this way. The infection control measurement template component was developed by another large trust and developed further by the commercial partner. This package was then purchased by Case E and developed further in conjunction with the commercial partner. The aim was to do something much more than infection control but not to go so far as the holistic reporting system developed by Case A. The care bundle data is fed to the commercial partner and HR adds-in the relevant workforce data including nurse numbers and skill mix. The resulting monthly reports are taken to the monthly

professional practice committee and at intervals to the health and safety committee as well as the clinical governance committee of the board – 'the same numbers are taken to each'.

The extent of nurse involvement and engagement in the development of the package was not a priority. The toolkit was developed centrally but there is a plan to develop awareness and engagement among nurses at all levels. At present, the understanding and buy-in is mainly at ward manager level. Despite this, there is active use of the tool by senior nurses (Band 7). Each week they present aspects of the data from their wards to their peers from similar care groups and their site – usually an audience of about 40 staff. And once a month there is a Trust wide report back session. These reporting sessions help ensure that the data is used actively and they are used to hold people to account and to help ensure follow-up actions where required. Nurses in these sessions talk about their results and their action plans. MRSA and CDiff cases are benchmarked by care group against other hospital trusts. The improvement elements as well as the performance element is regarded in this case as crucial. The toolkit is used as a method to tackle patient care issues such as measuring falls or patient reporting of pain in cancer wards. That said, a number of measures reflect CQC reporting requirements such as whether a call bell is within reach of all patients (though not the time taken for a nurse to respond). This case reveals that the motives for innovating can vary dramatically even within the context of the NHS and with reference to a similar technology. The case also reveals that adoption of innovative technologies within the NHS is just as likely to be enabled by top down determination as it is by bottom-up buy-in.

Discussion and conclusions

The issues underpinning the quality assurance technology examined in this paper were given high priority by the Department of Health; in addition, a number templates and support systems had been constructed at national level. Yet, despite these favourable conditions, the development and adoption of these technologies designed for quality improvement and assurance in basic nursing was limited and patchy. It would seem that there must be some *systemic barriers* to the wide diffusion of these kinds of innovation. The cases selected for study were those which had been specifically identified as having taken some steps to ether develop or adapt and adopt such technologies. Even in these cases, as described in the case presentations above, there were significant obstacles. There were also some clues as to how and why adoption can succeed.

As reported earlier, the main body of literature on healthcare quality assurance tends to be prescriptive – the key elements are defined, described and recommended for action. But as revealed in the cases described above, the process of adoption is hindered by a number of factors. Some of these are quite subtle; in part they stem from varied motives, priorities and fears. Taken together, these five cases help shed light on the forces at play.

The reasons for the overall lack of take-up of these quality assurance technologies can be picked out from the analyses of the cases above: there is an insularity between hospital sites and between departments within sites; there are high occupational/professional boundaries which obstruct smooth adoption (see also Ferlie

et al. 2005); there are legacy systems which staff tend to defend as they have become familiar with them (see also Greenhalgh et al. 2004); and, not least, new expenditure in times of financial stringency and cost-cutting makes the task of developing a 'business case' hard work and discouraging. The adoption decision (or as we have seen it is much more like a whole series of decisions) requires evidence of impact and cost effectiveness. Blocking opportunities arise at each stage. The 13 decision dimensions shown in Figure 1 were variously selected by the different cases and the decisions adopted reflected the situation in each of the trusts. For example, whether the scope of audit was wide or narrow, top down or bottom up, tended to reflect the power structures and priorities in the case sites. The precise detail of the option selected was secondary to the bigger issue of organisational power and priorites.

In principle, the technologies (apart from the significant exception of the package developed by Case E) were available to other NHS trusts. In practice, adoption had been limited. Indeed, it is the relative lack of adoption which is the most instructive part of these cases. Even though in two of the cases a commercial partner had been enlisted to both develop the IT functionality and to market the resulting packages, the success in finding customers had been relatively weak. This is the more notable because the wider policy context emphasised the need for clinical governance and for robust procedures. Further, the regulatory regime also required assurances of the existence of systems and data of a kind which would seem to favour these packages. Despite this supportive backcloth, adoption beyond the originating trusts remained sticky.

NHS hospital trusts have an evident need for clinical quality assurance tools. This is stimulated by requirements at a number of levels. Clinicians need some guidance about approved procedures and protocols governing care. Additionally, internal performance management and good clinical practice require systems of this kind. Beyond organisational boundaries, there is an external regulatory system which sets out expected standards and inspects against these. Overarching all of these is the national policy level which from times to time launches campaigns which prompt activity in line with such tools. The overall climate therefore is highly receptive to the development of the kinds of clinical assurance toolkits examined in this report. Yet, despite these 'readiness for change' signals, the adoption of the technologies described here remained curiously limited and circumscribed. Commercial technology partners who had helped the trusts develop their ideas had sought to market the packages to other trust – including publicising the availability and the advantages of these systems to all hospital trusts across the country. Not only was it difficult to sell these innovations into other trusts, but, as we have seen it was also difficult to disseminate good practice even within the 'adopting trusts'.

This limited diffusion reflects the bigger picture where even well-sponsored national level DH initiatives including *Essence of Care* have not been fully adopted. Key performance indicators stipulated at national level including *Vital Signs* are often collected at trust level rather than individual ward level. The toolkits described in this report, despite their limitations, could in general be considered as well ahead of the norm. The processes reported in this paper therefore give clues to the reasons underlying a more general pattern of non-adoption of new ideas in the NHS.

John Storey (2013) Factors Affecting the Adoption of Quality Assurance Technologies, JHOM 27(4)498-519.

No single technology has dominated the market. A number of similar technologies have emerged – some of which have been adopted and adapted by trusts beyond the originating site and others which have been more or less restricted to the developer-user location. Further, the scope of the technologies varies – some are narrowly focused on a specific aspect of clinical practice such as infection control while others are widely defined so that they seek to cater for the quality reporting requirements of the organisation and of its array of external audit and regulatory bodies in one single technology package.

The study lends qualified support to the significance of the attributes highlighted by Rogers (2003). 'Relative advantage' of the quality assurance technologies was an important variable in each of the cases. But the social dimension to this was also revealed – that is, relative advantage was not purely a characteristic of the process but was also weighed in terms of patient impact and in most case special consideration was given to staff impact. 'Compatibility with existing practices' was also found to be important; but when it was seen as highly compatible the question was raised about why change should occur. 'Complexity' was also confirmed as a relevant factor. Nurse leaders/product champions were alert to the need to be able to demonstrate to nurse colleagues that the innovation would be easy to use. 'Trialability' was also important and for similar reasons as the attribute of complexity. 'Observability' of beneficial outcomes was less evident as a major concern unless that was understood as about nurse reassurance concerning ease of use. Finally, 'Re-invention' was significant in some of the cases as the scope for modification and adaption of the technology was a selling factor where there was some opposition, but less important when reassurance was gained through the proposition that the package as a whole was tried and tested elsewhere in the NHS.

The hypothesis that insider, practitioner-developers would have some advantage in gaining acceptance for their innovations in their own immediate localities (Storey 2011) was broadly supported by the case evidence. But the cases also indicated that this influence did not extend very far into other NHS organizations. Clinical quality assurance technologies may be a special case; the central actors tend to be nurses and they seem to have a strong focus on professional practice and on top-down directives. Marketing efforts from commercial providers find it difficult to compete with these twin priorities. This would suggest that where commercial providers have made inroads in cognate areas, their point of entry has been via board level directors where ease of governance has been a high priority. Systematic audit and reporting systems which embrace clinical practice but are not confined to it are then more easily mandated in a top-down manner.

Despite the energy and commitment invested in the development of these toolkits by a number of individual champions, the process of take-up and adoption was usually problematical. This, in essence, is the problem that requires an answer. The cases suggest a number of possible reasons.

Disseminating the technological innovations was in the main not a high priority for the key players. The main focus of ambition for the developers was to improve local practice. Beyond that, some were willing to share experience with other trusts if requested. There was one notable exception where the innovation was regarded as offering a competitive advantage to the trust as a whole and therefore its operating features were protected.

In the other cases, some developers had a strong personal interest in 'technology' and this provided an incentive for their involvement. Others – the majority – were highly focused on service improvement. A few would have liked to have external recognition for the innovation but this rarely seemed to be a significant driver. Protecting IP and securing an incline stream from the innovation hardly figured at all.

There was sometimes a tension between honest self-appraisal so as to allow for improvement to practice and the urge to publicise 'good news'. Different product champions handled this tension in different ways. Some placed the emphasis on one end of the spectrum or the other, while some sought to tailor the message to different kinds of audience.

Cost was often mentioned by these developers as a factor which might 'explain' lack of adoption, but the relatively low sums at stake in these instances suggest that this cannot be the main issue. The bigger perceived costs were in overcoming the investment that all levels and types of staff had in their legacy systems. The toolkits provided relatively simple frameworks and procedures. Their adoption seemed to require a wider change management programme designed to ensure uniform adoption across a trust and a shift in behaviours including the cessation of well-established routines.

Acknowledgements

References

Adams, R. J., D. Tranfield and D. Denyer (2011). "A taxonomy of innovation: configurations of attributes in healthcare innovations." *International Journal of Innovation Management* **15**(2): 359-392.

Appointments Commission/DH (2010). *Governing the NHS*. London, Department of Health.

Balogh, R., Quinn H, Simpson A, Bond S (1998). "A comparative analysis of six audit systems for mental health nursing." *International Journal for Quality in Health Care.* **10**(1): 43-52.

John Storey (2013) Factors Affecting the Adoption of Quality Assurance Technologies, JHOM 27(4)498-519.

Balogh, R., Quinn H, Simpson A, Bond, S. (2001). "Completing the audit cycle: the outcomes of audits in mental health services." *International Journal for Quality in Health* **13**(2): 135-142.

Christensen, C., R. Bohmer and J. Kenagy (2000). "Will disruptive innovations cure health care?" *Harvard Business Review* September-October: 102-112.

Currie, G., Koteyko, N., Nerlich, B. (2009). "The dynamics of professions and the development of new roles in public services organizations: The case of modern matrons in the NHS." *Public Administration* 87(2): 295-311.

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

D'Avolio, L., Bui, A.A.T. (2008). "The clinical outcomes assessment toolkit: A framework to support automated clinical records-based outcomes assessment and performance measurement research." *Journal of American Medical Informatics Association* 15(3): 333-340.

Department of Health (2001). *Implementing the NHS Plan: Modern Matrons*, Circular 2001/010. London, Department of Health.

Department of Health (2010). *Essence of Care*. London, DH.

Donabedian, A. (1980). *Exploration in Quality Assessment and Monitoring*. Ann Arbor, Mich., Health Administration Press.

Ferlie, E., L. Fitzgerald, M. Wood and C. Hawkins (2005). "The nonspread of innovations: The mediating role of professionals." *Academy of Management Journal* 48(1): 117-134.

Fitzgerald, L., E. Ferlie, M. Wood and C. Hawkins (2002). "Interlocking interactions, the diffusion of innovations in healthcare." *Human Relations* **55**: 1429-49.

Francis, R. (2009) *Independent Inquiry into Care Provided at the Mid Staffordshire Foundation Trust*, London, House of Commons.

Glaser, B. G. and A. L. Strauss (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New York, Aldine Publishing.

Gravel, K., F. Legare and I. D. Graham (2006). "Barriers and facilitators to implementing sahred decision-making in clinical practice: a systematic review of health professionals' perceptions." *Implementation Science* 1(16).

Green, L., Lewis, F. (1986). *Measurement and Evaluation in Health Education*. Palo Alto, Mayfield.

Greenhalgh, T., G. Robert, P. Bate, O. Kyriakidou and R. Peacock (2004). *How to Spread Good Ideas: A Systematic Review of the Literature on Diffusion, Dissemination and Sustainability of Innovations in Health Service Delivery and Organisations*. London, NCCSDO.

Greenhalgh, T., G. Robert, F. Macfarlane, P. Bate and O. Kyriakidou (2004). "Diffusion of innovations in service organizations: systematic review and recommendations." *Milbank Quarterly* 82(4): 581-629.

Harvey, G. (1991). "An evaluation of approaches to assessing the quality of nursing care using predetermined quality assurance tools." *Journal of Advanced Nursing* 16: 277-286.

Johnston, G., I. K. Crombie, H. T. Davies, E. M. Alder and A. Millard (2000). "Reviewing audit: barriers and facilitating factors for effective clinical audit." *Quality in Healthcare* 9(1): 23-36.

Koch, T. (1992). "A review of nursing quality assurance." *Journal of Advanced Nursing* **17**: 785-794.

John Storey (2013) Factors Affecting the Adoption of Quality Assurance Technologies, JHOM 27(4)498-519.

Kyratsis, Y., Ahmad R and H. A. (2012). "Technology adoption and implementation in organisations: comparative case studies of 12 English NHS Trusts." *BMJ Open, e000872.doi:10.1136/ bmjopen-2012-00087.*

Marker, C. (1987). "The Marker umbrella model for quality assurance, monitoring and evaluating professional practice." *Journal of Nursing Quality Assurance* 1(3): 52-63.

Meyer, A. D. and J. B. Goes (1988). "Organizational assimilations of innovations: a multilevel contextual analysis." *Academy of Management Journal* 31(4): 897-923.

Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods*. Newbury Park, CA., Sage.

Pencheon, D. (2008). T*he Good Indicators Guide: Understanding how to use and choose indicators*. London, NHS Institute for Innovation and Improvement.

Raleigh, V., Foot, C. (2010). *Getting the Measure of Quality: Opportunities and challenges*. London, King's Fund.

Robert, G., T. Greenhalgh, F. Macfarlane and R. Peacock (2009). *Organisational factors influencing technology adoption and assimilation in the NHS: a systematic literature review*. London, NIHR/SDO.

Rogers, E. M. (2003). *Diffusion of Innovation,* (5th edition). New York, Simon & Schuster.

Rye, C. B. and J. R. Kimberly (2007). "The adoption of innovations by provider organizations in healthcare." *Medical Care Research Review* 64(3): 235-278.

Squires, D. (2010) *International Profiles of Health Care Systems*, The Commonwealth Fund, Washington, DC.

Storey, J., Fortune, J., Johnson, M., Savory, C, (2011). "The adoption and rejection patterns of practitioner-developed technologies: A review, a model and a research agenda." *International Journal of Innovation Management,* 15(5): 1043-1067.

Yin, R. K. (1994). *Case Study Research: Design and Methods*. London, Sage.