

December 2004

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Recommended Citation

Guah, Mathew and Currie, Wendy, "Knowledge Management In A 21st Century Healthcare Organization: The NHS Case Study" (2004). *PACIS 2004 Proceedings*. 90.
<http://aisel.aisnet.org/pacis2004/90>

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Knowledge Management In A 21st Century Healthcare Organization: The NHS Case Study

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Abstract

The technological development by the beginning of the 21st century, is making it humanly impossible for unaided healthcare professionals to possess all the knowledge needed to deliver medical care with the efficacy and safety made possible by current scientific knowledge. Several healthcare organizations are adopting rigorous methods and technologies for knowledge management (KM) as a potential solution to the knowledge crisis. However, awareness and understanding of such methods are not widespread with critics claiming that these technologies are not designed to be compatible with others neither are they interoperable.

This paper describes an effort by the NHS for individuals, organizations and partners (commercial companies supplying services to the NHS) to demonstrate their belief in the importance of improving KM in medicine and show that this can be best achieved through collaboration and consensus. It looks at National Knowledge Service, set up to provide a range of services, through one or more open-access web-sites. There is an asymmetry in most of the discussion of the field. KM, in this paper, is primarily discussed from the point of view of the user of medical knowledge. The motivation is seen to be the enhancement capabilities, and the utilization of knowledge to increase healthcare effectiveness.

Keyword: Healthcare Knowledge Management, NHS IS Strategy, Medical Knowledge, Evidence-based Medicine.

1. What Is Knowledge Management?

Knowledge management (KM) is widely regarded as the way an organisation can leverage the 'know-how' of its employees, trading partners, and outside experts for the benefit of the organization (Choo, 1998; Bellaver & Lusa, 2001; Ackerman et al, 2003). KM is regarded as the essential tool for success in the highly competitive world of the global economy (Ackerman, Pipek & Wulf, 2003) in the 21st century. It is further argued that the management—and with it the sharing—of knowledge, not only enhances the organisation's ability to compete by increasing the competence of its employees but also enriches the welfare of all those who are able to engage in the process.

Advocates of KM fall into two groups:

- i) Those who focus on technology as the mechanism for managing and sharing knowledge (Alavi & Leidner, 2001; Bellaver & Lusa, 2001; Hansen, Nohria & Tierney, 1999).
- ii) Those who place a greater emphasis on human relations, on conversation and on the elicitation of tacit knowledge (Alle, 1999; Disterer, 2001; Gold, Malhotra & Segars, 2001; Holsapple & Joshi, 2000; Lindsey, 2002).

But both groups appear to share the assumption that KM is beneficial, and that in certain cases, the knowledge being managed and shared is equivalent to the 'truth'.

Knowledge management is based on the idea that an organisation's most valuable resource is the knowledge of its people. Therefore the extent to which the UK's National Health Service (NHS) performs well will depend, among other things, on how effectively its staff can create new knowledge, share knowledge around the organisation, and use that knowledge to best effect.

1.1. Knowledge Management Models In Medicine

Medical informatics has long been established as the research area concerned with clinical information technology. It is used in such areas as electronic medical records, messaging systems, decision analysis, imaging, telemedicine and the Internet. Medical informatics is now being augmented with a range of new knowledge technologies. Many arising from the field of artificial intelligence, are contributing new languages and tools for modelling medical knowledge. There is now a considerable body of technical expertise and research results in the field of KM, in medicine and in other fields (Davenport & Prusak, 1998; Haines, 2002; Lelics, 2003; Rumizen, 2002). There is much less discussion about the source of knowledge or of the dissemination of knowledge or of the motives of the knowledge provider. The main knowledge management tools that are currently being developed and applied in medicine are summarised below:

| Models and formats | Software |
|--------------------------------|------------------------------|
| Terminology & language models | Terminology servers |
| Ontology models & standards | Ontology authoring tools |
| Clinical task models | Enactment engines |
| Guideline and protocol formats | Authoring tools |
| Care flow models | Care flow management systems |
| Messaging models | Communication engines |
| Medical devices | Middleware |

Despite the diversity and sophistication of many of these developments, and clear evidence of clinical value, take-up is still limited. Among the reasons for relatively slow adoption (by industry, clinicians and medical researchers) are a lack of awareness of what medical KM is and what it can do, inadequate access to tools and services, and incompatibilities between them, limiting their effectiveness and creating potential for misuse.

2. Research Base

The arguments in this paper is based on a research project (Guah & Currie, 2004a), funded by the Engineering and Physical Sciences Research Council (EPSRC) and experience in combination with insights drawn from the various literatures addressing dynamic strategy, KM design and flexibility (Alavi and Leidner, 2001; Lelic, 2003). This research was initially motivated by a desire to understand how healthcare organizations were planning for and dealing with the challenges of infinite knowledge in 21st century healthcare. Research was carried out throughout 2002 and 2003 involving participants from both NHS organization and private service providers to the NHS. Over 225 people were interviewed or surveyed. Questioning covered their KM models and initiatives and how these related to building the requisite technology in support of the patient care in the NHS. Private companies were drawn from a list of suppliers, distributors and partners of the NHS Information Authority (NHSIA).

The process taught the authors two key lessons:

- (1) That the issue of being prepared for unpredictable futures was a continuing concern for an organization beyond the immediate turbulence of KM; and
- (2) That conceptualizations of the kind of platform organization required for successful KM strategy could not be exclusively technological but should also embrace organizational reorganization and staff willingness to share knowledge.

The authors are continuously revisiting the NHS strategy and will continue to engage with executives at the NHSIA to further explore and develop their emerging conceptualization of healthcare KM strategy. In some cases this engagement has taken the form of taped and transcribed semi-structured interviews, and in others it has involved presentations and discussions with groups of managers including a number with responsibility for aspects of KM.

3. A New Form Of Crisis In Medical Knowledge

The assumption of NHS patients—when faced with medical problems is to be dealt with promptly and as effectively as the medical institution’s capacity will allow. Until recently, patients only look forward to gradual improvements in health service. Now that scientific understanding of diseases—and their management—has continued to grow rapidly, patients expect a further stimulus with the explosion of new knowledge in the post-genomic era.

Several research findings, have shown the provision of top quality care to be inhomogeneous (Ferlie & Shortell, 2001; Jacklin et al, 2003; Laycock, 2002; Marshall et al, 2003), even in wealthy regions, and the unprecedented growth in the current understanding of diseases and their management is not matched by equivalent abilities to apply that knowledge in practice (Evans, Pestonik & Classen, 1998; Johnston et al, 1994).

The principle reasons for these problems are lack of uniform access to new knowledge (Tsoukas & Vladimirov, 2001), and insufficient resources to deliver its benefits to all patients nationwide (Guah & Currie, 2004). Socio-economic and organizational factors also contribute to the causes of unequal access to the best medical care for all NHS patients (Davenport and Prusak, 1998; Majeed, 2003; Sussman, Adams & Raho, 2002). The NHS is also under strain from the increasing medical needs of an aging population, the demand to provide a wider range of services with a constant or even reduced budget, and the rising costs of medical research feeding into increased costs of treatments and services (Wanless, 2002).

In addition, a new difficulty fast becoming a permanent feature of the medical landscape is the management of medical knowledge. It involves the available information about new drugs, new clinical procedures and biomedical techniques, and even new diseases, which form an unending avalanche of information for healthcare professionals. Though the capacity for an individual doctor (or nurse) to know everything about general medicine has been a long standing problem, it seems impossible—in the 21st century—to keep abreast of developments in individual specialties areas of healthcare.

The method and means of publishing and distributing information—as documents which are slow to prepare and difficult to distribute—are major factors contributing to this problem. A far more important factor is our finite capacity as human beings to absorb and correctly apply the new knowledge in those documents. Every NHS staff, however talented, has only so much time and energy as well as a limitation of his/her ability to remember and recall information.

In their 1999 report ‘*To Err is Human: building a safer healthcare system*’, the USA Institute of Medicine shocked the public with such statistical evidences as (Kohn, Corrigan & Donaldson, 1999):

- Medical error annually results in between 44 and 98 thousand unnecessary deaths in the USA. "Even using the lower estimate, more people die from medical mistakes each year than from highway accidents, breast cancer, or AIDS."
- Medical error wastes up to \$29 billion per annum in the USA.

Operational errors are not the only cause of avoidable adverse events in healthcare. Another important source is lack of knowledge of current best practice. In the area of cancer, for example, about 16,000 lives could be saved in the UK annually if all current knowledge of cancer were properly applied (ICRF Vision for Cancer, 1995). A panel, chaired by the Chief Medical Officer, reported that in acute hospitals alone 10% of admissions result in adverse events which lead to actual patient harm (about 850,000 annually), including deaths (http://www.doh.gov.uk/orgmemreport/orgmem_execsum.htm). The report states: "*Just as none of these statistics can be attributed wholly to service failures, research in this country and abroad suggests that they give no indication of the potential true scale of the problem*".

The National Knowledge Service (NKS) was in response to the enquiry into the management of care of children receiving complex cardiac care at the Bristol Royal Infirmary (DoH, 2002). It specifically promised to deliver a common core of evidence-based health knowledge delivered by a single integrated national knowledge service by 2003. The NKS meets the needs of professionals, patients and the public, fully integrating the development of NHS knowledge systems (Haines & Dunn, 2003).

3.1. The Evidence-Based Medicine (EBM) Model

Literature has shown that clinical services are not delivering the quality and efficacy of cares that improvement in science makes possible (Emery et al, 1999; Lelic, 2003). However, a movement towards "evidence-based medicine" (EBM) has been arguing this view and has been gaining ground all over the world (Evans, Pestonik & Classen, 1998). Their aim is to encourage clinicians to make decisions that are fully informed by available scientific knowledge and beyond just individual experience and opinion. The EBM model encourages rigorous and comprehensive reviews of international clinical research, and publish the results of those reviews in the form of documents setting out recommended clinical practice as well as justification for such recommendations (Pisano, Bohmer & Edmondson, 2001).

In order for the NHS to provide evidence of care gaps, it needs efficient/effective EBM practice tools including:

- Improved query-answer systems
- Improved search filters
- Meta-search engines
- Voice recognition
- More robust evidence summary services
- Personalised evidence resources
- Resources seamlessly integrated with the EHR and online prescribing tools

The EBM model represents a vital contribution to improving the consistency and quality of care, notably the work of the international Cochrane Collaboration, providing a rational foundation for all clinical practice, which can be translated into guidelines for best clinical practice. EBM, unfortunately depends upon traditional methods of disseminating medical knowledge—use of paper guidelines, research papers and books mainly—adding to the already intolerable burden of information on doctors and other healthcare professionals.

Such distribution mechanism increases the threat if EBM depends solely on traditional methods of disseminating medical knowledge (whether on paper or increasingly via the Internet). In reality very few busy doctors have the time to do the necessary reading. Those assiduous in their reading also face the imperfect human capacity to remember and apply knowledge in the right way at the right time and under all circumstances clearly passes a critical limitation.

3.2. Knowledge Management Via Training

As the ultimate provider of healthcare in the UK, the NHS traditionally responds to these problems by extending professional training and providing in-service skills improvement courses. These courses present the NHS with the following problems:

- Short-term staff training are usually palliatives at best;
- Training is time-consuming and expensive;
- Medical knowledge is increasing at a rate many times faster than formal courses can disseminate.

To counter the above problems, the NHS is encouraging greater specialization by individuals and smaller bodies/groups/teams as an alternative (Laycock, 2002). However, this results in clinicians knowing more and more about less and less—and it becomes difficult for clinicians to manage the many patients whose conditions require skills that often cross-traditional specialty boundaries (McDermott, 1999). This is particularly relevant when involving patients with multiple conditions, a common feature in the elderly—probably the fastest growing patient category—in the UK today.

The Australian model is a rather radical solution. They attempt to reduce the incidence of disease through improved public health policy or public education (Blendon et al, 2003; The Commonwealth Fund, 2003). Even when they are successful such processes are painfully slow (and often controversial). This model cannot keep pace with the increasing demand for healthcare that comes, for example, from the public's constantly growing expectations and demands. General reaction to this model is commonly to demand greater "efficiency" of healthcare professionals, by insisting upon improved performance and better management (often without increasing resources). However, improving the performance of skilled busy healthcare professionals is not generally achieved by merely exhorting them to work better, faster, or more cheaply (Keen, 1994; Sussman, Adams & Raho, 2002; Wanless, 2002). As human beings, healthcare professionals have grown to make decisions, plan their time and remember what they need to remember, as well as they can. Blaming the individuals or organizations that provide our services (and punishing them through professional sanctions or the courts when they fail) is no solution. If services are to improve significantly, healthcare professionals are likely to require new ways of working or improved tools.

The USA came up with another model, after completing a major shake-up of healthcare services, with the creation of large managed care organizations. The USA model has resulted in two major reorganizations of the delivery of healthcare—to concentrate resources and expertise (Institute of Medicine, 2002). These offer standardized "packages of care" for specific conditions—often embodied in carefully prepared "disease management protocols". The aim is to provide a consistent level of clinical effectiveness at a given cost (Adler, Kwon & Signer, 2002). Healthcare providers in USA are getting prepared for HIPPA. Similar trends are spreading to many other countries, such as the UK and elsewhere in Europe (though they take on different forms based on the emphasis on public or private healthcare).

The work of Ferlie & Shortell (2001) shows that there are problems with such changes. On the face of it, standardization of care should produce more uniform quality, but many clinicians are anxious that the only uniformity will be of the cash-limited kind, that is likely to result in a uniformly poorer quality. Their work points out fears that the imposition of standardized treatment protocols would undermine the clinician's skill. Thus, encouraging a narrow approach to treatment and discouraging clinicians from seeing the patient as a unique person with particular problems and clinical needs.

4. Knowledge Management In Medicine

The paraphernalia of the information revolution - computers, communications networks, compact disks, imaging systems and so on - are now widely expected to make a vital contribution to helping doctors and other medical professionals do their work better. Emerging technologies used for medical KM in the NHS include:

- Electronic patient records, which are more up to date, easier to access, and more complete than paper ones;
- Standardized medical terminologies and languages, both within and across natural language communities;
- Methods and tools to support faster dissemination via the Internet of new scientific understanding of diseases and their treatment;
- More timely and reliable methods and tools to support communication and coordination among members of care teams.

At the individual level, computers can be used to make use of electronic patient records to prompt and remind clinic staff of tasks that need to be carried out (Rumizen, 2002) and to suggest the most appropriate decisions or procedures for each individual patient. A new generation of decision support systems is beginning to appear that can help the community physician with, for example, advice about the use of medications (Anderson & Aydin, 1997; Evans, Pestonik & Classen, 1998; Laerum, Ellingsen & Faxvaag, 2001) and the assessment and management of genetic and other risks (Emery et al, 1999). The evidence is now strong that point of care systems to assist healthcare professionals can have real benefit, in terms of improved clinical outcome for the patient and savings in the cost of delivery of care (Litzelman et al, 1993; Evans, Pestonik & Classen, 1998).

21st Century healthcare consists of modern, science-based medicine, where the traditional process of care—one clinician looking after one patient—is being replaced by one in which the patient is managed by a *multidisciplinary team* of health care professionals (Ackerman, Pipek & Wulf, 2003). These may include oncologists and cardiologists working with general practitioners and home-care nurses. The effectiveness of such shared care critically depends on the ability to share patient specific information and medical knowledge easily among care providers (Johnston et al, 1994; Laerum, Ellingsen & Faxvaag, 2001; Pouloudi, 1999). Indeed it is widely recognized that the inability to coordinate information and services across organizations represents one of the major impediments to quality care (Collison & Parcell, 2001; Majeed, 2003). The NHS needs to take a more process-oriented view of health care delivery (Young et al, 2004) with appropriate organizational and information infrastructures (Guah & Currie, 2003).

A clinical guideline is in effect a *knowledge model* of the preferred process of care. Young et al (2004) suggests that such models can be combined with an organizational model of the healthcare system to take advantage of the workflow technologies that are widely used in

industry today. It provides a *care flow* infrastructure for dissemination and application of medical knowledge and supports communication and coordination of the healthcare team.

5. Knowledge Management In The NHS

The NHS is an active member of the government's Knowledge Network, co-ordinated by the Office of the e-Envoy. The NHS takes a highly pragmatic approach to KM, viewing it as a continuous process of change with three aspects:

- Creating the knowledge base - both tangible and intangible;
- Making it available in a user-friendly form; and
- Encouraging and skilling people to seek, share and use knowledge.

The NHS developed its own KM strategy in 2001 (see Figure 1). This was built around two simple but effective concepts:

- Recognising the ways in which all types and forms of knowledge is being managed already. For example, through the use of e-mail, shared document drives, desktop access to information and knowledge databases, the Departmental intranet, online staff directories, meetings, seminars, informal chats at the coffee machine etc.
- Building on this by making KM better - for example by improving access to information and 'joining up' information assets (see Figure 1), providing training and guidance, piloting new ways to capture and share knowledge, among others.

The NHS's strategy for KM includes a two-year implementation plan and covers four key strands:

1. Leadership and accountability;
2. People and change;
3. Content and processes; and
4. Information and technical infrastructure.

The strategy is built around three key ingredients, namely people, processes and technology (see Figure 1).

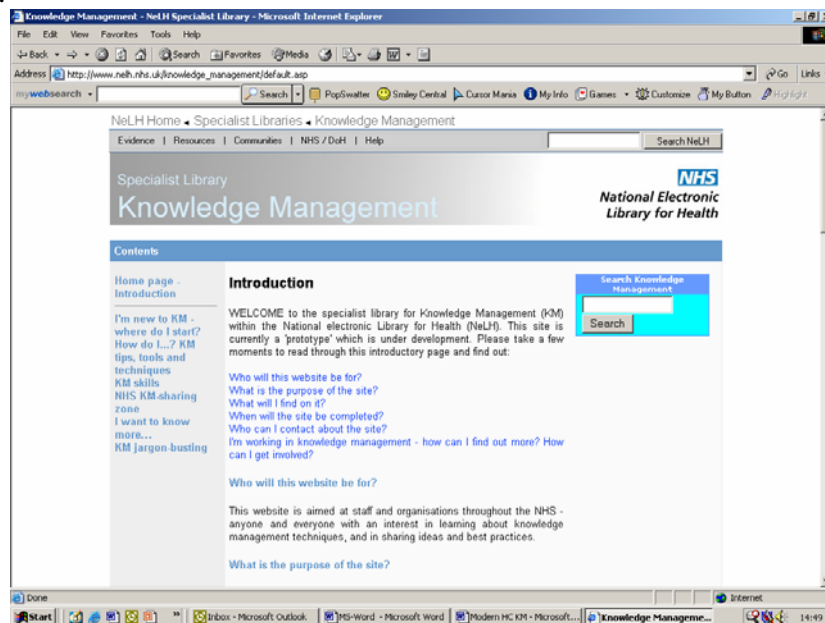


Figure 1: NHS Electronic Specialist Library for Knowledge Management

Effort by the NHS for individuals, organisations and partners (commercial companies supplying services to the NHS) to demonstrate their belief in the importance of improving KM

in medicine, shows that this can be best achieved through collaboration and consensus. Among the services being supported by the NHS are:

- A single portal (see Figure 1) for information about developments in the field of medical KM;
- Access to demonstrations of KM technologies and their applications;
- Papers and other information on standards, including current needs, issues and proposals, for open discussion;
- Open source knowledge content, including knowledge bases and reusable components; and
- A directory of projects, technologies and services.

Knowledge initiatives that have developed as a result of these policies include:

- NHS UK;
- NHS Direct Online;
- The National electronic Library for Health (NeLH);
- The National electronic Library for Social Care (NeLSC); and
- NHS Modernisation Agency's Connections database.

These initiatives now fall under a wider umbrella—the National Knowledge Service (NKS). This was promised in *'Learning from Bristol'* (Department of Health, 2002)—the government's response to the enquiry into the management of care of children receiving complex cardiac care at the Bristol Royal Infirmary. The enquiry report specifically promised to bring together the various national providers of information and knowledge in the NHS for the provision of a common core of evidence-based health knowledge delivered by a single integrated national knowledge service by 2003. The NKS was intended to meet the needs of professionals, patients and the public for up-to-date, cross-referenced, evidence-based information by fully integrating the development of NHS knowledge systems. Funded by the Department of Health, the NKS purposes cover:

- The analysis of knowledge needs of providers and consumers of health services;
- The creation of high quality knowledge resources either funded by the Department or procured externally to specified criteria;
- The delivery of those knowledge resources via traditional and new technology systems to agreed standards;
- The development of individual and organisational knowledge skills to use the resources effectively; and
- The active promotion of the NKS to support the spread of good practice and further the development of local knowledge management strategies.

5.1. Institutional Strategy For Knowledge Management

The direction of a knowledge-based NHS is taking place while the NHS is undergoing major reform and reorganisation. In *Shifting the balance of power* (Department of Health, 2001), the government announced its plans for devolving power and decision making to local NHS organisations, allowing local choice consistent with a nationally integrated service. In the context of information and knowledge management this means that the Department of Health will provide the national leadership, setting national frameworks and some centralised procurement, but the implementation of knowledge policies will devolve to local organisations, overseen by Strategic Health Authorities.

At the local level, various knowledge management roles and initiatives are already beginning to emerge. On a national level, to help local NHS organisations with this challenge, three key

groups are currently looking at how best to develop a coherent national strategy for knowledge management in the NHS, to cover people, processes and technology. These three parties are:

- ***The NHS Information Authority*** The NHS Information Authority supplies a range of services to support knowledge management in the NHS. These include basic services such as network connectivity and e-mail services, and other complex applications like an NHS-wide Directory Service. Information services include the National electronic Library for Health (NeLH) and www.nhs.uk. The NHSIA also manages information strategies to support National Service Frameworks and supports user tools such as MyWorkPlace. Progress is being made on a range of corporate web-based knowledge management tools, planned for 2004. Those include web log software, an NHS wide search engine, a clinical question answering service, and a digital archive.
- ***The NHS Modernisation Agency*** As an integral part of the national modernisation programme, the Agency is currently looking at how to improve knowledge sharing within the Agency itself, between the Agency and Strategic Health Authorities, and between the various Strategic Health Authorities. This is essential in ensuring that the evidence base for healthcare improvement is captured, made available and actively used at local level, and then renewed on an ongoing basis as further knowledge and experience are gathered. The Agency's knowledge management team is also currently exploring how best it might support Strategic Health Authorities in helping local NHS organisations to implement knowledge management practices and processes. To this end, a series of workshops were organised in 2003, aimed at Strategic Health Authorities and Workforce Development Confederations. They explored potential ways forward and shared examples of current local knowledge management strategies and issues.
- ***The NHS University (NHSU)*** The team responsible for the development of the NHS University is currently exploring how the NHSU might best support the NHS in terms of knowledge management. Research has been commissioned to look at how this has been tackled by various companies in the private sector, and what might be learned from that.

The NHS is clearly already making some progress in exploring and implementing knowledge management principles and practices. However, they are very much at the early stages. As is often the case in an organisation the size of the NHS, progress is being made in pockets rather than across the board. Confusion still remains as to what exactly knowledge management is and what it involves. Naturally, certain amount of cynicism still exist with common saying like: 'we haven't got time', 'what's in it for me', 'not another new initiative', 'doesn't happen, doesn't spread, doesn't last' etc.

The major challenge for the NHS today, regarding KM, is to implement KM principles in a way that allows local ownership and variation but avoids a postcode lottery in relation to good knowledge management practice. They need to strike a balance between national coherence and local creativity. They also need to broaden their views of knowledge. Many current initiatives rightly focus on clinical knowledge and knowledge relating to evidence-based medicine. However, given the extensive modernisation programme currently underway, the NHS also needs to focus on other types of knowledge. For example knowledge about healthcare improvement; about the 'customer service' aspect of patient care as well as the health aspect; about management and leadership and particularly change management; about

sustainability and spread of new ways of working; about organisational learning and knowledge management; etc.

5.2 Promoting Evidence-Based Health Care

The National Knowledge Service (NKS), as already mentioned, is integrating the development of NHS knowledge systems such as NHS Direct Online, the National electronic Library for Health, the Department of Health's websites, etc. The view is to create a single integrated core evidence base for healthcare professionals, patients and the general public. The NKS must not be seen as 'just a database'. It should aim to provide access to this core knowledge base through a range of different channels, including facilitating communities of practice as outlined below.

As part of the present initiative to improve access to health service information nationwide, the NHSIA is endeavoring to raise awareness of the range of knowledge management technologies that are available (Pisano, Bohmer & Edmondson, 2001). It is promoting their uses and benefits, and introducing standards to improve compatibility between products and systems. These are being achieved through the provision of a number of services including:

- Introductory articles and technical briefings on medical knowledge management methods, technologies and products;
- Demonstrations of technologies and applications which can be run on or accessed through the site;
- Presentations of clinical knowledge-management projects, discussion papers etc.
- Links to sites maintained by the NHS partners; and
- Access to certain knowledge management software, which can be downloaded from the NHSIA site or from partner sites.

The NHSIA generally aims to provide a comprehensive and up to date source of information on technologies, methodologies and experience. The medium-term aim is to provide an informal "portal", a single point of access for comprehensive information throughout the general field of medical knowledge management. The central role of this project is to champion the use of knowledge management technologies in routine medicine, and support developments that will promote their adoption. A longer-term objective in this respect is to stimulate discussion and the development of ways of guaranteeing *quality and safety* in this new field, and the creation and adoption of standards that will support such guarantees. Progressive commitments to KM are clearly shown in the following policy documents, produced over the last six years:

- ***Our information age*** (declared in the 1998 version of NHS IS strategy), in which a promise was made that information communications technology would be fully exploited by the NHS to support patient care.
- ***An organisation with a memory*** (declared in the 2000 version of NHS IS strategy), making the case for knowledge management systems to capture and disseminate the learning and tacit knowledge generated through work.
- ***Managing for excellence in the NHS*** (declared in the 2002 version of NHS IS strategy), setting out the new task for NHS managers and leaders to 'spread good practices' over the next three years, given the context of the NHS Plan.

Medicine is a safety-critical field and knowledge management users and suppliers should expect that the best current technical practices must always be applied. These will include standard software safety techniques that are used in others fields like aerospace and nuclear engineering (Young et al, 2004). It should also include the best available methods for capturing and updating medical knowledge for its new role at the point of care.

6. Conclusions

KM increasing pervasiveness in healthcare organizations means that their KM strategy continuously defines the organizational characteristics. As the 21st Century unfolds, when IT strategies are becoming less explicit and more dynamic, obtaining benefits from best practice for healthcare service providers depends heavily on having the right organizational capabilities. This paper therefore concludes that KM has a very strong ethical dimension and unless that fact is recognised healthcare organizations will continue to develop technology-based systems, which enhance the power of the knowledge manipulator.

The authors' approach assumes that long-term strategy is more about developing capabilities than achieving an advantageous and sustainable competitive position. Logical argument has been used to establish the need for a flexible KM strategy in the NHS. The paper has used field observation and discussions with relevant practitioners to suggest that this is not merely a theoretical possibility but that the NHS is moving in the right direction as far as KM is concerned.

Does every healthcare provider require a KM strategy? This research does not as yet tell us because the authors' started with a focus on NHS organizational approach to KM. The more a healthcare provider requires sharing knowledge and good practices, the more it seemed a KM strategy would be required. Equally, as the research has developed, it has become apparent that the fundamental idea of developing a strategic plan for KM in a healthcare organization is as relevant to healthcare process (to exploit its dispersed professional knowledge) as it is to train its medical staff. Similarly, while large, decentralized organizations have developed challenging KM strategy because of their centrifugal tendencies, the basic issue of IT acting as an enabler and constraint also applies to smaller more centralized providers. KM strategy may be easier to implement in some types of healthcare organizations, but is nonetheless needed in all.

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