



## The role of integrated technology solutions in **Healthcare** reform

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# The Promise of Healthcare Reform – Evolution or Revolution?

**Public health services around the world suffer from a number of chronic and progressively more serious ailments. Governments are making fundamental decisions about the way that citizens' health will be managed going forward. Healthcare in the future will be dramatically different to the illness-focused, inpatient-orientated services most common today.**

There are a number of emerging themes in the debates surrounding the national provision of healthcare that are likely to form the shape of health systems in the future. These include the changing nature of the relationship between patient and doctor, the need to find new and better ways of funding healthcare provision and the role of public/private sector partnerships in care funding and delivery. At the heart of most conversations is the role that information and communications technologies (ICT) will play in helping to deliver the accepted goal of excellent, efficient, patient-centred healthcare.

Access to complete, accurate patient information at “points of care” along care pathways (that is disease-specific clinical protocols) is seen as critical by many to delivering timely and appropriate care for patients. This care will increasingly be delivered in the community, in pharmacies, via national call centres, as well as by more conventional channels such as physician practices. In order to support the trend of health management during a citizen's lifetime, information must be delivered in ways that have not been possible in the past. This includes making patient information available to patients themselves.

For healthcare executives and policy leaders the availability of operational information at local and national levels must be improved in order to allow the necessary planning for healthcare changes and improvements. Information gathered for clinical audit purposes is particularly important to achieving targeted improvements.

With new treatment options and technologies staff will require access to high levels of training, and access to support systems in order to maximise effectiveness. It is not possible for training and development to be delivered as it has been in the past, as conventional delivery is costly and inefficient. eLearning tools, commonplace in the private sector, will increasingly provide on the job training both for clinical and non-clinical staff.

The desired changes cannot be brought about by one party (that is government) working in isolation. Where previously there may have been suspicion about the extent to which private (and therefore profit-making) companies could be involved in the provision of publicly-funded healthcare, there is now a move to create partnerships, in which both the risks and the rewards are shared by private enterprise and public sector bodies and in which the pursuit of success means delivering the desired results for both parties. Many organisations will be involved in the emerging eco-systems of healthcare provision that will bring about the new solutions and services.

For many of the reasons stated above, and for others with long historical precedents and peculiar to the development of healthcare in different countries, many governments around Europe are beginning to address the need to reform both the ‘what’ and the ‘how’ of healthcare systems. This is truly a revolution and it is only possible because new technologies are enablers for dramatic change. It's not about doing more with less. It's about providing better access and quality whilst constraining costs.

# eHealth - the Role of Technology in the Healthcare Revolution

The term “eHealth” describes all those processes, products and services related to patients’ health that are available on-line. Some of these services will be electronic versions of processes that are currently provided using manual methods. Most prescribing of drugs, for example, - and in particular repeat prescriptions - that presently takes place manually through direct contact between physician and patient could very easily be transferred to a Web-based relationship. And, in addition to the greater ease with which routine administration can be achieved, electronic and networked provision will deliver considerable advantages in terms of ease of use for both patients and doctor, offer enhanced record-keeping ability - particularly important with the care of chronic patients - and enhanced accessibility to information and services.

The eHealth transformation is driven in part by its’ huge economic importance: total expenditure on healthcare across Europe represents more than 8% GDP and contributes between 5% and 11% of employment across EU member states. The new technologies can be used to automate manual processes, provide timely information to clinicians and patients with fewer staff and reduce the number of redundant communications and transactions between hospitals, physicians, health funders and suppliers such as pharmaceutical firms.

The deployment of healthcare services via the Web can be described using a 5-stage model (Figure 1). Each stage has its’ own potential to drive costs out of healthcare. Stage 1 is characterised by simple websites, which provide little to none of the richer features now expected by consumers and business partners alike. A simple “vanity” web is the bare minimum required of any viable organisation today. However, the lack of “website stickiness” (the ability to hold a users attention and causing them to return to your site) presents a serious shortfall in these simplistic developments. Many healthcare organisations have progressed to the “value retention” stage but few are evolving to the transact/relate model where users can interact dynamically with the organisation. More advanced services involving supply chain automation, mass customisation, integrated disease management and new revenue generation opportunities have yet to be developed by any healthcare organisations. A recent report by the Efficient Healthcare Consumer Response Consortium detailed nearly \$11 Billion in wasted spending associated with healthcare supply chain inadequacies. If inventories could be reduced, this \$11 Billion could be redeployed in more productive investments, saving the healthcare organisation another \$1 Billion.

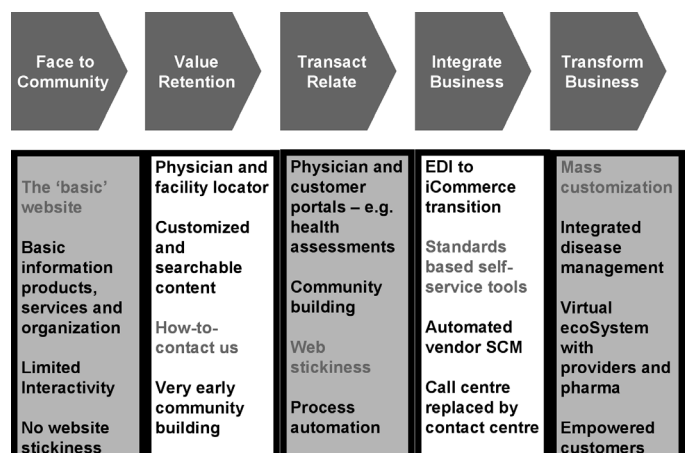


Figure 1: The 5-Stage model of eHealth evolution



In addition to the “e-transformation” of existing manual processes, eHealth also means a fundamental transformation in many of the relationships that typify healthcare provision today, as well as a substantial change and development in the way that patients approach their own health and well-being.

The traditional model of healthcare provision can usefully be thought of as a pyramid - patients move up the pyramid to more and more specialised centres of treatment depending on the severity of their condition or, in some cases, the rarity of the condition and its consequent interest to the medical profession. This system is one in which patients have little choice about the healthcare services they receive.

As in many other areas of activity however, the Internet and networking of communications and information technologies provide the ability to reform traditional organisational structures and hierarchies and create new ways of doing business and conducting relationships. In eHealth systems, the patient will be at the very centre of the healthcare process.

eHealth technology means the delivery of health information any time, to any place in any format. eHealth connects carers together and enhances their ability to communicate to the point that both patients and healthcare professionals at all levels benefit from a seamless flow of information.

By challenging many aspects of traditional modes of providing healthcare, eHealth opens up a far wider range of possibilities as to how, when and where people receive treatment. It recognises the broad range of locations where people already receive “care” and provides the necessary information accordingly. It also broadens society’s view of healthcare to encompass lifestyle services such as exercise and diet programs.

Increasingly knowledgeable and sophisticated patients, who expect to play a far more active role in their choice of therapies, and are able to engage in a more informed dialogue with their physicians, further intensify the challenge.

Though the provision of care has traditionally been conceived of as a local phenomenon (with patients reluctant to travel more than a few miles for treatment of most conditions), it is likely that greater access to wider sources of information and different providers will lead to the creation of pockets of excellence in particular areas of medicine spread across far wider geographical areas. Consumers will increasingly be aware of these centres of excellence. So, for example, patients in the United Kingdom being sent for treatment for particular conditions elsewhere in Europe (a situation that causes a furore whenever mentioned in the national press and is widely reported as a ‘failure’ of the NHS to provide appropriate treatment locally) could become more and more commonplace. Indeed, it is perfectly possible to conceive of a global market in health, with a global patient community willing to travel to different places for specifically identified treatments or remain at home but receive best-in-class care from a provider half-way around the globe. The Internet delivers the possibility of uniform and local access to global information and services as well as access to best quality care.

“Progressive hospitals realise that what the Internet represents is a fundamental shift in power towards patients, and away from institutions and professionals. Assisting in this shift in power is the counterintuitive thrust of an effective hospital Internet strategy. The highest and best use of the Internet is not to ‘market’ the hospital, but to make the use of the hospital easier and more transparent to consumers. Hospital executives should view Internet applications as a rich and diverse toolbox for restructuring their relationships to their customers and reducing the cost of resolving their health problems. Equally important, the Internet may help replace bricks and mortar-based administrative and clinical processes (and attendant clerical costs) with electronic processes that are more responsive and transparent to their users.”\*

\*How Hospitals should be using the Internet

**Jeff Goldsmith**



eHealth has the potential to deliver numerous benefits to citizens, healthcare organisations and national institutions, including:

- Integration of health, emergency response and social care services.
- Fewer consultations due to preventative patient education and filtering via web contact centres.
- Appropriate and fast decisions on treatments and interventions.
- Provision of integrated out-of-hours and emergency services.
- More accurate collation of treatment information leading to better care processes.
- More accurate management information on clinical and administrative practices.
- Improved resourcing flexibility and capacity planning.

There are, of course, some entrenched interests in medicine (as in any other fields of activity) who are resistant to the profound changes that the introduction of eHealth will undoubtedly usher in. In many ways, the medical profession is looking at a paradigmatic shift in the way that it thinks of itself and its relationship with the 'patient community'. Again, the Internet plays no small part in creating the disruption and generating both the desire for and the possibility of change in the way that healthcare is both conceived of and delivered.



# The Role of the Internet – the Primary Source of Healthcare Information

A survey conducted in the US by Harris Interactive in June 2002 found that 110 million adults in the US used the web to gain access to healthcare information. In 1999 Planet Medica and Goldman Sachs released a report which indicated that by 2005 55% of European Internet users will be using the web to retrieve healthcare information.

This global phenomenon is creating informed, empowered healthcare consumers. Any search through a standard search engine such as Google or Yahoo reveals a vast array of information sources specifically concerned with health or health-related issues. These statistics confirm that the Internet is now a primary engine for the dissemination of health information from funders, pharmaceutical firms, patient support groups and providers. The Internet, used to best advantage, can become a powerful tool for governments to communicate with their citizens.

**National electronic Library for Health**

● NHS Direct Online ● nhs.uk ● Department of Health ● Electronic Library for Social Care 25th July 2002

**Know How**

- CLIP Database
- Commission for Health Improvement
- Health Care Needs Assessment
- Maternity (MIDIRS)
- National Service Frameworks
- NeLH Care Pathways Database
- NeLH Guidelines Database
- NHS Modernisation Agency
- NICE Guidance and Guidelines
- NICE Audit Principles

**Knowledge**

- Anatomy
- Bandolier
- OMNI Reviewed Internet Resources
- British National Formulary
- Clinical Evidence Issue 7
- Cochrane Library 2002/2
- DIPEX
- Evidence Based on Call
- HTA Publications
- MEDLINE/PubMed
- NHS Cost & Effectiveness Reviews
- Research Findings Register
- ZETOC

**Resources**

- -- Virtual Branch Libraries --
- -- Professional Portals --
- -- Reference Section --

**Welcome**

The National electronic Library for Health Programme is working with NHS Libraries to develop a digital library for NHS staff, patients and the public.

- Registering to use NeLH
- Frequently Asked Questions
- About Us
- Publicity Material | Training Material
- Site Maps: [A to Z](#) | [Where do I look?](#)

**Pilot Search Engine**

[\[more...\]](#) [\[help...\]](#)

**Highlight**

**NeLH Survey**

Please help us develop the NeLH by completing an online questionnaire. [\[more...\]](#)

**What's New?**

24/07/02 NeLH Launches Intranet Template

A template is now available to enable NHS organisations to imbed access to NeLH within their own intranets. [\[more...\]](#)

[\[archive...\]](#)

**Hitting the Headlines**

[\[What's this?\]](#) [\[archive...\]](#)

**New imaging technique for cardiovascular disease**

An article in The Times on 23 July 2002 reported that a new scanning technique could revolutionise the diagnosis and treatment of heart disease and stroke. This article extrapolated evidence from a small, preliminary study and much more research is needed. [\[more...\]](#)

Added: 24/07/02

**Document of the Week**

[\[What's this?\]](#) [\[archive...\]](#)

**Understanding Clinical Papers**

This text aims to provide healthcare professionals with the ability to understand types of study design, how to interpret their results and whether the findings are clinically important. The book contains examples taken from actual research papers - the results and concepts are explained simply and clearly with the aid of these visual examples. [\[more...\]](#)

Added: 24/07/02

**Medical Dictionaries**

[\[help...\]](#)

[Feedback / Request Help](#) [Make this your homepage](#) © 2002 National electronic Library for Health. All rights reserved. [Usage & Privacy Policy](#) **NHS Information Authority**

**Figure 2:**  
UK National Electronic Library for Health

Health and health related issues are among the most commonly researched topics on the Internet. In the past, there has been a tendency by healthcare professionals to ignore the potentially valuable contribution that such sites are able to make to healthcare efforts, the poor quality of many of the sites tending to influence the perception of them all as being of a low standard. Now, however, there are various initiatives in countries and within specific health specialisations, to try and accredit the better sites and begin to create additional and valuable health resources online. One such effort is the United Kingdom's National Electronic Library for Health (Figure 2: <http://www.nelh.nhs.uk/>). The project captures information and resources from a broad range of organisations, including charities and pharmaceutical companies.

# A Vision for the 21st Century – Information Driven Healthcare

**“The entire healthcare landscape is being reinvented and the Internet is the tool for new improved healthcare processes related to all aspect of e-communications, e-commerce and e-Care. Healthcare executives and doctors who can see the future and can execute “best” will ride the CyberTsunami and lead the revolution in eHealthcare”.**

**Douglas Goldstein**

<http://www.ehealthcare.net>

All healthcare professionals have a common desire: to deliver quality care by placing their patients at the centre of a ‘seamless healthcare process’. But in many countries healthcare systems have developed in a fragmented way and three major healthcare ‘domains’ have arisen:

- Primary healthcare – local physicians or general practitioners
- Secondary care – specialists in a particular area of medicine, usually attached to a hospital and operating via referral from a general practitioner
- Tertiary care – patients treated at home- or in a residential care facility – often by nurses working in their own or within another physician’s healthcare practice.

These domains resemble the departmental silos that characterise many government and public services - but on an enormous scale. They are effectively ‘closed systems’ - each with its own, stand-alone processes and information systems and there is little effective integration between them. For example, patient records are maintained separately and primary care records are not routinely available to secondary care specialists. This causes delay and inefficiency. Many basic administrative processes e.g. booking appointments, processing prescriptions, creating and maintaining clinical records are manually intensive and supported by stand-alone or poorly integrated IT systems. The fragmentation within healthcare is inhibiting delivery of the highest quality healthcare: lack of systems integration and interoperability is preventing the sharing of information, reducing overall efficiency and hampering efforts to optimise patient care.

Information and networking technologies have the ability to transform healthcare and to deliver ‘integrated patient centric healthcare. In this integrated world professionals will have the ability to review case histories, schedule care plans, prescribe drugs, commission and review tests more quickly, online at the point of care. They will have common access to patient records that can be kept up to date and accurate through the use of common, fast and secure networks available reliably to all. Healthcare managers will have more reliable financial and clinical data, enabling them to allocate resources more effectively. Better, real-time sharing of reliable data will support more effective planning and the delivery of seamless services across organisational boundaries. Patients will be able to see that their up to date records are available to all healthcare professionals with whom they come into contact and citizens will be able to obtain information over the phone or via the Internet 24 hours a day, seven days a week and will be able to review symptoms on line as well as make appointments to see doctors and other healthcare providers.



# A Foundation for the eHealth Revolution

**To achieve these benefits healthcare providers must build out a 'standards-based infrastructure'; they must automate routine administration and they must dismantle silos by creating integrated, not stand alone, solutions. These solutions must be designed to support the work of the healthcare providers and they must use them to enable the flow of patient information between all parts of the healthcare system. Crucially, this level of integration requires that healthcare providers standardise processes and develop and share data standards. The adoption of enabling technology standards such as SNOMED - Systematised Nomenclature of Medicine - (<http://www.snomed.org/>) and HL7 – Health Level 7 (<http://www.hl7.org/>) will be essential.**

Standardisation of data and processes will allow the development of applications to improve the administrative efficiency of patient care by creating a holistic repository for each patient that users of a system have secure access to. Unlike today where a specialist may not have any direct access to a patient's previous treatment and prescription history, holistic records will support clinical and administrative activity across the healthcare domains. Of course, the sensitivity of data contained in patient records also requires that security and encryption standards to protect confidentiality are defined and established across all healthcare domains.

There are various possible approaches that will help to create the necessary uniformity of information in an enterprise-wide way. For example, patient administration systems can be developed on a small, manageable scale at first by standardising data within individual therapeutic areas and then one-by-one aggregating these across healthcare domains to achieve global roll out, or systems can be procured (and in some cases developed using public funds e.g. US Veterans Health Administration clinical applications) as commercially available versions of electronic patient records 'off the shelf' for global implementation. In either event, achieving the ambition of putting the patient at the centre of the healthcare process will be expedited by providing healthcare professional across all domains with an integrated healthcare delivery portal that contains standardised and commonly accessible, secure data about patients and their health histories.

# The Challenge of Change – Winning Hearts and Minds

**The promise of healthcare transformation also brings concern and uncertainty for those comfortable with the current situation. Clearly describing the benefits of information-driven healthcare and providing positive early experiences is essential to achieve the full promise of eHealth's potential**

The information agenda that seems set to transform both the delivery of healthcare and patients' approach to receiving care will undoubtedly create many legitimate concerns. Security of data and patient confidentiality and a degree of scepticism about technology are two of the most obvious. For changes to be implemented, therefore, it is essential that these concerns are addressed and that all stakeholders in the healthcare system (institutions, businesses, citizens and professionals) are included in the process of dramatic change that the effective use of new ICT techniques and tools implies.

One of the greatest challenges that governments face in creating better and more efficient national healthcare systems resides within the very systems that they are seeking to change. Many healthcare employees are averse to change, fearful of disruption and therefore unwilling to offer their wholehearted cooperation in the deployment of new means and methods of delivering healthcare.

Understandably, many practitioners and administrators within health systems feel besieged with a combination of excessively high public expectations, an often hostile press and the political ambitions and concerns of governments to deliver improvements to a very tight timetable. In these pressurised circumstances there can be little surprise that many managers within public health systems find that they become very inwardly focused and defensive of the status quo rather than being able to work towards the changes required for delivery of patient-centred results.

One of the major problems that healthcare systems have is to create, on a sustainable basis, the conditions in which doctors, nurses and other care workers are able to feel that their professional development, and their ability to keep pace with technological changes is at a sufficiently high level. It is also critical for healthcare systems to address the shortage of informatics professionals and to provide training and career path development opportunities.

In the US, for example, competing private healthcare providers find it difficult to retain valuable staff in the light of intense competition for their services. Though the situation may not be as acute in other countries, there is nonetheless competition between private and public systems. Aside from the variability of pay and benefits that different environments may offer, one of the key aspects of a successful retention policy is the ability to provide a learning environment in which professionals can develop their role and continually expand and refine their knowledge.

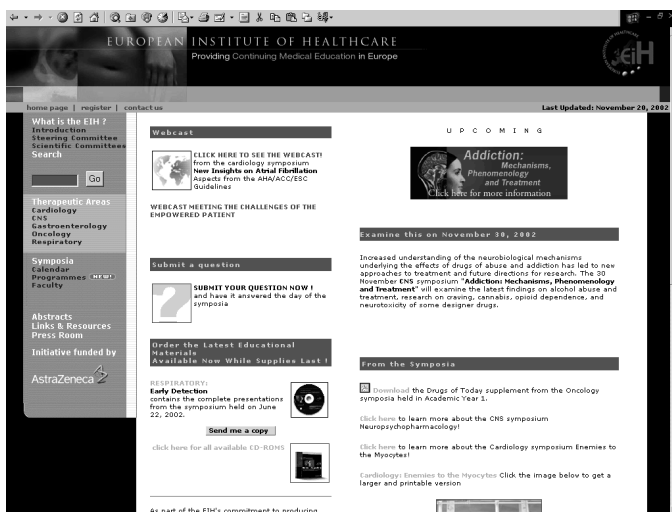
Ensuring that healthcare professionals are kept fully up-to-date with developments in best clinical practices, procedures, and research is one of the key challenges confronting healthcare management.

Professional development takes in more than simply the dissemination of clinical information: staff at all levels need retraining in order to deal more effectively with evolving relationships between patient and physician.



The use of the Internet and eLearning techniques is the key to delivering more courses anytime, anywhere to supplement other forms of teaching. eLearning will be an effective complement to more traditional classroom teaching and will provide new services for doctors and nurses, such as:

- Registration and administrative procedures
- On-line assessment
- On-line course evaluation and accreditation
- On-line tutoring
- Access to learning, independent of time and distance (e.g. European Institute of Healthcare – Figure 3: <http://www.euihc.com/home.asp>)
- Real-time, multimedia observation of complex and specialised procedures and practices



**Figure 3:**  
European Institute of Healthcare

A countrywide network such as NHS Direct (UK), or RSS (France), can be used as a way to connect doctors and share information. There are 11 national healthcare networks presently operational in the EU, mainly through secured virtual private networks, operated by service providers. Increasing numbers of telecom companies are providing applications and learning services such as Skolar (<http://www.skolar.com/>) and Web-MD (<http://www.webmd.com/>).

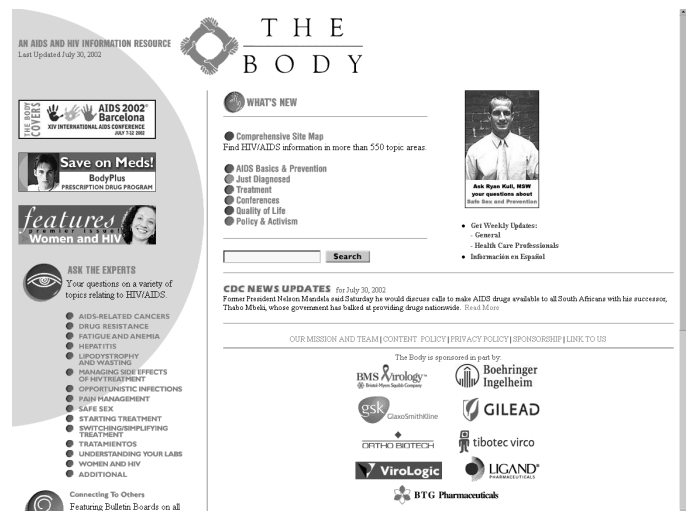
The availability of high bandwidth switching infrastructure within hospital campuses, to deliver new learning applications such as IP-TV and virtual classrooms will greatly enhance the learning environment and the ease with which healthcare professionals can use media-rich learning tools and content.

It is clear that the provision of compelling, accessible health information provides governments with the opportunity to decrease the demands placed on the health service. This is the basis for the United Kingdom Public Health Electronic Library (Figure 4: <http://www.nelph.net/>). The opportunity is to bring about a general improvement in health for much of the population.



**Figure 4:** United Kingdom Public Health Electronic Library – prototype Web page

The Internet also introduces the possibility of interactivity in the provision of information, and the opportunity to provide citizens with access to databases that can be interrogated with specific enquiries and created to provide tailored information about specific ailments and available remedies and prevention. Interactive kiosks available in pharmacies, for example, could begin to provide routine information for which many people may now visit their physician. This is also a way to provide early alerts about disease outbreaks, collect epidemiological data and track infectious diseases.



**Figure 5:** The body (<http://www.thebody.com/index.shtml/>) An award winning Website covering HIV and Aids

The very nature of the Internet means that information about a particular condition or disease can be made readily available and communities of common concern can come together very easily. This inevitably leads to a variation in quality and seriousness of the information that is available. The creation of knowledgeable patients (or perhaps more accurately healthcare consumers) is a phenomenon that will increasingly inform the deployment and quality of information resources on the Web.



# Examples of Health Initiatives and Resources

## Healthcare transformation initiatives in Europe are being driven at both EU and national levels as well as via health associations.

The Europa Website ([http://europa.eu.int/pol/health/index\\_en.htm](http://europa.eu.int/pol/health/index_en.htm)) provides an overview of public healthcare activities and policy in Europe – the information society sub-site ([http://europa.eu.int/information\\_society/europe/ehealth/index\\_en.htm](http://europa.eu.int/information_society/europe/ehealth/index_en.htm)) includes links to current best practice projects. An example is RESHEN – Regional Secure Healthcare Networks. This project is a demonstration of best practice in secure healthcare information exchange using PKI and TTP. The objective is to develop a business case for security services in health care informatics.

### The United Kingdom story – reforming the NHS:

At the national level, the reform of the NHS in the United Kingdom provides a good example of an integrated eHealth development.

The statistics relating to the NHS provide ample evidence of the scale of the problem that governments face in providing healthcare to their citizens:

- The NHS is the primary healthcare provider to a population of 56 million.
- The NHS employs one million people directly or indirectly.

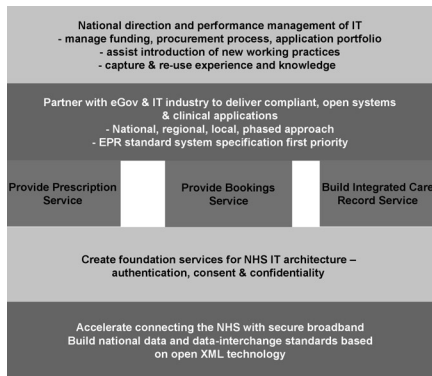
The complex and challenging organisational factors are made even more difficult by the acute political sensitivities that surround both discussion of and real attempts to reform the service.

As the Department of Health's own study: "Delivering 21st Century IT Support for the NHS" (<http://www.doh.gov.uk/ipu/whatnew/index.htm>) admits: "Historically, the NHS has not used or developed IT as a strategic asset in delivering and managing healthcare. While there were good, usually local, IT initiatives sponsored by enthusiastic visionaries, these were outweighed by the overall lack of funding and development priority given to IT at all levels. Good experiences were not captured, and successful implementations were not scaled from their local beginnings to NHS-wide application."

Principal among these problems has been a lack of connectivity between the various providers of primary, secondary and tertiary healthcare. It is rarely possible, at present, for example for patients' records to be transferred between general practitioners and specialist consultants, nor is it possible for either of these groups to access a single patient's records through a common system. As is the case with much of the public sector, data is held in a series of uncommunicative silos, with each element of the health service operating its own, often manual and paper-based systems. Again, in this regard the United Kingdom NHS is not alone. Most public health providers face the problem of little interoperability between systems, creating low levels of administrative efficiency and hampering efforts to maximise the effectiveness of patient care.

The vision that the NHS has for the future is "to connect delivery of the NHS Plan (<http://www.doh.gov.uk/nhsplan/nhsplan.pdf>) with the capabilities of modern information technologies".

This breakaway strategy is encapsulated in the National Strategic Program (Figure 6) and is derived from best practice in the areas of IT infrastructure, partnerships and delivery, and governance.



**Figure 6:**  
United Kingdom NHS National Strategic IT Program

The major change proposed in the National Program is “to move away from the concept of a number of separate information systems based primarily around organisational structures and with which health and social care professionals interact, to a situation in which professionals are provided access to an Integrated Care Records Service.

Patient record confidentiality is a central component of this service. The NHS Information Authority recently undertook research jointly with the Consumers’ Association to find out how citizens want their health information to be managed by the NHS ([http://www.nhsia.nhs.uk/confidentiality/pages/hw\\_report\\_1002.asp](http://www.nhsia.nhs.uk/confidentiality/pages/hw_report_1002.asp)). The conclusions indicate that: “in general there is agreement that the potential benefits of electronic records outweigh the risks, provided appropriate safeguards are put in place”.

Provision of an electronic prescription service is also very high on the reform agenda due to the increased numbers of

both scripts being processed and prescribers. Industry analysts estimate that automating core processes, such as prescriptions, using workflow software and online forms will result in annual savings of the order of tens of billions of dollars globally.

### Health Telematics:

The development of tele-medicine techniques (see: The European Health Telematics Association <http://www.ehtel.org/> and European Health Telematics Observatory <http://www.ehto.org>) offers perhaps one of the most remarkable departures from conventional means of providing healthcare. The development of secure and reliable wireless IP networks that combine voice, data and video capabilities represents a significant breakthrough in the provision of information and services to patients and healthcare professionals.

Remote diagnoses and recommendations for treatment already take place between patients and primary or secondary care practitioners who may be hundreds of miles apart from one another. The distribution of healthcare excellence away from concentrated urban areas that telematics introduces is, of course, one of the chief benefits for patients in more remote areas, though there are of course substantial implications for the cost of making such provision universally available. Remote access to data, tele-monitoring, video conferencing and electronic case handling all have key roles to play in creating a more diffuse provision of the very best that health systems have to offer.

There are also dramatic improvements available through telemedicine techniques for people who live in more densely populated areas of Europe including the provision of information and remote diagnostic capabilities for emergency workers. The potential increases in emergency-room capabilities are of potentially enormous impact. Some emergency agencies in Europe have started to use ICT at the site of, for example, road traffic accidents. In France, the fire service has paramedic capabilities and with the provision of remote, wireless access is able to attend to accident victims with greatly enhanced information and diagnostic capabilities.

Several projects have come together under the auspices of the FEST (Framework for European Services in Telemedicine: <http://www.cce.hw.ac.uk/Databases/lachs/fest.html>) to explore the possibilities that such technologies may offer. The FEST project involves some 22 partners in Europe engaged in the provision and development of telemedicine services in one form or another. The project sets out some guiding principles and questions that telemedicine suppliers can use to assess the services that they offer or plan to offer. The framework consists of four components:

- A question set containing a list of the questions that a TMS producer (and this includes planners, implementers, operators and assessors) will have to answer in order to produce the service
- An advice component that provides guidance on answering the questions in the question set
- A body of information which is used to populate the advice component and which

contains detailed textual information drawn from fields that are identified as having relevance to Telemedicine - for example, economic evaluation of Telemedicine services, user requirements, legal, ethical and social constraints, organisational issues, telecommunication standards, etc.

- A descriptive model which "justifies" the framework by providing an underlying structure through which the comprehensiveness and rigour of the framework as a whole can be maximised.

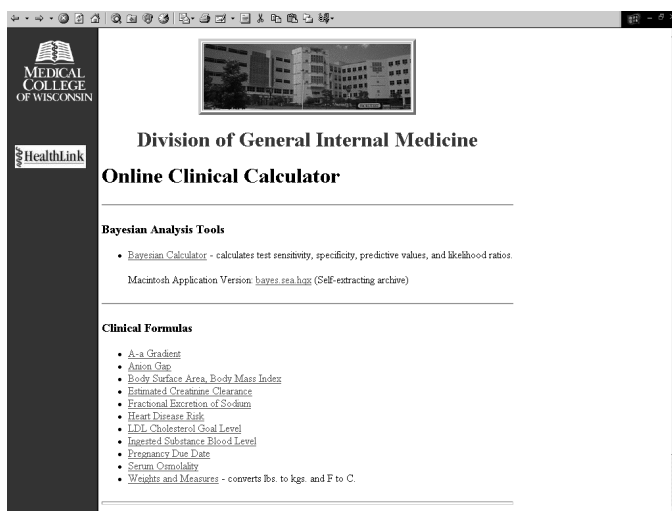
The FEST project aims to provide a series of recommendations and standards that telemedicine schemes can use in planning new projects and in the assessment of existing initiatives. Such benchmarks will only increase in importance as health systems become more integrated and interoperability becomes a key determinant of a project's usefulness. Though initiatives must begin at the local level, it is likely that there will be a greater push towards greater integration of services across an ever-widening geographical landscape. The importance of cross-geography standards cannot be underestimated.

#### Other resources:

The Internet offers medical professionals a variety of other resources from on-line decision support tools to the promotion of free access to medical books

(<http://www.freebooks4doctors.com/>).

The area of decision support covers a wide spectrum from clinical formulae (e.g. On-line Clinical Calculator, Figure 7:



<http://www.intmed.mcw.edu/clincalc.html>) to expert advice in

specific therapeutic areas. Across the spectrum it is important that these resources are accredited to recognised standards in order to regulate clinical decisions with expert advice to give quality integrated care and valuable knowledge transfer.

#### Figure 7:

On-line clinical calculator resource

Summary eHealth resources, providing information on policy and technology developments, are wide available on the Internet. For Europe, the overall eHealth vision is outlined in the eEurope 2005 action plan

([http://europa.eu.int/information\\_society/eeurope/action\\_plan/index\\_en.htm](http://europa.eu.int/information_society/eeurope/action_plan/index_en.htm)) and includes the role of smart health cards for data storage and to provide citizens with secure access to healthcare information and services.

# Moving Forward – Networked Virtual Healthcare

**Early eHealth initiatives provide a glimpse into the healthcare future. A more complete picture of healthcare provision in the 21st century shows effective collaboration across multiple organisations, some of which can only be imagined today. Perhaps home security firms will also collect information such as blood pressure and respiration from monitoring devices embedded in blouses and shoes. Abnormal data will cause an alarm and notification to a physician or emergency medical services.**

Current partnering models between public and private sector organisations can't satisfy citizens' demands for improved services let alone restrain costs within required limits. Citizens suffer because the existing approach simply moves problems from one place to another – from one organisation to another – without the necessary supporting information. To succeed, healthcare providers must instead master a new operating strategy: dynamic collaboration. New technologies that lower the cost of coordination make this partnership strategy possible.

Cisco Systems has developed a new framework for such dynamic collaboration: The Networked Virtual Organisation (NVO). Cisco is increasingly interested in NVO as a means of evolving its own business model as well from the perspective of the application of Internet business solutions.

The key challenge is to bring together different organisations that together add greater value to customers and citizens than they would alone – and drive out costs in the process. Organisational collaboration isn't new; it's ubiquitous. There is even general agreement among that collaboration is necessary and good, and that organisations can't compete without an active collaboration agenda. What's new and perhaps ambiguous about the widespread use of the term in IT circles is the fact that collaboration represents so many different types of joint activities--from periodic information sharing between business units to complex, multiyear product development and marketing projects among partners.

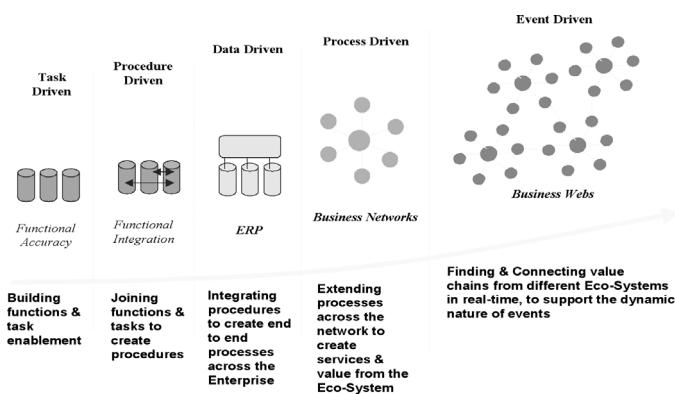
As for the resources required to succeed in the new competitive environment, the demand for talent and capital may be too onerous for a single company to handle. World-class skills may be easier to find outside than to develop internally.



**The networked virtual organisation is based on four concepts:**

- A better way to move services and information to consumers as quickly and effectively as possible.
- Reducing the time and distance involved in making and executing key decisions, whether a treatment decision for patient care or a decision on where to build a new clinic.
- Increasing the quality and value of real-time collaboration between increasingly complex communities of interests, resources and skills whose peculiar contribution to the network is defined in terms of what is ‘core’ (what they do best and adds most value) and what is ‘context’ (what others can do best).
- An obsessive focus on creating value for end-users.

The networked organisation has evolved from a task driven to an event driven focus. Organisations can layer IT requirements for various modes of collaboration as they move away from arm's-length sharing. It is important to recognise that the information infrastructure, with all its social and technical dimensions, is central to the new forms of collaboration. The ability to access key information, and to collaborate across cultures and distances and multiple agendas, requires a technical infrastructure that can seamlessly handle structured and unstructured information, text, images, audio, video, and all sensory data. Successful experiences that foster further collaboration can be built only on infrastructures that allow for a positive total experience. Done right, collaboration will transform IT into a strategic capability.



**Figure 8:**  
Evolution to the NVO

In the healthcare context, NVO provides the foundation for mission critical clinical and non-clinical activities delivered via multiple professional groups and different public and private sector organisations. This enables care communities, separated by geography or clinical discipline, to deliver a more effective service to the patient. In many countries the priorities will include integration of primary and secondary care with the accident and emergency units and social services.

In the words of John Chambers, Cisco's CEO: "It's all because of increased productivity made possible by the Networked Virtual Organization (NVO), which uses the Internet to connect not just networks but business processes and productivity applications to employees and customers. I believe the NVO will create the most fundamental change in business since the automobile assembly line."

# Conclusions

**The Internet and associated technologies are challenging and changing the traditional hierarchies of medical knowledge and empowering patients to understand more about their health, their ailments and their treatment. At the same time, the demands on health providers grow ever more onerous and there is a pressing need throughout all healthcare systems to identify ways to improve and reform the administration of healthcare systems. The promise of ehealth is that we can describe, and implement new ways of accessing, delivering and measuring the impact of health services and improve the care of patients in doing so. This is the healthcare revolution.**

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“My patients say two things to me about information: first, there is information about me which you do not have and you should and second, you have information about me which you are not sharing with me and you should.”

Martin Lee, Medical Director,  
Birmingham City Hospital, NHS, United Kingdom



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