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## Editor's FOREWORD

Arguably, the increased ageing of our populations and the increasing demands being placed on health care services are the biggest challenges that we have to confront in the coming decades. As the retired population swells and the work force diminishes, public expenditure will rise as the tax burden falls on proportionately (and, in most cases, absolutely) fewer people. These trends are accompanied by rapid advances in medical science which significantly extend the range (and costs) of available forms of health care. Already in Europe, health care is a huge industry and public health care often represents the largest component of public services.

Competences regarding public health service delivery are usually shared between national and regional administrations – but the extent of regional responsibility varies from one Member State to another. To that extent, this Guide offers only an overview of the issues and arguments – without seeking to delve into the more detailed aspects involved in regional health systems. Even where regional authorities have no responsibility for health care delivery, it may be in their interests to at least support some eHealth research and pilot projects. Often, it is the leadership and commitment of specific health care professions that bring about innovations with the use of ICTs – and they need every bit of help they can get. Successful local projects, moreover, can sometimes give rise to external demands for new products and services and through the export of these to new markets and new jobs for the region in question.

More generally, there appears to be an increasing trend towards devolution of competences to the regional level. The situations in which today regions have no competences in the health care field may well change in the years ahead.

This Guide is not intended for eHealth specialists but is targeted at an audience comprising non-specialists amongst regional administrations, elected representatives, information society programme managers and practitioners – and others generally interested or concerned to know more about the subject.

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# 1

## INTRODUCTION

The concept of “eHealth” is used to describe the application of information and communications technologies (ICTs) across the whole range of functions which affect the health of citizens and patients.

eHealth is an umbrella term encompassing a broad range of ICT-driven activities that are transforming the delivery of healthcare. Such activities normally involve the use of digital data that is transmitted, stored, and retrieved electronically for clinical, educational and administrative purposes, whether at a fixed location or remotely. The important implications of eHealth are becoming more and more apparent to patients, health workers, administrators, and practitioners as new applications allow the provision of medical support remotely at any point in time and facilitate access to, and exchange of, pertinent health information on demand. The introduction and effective delivery of eHealth concerns all players in the healthcare sector. These include hospitals and other healthcare facilities, public and private insurance firms, organizations developing and applying technological solutions, as well as a variety of user groups - citizens, patients and their environment, doctors, nurses and allied healthcare professionals. The growing body of literature on eHealth has extensively dealt with the rise of new technologies and the bottlenecks and challenges facing eHealth strategies in the 21st century. Less attention has been given to ways of increasing awareness and general understanding and utilization of ICT-driven activities among all the parties directly involved. For this, it is important to recognize that technology alone cannot guarantee optimal results. New types of skills, competencies and, above all, mindsets and attitudes to novel ways of working are required for the ubiquitous introduction and effective exploitation of ICTs in healthcare.<sup>1</sup>

In its widest sense, eHealth can be described as the use of information and communication technology and the Internet to<sup>2</sup>:

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<sup>1</sup> *The IPTS Report*, Anastasia Constantelou and Vasiliki Karounou, National Technical University of Athens

<sup>2</sup> *Health Telematics Working Group of the High Level Committee on Health: Final report*. April 2003

- Connect citizens, health information providers and governments;
- Inform, educate and empower citizens, patients, health care professionals, managers and policy makers;
- Stimulate innovation in health policy development, health promotion and prevention of illnesses, and
- Improve the quality and management of health data as well as care delivery and health system management.

Successful ICT initiatives have to be patient-driven and not technology-driven, seeking to meet an identified, legitimate patient need.

Legal competence at European level is restricted in some of these areas, particularly where the delivery of health services is concerned since this is often a Member States competence, but in many cases it may also be a regional competence. Therefore, the different fields of ICT may require quite different types of response at European, national and regional levels.

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### THE CASE FOR eHEALTH

As populations age and medical technologies advance, the pressures on health care systems will soon reach a breaking point – if they have not already done so. ICTs offer the potential for significant amelioration of the pressures caused by these factors, not least of all in terms of provision of better and more cost-effective health care and administration.

The European health sector is still based primarily on bricks and mortar and on paper, a system where lab tests must be repeated, because medical professionals do not have access to electronic records, or where patients routinely travel long distances to access medical services that could be made available electronically.

eHealth is the single most important revolution in health care since the advent of modern medicine or hygiene. *eHealth is the application of information and communication technologies across the whole range of functions that affect health care, from diagnosis to follow-up*<sup>3</sup>. It is the means to deliver responsive health care tailored to the needs of the citizen. The following factors favour the adoption of eHealth programs:

- Growing concern regarding medical error and the increasing costs of insurance and litigation;
- Advance of patient-centric health care systems; putting the patients needs first;
- Need to improve cost-benefit ratios and to rationalize health care – so as to contain costs within manageable proportions, delivering patients' growing expectations at limited or no additional cost;
- Supporting citizens' mobility across Europe – as more and more people spend more time 'abroad' (to live, in retirement, for extended vacations, for work), the need for access to national health records and other services grows.

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<sup>3</sup> *The Case for eHealth*, Denise Silber. May 2003

If we consider eHealth in reference to the settings in which health care services can be dispensed, we see the myriad of opportunities<sup>4</sup>:

- The citizen/patient uses eHealth when s/he seeks information online, uses self-management tools, participates in electronic communities, and requests a second opinion;
- Primary care includes the use of ICT by the Primary Health Care Team (PHCT) for patient management, medical records and electronic prescribing. Health care professionals can also call upon eHealth for their continuing professional development (lifelong learning);
- Home care includes care services which are delivered by home care professionals via telecommunications to a patient in the home;
- Hospitals may call upon ICT for scheduling, logistics, patient administration, laboratory information, radiology, pharmacy, nursing, electronic messaging between the hospital and other healthcare actors, for communication of clinical and administrative data, and telemedicine and second opinions, in any specialty.

## Determinants of Health<sup>5</sup>

The main determinants of the major health problems tend to be behavioural (tobacco smoking, alcohol abuse, inadequate diet, drug addiction, physical inactivity), poor environmental conditions, and low socio-economic status. It is important to acknowledge that these determinants interact with each other in a complex way and that what counts in terms of health status outcomes is the combined impact of all determinants.

### Socio-economic determinants of health status

- Macroeconomic determinants (e.g. GDP per capita) partly explain the expenditure power of countries and individuals on health care. The chances of premature death are highest amongst people with the lowest expenditure power. The prevalence of ill health increases proportionately with decreasing income.
- Education, on its own or as a proxy for social status, is an important determinant of health behaviours and of health status. The prevalence

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<sup>4</sup> *The Case for eHealth*, Denise Silber. May 2003

<sup>5</sup> *The Health Status of the European Union – Narrowing the health gap*, DG Health and Consumer Protection, European Commission. 2003

of ill health increases steadily with decreasing educational level. People with chronic diseases and low education appear to have a more unfavourable course of chronic health problems, with more disabling outcomes, than better educated patients.

- The family represents the first source of informal health care and the major support system for the young and the old. Family structures are important sources of companionship and are associated with patterns of mental health, as well as other morbidity and mortality patterns.
- Stable employment provides not only income and a share of material well-being, but also structures one's social life and gives specific meaning to personal existence.
- Unemployment results in a loss or reduction of income that may or may not hasten the unemployed under the poverty line. Sudden redundancy and long-term unemployment and the associated loss of social status and social contacts and increasing hopelessness of the situation may lead to stress with consequent psychological problems.

#### Health behaviours

- Tobacco smoking is harmful not only to the individual smoker but, because of passive smoking, also to others. Smoking is associated with a wide range of diseases.
- Alcohol is another important health determinant amenable to policy intervention.
- Drug addiction damages the physical and mental health of consumers and may lead to de-socialisation.
- Diet is of great importance in disease prevention and health promotion.
- Physical activity, at all ages, improves health and the quality of life.

#### Health promotion

Effective health promotion leads to changes in the impact of the determinants of health. Health promotion activities are addressed from four intervention perspectives: health protection, disease-oriented, risk-oriented and settings-based.

## The Role of ICT in Health Care Innovation

The use of ICT in health care will allow for greater communication and information sharing among patients, caregivers and policymakers, having a great potential to significantly improve the accessibility and quality of health services for all citizens while increasing the health system's efficiency and effectiveness. Patients will benefit from the strategic use of ICT in health care through reductions in rates of mortality and morbidity due to misdiagnosis and improper treatment and medication errors, through access to online drug reference databases and the virtual elimination of handwritten prescriptions. Health promotion and disease prevention will be enhanced through superior monitoring and patient education, as will decision-making by providers and patients. Multimedia applications can enable professional and patient education and research. Health information networks enable institutions and individuals to exchange electronic health records and share information systems and databases to collect or deliver health information at distance.

### The Role of the Internet<sup>6</sup>

A variety of health-related processes stand to be reshaped by the Internet. In clinical settings, the Internet enables care providers to gain rapid access to information that can aid in the diagnosis of health conditions or the development of suitable treatment plans. It can make patient records, test results and practice guidelines accessible from the examination room. It can also allow care providers to consult with each other electronically. The Internet also offers the added benefit of supporting a shift toward more patient-centred care, enabling consumers to gather health-related information themselves, communicate with care providers, health plan administrators and other consumers electronically and receive care in their homes.

The Internet can streamline the administrative overhead associated with health care provision. Providers can use the Internet for more cost-efficient procurement or to submit claims for payment, and individuals can use it to update their coverage. By accelerating these transactions, the Internet could reduce misunderstandings and disputes, accelerate payments and reduce administrative costs.

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<sup>6</sup> *Toward the Transformation of Health Care Delivery in Canada: ICT in the service of Health Care Innovation*, ITAC. 2003

Public health monitoring would benefit from application of the Internet to:

- help in collecting data about the health of individuals;
- help identify personal risk factors and medical treatments;
- provide data about sources of disease and injury in the environment, and
- suggest possible effective action.

The Internet facilitates research by helping integrate databases for improved analysis (e.g. larger and more reliable samples), allowing linked simulations and enabling remote control of biomedical research apparatus.

Many people do not have access to Internet facilities. There are also social and literacy considerations that need to be taken into account. Therefore the Internet should be seen as complementary to other initiatives at national/regional level to provide health care and health information services to citizens.

#### Issues & Challenges<sup>7</sup>

Health care must be a client-centred system where patient safety and privacy are paramount. Issues include lack of commonly agreed standards and regulations for the collection, storage, use and transfer of electronic patient information, and the cost and difficulties with the integration of patient information systems into office practice.

The best way to encourage adoption by providers is to give them solutions that help them provide better care for their patients, improve efficiency, or reduce practice costs. Therefore, health care providers must be consulted early in the design phase and receive ongoing training and support in their use of the technology. For health care to receive the benefits of ICT applications, companies with a wide variety of interests must work together to develop integrated solutions.

**Technological challenges** include:

- lack of access to ICT infrastructure and bandwidth (some remote/rural communities do not have access to broadband);
- cost;

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<sup>7</sup> Op cit

- lack of decision support tools and reliable, functional clinical support systems, and
- lack of interoperability and standards.

**People challenges** include:

- the digital divide between citizens who do and those who do not have ICT skills;
- lack of health informatics expertise to support providers using ICT, especially in remote areas;
- a health care culture that is typically conservative, risk averse and slower to seize new ideas;
- scarce resources, with providers having to take on increased workloads;
- fear of how EHRs (Electronic Health Records) will be used and of interference with the patient-provider relationship;
- concerns over the business case for ICT investment (will ICT improve care, lower costs, free up time, safeguard privacy and safety?), and
- lack of confidence in the appropriateness of applications and whether they can be smoothly integrated into the practice.

### **Electronic Health Record (EHR)<sup>8</sup>**

The cornerstone of a system for sharing information about patients between care providers is the electronic health record (EHR). The method for documenting patients' health history and episodes of illness varies from country to country. Typically, there is within a single institution a structured record including both clinical and administrative data. The data content of the electronic health record (EHR) is regulated and often reflects the organisational structure of the health care service system. There may also be regulations governing longitudinal patient health documentation. This health documentation can be episode-based or even cumulative within a service provider or region.

The information contained in the EHR is typically used within a single organisation for the purpose of planning and delivering care. EHR systems currently in use have limited communication capabilities. There are also

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<sup>8</sup> *Health Telematics Working Group of the High Level Comité on Health: Final Report.* DG Health & Consumer protection, EC. April 2003

legal barriers to the access and transfer of patient information between different health care organisations. However, there already exist today technologies which provide the ability to network the distributed EHR in a secure way. The principal benefit of the networked EHR is the possibility it provides for 24-hour access to a comprehensive set of patient health information. The result could be a regional or nation-wide virtual patient record, which is a basic building block for modern, tailored care procedures.

The EHR is a collection of an individual's relevant interactions with the health care system – whether with a physician, a pharmacist, a hospital, a lab, a community health centre, or a home-care agency – that would be available to authorized health care professionals anywhere in the country (or Europe) on a need-to-know basis. EHRs would empower individuals by giving them access to their own personal health records. EHRs can also enhance confidentiality of personal information by putting in place safeguards that do not exist with paper-based records. For example, individuals could exercise greater control over who has access to their personal records, on what basis, and for what purpose, than they can with the current, paper-based systems.

The EHR has been identified as the central tool to enable eHealth and strengthen and integrate existing health care systems. An eHealth system would contribute to a health care environment where we would have:

- improved quality of care;
- fewer errors (improved patient safety);
- increased efficiencies through better access to health care, particularly for those living in rural and remote locations and those with limited mobility;
- greater focus on competencies, giving providers the opportunity to maximize the time devoted to providing direct patient care (less time consumed by administrative and management tasks); and
- better overall patient satisfaction in terms of access and outcomes.

EHR benefits are tangible – more time spent with patients, increased utility of patient files, less superfluous paperwork, better and faster diagnosis and treatment plans, and greater opportunities for consultation among providers. Access to information on previous medical or lab tests would reduce the number of redundant procedures and result in cost savings and efficiencies. It would also avoid procedures that might pose a health risk to patients if they were repeated.

A national EHR system will help reduce fiscal pressures from rising health care expenditures, while making it possible for all citizens to obtain access to the right care, at the right time and place – whether they live in major metropolitan areas, rural communities, or remote settlements. As well, the information that a national EHR system could provide to researchers would improve the quality of care for individuals and the ability of health care administrators to develop policies for the future, determine trends and analyse the health of various sectors of the population.

### **Information Management**

There can be no quality health care without the correct management of information and information flows.

Information is a vital resource for the effective running of all major businesses. The health sector is arguably one of the most information-dependent businesses of all. Its information requirements can be classified as<sup>9</sup>:

- Information for citizens;
- Patient education services;
- Health management information;
- Personal health data;
- Decision support systems for health care professionals, and
- Life long learning for health care professionals.

Modern information and communication technologies, including the Internet, offer an opportunity to meet these needs and others, and to reengineer and revitalise the processes and procedures currently in place. At the same time, eHealth must support appropriate developments in health policy. There is a large and growing body of health-related information on the World Wide Web, to which citizens and patients - hungry for information - are increasingly turning. However, the information available via the Internet is of highly variable quality and many people still do not have access to the Internet, or have difficulties in finding information in a language they understand. Population-level public

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<sup>9</sup> Op cit

health/health management data is still not of a quality or comparability to support confident inferences about public health policy.

The development of societies where health considerations permeate all policies can only take place if modern information and communication technologies are also fully utilised. With the help of these technologies citizens' participation in the definition of health and health-related policies can be enhanced.

The availability of, and access to, *reliable* information is also crucial for health promotion and prevention which are gaining an ever more important role at global, European, national and regional levels. There is a great deal of information available from evidence-based research and other types of evaluation, but gathering, assessing, summarising and disseminating it requires coordinated efforts. The provision of high quality, efficient, cost-effective health care can only be truly realised through the *collaborative* efforts of various health professionals, health care planners, funding providers, administrators and, very importantly, the public themselves. Real added-value can be gained through systematic exchange of information and collaboration regarding the development of infrastructure for reliable information systems.

### Problems of sharing data

**Interoperability** of national/regional systems will be critical as citizens of Europe become more mobile in their healthcare management. Most IT systems currently used in health systems are stand-alone, developed by a multitude of suppliers and are incompatible with one other. This non-interoperability of IT systems represents perhaps the biggest single problem in transferring data securely between different parts of the healthcare system (and between systems). It is a problem to be found not just across national borders, but between regions and even municipalities.

Interoperability is not just about getting the right technologies in place. Effective use of interoperability technologies cannot be fully separated from policies for using and administering sharable resources.

Member States<sup>10</sup> have expressed the need to support actions that cover the development of standards addressing the interoperability of diverse systems and services and to explore in particular the possibilities of open source applications to achieve this objective. In this context, the need for future standards is clearly emphasised so as to solve interoperability

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<sup>10</sup> *eHealth – Making healthcare better for European citizens: An action plan for a European e-Health Area*. COM (2004) 356 final

concerns in a way which will benefit all stakeholders through the possible adoption of Open Source reference implementations for care services. In addition, open and freer access to future and existing eHealth standards should be recommended, taking inspiration from models such as the World Wide Web Consortium. The exchange of experience in the use of open standards and open source solutions among health administrations in Member States should be promoted.

The development of *regional networks*<sup>11</sup> represents one limited solution to the problem of interoperability of IT systems. Even within highly evolved health care systems, specialised health care is planned on the basis of sub-sectors of the population of between half a million and five million, depending on the level of specialisation involved (for example, secondary or tertiary care). Since the beginning of the nineties, there have been national and European research and development activities on regional health care networks, a few at the beginning of the decade, and several in more recent years. These activities have resulted in pilot projects and operational regional health care networks in several European regions, all quite different in scale, and each providing different services (from simple messaging to shared electronic health care records). In the last part of the 1990's, many European countries started building Regional Health Care Networks using different types of technology, and a broader approach mainly around shared patient records supporting continuity of care.

Regional, national and European projects and programmes in the past have to a large degree developed bespoke (i.e. specifically developed) regional health care services for local use, in the same way as was done for IT solutions for hospitals and laboratories in the beginning of the 1970's. By using standardized information transfer schemes, interoperability of the transmission can now be assured. There is, however, a need to assess, compare and interconnect some relevant regional health care networks all around Europe and to consider and follow-up the cross border projects in order to expand the networks and increase the continuity of care which they can provide.

**Trust and confidentiality in an eHealth environment.** Many privacy and confidentiality issues remain to be resolved. The data content of an EHR is of the utmost sensitivity. Therefore, issues concerning both the ownership of, and the rules for managing, the data contained in the EHR are issues that demand clear policies.

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<sup>11</sup> *Health Telematics Working Group of the High Level Comité on Health: Final Report.* DG Health & Consumer protection, EC. April 2003

**Security.** The need for technological security when data is transmitted electronically is clearly inseparable from legal data confidentiality requirements.

There needs to be a **standardized terminology** by which to code diseases and clinical interventions. How the health data is organised and encoded also affects how flexibly it can be used, required storage capacity and the ability to represent the information in different languages.



## 3

### CHALLENGES FOR WIDER IMPLEMENTATION

Health care systems<sup>12</sup> around the globe face major challenges<sup>13</sup>, even if their nature and scale varies significantly between industrialised and developing countries. For the European Union these challenges include:

- rising demand for health and social services, due to an ageing population and higher income and educational levels;
- the increasing expectations of citizens who want the best care available, and at the same time to experience a reduction in inequalities in access to good health care;
- increasing mobility of patients<sup>14</sup> and health professionals within a better functioning internal market;
- the need to reduce the so-called 'disease burden', and to respond to emerging disease risks;
- the difficulties experienced by public authorities in matching investment in technology with investment in the complex organisational changes needed to exploit its potential;
- the need to limit occupational accidents and diseases, to reinforce well-being at work and to address new forms of work-related diseases;
- management of huge amounts of health information that need to be available securely, accessibly, and in a timely manner at the point of need, processed efficiently for administrative purposes, and

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<sup>12</sup> *eHealth – Making healthcare better for European citizens: An action plan for a European e-Health Area*. COM (2004) 356 final

<sup>13</sup> COM(2001) 723 final 05.12.2001, *The future of health care and care for the elderly: guaranteeing accessibility, quality and financial viability*; (6528/03, 20.02.2003) and *Joint report by the Commission and the Council on supporting national strategies for the future of health care and care for the elderly*.

<sup>14</sup> Patient mobility is addressed specifically in a Communication from the Commission, COM(2004), entitled *Follow-up to the high level reflection process on patient mobility and healthcare developments in the European Union*.

- the need to provide the best possible health care under limited budgetary conditions.

Despite the availability and proven benefits, eHealth systems and services are not yet widely used in real-life medical or health situations. In many places, development is still at a pilot phase, often financed through research grants. The speed of organisational change is often slow, and it can take up to twenty years to achieve full implementation. A broad range of challenges remain to wider implementation<sup>15</sup>:

- **Commitment and leadership of health authorities**, in particular those related to financial and organisation issues, are essential elements for the successful deployment of eHealth. For eHealth to improve the way healthcare is provided, it must be combined with organisational changes and the development of new skills in users.
- **Interoperability of e-Health systems**. Interoperability should enable the seamless integration of heterogeneous systems. This will allow secure and fast access to comparable public health data and to patient information located in different places over a wide variety of wired and wireless devices. However, this depends on standardisation of system components and services such as health information systems, health messages, electronic health record architecture, and patient identifying services.
- **User friendliness of e-Health systems and services**. A top priority for health providers in using an eHealth system is speed in getting the desired, high-quality results. There is an absolute need for fast connection, connectivity, and high speed. This highlights the importance of ensuring broadband connection for on-line health services and infrastructure for regional health information networks.
- **Lack of regulation and fragmentation of e-Health market** in Europe. The lack of standards and accreditation of products, together with different national regulations, have pushed up the cost of development and customisation.

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<sup>15</sup> I. Iakovidis (1998) Towards Personal Health Record: Current situation, obstacles and trends in implementation of Electronic Healthcare Records in Europe, In *International Journal of Medical Informatics*, vol. 52, no 123, pp 105 -117 & *eHealth – Making healthcare better for European citizens: An action plan for a European e-Health Area*. COM (2004) 356 final

- **Confidentiality and security issues.** The requirement for confidentiality makes health information systems security critical.
- Issues relating to the **mobility** of patients, including the cross border circulation of goods and services, among which eHealth services are of growing importance.
- Stronger cooperation among health providers across Europe is needed to enable wider implementation. Hence, the **establishment of European networks of reference** could provide health care services for conditions, in particular rare diseases, requiring a concentration of resources or expertise. Interoperable eHealth solutions will be needed to create the technical platform to implement such an initiative.
- **Needs and interests of users.** The take-up of e-Health systems and services would take place more rapidly where the needs and interests of the user communities (health professionals, patients, and citizens) to be taken on board.
- **Access for all to e-Health.** There is a risk that certain parts of society - such as single parents, isolated communities, inner city communities, individuals with literacy and numeracy challenges, groups of immigrants, homeless persons, elderly persons and disabled persons – could remain excluded from the possibilities offered by eHealth (including Internet-based health services) if special efforts are not made to counterbalance such trends. On the other hand, eHealth can offer considerable possibilities for the provision of health services to such individuals, groups, and communities.
- **Common understanding and concerted efforts by all stakeholders.** No single stakeholder can carry through implementation successfully on its own without the active co-operation of all the others. Each of the stakeholders - health authorities, professionals, consumers, industry - has the power to veto an implementation if it is not perceived as beneficial. Only through concerted efforts by all stakeholders can we ensure a successful implementation where all partners benefit, thereby creating a win-win situation.

## Mapping the potential of eHealth<sup>16</sup>

The challenges to the full implementation of eHealth are technical, social, economic and political. Not only are there many hurdles, but the players who must overcome them are also numerous. An effective eHealth strategy requires coordinated political leadership, coupled with a strong commitment to the financial investments needed. eHealth requires that legal and regulatory bodies keep pace with the regulatory changes that are now required to allow health care providers to use eHealth tools in existing health systems. Technical and medical researchers must continue to undertake development and evaluation activities so that eHealth systems develop and improve. Their research must be built on the experiences of users, who in turn are trained and supported. eHealth applications and services have to become an *integral* part of every health professional's training so that their use becomes as natural as face-to-face interactions.

The greatest hurdle remains persuading those with leadership roles that eHealth can be used *safely* and *securely* to give wide *access* to improved health care.

In order to share the potential benefits of eHealth across the Union, it is essential that Europe adopts common standards for quality, security and interoperability that are tailored to local requirements and based on a thorough understanding of infrastructure needs developed through cooperation with users.

ICT tools may be used to empower citizens to gain information. On the basis of such information, a particular citizen may choose to seek the advice of a health professional, at which point s/he might become a patient within the health system. Once s/he is a patient, professionals will enter information into their Electronic Health Record concerning diagnosis, treatments and other relevant factors. The Electronic Health Record will in turn link to local, regional, national and even international systems that will allow health professionals to better treat the patient. On the basis of secure information, the health professionals involved will be able to adapt their treatments and interaction to the needs of the individual with much greater ease. At the same time, the data collected will allow health managers, planners and regulators to adapt to the needs of the populations they serve more easily and with greater efficiency.

The true potential for eHealth lies, therefore, not only in its science and technology, but in those who implement it. eHealth is not only a technological solution but a new approach to citizens-centred health care

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<sup>16</sup> *Mapping the Potential of eHealth: Empowering the citizen through eHealth Tools and Services*, Petra Wilson, Christine Leitner and Antoinette Moussalli, EIPA 2004

which embodies a commitment to **networked, global thinking to improve health care locally, regionally, and worldwide by using information and communication technology**. eHealth requires all players in the system, from the citizen to government, to dare to want the best for their own health and for the health of the nation. It requires all of us to make eHealth adapt to our own particular needs.

**Mapping the potential of eHealth – from the citizen to the government and back again**

**eHealth empowers citizens:**

- to be better informed about disease prevention and alternative lifestyle strategies for self-help
- to have confidence in an informed service delivering care according to a model more closely related to their needs and perceptions
- to exercise reasonable levels of choice, which will help them to take a more active role in managing their own health

The citizen becomes a patient



**eHealth empowers the patient:**

- to gain access to information about diagnosis, treatment and best practice so they can be better informed about their responsibilities
- to be more informed in their interactions with clinical professionals so they can be more aware of actions they can take in self-help
- to interact with healthcare services that can provide the sort of consumer-oriented services available to them in other sectors

The patient goes to the health professional



**eHealth empowers the clinicians and healthcare professionals:**

- to provide a more informed and patient-oriented service
- to gain access to information on patients, treatment and diagnosis from other parts of the care process, and in particular, to improve the interfaces between primary and secondary care
- to access information (about best practice, treatment profiles and drug interactions) to support their clinical activity
- to ensure that other institutions are able to share information and gain access to it at the point of care
- to gain access to disease management information which will improve their ability to deal with chronic care
- to develop new clinical applications to improve their workflow and clinical business processes
- to use valuable supporting information outside their own environment without increasing administrative workload

The managers collect data from the professionals



**eHealth enables managers and regulators**

- to secure access to accurate information generated at the point of care which is needed for operational and management functions
- to generate cross-business information and share this information with those who are authorised to access and use it
- to make better use of available resources through more efficient context-sensitive scheduling and ordering
- to work more effectively with supporting businesses utilising cost-efficient supply chain support
- to have greater confidence in information available for performance management where this information is generated at the point of care
- to assess real activity and true performance characteristics in order to better understand the implications of new demands and priorities
- to understand and articulate current societal changes in terms that are actually relevant to deliverers of care

*Source: Health Information Network Europe, eHealth 2003 Report - Adapted by EIPA (see footnote 16)*

## 4

### SKILLS & COMPETENCIES FOR THE FUTURE OF eHEALTH<sup>17</sup>

The modernisation of public service provision with the use of ICTs is a challenge to existing forms of organization in the health sector and implies some kind of organizational change. In fact, technical innovation to a large extent depends on organizational innovation in order to achieve real improvements in efficiency and quality of service. On the other hand, the translation and implementation of new modes of service provision into practice is always a serious challenge to management. Still, the potential of eHealth may fall flat without the active involvement of health care professionals and citizens in the choice, deployment, and assessment of relevant technologies. For these user groups to participate in a meaningful way in these procedures, they have to be empowered and informed about the benefits that ICTs can bring to healthcare delivery.

Human resource development through appropriate education and training is a key factor in introducing new methods of work for health care service providers and in empowering citizens to use ICTs to obtain medical information. The nurturing of competencies and skills and the introduction of new working methods have become key factors in the successful re-engineering of service suppliers as they transform into agencies providing eHealth services. Changes to strategies, structures and methods of service delivery are dependent upon a creative and innovative workforce. The latter needs to adapt its skills, competencies and, above all, mindsets and attitudes to new ways of working that are more responsive to the needs of citizens.

eHealth competencies and skills are particularly necessary in relation to four major eHealth application areas:

- **Public health policy & prevention:** this refers to the collection of health care event, environmental, and socio-economic information that enables data mining for health care strategy planning. Essential skills for health care professionals involved in this area include the ability to understand the functional design and use of personalized

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<sup>17</sup> This chapter is inspired by *The IPTS Report*, Anastasia Constantelou and Vasiliki Karounou, National Technical University of Athens

web services as well as the ability to understand the structure and information needs of Public Health Policy and Prevention in order to come up with new algorithms to fit in new types of data.

- **Information services to citizens:** these encompass activities providing information to citizens on issues such as good health and lifestyle advice and empowering them to know when professional help is required, and where and how to obtain it. Essential skills for health care professionals involved in this area include the ability to contribute to the structuring and updating of citizen information services and to the functional design and use of personalized web services.
- **Integrates patient management & patient health records:** these concern activities surrounding the efficient and secure sharing of information between health and social care professionals and the establishment of an environment to provide support for integrated client case management. Essential skills for health care professionals involved in this area include the design and use of evidence-based eHealth clinical protocols, the ability to understand the structure and functional capabilities of integrated patient management systems and patient health records, the operation, updating and maintenance of integrated health records, and the efficient management of personal and health information security and confidentiality.
- **Tele-care & independent living services:** These comprise tele-consultations, tele-homecare, vital signs monitoring, and services for the elderly and disabled that support independent living. Essential skills for healthcare professionals involved in this area include basic technical knowledge on how to operate tele-care and independent living services, ability to form tele-care and independent living Service Level Agreements with third parties, ability to evaluate the equipment and services delivered, and also the management of personal and health information security and confidentiality.

### **The Way Forward: Recommendations for the Future of eHealth Education**

One of the principal barriers to the adoption of eHealth is the resistance of health professionals - primarily doctors - to the use of new technologies in their daily practice. Survey findings confirm that the inability of healthcare staff and healthcare professionals to accept and manage change is seen as

a major blockage in implementing eHealth<sup>18</sup>. Health professionals in general are averse to using high technology equipment when treating patients, especially if treatment takes place from a distance. Often, they perceive the implementation of the service as a threat to their authority. From another perspective, health professionals find that education and training in ICTs do not fit in with their busy schedule and could in no way substitute for the personal relationships they develop with patients. In the UK, for example, doctors argue that in the fourth and fifth years of their medical training and in their first years as junior hospital doctors, there is no time for training in ICTs because priority is given to clinical work and it is in practice very difficult to fit in training on 'fancy ICT systems'<sup>19</sup>.

For many years, the inclusion of IT skills in the training of health care professionals has been a low priority in most countries. This approach has caused significant discrepancies in the health systems since the on-going under-investment in professional education and training has been occurring in an environment characterized by rapid technological and organizational change. Today, the introduction of medical informatics into the curricula of medical schools at both undergraduate and postgraduate levels is gaining more and more ground, as it is becoming widely recognized that the ability of physicians to use ICTs is vital for the effective management of medical information. Courses in this area are designed to equip medical students and other health professionals with the necessary formal informatics competencies that will allow them to function as users and producers of medical data. Internet technology is often used in medical training and in the teaching of health informatics as it allows better communication between participants and better support for students. The primary goals of such courses include<sup>20</sup>:

- Raising health-care professionals' understanding of health informatics and computer technology, including the effective use of common software, communication tools, and some of the concepts underlying the use of computers in healthcare;
- Providing academic recognition of informatics skills by awarding a diploma;

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<sup>18</sup> Richardson et al., Position Report for the development of eHealth in Europe, EHTEL report 2002.

<sup>19</sup> Mansell, R. and Curry, R. Emergency healthcare: *An emergent knowledge-driven system*. Chapter prepared for P.A. David, D. Foray and J. Mairesse (eds) *The Public Dimensions of the Knowledge-driven Economy* [working title], book or report forthcoming 2003 by OECD/CERI.

<sup>20</sup> Parry, D., A. Holt and J. Gillies *Using the Internet to teach health informatics: A case study*. *Journal of Medical Internet Research*, Vol 3 (suppl. 2), 2001.

- Developing a network of expertise, and
- Reaching people working in relatively remote environmental settings.

However, 'soft' types of skills are equally, if not more, important for the transformation of the health care system into an eHealth system. Therefore, an important prerequisite for engaging more and more professionals in formal training in health informatics is first to raise their awareness of the potential of ICTs and adjust existing mindsets and attitudes to the transforming norms and practices in health care delivery. In other words, apart from basic computer skills, health professionals need to be provided with the necessary education and training that will allow them to understand the functional capabilities of eHealth technologies and applications as well as their legal, ethical, and economic implications in order to have at least some input into technology choice and assessment. Furthermore, people-based skills, such as co-operation, leadership, and creative thinking are critical for inspiring participants and sustaining their interest at turbulent times.

Continuing medical education activities need to endorse this approach. In the same way as other professionals (e.g. engineers, industrialists) deliberately enrol in postgraduate training in order to develop the key technical, organizational, and administrative competencies that they need in order to be able to deliver value-added services to customers. Health professionals also need to empower themselves with the necessary knowledge of health informatics as well as with an essential understanding of the broader functional, legal, ethical, and economic implications of eHealth. More training programmes addressed to all groups of health professionals - doctors, nurses, and allied health care professionals - should be designed along these lines. The importance of eHealth and the variety of eHealth services need to be explained through concrete examples so that the full benefits are appreciated and key messages are delivered to multi-disciplinary professional groups. Multimedia and web-based technologies can effectively support the delivery of such training schemes and establish a user-friendly interoperable systems infrastructure for eHealth education.

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### CONCLUSIONS

eHealth offers European citizens important opportunities for improved access to better health systems. It can empower both patients and health care professionals. It offers governments and tax payers a means to cope with increasing demand on health care services. It can also help to re-shape the future of health care delivery, making it more citizen-centred.

The importance of eHealth needs to be explained to citizens in term of its concrete benefits. They will then become part of the process to move eHealth forward.

If there is one thing that national and regional governments can do to advance their capacity of innovation, it should be to foster the widespread and rapid adoption of productivity-enhancing technology. Governments should make additional, substantial investments in ICT with the objective of improving the health of their citizens, as well as improving the efficiency and effectiveness of their health care systems.

Community readiness is the extent to which communities demonstrate the capacity to implement, manage and sustain eHealth initiatives. Rural and remote communities will need special assistance in developing and improving community readiness. As well, governments must work with communities and other stakeholders to develop national or regional rural health strategies.

Governments and the ICT sector must collaborate to build a critical mass of qualified health informaticians, on-line health informatics content, and flexible programs that can be easily accessed from multiple institutions by health professionals across each country and, even better, across Europe. In addition, there is a need to support clinical training programmes to enhance their curricula with health informatics knowledge so that clinicians understand the application of informatics to support evidence-based care.