eHealth

Research report

www.ehealthconference2004.com

2004 eHealth

Mapping the Potential of eHealth

Empowering the citizen through eHealth tools and services

Petra Wilson (EHMA),
Christine Leitner and *Antoinette Moussalli* (EIPA)

EUROPEAN COMMISSION

EHMA
European Health Management Association

Institut Européen d'Administration Publique
European Institute of Public Administration

www.eu2004.ie

Mapping the Potential of *e*Health: Empowering the Citizen through *e*Health Tools and Services

Presented at the *e*Health Conference, Cork, Ireland, 5-6 May 2004

Petra Wilson
European Health Management Association
and
Christine Leitner and Antoinette Moussalli
European Institute of Public Administration

ISBN 90-6779-188-1

Typeset by the Publications Service, EIPA, the Netherlands.
Cover design by Team Work, France.
Printed by Atlanta, Belgium.

EIPA wishes to acknowledge the financial support of the European Commission provided through the eEurope Awards Project IST-2001-38016.

Table of Contents

Foreword

This report has been drafted with the collaboration of a wide number of European actors in *e*Health. Its purpose is to provide the visitors of the *e*Health 2004 Conference and Exhibition – *Empowering the European Citizen Through eHealth* with an introduction to and overview of some of the key issues in *e*Health.

In Part One of **Mapping the Potential of *e*Health**, we seek to identify the coordinates of *e*Health in order to locate it on the European policy map. From there we aim to chart some of the main technical, social and political challenges which may impede the implementation of *e*Health, before finally proposing some key policy arguments for addressing the challenges, so that European citizens can fully enjoy the wide range of benefits *e*Health can offer.

In Part Two, **Empowering the Citizen through *e*Health Tools and Services**, we provide the visitors to the *e*Health 2004 Conference and Exhibition – *Empowering the European Citizen Through eHealth* with an overview of the 109 submissions to the *eEurope Awards for eHealth – 2004*, and highlight a range of tools and applications which exemplify European best practice, while presenting some of the key learning points they provide for the development of *e*Health in Europe.

Acknowledgements

Part One was written by Petra Wilson, Associate Director of the European Health Management Association.

Petra Wilson would in particular like to thank the Health Information Network Europe (HINE) for access to materials and reports, as well as the Health on the Net Foundation and the International Medical Informatics Association. She also wishes to thank the Scientific Advisory Committee and the Steering Committee of the Conference for their very helpful input.

Many helpful and detailed commentaries on Part One were received from friends and colleagues. Petra Wilson notes in particular the help of Diane Whitehouse (European Commission), Joan Dzenowagis (World Health Organization) and George Kernohan (University of Ulster).

Part Two was prepared by Christine Leitner, Head of the *e*Europe Awards Project Management Secretariat, European Institute of Public Administration, and Antoinette Moussalli, independent expert.

Christine Leitner also wishes to note the help and support of Angelo Carenzi (EIPA – CEFASS); Alexander Heichlinger (EIPA – ECR); Morten Meyerhoff Nielsen, Denise Grew, Andrew Constable (EIPA) and in particular Matthias Kreuzeder for his dedication and support in analysing data and editing.

The *e*Europe Awards team at EIPA would also like to extend their thanks to the applicants for the *eEurope Awards for eHealth – 2004,* and the European Commission, DG Information Society for entrusting EIPA with this opportunity.

Executive Summary

Executive Summary

*e*Health, like *e*Government, *e*Commerce and *e*Learning, is part of twenty-first century life. The label describes not only its content (electronic health records, *e*Prescription, *e*Booking, and online information and advice) but also its fundamental character. In the context of this conference, *e*Health, like *e*Government and *e*Commerce, is about placing citizens at the centre of the circle in order to simplify and improve their interactions with the wide range of people who look after their health needs.

*e*Health is not an easily-defined term. It covers applications ranging from simple administrative tools for the administration of health services, such as booking and referral systems; it covers integrated information tools which allow secure access to personal health data for all those who need it to deliver optimal healthcare; and it includes complex clinical applications which can support the clinician in diagnosis and treatment and ultimately support the citizens in their own environment. *e*Health is a shorthand label for the wide range of uses to which information technologies are put in the healthcare setting. *e*Health encompasses all those information technology tools and applications that were previously bundled together under the labels: health computing, health informatics, health telematics and telemedicine.

*e*Health tools and application have been in development and use in Europe for more than 40 years and now go some way to addressing some of the key challenges facing healthcare providers in Europe today: demanding patients, an aging population, medical errors and rising costs. However, *e*Health is more than the sum of its parts. *e*Health is the embodiment of a commitment to networked, citizen-centred health, which must have a strong political as well as technological base. While the technologies will continue to develop, and new devices and gadgets will continue to come on the market, the impact will be limited without strong commitment and leadership at European, national, regional and local levels.

If the full potential of *e*Health is to be exploited, then Europe must show strong political and organisational leadership which dares to ask the most of itself.

While there is diversity across Europe, the *eEurope Awards for eHealth – 2004* have shown that there are common themes in patient care, just as there are common problems, such as tighter public finance. There are also a number of important learning points that can be taken on board in many future plans for healthcare programmes.

Part I

Mapping the Potential of *e*Health

1 Finding the *e*Health coordinates on the map: A short history and definition of *e*Health

*e*Health, like *e*Government, *e*Commerce and *e*Learning is part of twenty-first century life. The label describes not only its content (electronic health records, *e*Prescription, eBooking, and online information and advice) but also its fundamental character. In the context of this conference, **eHealth, like eGovernment and eCommerce, is about placing citizens at the centre of the circle and easing their interaction with the wide range of people who look after their health needs**.

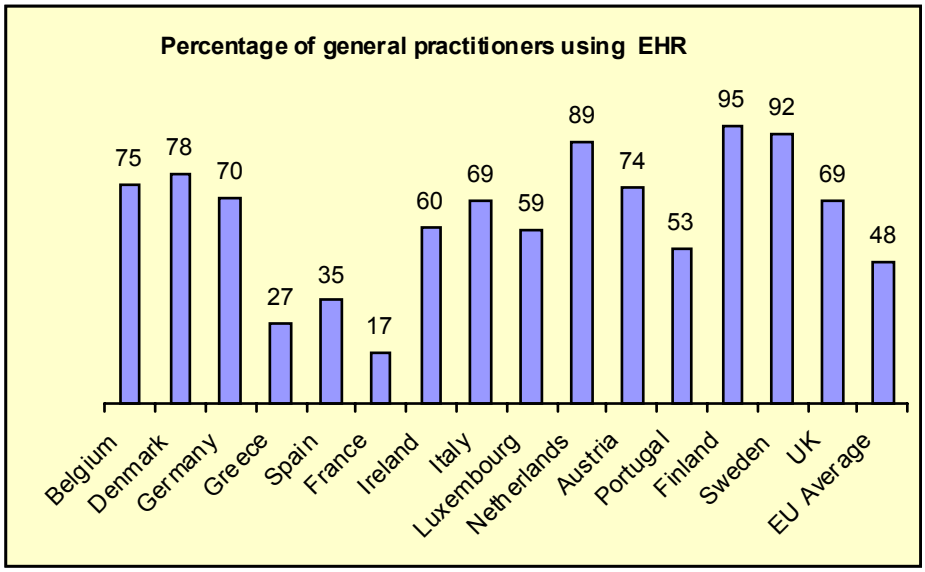
The term *e*Health, although now quite current in Europe and indeed throughout the world, is rather new, appearing in the literature for the first time around 1999-2000. That does not mean however that concepts of *e*Health are all new. The history of the use of information and communication technologies in healthcare and clinical sciences is well established.

As long ago as the 1960s, the concepts of health informatics and bio-medical computing began to find a permanent position amongst academic interest groups. However, in the 1960s, health informatics was an erudite domain, largely inhabited by electrical engineers, mathematicians and other boffins, and it had little meaning for most people either consuming or dispensing health services. An early specialised use of information technologies in clinical care was in radiotherapy planning, where the very careful calibration and dosage calculation necessary to allow the correct dose of radiation to be delivered with minimal dosage to other parts of the body, lent itself very well to the engineering and mathematics domain of healthcare computing.

After the boffins came the managers. The use of information technology to manage the complex and diverse work and service provision environment of hospitals became evident as long ago as 1970. Computer technology (even at its immense 1970s size) was considered an ideal way of keeping track of patients' notes, bed occupation and planning in a busy hospital. With the development of many stand-alone applications, the quest for an integrated record which could follow the patient in every interaction with the health service providing a complete record of healthcare services related activities from online advice seeking, through primary and secondary care provision, as well as pharmacy services and other health and social care related services, soon became the holy grail of *e*Health.

Although the ultimate integrated electronic health record has not yet been achieved, the electronic health record tool has become the cornerstone of many EU Member States' *e*Health plans. The Eurobarometer survey of General Practitioners in 2002 found that on average 48% of European general practitioners use an electronic health record, ranging from 95% in Finland to 17% in France [see table 1].

Table 1



Source: Eurobarometer EB Flash 126 June 2002

Not only is the number of practitioners using electronic health records in Europe significant, but so is the range of *e*Health record tools used. These may range from a relatively simple replacement of paper records, to fully integrated systems which provide a secure entry point into a single and complete record for all social and healthcare providers, while at the same time maintaining patient confidentiality and privacy. The range of applications already in place is huge, and mirrored only partially in the wide number of abbreviations used to label this central *e*Health tool [see box 1].

Box 1

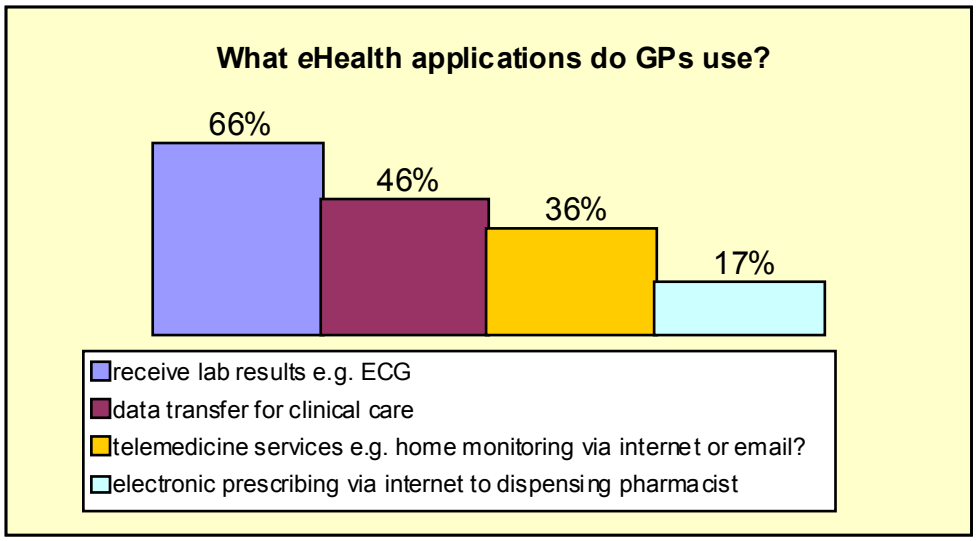
CMR (computerised medical record). Any document imaging-based system
CPR (computer-based patient record). Lifetime patient record that includes all information from all specialties (even dentistry and psychiatry) and requires full interoperability (potentially internationally); unlikely to be achieved in foreseeable future
DMR (digital medical record). Web-based patient record using "pull" technology (minimum number of messages)
EMR (electronic medical record). Electronic record with full interoperability within an enterprise (hospital, clinic, practice)
EPR (electronic patient record). Similar to CPR but not necessarily containing a lifetime record and not including dental, behavioural, or alternative care; focuses on relevant information
CRS (care record service) or **NCRS** (national care record service). Term used in the United Kingdom for the integrated care record service to be used throughout the National Health Service (currently in pilot)
PCR (patient-carried record). All information contained on a token or card that a patient carries; most pilots and demonstration projects have been discontinued
PHR (personal health record). Managed and controlled by the patient; mostly Web-based.

Based on Peter Waegemann *Health Informatics* May 2003

The Health Information Network Europe (HINE, 2003) study also found that interest in the electronic health record was growing steadily in Europe. HINE argues however that the successful roll-out of shared electronic records will depend on the availability of a common technical infrastructure which incorporates network bandwidth, intermediate databases, transformation engines and the necessary capabilities to cope with multi-media/document facilities, security and privacy, standards compliance and basic business or process rules. Such an infrastructure will ideally enable sharing of information between many different disparate (including legacy) applications without the necessity for wholesale replacement of existing systems. This in turn will facilitate a more orderly and cost effective approach to migrating from the current mixed systems environment to a more homogeneous *e*Health approach.

Around the same time as prototype electronic health record systems were developing, so were specialised, stand-alone applications for tracking and transmitting laboratory test results. These too caught on well. In fact, the most recent Eurobarometer survey of General Practitioners' use of *e*Health tools showed that 66% of general practitioners in Europe obtain laboratory test results electronically, making this the single most used *e*Health transaction in Europe up until 2002. More recent additions to the suite of *e*Health tools used in general practice are *e*Prescribing programmes, which link general practitioners directly with pharmacists; and home monitoring devices, which track patients' vital signs via the internet or a digital TV link [see table 2].

Table 2



Source: Flash EB 126 – Fig. 6 June 2002

In light of the wide range of issues that the term *e*Health has covered in its 40-50 years of development, one might ask oneself what the term *e*Health means currently in 2004. No single definition can, or indeed should, be given since *e*Health is by definition a dynamic and changing concept that must grow to reflect its current content. The complexity of the range divisions and sub-divisions of *e*Health that exist is well reflected in the current content map of the International Medical Informatics Association which lists 101 sub-themes under 6 categories of *e*Health [see table 1 in annex].

Steps on an *e*Health journey

In order to outline some of the uses of those 101 aspects of *e*Health, a simple scenario outlines the extent to which one patient might encounter *e*Health, in the course of one healthcare journey.

> After reading information about healthy lifestyles on a government sponsored website, Sophie Nielsen feels concerned about her health. On the site she finds a questionnaire on possible genetic predisposition to breast cancer. Sophie completes the questionnaire and on self-examination finds a small lump in her breast. Following the advice on the website, she visits her general practitioner's website to arrange an appointment for further advice. Her GP examines her and agrees that something is not quite right. Suspecting that Sophie may be showing early stages of breast cancer, the GP uses the national oncology decision support tool, and on the basis of its result, he uses the regional health network to book an urgent appointment with a radiologist at the local hospital. He makes an entry into her Electronic Health Record using both a natural language description and an internationally recognised code for clinical diagnoses.
>
> On returning home, Sophie accesses the internet once more to find a local women's health support network. Using a specialist health-oriented search engine she finds several national and regional groups whose web pages give helpful outline information about diagnosis and treatment pathways in suspected cases of breast cancer.
>
> The radiologist examines Sophie using a digital mammography system. Immediately after the images are captured, he stores them in her Electronic Health Record and simultaneously forwards the images involving three-dimensional pattern recognition and comparison tools with an international quality assured image dataset.
>
> The digital mammography system has recognised that some of the tissue density is indicative of a cancer. The radiologist interprets the results of the image processing and advises Sophie that she should see a cancer specialist. He makes the necessary appointment using the secure regional health information network. He also advises Sophie to see the cancer counselling service located in the same hospital.
>
> Shortly after her first visit to radiology, Sophie receives an email at home informing her of her appointment date with a cancer specialist in the regional teaching hospital. The specialist is able to access all Sophie's medical notes from both the general practitioner and radiologist using the regional secure network. After examination, the specialist orders a series of blood test and arranges for a biopsy to be taken. The tests reveal certain drug sensitivities. These are duly entered into the Electronic Health Record so that they may be linked into the regional electronic prescribing system in order to avoid possible medication errors in subsequent treatments.

On receiving the biopsy results, the specialist consults an online database of medical evidence before confirming that Sophie has the early stages of breast cancer. She believes however that it may be amenable to treatment with targeted radiotherapy. She thinks it would be advisable to start therapy as soon as possible. However, before enrolling her in the therapy, she asks Sophie's permission to send the data acquired through radio imaging and biopsy to a colleague in Italy for a second opinion. On receiving her colleague's diagnosis she uses the hospital's internal booking system to arrange Sophie's first course of treatment to commence in three weeks. She makes all the necessary additions to Sophie's Electronic Health Record and advises her to seek support from the counselling centre and her general practitioner.

Sophie visits the counselling centre where she is able to give a nurse access to her Electronic Health Record. The nurse considers the medical report in conjunction with the personal information Sophie gives her. Using a complex database, she is able to retrieve and print several pages of health information which is targeted at Sophie's current needs. She also gives Sophie some references to trustworthy websites where she can find further information, as well as advising her about trust "labels" (kitemarks) that she should look out for when accessing information on the internet.

Sophie's radiotherapy treatment is based upon an enhanced planning system which formulates the shape of the beam and dosage to offer minimum dosage and optimum targeting. After three courses a second biopsy and radiogram reveal that all pre-cancerous tissue has been removed. Sophie is discharged from the care of the oncologist. Her case history is noted and linked to an automatic screening recall system which means that from now on she will be invited to screening mammograms on a regular, 12-monthly basis. Her insurance coverage is automatically initiated and processed at each visit through the use of her health insurance smart card at the point of care.

Sophie and her partner find continued support through the online community of people who have had similar experiences. Sophie continues medical treatment and through her online support system feels empowered to adjust her diet and exercise appropriately. Sophie begins to make a good recovery.

The scenario gives a simple picture of a patient's interaction with the healthcare system. The scenario outlines the key moments at which patient/practitioner interaction takes place and outlines some of the applications and information technology tools that may be used by the patient and the practitioner in the course of the patient's journey through the system. The scenario shows the use of administrative tools (electronic booking, electronic recall), clinical tools (digital mammography, guided radiotherapy, second medical opinion) and shows how practitioners can guide patients in successful and critical use of the internet in order to support and empower themselves.

The scenario does not enter into all the possible details. It does not, for example, indicate the wider use that may be made of the data generated from her Electronic Health Record so that her data can be added to the global breast cancer data bank. Currently, information and communication tools are being developed for the integration of the data

that will, in the near future, use Grid technology (see http://www.healthgrid.org) to make data accessible from delocalised heterogeneous sources as if they were associated with the use of these applications in practice. In the near future, such data banks will use Grid technology to enable practitioners from all over the world to use data from molecular to population level through user-adapted access and information retrieval to all the data produced by the different communities.

The scenario shows that all the health practitioners were heavily dependent on an interoperable Electronic Health Record that they were able to access at the point of care using secure internet, intranet or wireless technology. In order to ensure data security, complex tools were used to ensure that the accreditation of anyone accessing or adding to the record could be authenticated. This ensured that no-one could access the data while it was in transit and that the record retained its integrity and trustworthiness at all times – in particular showing the identity of all those who added or removed data from the record.

The scenario outlines some of the huge breadth of *e*Health tools and applications that exist. It also shows the extent to which *e*Health is a shorthand label for the wide range of uses to which information technologies are put in the healthcare setting. *e*Health encompasses all those information technology tools and applications that were previously bundled together under the labels: health computing, health informatics, health telematics and telemedicine. The significance of the term lies in the breadth of meanings it conveys:

> "eHealth characterizes a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology." (Eysenbach, 2001)

The following chapters identify the way in which European Union policy on research, information society and public health has been implemented to enable the development of *e*Health tools. These tools can address the day-to-day needs of European citizens at the centre of healthcare systems evolving to meet the demands of an aging population within the context of resource constraints.

2 Locating *e*Health on the European Union policy map: An overview of key European Union initiatives

Research, regulation and benchmarking

If *e*Health is more than the sum of its parts and, if it is the embodiment of a commitment to networked, citizen-centred health, then it must have a strong political as well as technological base. While the technologies will continue to develop, and new devices and gadgets will continue to come onto the market, the impact will be limited without strong commitment and leadership at European, national, regional and local levels. If the full potential of *e*Health is to be exploited, then Europe must show strong political and organisational leadership.

It remains true, of course, that each Member State organises its own health system, and that the European Union has no role in setting a European agenda on that score. (Article 152 of the EC Treaty provides that the Union's activity in matters of health shall be complementary to national policy only). Nonetheless, the European Union has a key role to play in mapping a Europewide *e*Health agenda.

The European Commission's policy on *e*Health, which was developed initially within the Information Society Directorate-General, reflects the three focal aspects of its information society policy: **research, regulation and benchmarking**.

- **Research:** The European Union has been supporting research in the area of *e*Health for the past 15 years, through dedicated budget lines in the Research Framework Programmes, as well as more recently in an *e*Health action line of the Public Health Programme. Other budget lines in, for example, the Safer Internet Action Plan or the Vocational Training Programmes (LEONARDO) have also supported *e*Health-related research.

- **Regulation:** There has been no direct regulation of *e*Health through specific directives or other legal instruments to date. However, a wide range of legal instruments touch on the way in which *e*Health is conducted. A significant example lies in the raft of regulation that has paved the way for a liberalisation of the telecommunications sector without which the boom in internet use would not have happened. A more specific example can be found in the Data Protection Directive (95/46/EC) which sets the EU standards for the handling of person-identifiable data and requires in particular that anyone handling sensitive data, such as medical data, may do so only within the specific terms of the legislation.

- **Benchmarking:** The benchmarking of *e*Health is achieved through a number of tools. The Eurobarometer surveys have been used to study the uptake of key *e*Health tools and to monitor growth in *e*Health across the Member States, the basis of which lie in the *e*Europe Action Plans.

The *e*Europe Action Plans

The *e*Health chapters of the *e*Europe Action Plans form an integral part of the European Union's overall aim to achieve the Lisbon targets of stronger growth creating more jobs within a dynamic, knowledge-based economy as set out by the Lisbon European Council in March 2000. Moving towards these goals requires coordinated action across a number of policy areas ranging from research and the roll-out of broadband networks in the telecommunications area, to action in the area of public health, and on-going work within Member States promoting mobility and looking at the impact of ageing on healthcare systems. Attempting to tackle the current *e*Europe 2005 Action Plan outlines three particular activities for *e*Health:

- **Online Health Services:** By the end of 2005, Member States and the Commission should ensure that citizens can access online health services (information on healthy living and illness prevention, electronic health records, tele-consultation and *e*Reimbursement, etc.). The Commission also intends to launch an action to monitor the way in which Member States implement the Quality Criteria. The Public Health Programme includes a support initiative to investigate the possible development of seals of approval for health-related websites.

- **Health Cards:** After the roll-out of the European Health Insurance Card in June 2004, the Commission intends to start the preparatory work for the phasing-in of a "smart" health insurance card. It intends to support a common approach to patient identifiers' and electronic health records' architectures through standardisation and will support the exchange of good practices on possible additional functionalities, such as medical emergency data and secure access to personal health information.

- **Health Information Network:** By the end of 2005, the Commission and Member States will develop Health Information Networks between points of care with broadband connectivity where relevant. Member States are to implement national and regional networks to link hospitals, laboratories and primary care providers. Europewide data networks will also be established to support rapid reaction to health threats.

The actions of the *e*Europe 2005 Action Plan underline the commitment to a strong role for *e*Health adopted by the EU Heads of State and Government. The European Council, in signing off this action, made clear that Europeans have the right to expect the following: to use information society tools to obtain reliable health information; that their health service providers have a strong backbone of *e*Health infrastructure to allow the secure sharing of their Electronic Medical Records; and that there should be European Union-level coordinated responses to health threats.

The political commitment to these targets was further underlined at the first *e*Health Conference in 2003, where the health ministers adopted a Ministerial Declaration on *e*Health which adopted three broad commitments to:

- Promote quality and enhance efficiency in healthcare through *e*Health
- Facilitate citizen involvement through access to high quality information
- Implement and share best practices of *e*Health.

The need to ensure access to personalised health information across Europe and the size of the investments to deploy such infrastructures immediately raise interoperability issues. Indeed, Health Insurance Cards' natural evolution towards an electronic medium would assume that a health insurance card from one region can be used in another region to deliver healthcare. With that aim, not only cards – the most tangible token for the citizen – but also the back office infrastructure, will need to be interoperable at the European level. These aspects are now being investigated in a European Standards Organisation called CEN in its Technical Committee 251. A new charter is proposed by CEN's *e*Health focus group, an open forum that discusses future needs in interoperability and standardisation efforts in *e*Health. Member States and regions that are interested should certainly seek to join this momentum.

*e*Health is therefore supported both in European policy and by European politicians. Some activities are based in deep-rooted European legislation, such as the adoption of the European Health Insurance Card, which is itself based upon Regulation 1408/71 on the application of the Social Security Scheme and which represents an essential stage in the possible development of new services or functions using information technologies, such as storing medical data on a smart card or secure access to the medical file through the insured person's identifying characteristics. Others are rooted in the more pragmatic so-called Lisbon approach, which encourages benchmarking and cooperation across Europe.

The *e*Europe Awards for *e*Health

It was of course the Lisbon approach, with its emphasis on open co-ordination and best practice, that gave rise to the *e*Europe Awards Programme.[1]

The first *eEurope Awards for eHealth*, which were awarded at the European Commission's *e*Health Conference in May 2003 "*The Contribution of ICT to Health*" set out to offer an initial overview of all key aspects of *e*Health. The exhibition of the 42 selected *e*Health tools and applications was set out in four key areas:

- *e*Health tools for citizen and patient empowerment
- *e*Health systems and services for health professionals
- Telemedicine and homecare
- Regional and national *e*Health networks.

Denise Silber, in her paper *"The case for eHealth"*, presented at the 2003 *e*Health conference, described an impressive number of *e*Health tools and applications under these headings. *"The Case for eHealth"* cited over thirty examples which included: information portals for citizens and patients; support services for particular disease groups; *e*Health tools for professionals continuing education; registries; decision support; homecare devices; national and regional networks linking primary and secondary care providers, and national smart card projects.

[1] For details on the results of the *e*Europe Awards Programme refer to http://www.e-europeawards.org. See also Part II.

The considerable interest aroused by the *eEurope Awards for eHealth – 2003*, for which 180 applications were received, led the European Commission and the Irish Presidency to decide that the *eEurope Awards for eHealth – 2004* should focus on the citizen and patient empowerment capacities of *e*Health tools. Accordingly, the call the *eEurope Awards for eHealth – 2004* was launched with the following three categories:

- ***e*Health information tools and services for citizens** focusing on the electronic provision of high quality health and wellness information to citizens. Examples of such tools include general health portals as well as information tools which allow citizens to interact with databases in order to retrieve tailored health information (e.g. selection-based on personal profile, disease, or a particular need such as travel or cross-border healthcare);

- ***e*Health administrative support tools and services for citizens** focusing on applications which allow citizens to interface with health service providers electronically in order to better support their use of health services. Such tools assist citizens in interactions with health service providers such as electronic appointment booking, eligibility assessment and pre-authorisation as well as obtaining test results or *e*Prescriptions;

- ***e*Health homecare and telemedicine tools and services for citizens** focusing on applications that allow citizens who are receiving healthcare to be supported in their personal environment (whether fixed or mobile) outside traditional healthcare facilities. Such applications might include *e*Health tools for the monitoring of conditions and treatments outside the traditional healthcare setting (e.g. pace-maker monitoring, remote ECG); *e*Health tools for interactive diagnosis and support of citizens outside the traditional healthcare setting (e.g. dermatology, wound management) and *e*Health for emergency and risk management (e.g. triage, accident and emergency management).

These are the current challenges presented by health service delivery for European citizens. It is important to consider the ways in which *e*Health tools, in particular those exhibited at the *e*Health Conference and Exhibition 2004, can address some of these challenges.

3 Charting the trends: A snapshot of current trends in *e*Health

Introducing the issues

The *e*Europe Action Plans and the Research Programmes of the European Union alongside national research and action plans and industry-led initiatives have gone some way to realising the potential of information technology. Thus, these research and practical activities have helped in meeting some of the key challenges in providing European citizens with wide access to health information as well as healthcare and support.

In recent years, the focus of many of these activities has been on citizen-centred applications which address the fact that we are all becoming more demanding partners in our own healthcare. The shift of focus in the *eEurope Awards for eHealth – 2004* from the general to the citizen-centred is not accidental – citizens and patients are now seen as the prime focus not only of *e*Health tools and applications, but also of health service delivery in general. We are moving away from a time when patients were the silent and passive partners in medical interaction. Today patients are encouraged and supported in taking an active role in their own health.

European and national efforts are also being made to address the fact that medical errors are causing significant numbers of deaths in a Europe which is becoming older and in which healthcare costs are rising in a context of ever-increasing demands on scarce financial resources. While demanding patients, an aging population, an increased awareness of medical accidents and rising costs are not the only challenges facing healthcare providers in Europe in 2004, they are certainly among some of the most frequently raised. If these are such pertinent issues, we must then ask ourselves if *e*Health can in anyway help to meet the challenges to which they give rise.

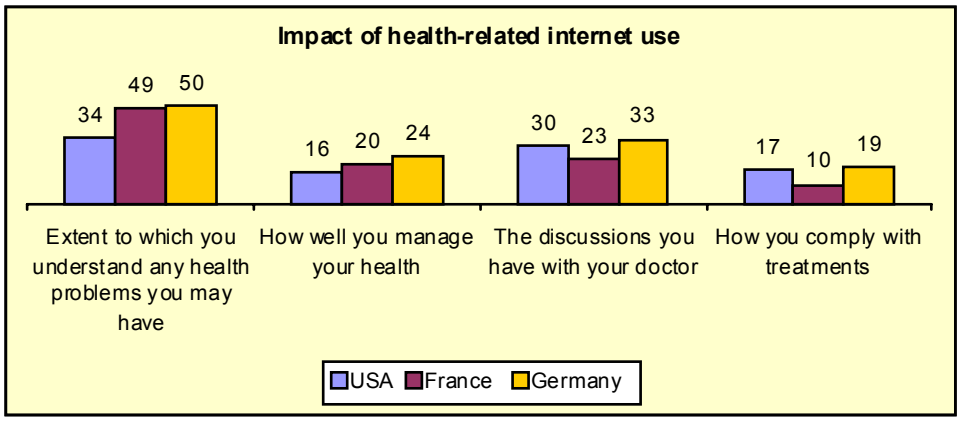
Citizens want more information

The role of the internet in the change of citizens' attitudes to medical care is significant. In 1999, it was estimated that more than 40% of searches on the internet were health-related (Gruen, 1999) and a recent Eurobarometer study from April 2003 confirms that 40% of Europeans use the internet to find health information (EB Flash 135, April 2003). Access to information has radically changed the doctor/patient relationship to the extent that one clinician has commented:

> "As clinicians we must become comfortable in a new role, that of intermediary between patients and the information they obtain from other sources… by taking a non-judgmental stance, we thus enable them to participate more in their own health care while avoiding potentially harmful advice." (Sonnenberg, 1997)

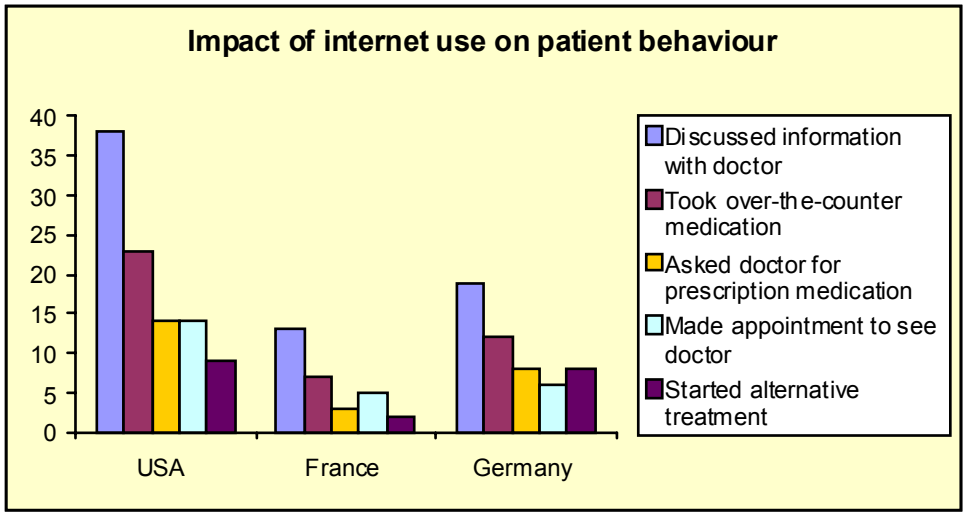
Studies conducted in the United States and Europe by Harris Interactive and by the Health on the Net Foundation have found that the health information citizens find on the internet has a significant impact on their interaction with medical professionals. The Harris poll of March 2002 found that one hundred and ten million American adults sometimes go online to look for healthcare information. On average, they do so three times a month, searching mainly through portals or search engines rather than by going directly to particular sites. In an international study which interviewed citizens in the United States, France, and Germany, Harris found that about half of all those seeking health information on the net in France (49%) and Germany (50%) believe that the internet has had a major impact in their understanding of their health problems [see table 3] and on their interaction with their doctor [see table 4].

Table 3



Source: Harris Interactive (Volume 2, Issue 12—June 11, 2002)

Table 4



Source: Harris Interactive (Volume 2, Issue 12—June 11, 2002)

The Health on the Net Foundation found similarly that citizens were significantly influenced by the knowledge and information they gained from internet searches. This research also showed that a significant number (31% of Europeans and 40% of Americans) were using interactive consultation services as well as simply searching for information on health-related websites and reporting on them [see table 5].

Table 5

Citizens' *e*Health behaviour in Europe and in the United States		
Citizens' Behaviour	**Respondents' Origin**	
	U.S.A. (n=676) %	Europe (n=269) %
I have discussed the results of my internet searches for medical/health information with my care provider(s)	69.1%	46.8%
I discuss the drug information I find with my care provider(s)	65.9%	41.3%
I have used online medical consultation services offered by websites	40.8%	31.2%
I buy drugs via online pharmacy services – From prescription – Over-the-counter (OTC)	17.2% 69.7% 30.4%	3.3% 42.9% 57.1%
I engage in email correspondence with my own healthcare provider(s) – Occasionally – Frequently	21.3% (n=115) 88.7% 11.3%	19.3% (n=40) 77.5% 22.5%
I use the web to search for information on drugs	82.5%	69.9%
I use the internet to seek second opinions on medical diagnoses	42.6%	56.1%

Source: Based on Health on the Net (HON) Survey of 2621 respondents who voluntarily completed a survey questionnaire between May and June 2002 http://www.hon.ch/Survey/8th_HON_results.html

The *e*Health Conference and Exhibition 2004 highlights a selection of health portals and other information provision sites which are described in more detail in Part II.

Some sites are national and are provided by national bodies seeking to give general healthy lifestyle advice: see, for example, *VHI Healthcare Portal*[1] (http://www.vhi.ie). This portal offers Irish citizens access to personalised information on all aspects of healthy living, including personalised diet and smoking cessation plans. Other health portals provide information targeted on particular settings. For example, the *European Network for Workplace Health Promotion* (http://www.enwhp.org) offers self-assessment questionnaires to improve workplace health.

Other portals target particular medical needs, such as mental health (see the German *Web4health*[2] at www.web4health.info), addiction (see the Finnish website

[1] See also Part II, page 40.
[2] See also Part II, page 40.

www.paihdelinkki.fi). Some portals offer passive advice. They do not allow a citizen to enter personal data and obtain personalised services. Most now, however, offer an element of personalisation. Some sites collect extensive data, such as the Austrian *VIE-DIAB* (http://www.ai.univie.ac.at/oefai/kbs/diabetes.html) service, which allows diabetic patients to submit glucose readings by SMS and to receive physician feedback via the same route.

Other portals seek to empower the citizens in their role as consumers of healthcare. In the United Kingdom, the services of *Dr Foster* (http:/www.drfoster.co.uk) enable a citizen to type in the name of any hospital or consultant and obtain key information such as procedure waiting times, mortality rates, and complaints. The Norwegian *Blood Donor Booking System*[3] (http://www.shdir.no/si@) uses automated SMS messaging to contact donors for donation appointments and can also call up donors when a particular blood group is urgently required. During its Fifth Framework Programme, the European Commission financed information technology support for health promotion and disease prevention through such projects as *HEALTHY-MARKET* (www.healthy-market.org) and *ACTIVE-HEALTH* (http://www.active-health.info) with the aim of supporting healthy lifestyles.

Citizens want better information

The challenge for *e*Health has not been met by the simple provision of information on the internet. In fact, many commentators would say that this is exactly where the real challenges of *e*Health begin. In its *e*Health 2002 Action Plan, the European Commission noted the need for Member States to adopt initiatives to assure the quality of health-related information on the internet. Accordingly, in conjunction with key actors in the field, the Commission developed a core set of Quality Criteria on the basis of which Member States could develop action plans and initiatives to facilitate patients' access to high quality and trustworthy health information (European Commission Communication 2002/667).

The European Commission further supported the initiative for quality health information on the internet in supporting research projects under three of its programmes. Through the Fifth Framework Programme, it has supported the *WRAPIN* project (http://www.wrapin.org) – led by the Health on the Net Foundation – which set up a semi-automatic editorial policy service, as an extension of the current Health on the Net Foundation services, using the HON[4] Code; and through the Safer Internet Action Plan it has supported the *MedCERTAIN* and *MedCIRCLE*[5] projects (http:/www.medcircle.org), which establish meta-tagging tools for health information on the internet. The Public Health Programme plans to fund a project on quality seals for the health-related websites as from May 2004.

[3] See Part II, page 43.
[4] See Part II, page 39.
[5] This case was submitted in 2003 and 2004.

Healthcare delivery is safety-critical

It has long been acknowledged that healthcare is not necessarily good for your health. The philosopher Ivan Illich claimed famously that the medical establishment completely undermined illness or disease caused by medical care – what he called iatrogenesis. He claimed that the medical establishment harmed people by "clinical iatrogenesis" (the physical damage caused by doctors in their attempt to cure people), "social iatrogenesis" (the addiction of people to medical care as a solution to all their problems), and "structural iatrogenesis" (the destruction of the patients' autonomy, along with the expropriation of their responsibility for individual healthcare).

While we cannot claim that *e*Health will brush aside all of Illich's concerns, *e*Health portals and other web-based *e*Health tools go some way towards re-establishing citizens as stakeholders with personal responsibility for their own health.

It is now well established that many illnesses and even deaths arise as a result of medical accidents and errors. In 2000, the Institute of Medicine in the United States published the now famous report entitled "To Err is Human" which claimed that, in the United States, 44,000 deaths each year are due to medical errors. According to the Report:

> "More people (44,000) die in a given year as a result of medical errors than from motor vehicle accidents (43,458), breast cancer (42,297), or AIDS (16,516)." (Kohn *et al*, 2000)

Can *e*Health tools begin to address these errors? It has been argued that in fact only tools, applications and systems can overcome these human errors:

> "Expecting perfection in human action, or simply telling our doctors and nurses to 'try harder' not to kill their patients by mistake has nothing at all to do with our eventual success…. The remedy is in changing systems of work. The remedy is in design." (Berwick, 2001)

The answer lies in designing better systems in which humans work, and some significant solutions lie in *e*Health. Appropriate increases in the use of information technologies in health could result in substantial improvements in patient safety. Clinical decision support and better linkages in and among systems can be introduced, resulting in process simplification. Evidence provided from a controlled trial showed that the implementation of a computerised application for physicians' prescription (which improved communication; made knowledge accessible; included appropriate constraints on choices of drugs, routes, frequencies and doses; helped with calculations; performed real-time checks and assisted with monitoring) resulted in a 55% reduction in serious medication-related error (Bates *et al,* 1998).

Numerous other studies have shown that use of decision support systems, smart monitoring and adverse reaction tracking, especially if linked to an electronic health record, will contribute to patient safety in ways that vigilance by humans simply cannot achieve:

> "Monitoring is inherently boring and is not performed well by humans. Moreover, so many data are collected now that it can be hard to sift through them to detect problems. However, if the monitoring of information is computerized, applications can perform this task, looking for relations and trends and highlighting them, which can permit clinicians to intervene before an adverse outcome occurs." (Bates *et al*, 2003)

Many of the tools and applications highlighted in the literature as contributing to rises in patient safety are – of course – hospital systems, which are by definition used primarily by healthcare professionals. Few such applications are exhibited in the *e*Health Conference and Exhibition 2004, which focuses on tools and applications for citizens. However, it is evident that some of the know-how of decision support and monitoring systems originally used for in-patient management, is now being transferred to patient-controlled tools for use in the home.

The high-end information technology applications that have achieved significant reduction in error in hospitals are not, at least at present, suitable for home use because of their cost. Most healthcare payers, whether private or public, would not be able to bear the cost of equipping homes with expensive computer technology that requires support and maintenance. It is for that reason that, for example, the *Scottish Interactive Telephone Monitoring System for Rheumatology Patients in the Home* was developed. Recognising that most patients had access to a telephone but no other information and communication technologies infrastructure, the health authority developed a patient support system using only a telephone and interactive messaging service.

Europe is getting greyer

The United Nations has forecast that, over the next 50 years, the number of people above retirement age will grow from 60 million to 100 million in the EU15. During the same period, the proportion of the population over the age of 80 will almost treble to 38 million. Estimates show that, by 2050, Germany will have two employed persons for every retired person, and that many other European Union countries will be nearing this level of high dependency (UN world population ageing Report 1950-2050). The current population statistics already show evidence of the trend: in mid-2003 16% of the European population was aged under 15 while 21% was aged over 60 (UN world population, 2002).

The Organisation for Economic Co-operation and Development (OECD) has found similarly that, within the OECD region as a whole, the dependence ratio of older people (i.e. those aged 65 and over as a proportion of those aged 20-64) will rise from the current figure of 22% to 46% in 2050 (OECD, Health at a Glance 2003).

*e*Health tools will not address these trends directly. No *e*Health tools will create a population explosion which could ensure that, by 2050, there is a sufficient number of working young Europeans to provide easily for those of a dependant age. However, *e*Health tools will have a significant impact in addressing some of the needs that will arise as a result of these demographic changes.

The health needs of an ageing population are as varied as the population as a whole. A simple search of *medline* reveals major concerns about the provision of geriatric care centring on dementia care, caring of carers, and supporting older people in their own homes. It will not be easy to use *e*Health-based tools to address the challenges – the older citizen who has never used modern information technologies and whose mental capacities may be declining will not easily be attracted to online tools and applications to assist him or her in personal health management. However, it should be noted that older European citizens are a significant minority information technology user group. A study of 9661 elderly people in EU15 found that 17% were active internet users (Stroetmann *et al*, 2002). However, a number of *e*Health tools to support citizens with mental health problems, including dementia (see *Online Information and Suggestions about Dementia from the Emilia Romagna region of Italy* http://sezionedemenze.emiliaromagnasociale.it/) are becoming more prevalent. The target group of such information portals includes not only those affected by the illness, but also their carers, who are in themselves developing into a significant community. In Britain alone, it is estimated that 5.7 million people are caring for relatives (http://www.carers.gov.uk).

The European Foundation for the Improvement of Living and Working Conditions has found that "in all countries of the [European Union], most care and support for older people is provided by their family members, particularly spouses and daughters". It has argued that assistance for family carers should form an integral part of the objectives and responsibilities of services and organisations looking after elderly people. A number of *e*Health applications have been developed to support carers, ranging from simple information sites to more interactive tools which allow interaction with professional care providers and citizen-centred support (see *Caring for Carers*,[6] Ireland, http://www.caringforcarers.org).

A number of clinical conditions such as hypertension, chronic obstructive airways disease, thrombosis risk and many other conditions which are more common in older people have now also become the focus of *e*Health applications which seek to involve patients more actively in their care, reduce the number of in-patient appointments, and support patients better in their own home. Current examples exist in applications to report blood reading from coagulation risk electronically to facilitate accurate and effective use of anti-coagulation medication (see *Terivan*,[7] http://www.terivan.com).

Healthcare costs are rising

The challenges facing healthcare provision all have the potential to raise the costs of healthcare. Patients who know more about their illness and who are more demanding of their care givers may ultimately cost more in terms of professional time and money. Conversely, well-informed patients who are empowered to take an active role in their own health management may require less medical care, and this may ultimately cost less to the health system. The OECD has estimated that by 2040, the share of health expenditure accounted for in OECD Europe by the over-65s is expected to range from

[6] See also Part II, page 42.

[7] This case was submitted in 2003 and 2004.

30% in Belgium and 63% in Sweden, marking a sharp rise from 22% and 51% respectively in 1980.

The cost of healthcare is outpacing economic growth in most OECD countries, forcing many governments to pass a larger share of the costs on to individual citizens. In 2000 and 2001, health spending in OECD countries increased by 4% per year in real terms on average, while real growth in the gross domestic product averaged just 2.3% per year. Accordingly, a considerable gap exists which gives rise to a further increase in health spending as a share of gross domestic product, reaching 8.4% on average in 2001 (OECD, 2003).

It cannot be denied that new medical technologies including diagnostic technologies such as computed tomography scanners and magnetic resonance imaging have contributed to these costs. So is it a little bizarre to suggest that *e*Health tools could be used to address the rising costs of healthcare?

The answer lies, of course, in the same OECD statistics. If *e*Health tools can lead to a reduction in 55% of medication error, the costs associated with the aftercare of errors will be reduced. Perhaps as significantly, the costs of litigation started by the relatives of those dying as a result of medical errors, can be avoided at the same time as the lives of the patients are saved. However, answers lie in the longer-term value of *e*Health tools which empower citizens to take a greater interest in their own health. Thus, citizens are armed with more and better information and will, through appropriate online support, lead healthier lives and incur lower medical costs.

Ball and colleagues found that about $500,000 are saved each year by an American health insurer whose clients are enrolled in an *e*Health diabetes programme which kept them out of hospital over the four-year trial programme. Significant savings were also found in the use of home-monitoring applications by patients discharged from hospital after coronary care. The use of a telemonitoring and patient support system reduced the 30-day re-admission rate to zero and the 90-day re-admission rate by 83% (Ball *et al*, 2001).

Diet and healthy nutrition advice provide good examples of potential savings in the costs of healthcare. Obesity rates have been rising in all European countries. The greatest growth has been in the United Kingdom, where the rates have tripled in the last 10 years. Current figures show that more than 20% of the adult population in the United Kingdom are obese. The medical literature argues that the rise in obesity will bring with it greater healthcare costs as obesity-related problems, such as diabetes, hypertension, cardiovascular diseases and asthma, increase proportionately. Thus, *e*Health tools aimed at supporting healthy eating as well as providing information about food quality are of great importance.

4 Negotiating the challenges and mapping the potential of *e*Health

Negotiating the challenges

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

The key to the realisation of these goals lies in good communication**.** *e*Health is not only built on information and communication technologies, but also on communication. As Grimson and colleagues observed:

> "Health service workers are looking for leadership. These leaders need to be drawn from within the health sector itself and go forward in a unifying manner, learning from each other." (Grimson et al, 2000)

The learning processes must become more communicative so that all users feel part of the system from the very outset. Users can range from hospital chief executive officers, to nurses and citizens. All must be considered in the *e*Health design, development and implementation process.

Much research work has been done to chart the hurdles that stand in the way of a full implementation of *e*Health. In 2001, Thomas Eng in particular mapped out a very full Terrain Map of Emerging Information and Communication Technologies in Health and Health Care which highlights the need for strong leadership from health policy makers as well as attention to practical solutions for interoperable systems which are secure, respect confidentiality and promote the best possible access to healthcare for all citizens.

We have noted a selection of new *e*Health tools and applications which show clearly that *e*Health is a burgeoning field in which the research and technological development funds of the European Union, Member States and private enterprise are being actively used to develop many new and exciting tools. We have also noted that Europe is facing a number of key challenges in its provision of healthcare in a setting of increasing demands on resources for an aging population with lifestyle-related medical conditions. Part Two summarises a selection of European solutions to meet these new challenges across the three categories of application of the *eEurope Awards for eHealth – 2004* which celebrates examples of best European practice in the provision of health information to

citizens, of support to patients through administrative tools and of support to the patient in the home through telemedicine and remote care.

The hurdles are not overcome, however, simply through existence of the tools. The greatest hurdle remains persuading those in **leadership** that *e*Health can be used **safely** and **securely** to give wide **access** to healthcare.

Leadership
*e*Health investment is not at an optimal level, because the key players still need to be convinced about the cost benefits of the systems. The Health Information Network Europe (HINE) has argued that there is clear evidence that substantially higher investment is required before the real cost benefits of *e*Health investment become evident. They argue that the economies of scale achieved by coordinated *e*Health investment across regions are vital if the real benefits of *e*Health are to be reaped. Accordingly, the necessary political and strategic leadership should be built upon:

- Human, organisational and financial incentives for change
- Effective partnerships with industry
- Awareness of global market trends
- Acceptance of need for market diversity
- Cross-agency policy collaboration
- Willingness to invest adequate funds.

If *e*Health is to show its true potential, then efforts to move forward must be supported at a European level through strong ministerial leadership. The time is now ripe for European governments to show leadership on *e*Health in order to develop a shared strategic vision for *e*Health across Europe.

Safety
The consequences of poor quality *e*Health applications are potentially lethal. A poorly calibrated *e*Health device, a wrongly executed decision support programme, and even inaccurate advice on a website, could all lead to serious injury or death. Quality and safety are as important in the *e*Health sector as in any other sector of healthcare. To address the quality needs of *e*Health the European Union must lead the way forward in establishing:

- Commonly accepted systems of accreditation and certification for devices and procedures
- Standardised European *e*Health training modules as part of standard medical and health professional training
- Commonly understandable quality compliance standards for health information
- Collection of safety data on *e*Health tools, applications and procedures across the Union
- An EU wide *e*Health incident notification system.

In order to share the potential benefits of *e*Health 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.

Security
Closely allied to the quality and safety issues, security, privacy and confidentiality must be assured. Health is one of the most data-intensive enterprises in the sphere of human interaction. Every medical interaction generates data which are stored in medical records and which are, according to law, to be treated as confidential. One of the great promises of *e*Health is the fully shared and accessible *e*Health record, shared within the limits of patient confidentiality. EC legislation on data protection paves the way towards harmonised privacy regulation across the Union. Efforts should now be made to ensure that medical privacy is similarly interpreted and implemented across the Union. It should be based on common standards, so that data may be shared across borders with the full confidence of those bound by law to protect confidentiality (the health professionals) as well as that of the data subjects (the patients) themselves.

Access
Every effort must continue to be made to give as many European citizens as possible access to *e*Health services. Access to web-based information must be made available in public spaces such as libraries, post offices and shopping centres. Having no internet access in your home, or indeed no home, should not preclude a European citizen from gaining access to health-related information on the internet. The content of internet-based information should be developed with accessibility in mind. There should be suitably adapted sites that provide for differing intellectual and physical capacities as well as particular community needs.

Mapping the potential of *e*Health

The objective of both this paper and the *e*Health Conference and Exhibition 2004 is to highlight the potential of *e*Health as a significant vehicle for achieving safer and more fully informed healthcare delivery.

*e*Health is still a developing discipline, which it seems evident will eventually affect the majority of healthcare transactions. *e*Health has already begun to change the way in which citizens access health information, and is affecting the way in which health professionals work with patients. *e*Health will empower and enable all actors in the healthcare delivery cycle through better information. The information may inform individuals' lifestyle choices, support a clinician's decision-making, allow managers to make more accurate planning decisions, and enable policy makers to understand more effectively the healthcare system that they are governing.

Returning to the *Steps on an eHealth journey* scenario outlined in the introduction, we can see that patients and professionals can gain at every step of the journey. The tools may be used to empower the citizen to gain information. On the basis of such information, the particular citizen may choose to seek the advice of a health professional, at which point one might become a patient within the health system. Once one 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 the 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 collected data will allow health managers, planners and regulators to adapt to the needs of the populations they serve more easily and with greater efficiency.

A simple mapping of benefits can be seen in the benefits map presented on page 29. The study conducted by Health Information Network Europe (HINE) has shown through a series of case studies with key actors in health that *e*Health is one way of meeting the compelling pressures in healthcare today. HINE's studies have shown that most health decision makers believe that *e*Health creates new forms of information that change the relationships between institutions, citizens, healthcare professionals and external businesses to create a system in which citizens, patients, healthcare professionals and the central authorities are better empowered.

*e*Health is a significant vehicle for achieving more efficient methods of delivering improved outcomes from healthcare interventions and a better service to patients. It enables healthcare staff to cope with growing pressures on volumes and resources – and to provide the levels of service now expected by patients – in short, it creates a flow of empowerment.

The true potential for *e*Health lies, therefore, not only in its science and technology, but in those who implement it. *e*Health is not only a technological solution but a new approach to citizens-centred healthcare which embodies a commitment to **networked, global thinking, to improve healthcare locally, regionally, and worldwide by using information and communication technology**. *e*Health requires all players in the system, from the citizen to government, to dare to want to the best for their own health and for the health of the nation. It requires all of us to make *e*Health adapt to our own particular needs. In the words of G.B. Shaw:

> "The reasonable man adapts himself to the world, the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man."

The onus is thus upon us all to dare to be unreasonable in our expectations of eHealth and make eHealth work for us!

Mapping the potential of e*Health – 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: HINE *e*Health 2003 Report adapted by kind permission of Health Information Network Europe

Annex: International Medical Informatics Association Content Map

Applied Technology	Information Technology Infrastructure	Data-Infrastructure Related	Applications and Products	Human – Organizational	Education and Knowledge
• Algorithms • Bioinformatics • Biosignal processing • Boolean logic • Cryptology • Human genome related • Human interfaces • Image processing • Mathematical models in medicine • Pattern recognition	• Archival-repository systems for medical records- EPR-CPR-EMR • Authentication • Chip cards in healthcare • Distributed systems • Health professional workstation • Interfaces • Knowledge based systems • Networks • Neural networks • Pen based • Security • Speech recognition • Standards • Systems architecture • Telehealth • User interfaces	• Classification • Coding systems • Concept representation-preservation • Data acquisition- data capture • Data analysis-extraction tools • Data entry • Data policies • Data protection • Database design • Indexing • Syntax • Language representation • Lexicons · • Linguistics • Modelling • Nomenclatures • Standards • Terminology-vocabulary • Thesaurus tools	• Biostatistics • Clinical trials • Computer-supported surgery • Decision support • Diagnosis related • Disease mgt. • EPR-CPR-EMR • Epidemiological research Hospital IS • Event-based systems • Evidence based guidelines • Expert systems • Health services research • HIS management • Knowledge-based systems • Laboratory data • Image processing • Operations/Resource management • Outcomes research and measurement • Quality management • Patient identification • Patient monitoring • Minimum Data Sets • Supply chain • Telematics • Telemedicine	• Assessment • Compliance • Cognitive tasks • Collaboration • Communication • Economics of IT • Ethics • Implementation-deployment • Diffusion of IT • Evaluation • Human Factors • Legal issues, implementing national laws • Management • Managing Change • Needs assessment • Organizational redesign processes • Organizational transformation • Planning • Policy Issues • Privacy • Project Management • Security • Strategic plans • Unique identifiers • User-computer interface	• Bibliographic • Cognitive learning • Computer aided instruction • Computer-supported training • Consumer education • Continuing education • Digital Libraries • E-Business • H/MI education • Information management-dissemination • Knowledge bases • Knowledge management • Learning models • Online/distance education

Part II

The *e*Europe Awards for *e*Health – 2004

Empowering the Citizen through *e*Health Tools and Services

1 Background

The European Institute of Public Administration (EIPA) was contracted by the European Commission to manage the *eEurope Awards Programme* from 2003 to 2005.[1] The first *eEurope Awards for eHealth* were presented at the Ministerial *e*Health Conference in Brussels in May 2003.

This year, EIPA has devised and managed a programme to select good practices that empower the citizens through *e*Health tools and services. The applications had to be in current use and supported by a health actor. *e*Health actors of all types (public and private; local, regional, national and/or pan-European) from across Europe were invited to submit applications. The overall objective of the *eEurope Awards for eHealth – 2004* is to share experiences and identify best practices that offer the citizens *e*Health tools and services from which they will directly benefit.

As can be seen in the project analysis that follows, there is much good practice that can be emulated, even if the delivery mechanisms may sometimes vary depending on a variety of factors including population distribution and geographic location.

[1] For details on the *e*Europe Awards refer to http://www.e-europeawards.org

2 Analysis of cases received

The large number of projects submitted in response to the call is clear evidence of the interest there is among health actors to share experiences and learn about "good practices to empower the citizen through *e*Health tools and services".[2] The *e*Europe Awards Helpdesk at EIPA received approximately 150 general queries.[3] A total of 109 applications (hereafter called "cases") were submitted for the *eEurope Awards for eHealth – 2004*.[4] It is important to bear in mind that the number of submissions received does not necessarily fully reflect the state of *e*Health in the various countries as it may be influenced by a variety of internal and external (political and other) factors.

Submissions were received electronically via the *e*Europe Awards web application and evaluated by a panel of independent experts from a range of European countries. The call for proposals was open from 26 November 2003 to 23 January 2004. As in the previous *e*Europe Awards, the first part of the evaluation took place on an electronic basis via the *e*Europe Awards web application. Consensus meetings and a plenary session of the expert panel were held in Maastricht at the end of March 2004. Thirty-two cases were selected according to their suitability for exhibition at the *e*Health Conference 2004 – *Empowering the European Citizen through eHealth* in Cork, Ireland, from 5-6 May 2004, where the final award winners will be selected by a committee of judges.

The following eligibility criteria were applied:

1. The case must be European
2. The case must demonstrate a tool or service in current use
3. At least one applicant per case has to be a health actor
4. The tool or service has to be citizen-focused.

The following four criteria were applied in the selection process:[5]

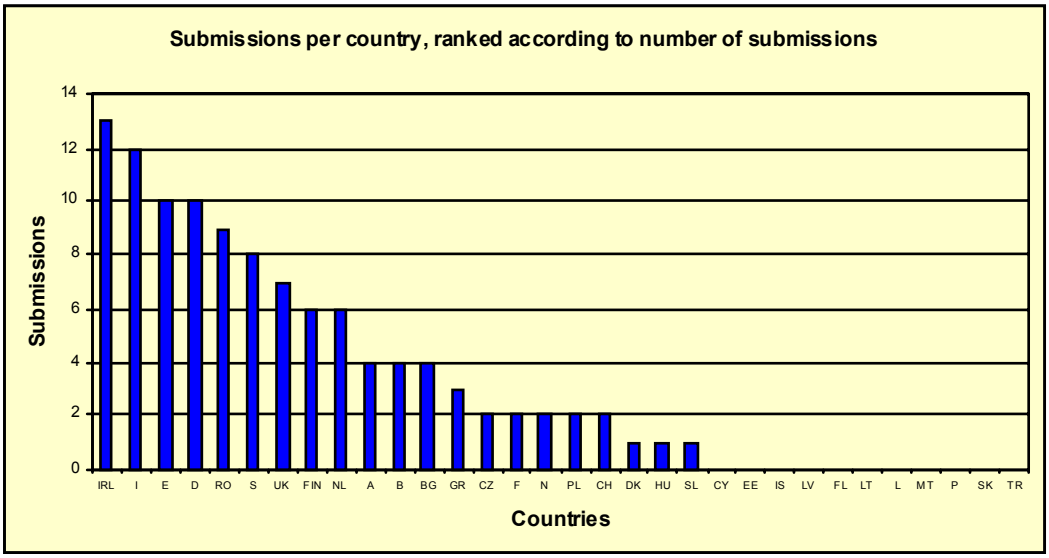
1. Innovativeness
2. Good use of ICT (Information and Communication Technologies)
3. Real practical results and impact
4. Functionality
5. Transferability and valuable learning points.

[2] For details on the 2004 call refer to www.e-europeawards.org
[3] 'First stop queries'; the follow-up is not included in this figure.
[4] 180 cases were submitted for the *e*Europe Awards for *e*Health – 2003.
[5] For details see the "Guidance Notes for Submission", http://www.e-europeawards.org.

Twenty-one of the 32 eligible countries (EU-25, candidate countries and EFTA countries)[6] participated in the call.

Table 1 shows the number of submissions received per country. Ireland submitted the highest number of cases (13) followed by Italy (12), Spain (10) and Germany (10).

Table 1



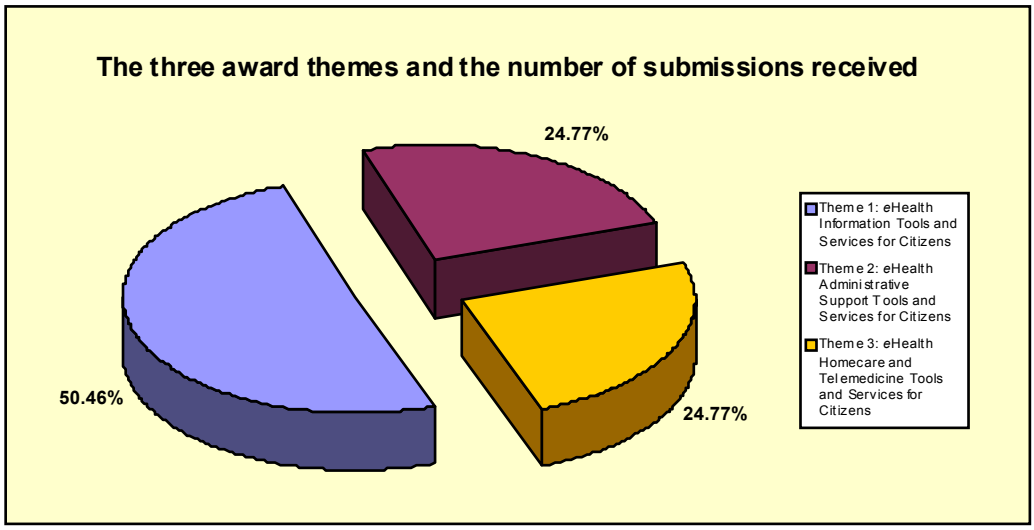
Participants were invited to submit their cases under three themes, each of which had a different focus:

- *e*Health information tools and services for citizens
- *e*Health administrative support tools and services for citizens, and
- *e*Health homecare and telemedicine tools.

Table 2 shows that more than half of the cases (55) were submitted for the theme "*e*Health information tools and services for citizens". Approximately a quarter of the cases were submitted for each of the other two themes, i.e. for "*e*Health administrative support tools and services for citizens" (27) and for "*e*Health homecare and telemedicine tools" (27). Clearly this result shows that there is a great interest in and commitment from many health actors in the majority of the countries in Europe to provide more and better information on health issues to their citizens and to empower them by providing a variety of tools and services.

[6] Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. See also http://www.e-europeawards.org

Table 2



Looking at the spread of the three themes within each country's submissions in table 3, the general trend (half of the submissions fell under theme 1) corresponds to the spread within each country's submissions. Within the first theme, Italy submitted 8 cases followed by Germany (7) and Ireland (5). In the second theme, the highest number of cases was submitted by Spain, followed by Ireland and Romania (4 each). In the third theme, the highest number of cases was submitted by Ireland (4), followed by Sweden and Italy (3 each).

Table 3

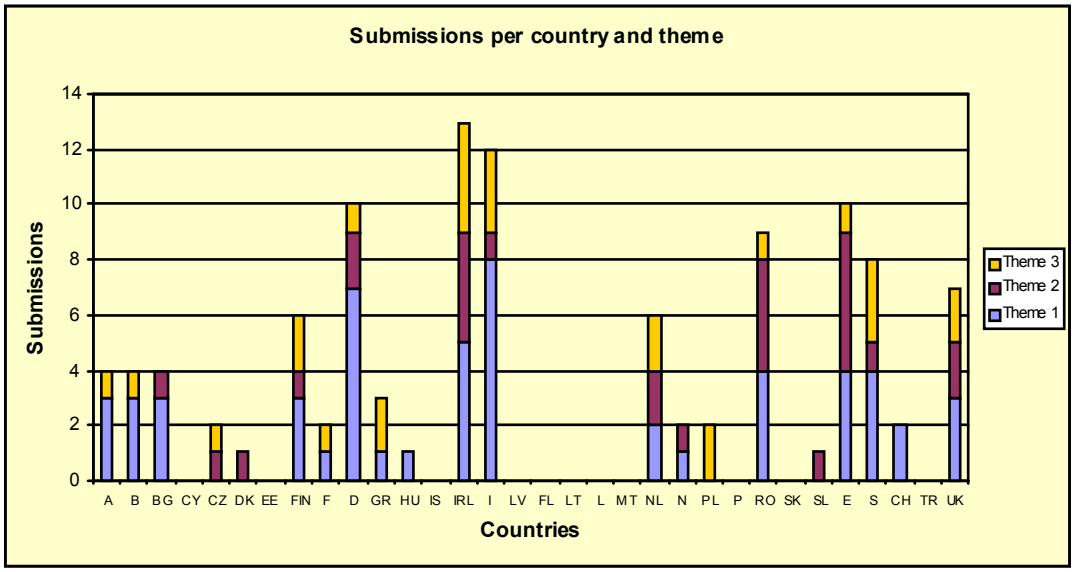


Table 4 shows that most submissions originate from the EU 15. Thirteen of the EU 15 submitted at least one case. It is quite interesting to see that there are more submissions from the candidate countries than from the new Member States. Four out of the ten new Member States submitted at least one case. In contrast to this, two out of the four EFTA countries submitted at least one case.

Table 4

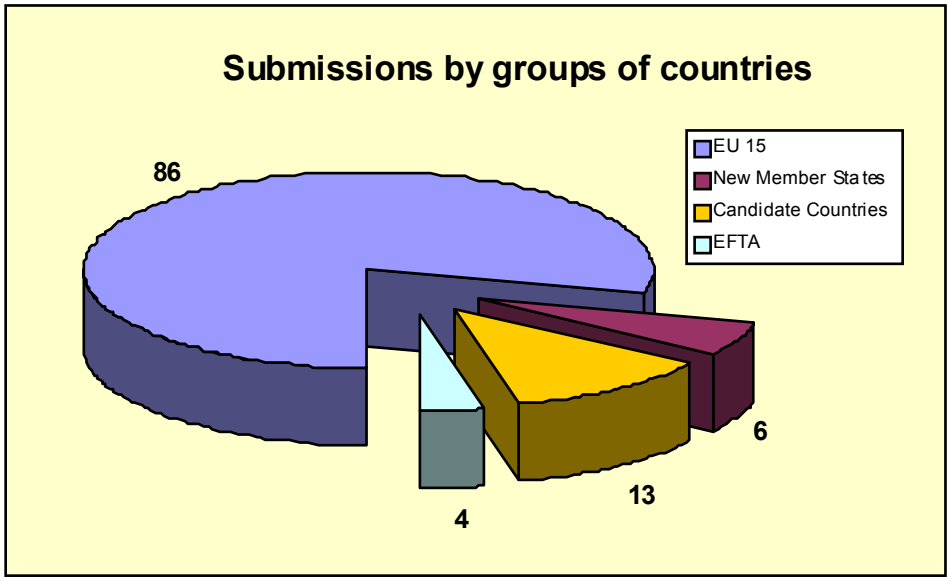
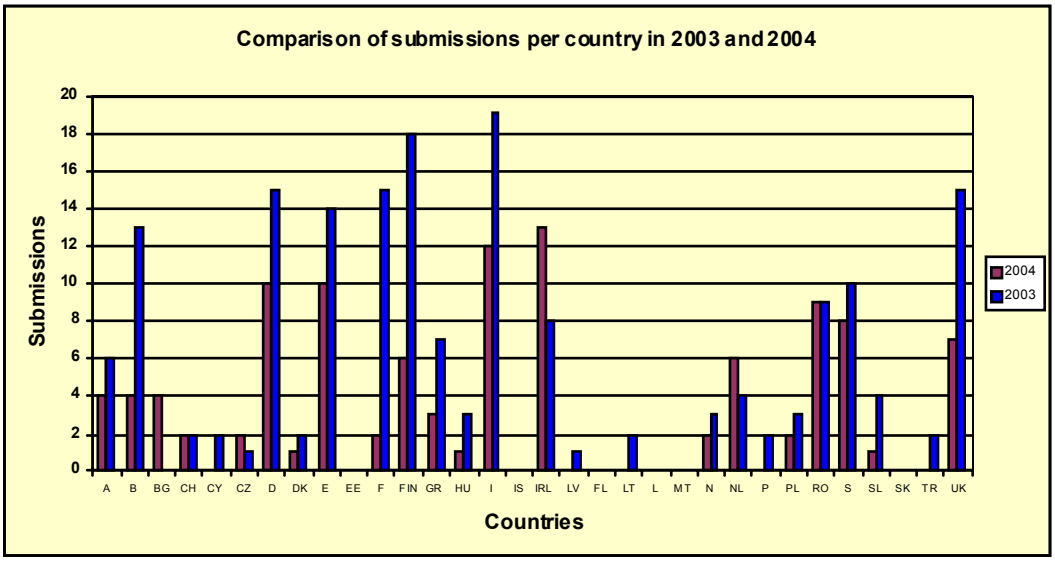


Table 5 shows a comparison with the first *eEurope Awards for eHealth* in 2003, for which a total of 180 cases were submitted. A trend can be noted that countries which submitted a higher number of cases in 2003 (such as France and Finland) submitted only a few cases in 2004. Overall, only Ireland and the Netherlands submitted more cases in 2004 than in 2003. Sixteen cases were re-submitted in 2004. Cases submitted for a previous *e*Europe Award had to provide evidence to show significant development since the last submission.

Table 5



3 Review of the themes and overview of the cases

In addition to the technical revolution that *e*Health has brought about, with the unabated development of new techniques and solutions, there is another quieter, more personal or perhaps cultural revolution that has taken place within the delivery of healthcare services across Europe. This concerns citizens and their place in the treatment programme. Unlike the case of traditional healthcare treatment, in enlightened healthcare programmes, such as those that have made a strong showing in the *eEurope Awards for eHealth*, the citizen or patient is clearly put at the centre and has a clear decision-making role in any treatment plan and progress. This not only enables empowerment, but it also makes the citizen responsible to remain as healthy and well as possible.

*e*Health information tools and services for citizens

These days there are many ways in which citizens can remain informed, but one of the key sources of knowledge for the patient comes from the provision of quality health and wellness information made available electronically. This provision may be via a number of channels including the internet, digital television and mobile telephones. These tools and services support citizens in making health-related decisions to manage their lifestyle more effectively.

There were fifty-five projects submitted in the category of *e*Health information tools and services for citizens from all over Europe. This included a key project from Switzerland which addresses the issue of standards in the presentation of health information, *Health on the Net Foundation*[7] *(*http://www.hon.ch). It addresses the fundamental issue of the provision of health information to citizens who one day may be patients or may even be existing patients: how can we ensure that certain standards are met in the presentation of that information?

The *Health on the Net Foundation* has presented a solution to this dilemma through the development of a code of ethical conduct which they call the HONcode. This code ensures that information presented on a health information website is sound, reliable and free of any commercial influence. The parameters within which the code is awarded are clearly visible on a dedicated website currently available in five European languages (English, French, German, Spanish and Portuguese), although a description of the HONcode is available in twenty-eight languages. Website developers can visit the site. Since it is used by 3,600 websites, it is clear that many website developers already do.

The range of information available is vast. Across Europe it is clear that Member States want to be sure that their citizens know their rights and what services are available to

[7] This case was submitted in 2003 and 2004.

them. *Web4Health.info* (http://www.web4health.info), a German consortium in partnership with partners from five other European countries (Greece, Sweden, Italy, Denmark, the Netherlands) produced a site focusing on mental health and well-being. This is a multilingual website available in five languages which allows citizens to put questions to psychiatric and psychotherapeutic experts, and receive replies directly at their personal email addresses. Another project from Sweden, *Pure Quality Life (*http://www.pql.se) provides neurocognitive exercises aimed at decreasing stress. Other projects, such as the *National Health Insurance Fund of Bulgaria Portal (*http://www.nhif.bg), give vital information about the legal aspects of healthcare, as well as names and addresses of doctors, specialist healthcare providers and pharmacies.

In addition to putting patients firmly at the centre of their care and treatment, a further progressive step in the delivery of *e*Health has been the inclusion of complementary health treatments as respected adjuncts to mainstream care. Many of the projects submitted have recognised this fact, such as *VHI Healthcare Website (*http://www.vhi.ie) from Ireland.

Today a vast array of medicines is available over the counter. Generally pharmacists across Europe are now recognised as highly-trained health professionals who hold a vital body of knowledge. Knowing what drugs are available is one thing, but knowing what happens when one or two substances are taken together is another. Information providers have sought to address this point and an Irish project, *Eirpharm.com (*http://eirpharm.com), has developed a website which includes this information, in addition to which it highlights the dangers and likely outcomes of mixing certain medications with alcohol. This site also provides a special section on medicines in sport and, for those with real sporting talent and ambition, it publishes the International Olympic Committee banned substances list and identifies the over-the-counter medicines in which these may be found.

Some of the most vulnerable European citizens are the young: worrying about illness in our children is of course a natural response. A well-known and highly respected Italian hospital, has developed a website which focuses entirely on children and infants, *The Paediatric Health Portal (*http://www.ospedalebambinogesu.it), which in addition to providing information also brings a range of services available from a centre of paediatric excellence to the reach of parents in the regions of Basilicata, Calabria, Molise, the Comune di Roma and some other local health institutions and hospitals.

Other sites give information and support on dementia, addictions of all sorts and pregnancy. It is important to remember that these sites, as well as providing vital information, provide a twenty-four hour continuous service which is free and available right across the world.

Websites and portals do not only deliver information to support citizens. They offer a whole range of applications that support health professionals in the delivery of the care. In a fast-moving society, health professionals also need good quality information to stay abreast of knowledge, whether it is knowledge about defined areas of medicine or more generalist knowledge about disease patterns and bacteria spread. One of the projects submitted from the United Kingdom, *Enter-net and Salm-gene* (http://www.hpa.org.uk), describes a programme that maintains an international electronic database of bacterial

enteric pathogens. Any health professional can consult this site, which is an invaluable asset in the design and provision of preventative healthcare programmes.

Knowledge sharing, and especially specialist knowledge gained through years of practice, is of vital importance among healthcare providers. A good example of this high level knowledge transfer and dissemination comes from another project from the United Kingdom, *Medic to Medic (*http://www.medic-to-medic.com), which has devised a way of creating knowledge maps of the presenting symptoms, such as chest pain or shortness of breath, for a number of medical conditions. These maps have received contributions from a range of medical personnel and have been audited by specialists in the field. They are available to all primary and secondary healthcare providers as an extra tool to support the process of diagnosis. The site is undoubtedly a valuable resource which benefits both practitioners and patients.

Hospitals deal with hundreds of patients, and all healthcare systems have inbuilt ways of ensuring the highest possible levels of patient safety in an often busy and crisis-led environment. It was clear from the entries that despite existing checks and safety procedures, there is no room for complacency and several projects described the use of intelligent information pathways to enhance patient security. A highly reputed Italian hospital in Milan with its project, *Drug in Virtual Enterprise* (http://www.sanraffaele.org/drive), has developed an electronic tracking system which enables the movement of all drugs to be monitored from point of order to point of patient delivery. Further safeguards have been added with the development of a smart trolley that carries an electronic record of the patient's treatment and investigation plan, and will only function if that treatment is adhered to 100%. A system of sensor controlled drawers ensures this. The only inconvenience to the patient is the need to wear a small wristband.

Other information systems allow the monitoring and administration of well developed programmes in transplantation, such as *Quality in Transplant System* from Italy *(*http://www.ministerosalute.it/trapianti). There are also projects that allow the transfer and sharing of valuable clinical information such as developments in the treatment of HIV compiled by experts in the field from all over Europe and brought together in one site by Romania, *Professional Development for Healthcare Specialists (*http://www.emconline.ro/).

In addition to supporting vital professional discussion, another use of electronic communication tools is to allow and enable remote assessment and diagnosis of a patient's illness through teleconsultation. Several such projects were submitted. One project of note has opened up a telediagnostic electronic communication line between countries of the European Union and those situated in the Mediterranean basin, *EMISPHER (*http://www.emispher.org). This project also uses the communication potential that it has tapped into to deliver continuing medical education, so that doctors in more remote places can keep up to date. This remote learning model is now a feature of continuing medical education across Europe and the world. It is recognised as a cost-effective and ideal way of sharing knowledge at all levels.

Children who suffer chronic or long periods of illness often miss out not only on the company of their peers, but also on school and learning. Hospitals can now access education remotely and so offer an additional non-clinical service to their young patients as is the case with *La scuola in Ospedale (*http://scuolainospedale.indire.it). Another

similar project from Ireland, *Ait Eile (*http://www.aiteile.ie), has incorporated a videoconferencing system so that children can speak to and see family members, school friends and their peers. The system is also used to introduce children moving to other hospitals to the new medical personnel who will be caring for them.

Children are not the only group served by the potential of information technology. For people in the third age it can help form a bridge between institutional care and care in the community. An interesting project from Ireland, *Caring for Carers* (http://www.caringforcarers.org), does this by providing health information, remote access to healthcare professionals and a chat forum for elderly people and their carers living in scattered communities. Through the site, carers can access training programmes which help them develop their skills in providing the vital support that enables many elderly people to retain their valued independence.

Empowerment is about increasing choice. Two projects in particular are focused on this. In Norway citizens have the right to choose the hospital in which they want to be treated. *Free Hospital Choice Norway* (http://www.sykehusvalg.net) is a website developed by the Norwegian Government which allows patients to do just this. It provides full details of available medical specialities and specialists, details of waiting lists and information on individual hospital performance. The Barcelona Declaration of Patient Organisations has formalised for Spain the patient's role at the centre of any care programme. *The Spanish Patient's Forum* (http://www.webpacientes.org) promotes this central position by listing patients' rights and ensuring them through a number of defined objectives. The website promotes this important initiative and provides us with a glimpse of the consumer power that now exists in a medical world that was once dominated by closed 'bodies of knowledge' and was often shrouded in secrecy and mystery.

*e*Health administrative support tools and services for citizens

Another vital use of electronic communication is to provide administrative support tools and services for the delivery of medical care and support. Twenty-seven projects were submitted to this second theme.

Projects ranged from a Danish public health portal (http://www.sundhed.dk) that not only provides comprehensive information both for citizens and healthcare providers, but also immediate secure web access to all investigation results on procedures that may have been carried out in any Danish hospital. It also enables access to electronic appointment systems, prescription renewal and the renewal of medical certificates.

Other projects like one from Ireland, the *National Healthlink Project* (http://www.healthlink.ie), link primary and secondary care, speeding up the transfer of important information such as test results, discharge notifications and outpatient attendance notifications to patients' records held in general practitioners' surgeries; thus ensuring that patients benefit by receiving fast and appropriate treatment. Yet another case from Finland, *Web Nurse Service and eHealth Portal* (http://www.verkkohoitaja.fi),provides patients with 24-hour access to clinical nurses who provide help and guidance and, if necessary, refer the patient on to the doctor.

Some vital medical services depend on the generosity of fellow human beings who act as donors. The blood transfusion services across Europe have to keep their banks well-stocked in case of emergencies and disasters. A project from Norway, *Blood Donor Booking by SMS and Internet* (http://www.shdir.no/si@), has linked a central appointments' system with donors using short messaging. When a donor is due to make an appointment, an SMS is sent automatically, which can then be confirmed or rejected. In the event of an emergency, the system will alert all donors without delay.

As has already been said, both patients and doctors benefit from the application of information technology-based solutions and communication tools to healthcare delivery. One highly complex project has completely revolutionised healthcare administration and delivery through the development of a hospital which is entirely run through a highly advanced technological platform. This has enabled the use of new technologies for all procedures carried out in the hospital. At the *Hospital Son Llátzer* (http://www.hsll.es/itflash), on the island of Palma de Mallorca, even patient medical records are updated through Tablet PC technology. From the moment a doctor leaves home in the morning, an automatic message system delivers talking messages outlining his or her day's work via a mobile telephone.

Life event registration, recording for example births and deaths, often has to be duplicated across several government departments. *The eEnabling Life Event Data*[8] (http://www.reach.ie) project from Ireland has centralised this process; one registration is now sufficient for the system to automatically inform all relevant agencies. This project has also had an impact on the ability of the government agencies involved to compile accurate and vital statistics.

For citizens who cannot get a doctor's appointment because of the serious shortages that exist in some European countries, the Dutch have developed *www.dokter.nl (*http://www.doctor.nl). This is a website that offers medical consultations over the internet with expertly qualified doctors, in a range of clinical specialities. Citizens' access to healthcare services has been revolutionised across Europe; systems range from the comprehensive *Integrated Healthcare Management System* (http://www.gencat.net/catsalut) developed in Catalonia, which allows citizens immediate access to a range of services through a card carrying a Personal Identification Code, to *Patient Care Messaging* (http://pcm.iplato.net/nhs1) in the United Kingdom, which reminds patients of imminent appointments, giving them the option to reschedule if necessary. *The Almere Health Portal* in the Netherlands provides yet another comprehensive self-service programme, through which each citizen can develop his or her own personal health page, using information technology-based services to enhance the personal and individual touch.

*e*Health homecare and telemedicine tools

The third category of projects comprises those that come under the banner of *e*Health homecare and telemedicine tools and service for citizens.

[8] This case was submitted in 2003 and 2004.

There are many reasons why remote monitoring is the care programme of choice in treating a broad range of patients. Some of these are about making the best use of scarce resources; others are more people-centred reasons, such as allowing the patients to be cared for in the comfort of their own homes. There is practically no limit on the kind of care that can be delivered in this way, nor in the range of specialities that are covered.

USBone[9] from Greece has developed a device to be worn by patients with bone fractures. By using Ultrasound it can provide measurements that are then processed by an intelligent automated system which delivers accurate progress reports to remote orthopaedic surgeons. *The Linkcare project*[10] (http://www.linkcare-bcn.org) from Barcelona allows the remote monitoring of oxygen saturation, ECG, spirometry and accelerometry in the home-based treatment of patients with chronic respiratory disease. From Italy a similar programme, the *Long Term Oxygen Tele-Home Monitoring* (http://www.ulss22.ven.it/pneumologia) project has also developed a home-based monitoring service for patients suffering from chronic respiratory disease. This system enables comprehensive monitoring, which includes vital signs, heart frequency, oxygen consumption and reserve levels as well as patient compliance.

Remote monitoring through the *VieDome* (http://www.viedome.nl) project from the Netherlands enables elderly persons to continue to live in their own homes. Sensors located in their homes can monitor any physical signs which need to be kept under review, and these are monitored by a central medical service or virtual care centre, if necessary a touchscreen monitor links the patient directly to doctors and nurses who give professional advice and decide on any future action. The project has also developed several services which maintain the quality of life for elderly persons, via activities such as shopping and hairdressing.

Net for Care (http://www.netforcare.com) from Italy enables Italian citizens to have access to immediate remote teleconsultations from a range of countries throughout the world, many of which may not have well-developed medical services. From Sweden, *Remote Emergency Management System*, has developed a fully mobile cardiac monitor which will connect directly to the hospital emergency care unit when applied to the patient in an emergency. A specialist can thus intervene and direct treatment. *The Citizen Participation in Chronic Disease Management project (*http://www.axsys.co.uk/#north_glasgow) from the United Kingdom uses the telephone and a personal identification number for chronically ill patients to telephone in with updates on their progress. A carefully pre-defined script allows relevant information to be collected which is then reviewed by doctors who decide whether or not any medical intervention is necessary.

Imaging and the availability of imaging and other radiography services is a growing issue across Europe where resources are scarce. While much recent progress has been made in electronic image sharing through the development of the Digital Imaging and Communications in Medicine (DICOM) standard, there is still some way to go in some specialist procedures. With the advent of new non-invasive surgical procedures for

[9] This case was submitted in 2003 and 2004.
[10] This case was submitted in 2003 and 2004.

dealing with a range of chronic cardiac conditions, the strain on cardiac services has increased. For citizens living in sparsely populated areas, treatment often necessitates long journeys and long waiting lists. A project in Ireland, *RITA (*http://www.captec.ie/tcs) has developed a unique, interactive angiography teleconferencing system which links remote hospitals to a centre of excellence. This solution enables an appropriately equipped local hospital to offer full angiographic services, under the supervision of specialists in the field working from remote locations. The consultant radiologists can log on to the system from their homes or from their hospital, making the service available round the clock, seven days a week. Another project, the *Zittau-Löbau eHealth Initiative* (http://www.telemedizin-loebau-zittau.de) from Germany, has used information technology-based solutions to set up a radiology on-call service, as well as a remote radiology service.

In sparsely populated areas, radiotherapy is another service that often requires long treks to hospitals. Because it is such a complex procedure, requiring the expert input of physical measurements along with the application of medical science, enabled by some very special equipment, radiotherapy treatment is not available everywhere. Traditionally radiography has been available in large centres of excellence, of which there tend to be only a few in each country. The Swedes with their *Distributed Radiotherapy – A Joint Centre Model* project, introduced the notion of distributed care in this field. Mobile equipment has been developed involving open standards to ensure integration with equipment used in small local hospitals. The smaller hospital is twinned with a larger hospital where specialists in physics and radiotherapy oversee patients' treatment and care programmes. The vital dose planning is carried out remotely using a series of CT scans and a twice-weekly video case conferences between the two teams that support the programme.

There are several other interesting models of remote monitoring where online electronic logbooks are used, enabling patients to self-monitor chronic conditions under the remote supervision of their treating doctor. One such project is *Diabcarnet* (http://www.diabcarnet.com) from France which targets young people with type I diabetes. Another is the *Thrombosis Digital Logbook* (http://www.portavita.nl) from the Netherlands, which enables chronically ill patients at risk from thrombosis to self-monitor their progress under the remote supervision of their treating doctor, who is always able to intervene. These projects obviate the need for frequent trips to the hospital while at the same time putting the patient at the centre of their care programme. *Terivan*[11] *(*http://www.terivan.com) from Finland is another such project which, as well as monitoring anti-coagulation treatment, also monitors patients with chronic hypertension. This service has been extended by adding a digital television interface.

We live in a world dominated by pressures which often result in stress and anxiety. Psychiatrists, psychologists and psychotherapists are looking more and more for innovative tools to help their patients cope with these conditions. In the field of mental health, the *VEPSY* (https://vepsy.elsag.it) project led by a consortium from Italy working with two others from Spain and France targets patients with varying degrees of mental illness. It provides a virtual reality resource to support psychologists in their treatment of

[11] This case was submitted in 2003 and 2004.

stress and a number of phobias and dysfunctions. Patients can also directly access special patient pages, where three-dimensional simulations of reality allow them to continue their therapy on their own.

Two projects address the issues of hearing, speech and vision. *Telewelfare.com* (http://www.telewelfare.com) from Poland has developed an online multimedia-based service that enables the remote testing of hearing, speech and vision as part of a screening programme intended to pick up problems at an early stage. It also enables access to treatment packages to alleviate these conditions. *Home Rehabilitation Clinic* (http://www.ifps.org.pl) also from Poland, offers a programme of learning, therapy and rehabilitation targeting children with hearing impairments and communication disorders.

4 Lessons learned

While there is diversity across Europe, the *eEurope Awards for eHealth – 2004* have shown that there are common themes in patient care, just as there are common problems, such as tighter public finance. There are also a number of important learning points that can be taken on board in many future plans for healthcare programmes:

Empowering the citizen

- Healthcare professionals hold a precious body of knowledge, which clearly must be shared with a whole range of consumers. Patients need knowledge to keep them informed and up to date; carers need knowledge to help them give their best. Doctors, nurses and other healthcare professionals need knowledge to help them keep abreast of advances and developments in the art and practice of their profession, so that they can ensure the delivery of a high quality service.
- Patients are active participants in the healthcare process and not passive receivers of it.
- Online health-related information is a valuable asset and a method of access and interface with the public, which has clearly been exploited and enriched over the years. Much information about the nature and treatment of a range of illnesses could be translated into other languages and reused without having to start all over again.
- Information technologies need not be impersonal, while all aspects of treatment and care programmes are confidential; the patient is still a person who can be corresponded with via his or her private email. Secure electronic communication can support a more personalised service.
- By putting the patient at the centre of the diagnosis and treatment process, communication is more open and there is more scope for feedback or complaint. This enhances and supports human rights in the delivery of healthcare.

Reaching out to all communities

- Populations living in remote communities and those living in sparsely populated areas have sometimes been poorly served by healthcare providers. With the use of new technologies, the gap in services is being filled and parity is being restored to isolated communities.
- Shortages of well-qualified doctors and other health professionals across Europe have left many citizens without a doctor or nurse to turn to for routine treatment or in a crisis. New communications have bridged this gap successfully by enabling healthcare professionals to use a computer terminal or videoconference system where they can immediately deal with pressing healthcare problems.

- Remote diagnosis is yet another way of spreading the expertise of highly qualified specialist doctors across wide populations. Many systems exist and have been proven which support this. There is scope for extension and adoption by others in the future.
- Very sophisticated, carefully developed remote monitoring programmes have been set up to check progress and fine tune treatment, in a number of chronic illnesses. Much time and effort has gone into the development of these programmes which – although they may need constant updating to meet progress – do not have to be redeveloped. Whenever possible, what is good and is already there could be replicated.
- Remote imaging and diagnostic radiology are vital adjuncts to medical diagnosis and treatment. Some standards have already been set, others are being developed. Systems and protocols that have already been developed and well proven could be replicated. There is no need to re-invent the wheel.

The right to privacy, security and safety

- Security is vital in the delivery of *e*Health, but this need not be a problem since, as is evident in the submissions, robust and carefully developed systems already exist. Doubtless others are in development right now.
- Confidentiality at every stage and during every step of the healthcare process is absolutely vital, this of course is closely linked to security. It has been demonstrated that many hurdles have been overcome. All the cases described here put patient's privacy as a key requirement.
- Patient safety must be guaranteed at all times, and the projects submitted gave some good examples of new systems and accident prevention solutions that have been tested elsewhere, which can contribute to this.
- Preventative healthcare ensures the health of the nation and saves investment on emergency programmes. The well-being of citizens affects the growth of the economy. Citizens want and appreciate information which helps them to stay well.
- Computerised monitoring and measurement is very accurate; unlike humans, computers do not get bored by routine tasks, and efficiency levels are therefore maintained. The removal of these close monitoring tasks diminishes the risk of error and leaves qualified personnel free to care for more patients.

Knowledge enhancement and continuing education

- Healthcare is a fast-moving and fast-changing environment which thrives on new learning and discoveries. Medical education and continuing medical education are key issues in taking forward revolutionary new treatments and care programmes. Information technology-based systems combined with new communication tools are an effective, efficient and cost-effective means to ensure that medical personnel everywhere have fast and reliable access to this.
- Many of the projects submitted and that have been implemented, rolled out and enhanced, started life as part of European Commission funded research and other programmes, such as the Fourth and the Fifth Framework Programmes and *e*Ten. This work must continue and be encouraged.

It is clear that much has been and is already being done to create communities of knowledge and excellence in the delivery of healthcare across Europe.

Dissemination, knowledge-sharing and good practice are keywords in diffusing knowhow, learning and new ways of doing things. The Commission fulfils an important role in providing platforms for and supporting the dissemination of good practice and research.

The value and benefit to Europe of the *e*Europe Awards programme has clearly been demonstrated by the enthusiastic way in which many participants put forward their achievements for wider display. However, there needs to be some sort of permanent showcase and good practice exchange programme to facilitate this. This process has already started through the eEurope Awards programme, i.e. this and the previous *eEurope Awards for eHealth*, and the *eEurope Awards for eGovernment*[12] also held in 2003, with another to be held in 2005. This good practice in *e*Health must not be lost but should be easily available to healthcare planners, practitioners and strategists through a permanent reference centre which could be created and enlarged over the coming years.

With the continuous developments and advances in *e*Health tools, applications and services, European citizens increasingly have the foundations for powerful and effective European healthcare systems. It is now up to all the players involved in providing and sustaining good health for all European citizens to ensure that we continue to develop this further and to recognise that it is these citizens who will demand further opportunities to do so. We are all partners in the same initiative and it is this sharing of good initiatives and practices within Europe that is key.

[12] See Leitner, Christine et. al., *eGovernment in Europe: The State of Affairs*, presented at the *e*Government Conference held in Como, Italy on 7-8 July 2003, Maastricht, EIPA, 2003.

Bibliography

Books and Articles

Ball, M.J., et al., “Health Informatics: Managing Information to Deliver Value”, *Medinfo 10* Pt 1, 2001: 305-308.

Bates, D.W., et al., “Reducing the Frequency of Errors in Medicine Using Information Technology”, *ScD Am Med Information Association*, 2001(8): 299-308.

Bates, D.W. and Gawande, A.A., “Improving Safety with Information Technology”, *N Engl J Med*, 2003(348): 2526-2534.

Berwick, D. M., “Preventing Errors Lies in Redesign – Not Exhortation”, *BMJ 2001*, 2001(322): 247-248.

Braun, A., et al., *Prospecting eHealth in the Context of a European Ageing Society: Quantifying and Qualifying Needs*, IPTS/ESTO, Sevilla, Spain, 2003.

British Computer Society, Computers and Health 50 Years of Serving the Nation (1948-1998), Computers and Health 50 Years of Serving the Nation (1948-1998), www.bcshic.org/anniversary_leaflet.htm.

Coulter, A., *The Autonomous Patient: Ending Paternalism in Medical Care*, Nuffield, 2003.

Doyal, L., T*he Political Economy of Health*, London, Pluto Press, 1979.

Eng, T.R., *The eHealth Landscape: A Terrain Map of Emerging Information and Communication Technologies in Health and Health Care*, Princeton, New Jersey, The Robert Wood Johnson Foundation, 2001.

Eysenbach, G., “What is e-Health”, *Journal of Medical Internet Research* 3, 2001(2): e20.

Grimson, J., et al., “A Multimedia Approach to Raising Awareness of Information and Communication Technology amongst Healthcare Professionals”, Int J Med Inf 2000 September, 2000(58-59): 297-305.

Gruen, J., “The Physician and the Internet: Observer or Participant?” *M D Comput* 1999 Nov/Dec, 1999(16 (6)): 46-48.

Haux, R., “Health Care in the Information Society: What Should be the Role of Medical Informatics”, *Methods Inf Med* 41, 2002(1): 31-35.

Illich, I., *Limits to Medicine*, London, Marion Boyars, 1976.

Kohn, L.T., et al., *To Err is Human: Building a Safer Health System*, Washington DC, Institute of Medicine, 2000.

Leitner, Christine et. al., *eGovernment in Europe: The State of Affairs*,presented at the *e*Government Conference held in Como, Italy on 7-8 July 2003, Maastricht, EIPA, 2003.

Maheu, M., et al., *E-health, Telehealth & Telemedicine: A Comprehensive Guide*, New York, Jossey-Bass, 2001.

Silber, D., *The Case for eHealth*, Maastricht, EIPA, 2003.

Sonnenberg, F.A., “Health information on the Internet: Opportunities and Pitfalls”, Arch *Intern Med* Jan 27, 1997(157 (2)): 151-152.

Stroetmann, V.N., et al., “The Attitudes, Expectations and Needs of Elderly People in Relation to e-Health Applications: Results from a European Survey”, *J Telemed Telecare* 8 Suppl. 2, 2002: 82-84.

Waegemann, P., “EHR vs. CPR vs. EMR Whatever You Call It, the Vision is of Superior Care through Uniform, Accessible Health Records”, *Health Informatics* May 2003.

Reports and websites

*e*Europe Awards Programme website: http://www.e-europeawards.org

European Commission (1999), *eEurope: An Information Society For All*, Communication on a Commission Initiative for the Special European Council of Lisbon, March 2000, COM (99) 687, Brussels.

European Commission (2000), *The eEurope 2002 Update*, Prepared by the European Commission for the European Council in Nice, December 2000, COM (00) 283 Final, Brussels.

European Commission (2002), *eEurope 2005, An Information Society For All*, An Action Plan to be Presented in View of the Sevilla European Council, June 2002, COM (02) 263 Final, Brussels.

European Commission Public Health Programme 2003-2008, Decision No. 1786/2002/EC.

European Commission Quality Criteria or Health Related Websites, Communication from the Commission COM (2002) 667.

European Commission European Electronic Health Cards COM (2003) 73.

European Commission Regulation EC No 1408/71 of 14 June 1971 on the application of social security schemes to employed persons and their families moving within the Community, OJ L 149, 5 July 1971 (consolidated version OJ L 28, 30 January 1997, page 1).

Greek Presidency – Ministerial Declaration, 22 May 2003, Brussels.

Health Information Network Europe (HINE) Reports, http://www.hineurope.com

OECD (2003) Health at a Glance 2003 – OECD Countries Struggle with Rising Demand for Health Spending.

UN World Population Aging Report 1950-2050 http://www.un.org/esa/population/publications/publications.htm

UN World Population, 2002 http://www.un.org/esa/population/publications/wpp2002/wpp2002wc.htm\