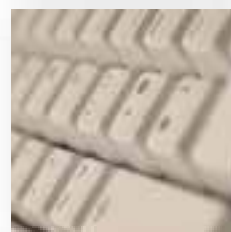


Building FOUNDATIONS for eHealth

Progress of Member States

Report of the WHO Global Observatory for eHealth



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Progress of Member States

Report of the WHO Global Observatory for eHealth

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Foreword

Advances in information and communication technologies (ICT) offer unprecedented opportunities to improve public health worldwide.

Scenarios which were inconceivable just 10 years ago are now a reality because of eHealth: patients in Africa being treated from a distance, often by a physician in another country or continent, through the use of telehealth; health professionals in Pacific islands upgrading their skills through eLearning without needing to leave their countries; or national networks of electronic health records making available a patient's entire medical history at any point of health care and supporting appropriate treatment.



Now for the first time we have global baseline data on the current state of eHealth, and a set of recommendations for Member States. This report *Building Foundations for eHealth* will contribute significantly to the evidence base.

Those recommendations for action broadly encompass three areas: strengthening the baseline policies for provision of information and communication technologies for health; supporting citizen protection, equity of access, and multilingualism; and promoting the growth of eHealth capacity, tools and services.

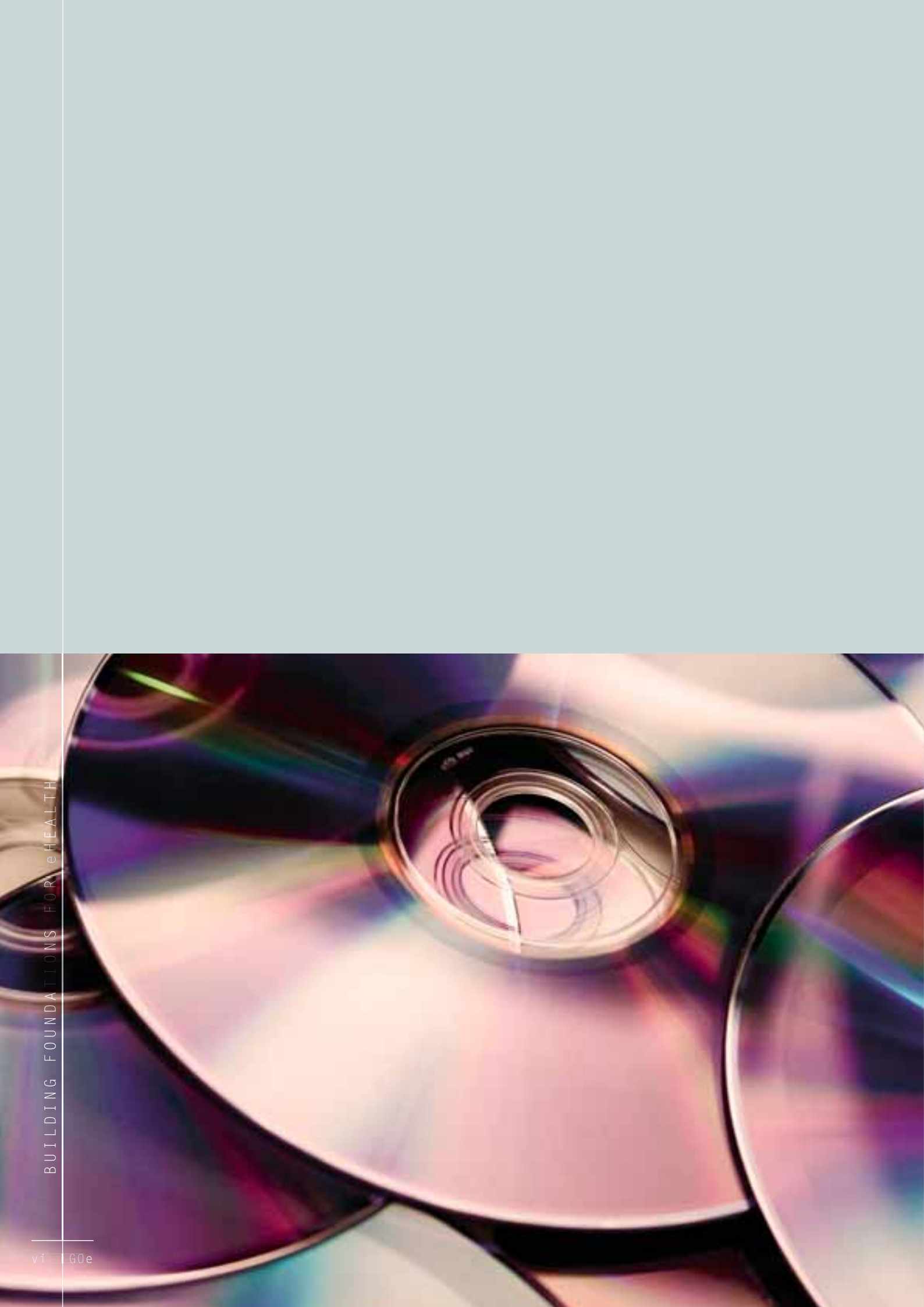
I encourage governments, policy-makers and international organizations to use this report to identify eHealth trends, opportunities and emerging challenges.

The eHealth landscape is rapidly changing. We have the opportunity to shape its evolution, through international, national and local collaboration. Solid eHealth foundations already exist, and more continue to be built across the globe.

We must continue to expand the framework and global vision into which eHealth can fulfil its potential; and better the health of people through the use of technology.

Dr Anders Nordström

Acting Director-General



Executive summary

Every day, across the world, people make improvements in health as a direct benefit of information and communication technologies (ICT). eHealth innovations like electronic health records, computer-assisted prescription systems and clinical databases are transforming health today, and hold even greater promise for the future. ICT support clinical care, provide health information to the general public and scientific information to professionals. They provide a platform for publishing, disseminating health alerts and supporting administrative functions.

The World Health Organization's (WHO) strategy on eHealth focuses on strengthening health systems in countries; fostering public-private partnerships in ICT research and development for health; supporting capacity building for eHealth application in Member States; and the development and use of norms and standards. Success in these areas is predicated on a fifth strategic direction: investigating, documenting and analysing the impact of eHealth and promoting better understanding by disseminating information.

To that end, WHO undertook a global survey on eHealth with which to garner baseline data on the current state of eHealth. Executed between mid-2005 and mid-2006, it represents the first attempt to examine eHealth from a regional as well as global perspective. Developed and implemented by the Global Observatory for eHealth (GOe), the survey focused on processes and outcomes in key eHealth action lines previously identified by the World Summit for the Information Society (WSIS),¹ which are supported by WHO as an overall framework for action.

Given this survey was the first of its kind the Observatory was greatly encouraged by the number of Member States that responded. Over 700 informants from 112 countries provided their expert knowledge (nearly 60% of the 192 WHO Member States,² representing approximately 80% of the world's population).

■ Key findings

Strong growth in eHealth since 2000

ICT is steadily being integrated into health systems and services worldwide, with the majority of growth coming after 2000. Many countries are planning even more ambitious advances in the next two years. This indicates that after a slow start in the 1990s there is growing momentum for eHealth uptake by countries which is very likely to continue.

Relationship determined between eHealth and country income groups

A consistent relationship was found between World Bank income groups and the introduction of eHealth actions by countries. Countries in the high- and upper-middle income groups are more advanced in their eHealth development than those in the lower-middle and low-income groups. Developing countries, in particular, will require extra guidance and support from WHO and its partners if they are not to be left behind in this rapidly emerging age of eHealth.

Solid progress made in implementing foundation actions

Member States are making concrete advances in building foundation policies and strategies for eHealth at the national level, with the exception of eHealth governance mechanisms; in this area, countries clearly need further support. In general, however, the development and implementation of eHealth policies is forecast to grow considerably by 2008, particularly in developing countries.

¹ <http://www.itu.int/wsis/>.

² Number of Member States at the time of survey closure by mid-August 2006.

Implementation of enabling actions needs attention

Adoption of most enabling policies or strategies for eHealth is low compared to the foundation actions reviewed. With the support of WHO, increased attention by Member States will need to be paid to such areas as multilingualism, citizen protection, equity, as well as to requirements for standardization and interoperability.

eHealth applications becoming more widespread

The levels of adoption of eHealth applications surveyed were generally very encouraging. The provision of online health information for the general public shows the highest rate of adoption of any action studied. International eJournal services for health professionals and students are also widespread, and eLearning—for the teaching of health sciences to students and professionals—is expected to expand.

■ Proposed action

Building foundations for eHealth provides a global view that will be particularly useful for governments, policy-makers and international organizations in identifying eHealth trends, opportunities and emerging challenges. What global trends mask, however, is the huge variation between countries and across regions. Individual countries are the unit of analysis for this survey and are therefore an important reference point. A complete set of eHealth country profiles of all responding WHO Member States can be found in the Annex of this publication or online at <http://www.who.int/GOe>. Each country profile lists the progress made in eHealth providing a “snapshot” of the actions taken and assessments of their effectiveness.

The survey analysis suggests that countries in the higher-income groups have progressed further in the adoption of actions and provision of services than those in the lower-income groups, in almost all areas studied. This finding is not surprising; it confirms that the “digital divide” includes eHealth. Our common goal should be therefore to lessen this divide with concerted action. Such action should be undertaken within the framework of partnerships, at all levels.

eHealth is a global phenomenon. One of the guiding principles in advancing WHO’s eHealth agenda worldwide is fostering collaboration with international and nongovernmental organizations, the private sector and other key stakeholders. Member States will achieve increased eHealth development through such collaboration, which includes learning from other countries and partners; their successes and failures will provide the necessary lessons needed for countries to move forward and embrace the emerging age of eHealth.

The actions and recommendations that arise from this report are based on the need for collaboration and cooperation, and of the international sharing of experiences, products and best practices in eHealth. General recommendations and actions in the three layers of eHealth development are outlined below.

To strengthen foundation policies and strategies

- WHO urges Member States to draw up long-term strategic plans for the development and implementation of eHealth services. This involves the establishment of eHealth governance bodies that would provide policy and strategy advice and guidance on data security, interoperability, cultural and linguistic issues, infrastructure, funding, monitoring and evaluation.
- The Global Observatory for eHealth will develop a set of tools and guidelines on eHealth policy for adaptation and adoption by Member States.
- WHO will draw up guidelines for the governance of public-private partnerships and Member States are encouraged to adapt them to their particular needs.
- The Global Observatory for eHealth will develop an international directory of eHealth best practices.

To enhance enabling policies and strategies

- WHO is establishing an eHealth legal and ethics committee that will offer practical guidance on issues such as citizen protection and equity in the eHealth domain. Member States are urged to provide equitable, affordable access to eHealth and promote the principles of confidentiality and privacy in the eHealth domain, and to seek advice from the eHealth legal and ethics committee as required.
- The Global Observatory for eHealth will establish a thematic working group to propose strategies on the international production and sharing of digital multilingual public health information among Member States to avoid the duplication of effort. Member States are urged to produce (and/or reproduce) and share public health content.
- WHO will support Member States to promote the development of national standardized health information systems to facilitate the effective exchange of information between countries.
- WHO is drafting guidelines for the training of health professionals and students in the use of ICT for health. Member States are urged to build on their existing achievements and to adopt such parts of the guidelines as are appropriate for their needs.

To promote the growth of eHealth capacity and applications

- WHO is launching an initiative to promote the adoption of quality criteria for eHealth content. Member States are urged to adopt guidelines to enhance the quality and reliability of content.
- Member States are encouraged to evaluate the benefits of creating open archives for health sciences as a cost-effective approach to the production and dissemination of national research literature.
- WHO will draw up a framework for the training of health professionals using eLearning with a focus on in-country training and local language content.
- Given the increasing need for qualified health professionals and the limited human resources available for training students, Member States are urged to integrate eLearning methods into student education where appropriate.



Satellite connection in Pakistan near a rural health care center.



Emergence of eHealth

A psychiatrist, puzzled by a patient's atypical presentation, confers with a colleague based at a university hospital on another continent as the two interview and observe the patient together via a video satellite connection. Together, they agree on a diagnosis and the best medication regimen.

A nurse in a remote rural hospital—who has not had access to continuing professional education since he graduated from nursing school—completes an Internet-based self-study course on the latest treatment protocols for drug-resistant tuberculosis, using the facility's newly installed computer system.

A woman recently diagnosed with breast cancer and offered a choice of two treatment protocols searches the World Wide Web and is able to access literature from a leading cancer institution—in her own language, which is Spanish—comparing their risks and benefits.

A man in a comatose state is delivered to an emergency room by paramedics who have no information about what prompted his loss of consciousness but have found his identity papers. The attending physician accesses his medical history from a nationwide electronic health records system available through the hospital's computer network. On discovering the man has diabetes she is able to start prompt and life-saving treatment.

Every day, across the world, people make improvements in health as a direct benefit of information and communication technologies (ICT). eHealth innovations like electronic health records, computer-assisted prescription systems and clinical databases are transforming health today, and hold even greater promise for the future. Information and communication technologies support clinical care, provide health information to the general public and scientific information to professionals. They provide a platform for publishing, disseminating health alerts and supporting administrative functions.

The World Health Organization (WHO), cognizant of the growing importance of eHealth, has carried out a number of key actions aimed at bringing the power of ICT to bear positively on health challenges at national, regional and global levels. These include the development of an organization-wide eHealth strategy and the adoption in May 2005 by the World Health Assembly (WHA) of a resolution on eHealth (1), which called on WHO to facilitate the integration of eHealth in health systems and services, including in the training of health-care professionals and capacity building. Monitoring progress and guiding developments in this area is part of the mission of the Global Observatory for eHealth (GOe), an initiative created shortly after passage of the WHA resolution.

In January 2006 the WHO Executive Board endorsed a set of priority action areas in eHealth (2). WHO has been an active participant in the World Summit of the Information Society (WSIS)¹ and subsequently, the United Nations Group on the Information Society, an interagency group created to carry out the summit's recommendations. The WSIS has had significant success in developing momentum and raising awareness among governments of their role in building and promoting equitable information societies through the deployment of ICT across all sectors.

Many different definitions of eHealth have been put forth. A recent systematic review of published materials identified 51 definitions (3). WHO defines eHealth, quite simply, as the use of information and communication technologies for health. Regardless of any controversy over definitions, there is wide agreement on a core principle: that eHealth represents "a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology" (4).

¹ <http://www.itu.int/wsis/>.

■ Historical perspective

Since ancient times, people confronted with illness have striven to marshal information or expertise not available at the patient's bedside, for example by going to a healer, describing the symptoms of a patient too sick to travel and then taking the recommended therapy back to the patient (5). This age-old approach to telemedicine is still in use today in some remote areas. The term has been in use since 1967, when Dr Kenneth Bird created a two-way audiovisual microwave circuit that enabled physicians at the Massachusetts General Hospital in Boston to provide medical care to patients three miles away at the Logan International Airport Medical Station.

Today, of course, integration of various media into a single system around computers with telecommunication, videoconferencing and real-time data transfer has revolutionized telemedicine. The power of the Internet to advance telemedicine was first brought to light by a seminal event in April 1995. An SOS e-mail message was sent through the Internet requesting international help for a Chinese university student named Zhu Lingling, who was suffering from an unknown, but what seemed to be a severe, disease. This led to the first recorded Internet diagnosis—of Guillian-Barré syndrome (6). Today we can routinely send imaging studies through the Internet and carry out live demonstrations and remote consultations through videoconferencing.

The practice of medical record-keeping dates back to the fifth century BC. In Hippocratic literature, medical records were used to demonstrate causes and courses of diseases. The modern medical record first came into use in the early 20th century.

The idea of the Electronic Health Record (eHR) system was first discussed during the 1960s but was not considered seriously until 1991, when the United States Institute of Medicine (IOM) issued a major report urging the adoption of computer-based patient records (7). The report recommended the following care delivery functions: health information and data; result management; order management; decision support; electronic communication and connectivity; patient support; administrative processes and reporting; and reporting on population health. It also called for a national patient identification system. Implementing these recommendations was stalled, however, by the lack of standards required for full interoperability of the complex systems involved.

Interest in moving forward on eHR systems was rekindled in 1999 with the release of two IOM reports on patient safety (8, 9), which concluded that prescription and medication errors could be prevented through the use of computerized order systems. Since then standards developments and technological advances have driven substantial progress in the eHR (6).

Today the eHR provides a comprehensive longitudinal record of patients, and automates and streamlines the clinician's workflow. The ultimate goal is to have federated records (linkage of records from multiple sources). Such a high degree of integration represents an enormous challenge and will need a step-wise approach, starting with subsystems built on clear standards.

Other eHealth advances also can be viewed as the next logical step in centuries-long developments. For example, decision support systems for diagnosis, in the tradition of the great medical reference libraries, use the collective wisdom garnered from a body of scientific evidence to support the diagnosis of diseases or identify potentially harmful interactions between medications even before they are reported.

■ Challenges and opportunities for the future

While industrialized countries have raced forward in developing eHealth, many developing countries remain at the starting gate. It has often been argued that eHealth is an unwise investment for developing countries where essential needs like water and sanitation, housing, food and basic education are not being met. Concerns have been raised that low-income countries might invest their limited resources in dazzling equipment, perhaps to the detriment of more productive approaches for development of human capital, providing quality services, and generally enhancing performance of health systems. The eHealth community needs to examine how ICT can be used to improve efficiencies in the delivery of basic health services; and to prevent eHealth from being driven by “technology push” rather than by needs-based and evidence-led “technology pull”. For example, eLearning has tremendous potential in the developing world. Seeking to tap that potential, WHO has created the Health Academy,⁷ which provides Internet- and CD-ROM-based access to reliable and current knowledge and information on health using text, audiovisual aids, illustrations, photos and animations.

In developing and industrialized countries alike, ICT has not realized its potential as a means to enhance disease prevention. There is evidence that better tapping ICT could result in more effective utilization of health services and increased efficiency (10).

Ever-advancing technologies are rapidly altering the eHealth landscape. Personal digital assistants (PDAs) have already been used successfully for data collection and in clinical practice in resource-challenged health systems. The European Commission has invested significant resources in the development of wearable computing devices that monitor the health of patients, for example, during rehabilitation or for persons working in situations of extreme stress.

In the not-so-distant future, ubiquitous computing, which will embed computation into the environment and everyday objects, will permit people to move around and interact at any moment with information via the Internet. These advances will open new vistas for eHealth. For example, short-range mobile transceivers embedded into various devices with increasing processing capability will permit communication between people and medical devices, and between devices themselves (11).

Many hurdles beyond those of technical knowledge, economic viability and resistance to change will have to be overcome if the full potential of eHealth is to be realized. For example, the Electronic Health Record holds the promise of expanding our understanding of human biology and disease phenomena, if eHR databases that cross-link with information on genomics and proteomics become available to researchers. There could be benefit to the individual as well through identification of personal risk factors for contracting diseases for which there are effective preventive interventions. However, such developments cannot move forward until ethical, legal and confidentiality issues are addressed.

But perhaps the greatest challenge is to generate evidence that eHealth can improve health system performance, help build human capital for health, improve access to knowledge, support decision-making and lead to better outcomes for patients. Through efforts such as the global survey on eHealth conducted by the GOe, evidence is building, and should it prove sufficient it may be time to put forth the concept of “eHealth for all by 2015” as an addendum to the Millennium Development Goals.

⁷ <http://www.who.int/healthacademy>.



■ Global Observatory for eHealth

The Fifty-eighth World Health Assembly in May 2005, adopted Resolution WHA58.28 establishing an eHealth strategy for WHO. The resolution urged Member States to plan for appropriate eHealth services in their countries. That same year, WHO launched the Global Observatory for eHealth, an initiative dedicated to the study of eHealth—its evolution and impact on health in countries. The Observatory model combines WHO coordination regionally and at headquarters to monitor the development of eHealth worldwide, with an emphasis on individual countries. Recognizing that the field of eHealth is rapidly transforming the delivery of health services and systems around the world, WHO is playing a central role in shaping and monitoring its future, especially in low- and middle-income countries.

The Observatory's mission is to improve health by providing Member States with strategic information and guidance on effective practices and standards in eHealth.

Its objectives are to:

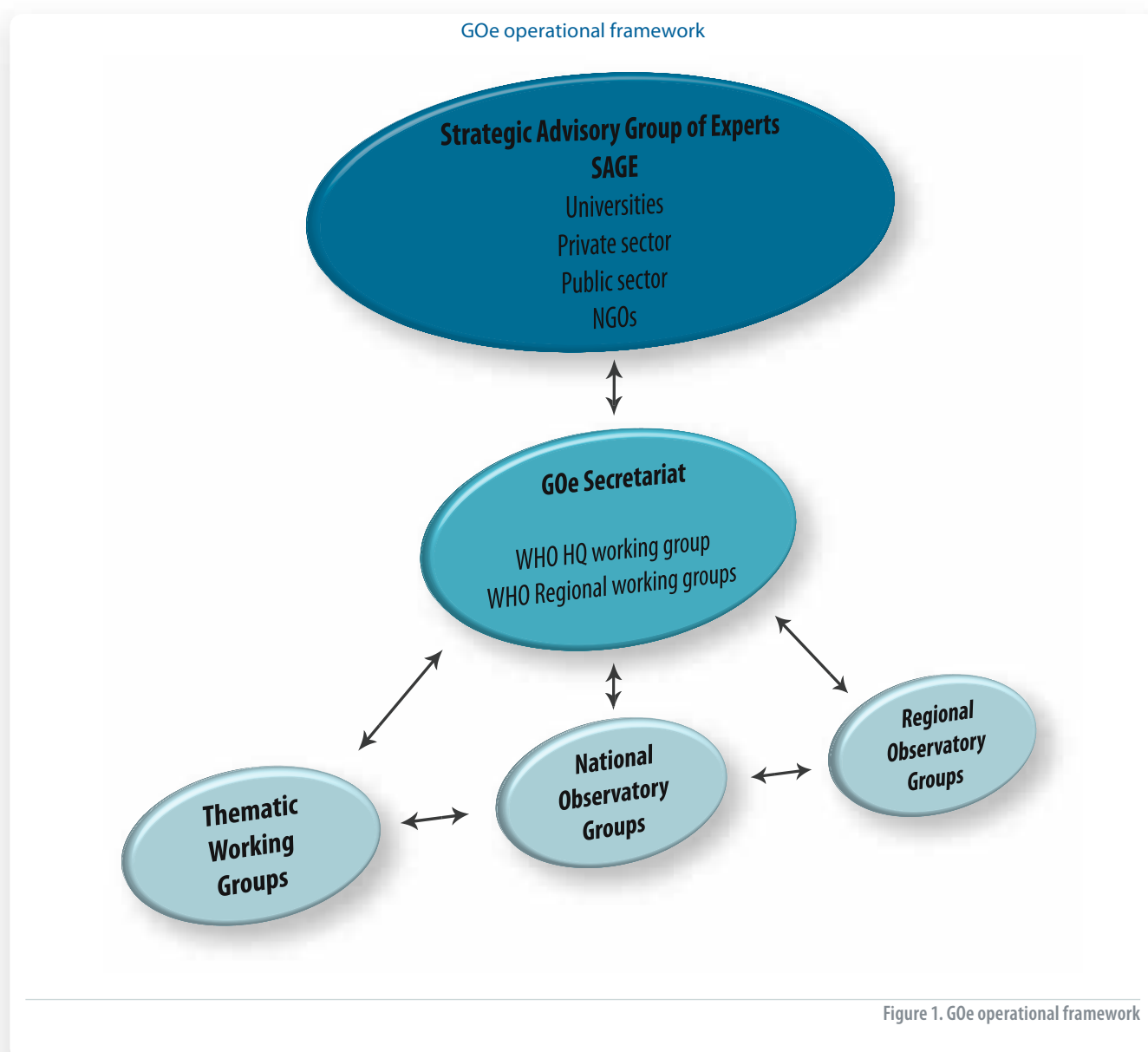
- provide relevant, timely, and high-quality evidence and information to support national governments and international bodies in improving policy, practice, and management of eHealth;
- increase awareness and commitment of governments and the private sector to invest in, promote, and advance eHealth;
- generate knowledge that will significantly contribute to the improvement of health through the use of ICT; and
- disseminate research findings through publications on key eHealth research topics as a reference for governments and policy-makers.

GOe operational framework

Figure 1 illustrates the operational structure of the GOe. The GOe Secretariat was established in 2005. As to the Strategic Advisory Group of Experts (SAGE), two preparatory meetings have been held in 2005 and 2006 while the group is in the process of being formalized. The advisory group comprises experts from both the public and private sectors and represents eHealth practitioners and researchers from across the globe. The Secretariat is based at WHO headquarters in Geneva and works with active input and support of its regional counterparts in all six WHO regions.

Vital to the long-term success of the GOe are the National Observatory Groups (NOGs) and the thematic working groups. As they grow, they will form the extended and decentralized research and reporting network of the Observatory by developing instruments for country-specific data collection and monitoring as well as participating in the collection of data for global purposes. At the time of publication, a national pilot for the NOGs had been undertaken in Cameroon while plans for a regional pilot were being drawn up for the Eastern Mediterranean Region, with the aim of engaging at least 70% of the countries. An early impact evaluation will be conducted following the first year of operations, and the development and implementation of the second GOe survey.

Thematic working groups will be established in strategically important areas such as eHealth policy; security and citizen protection; equity of access and multilingualism; eLearning; and telehealth. These will change with time, and where possible, the GOe will collaborate with existing groups.



Future goals

In the first five years of operations the Observatory aims to create and deliver the following products and services in support of the worldwide development and understanding of eHealth.

- **Establish a research network**—expand the GOe operations to include National Observatory Groups, Regional Observatory Groups and thematic working groups on specific eHealth topics, as well as streamline data collection and reporting through the use of ICT.
- **Develop a framework for analysis**—design a comprehensive framework to uniformly describe and analyse eHealth at all levels—sub-national, country, regional and global.
- **Establish indicators for monitoring**—develop and agree on indicators to measure eHealth within and across countries.
- **Promote best practices**—collect, assess and publish evidence to assist countries in adopting best practices.
- **Policy**—evaluate the impact of national policy, regulations and legislation on eHealth, and assess the impact of eHealth on health systems.
- **Report**—publish reports on special areas of interest in eHealth.



First global survey on eHealth

■ Purpose

WHO's strategy on eHealth focuses on strengthening health systems in countries; fostering public-private partnerships in ICT research and development for health; supporting capacity building for eHealth application in Member States; and development and use of norms and standards. Success in these areas is predicated on a fifth strategic direction: investigating, documenting and analysing the impact of eHealth and promoting better understanding by disseminating that information.

Charged with monitoring the evolution of eHealth and its impact on health in countries, the GOe's first project was to undertake a worldwide survey on eHealth to determine the progress at regional and global levels in the building of the necessary foundations to support the growth of this field. With the results, not only will governments be able to compare their progress against other countries, but more importantly, they will be able to use the identified regional and global statistical means as a benchmark for their own development. The survey is part of the mandate defined during the GOe's inception: to provide to Member States reliable information and guidance on best practices, policies and standards in eHealth.

This report is primarily targeted at ministries of health, ministries of information technology, nongovernmental organizations involved in eHealth, professionals working in the ICT and health field, and academics.

■ Reporting results

Some of the survey data have already been analysed in *eHealth tools & services: needs of the Member States* (12). Published in January 2006, the report was disseminated to coincide with the 117th Session of the Executive Board of WHO, during which the subject of support for eHealth tools and services was discussed. The report identified those tools and services considered to be the highest priority across the majority of countries, and recommended strategies for immediate action.

Building foundations for eHealth, goes further, addressing the findings of the entire GOe survey. It provides an analysis of the data from over 100 countries in thematic areas related to eHealth, such as policy development, funding environments, infrastructure, capacity, eHealth for citizens, access to electronic information on the part of the public and health professionals. Specific country examples to illustrate eHealth in action were selected from survey responses. Key findings are discussed in this report and the complete statistical results are available on the GOe website.¹

The Annex contains an unique and valuable component of this report. The collection of eHealth country profiles provides country-by-country overview of actions taken in the eHealth domain, their perceived effectiveness, the successes and challenges, and future plans. The full data sets, including the country profiles, are also available online.

In addition, two tables are provided (Table 20 and 21) to give an overview of selected country indicators for the responding Member States, as well as the results of a number of key policy actions studied in the global survey.

A solid statistical complementary source of information to the GOe eHealth country profiles is provided through the recently published *Connecting for health: global vision, local insight* (13). Produced by WHO for the WSIS,² this publication provides profiles of each Member State bringing together statistics on health, demographics and ICT to provide a context in which investment in ICT for health can be better understood by all stakeholders.

¹ <http://www.who.int/GOe>.

² <http://www.itu.int/wsisis/>.

■ Survey implementation

The GOe undertook the global survey on eHealth in an effort to strengthen the evidence base required by policymakers to improve programmes and policies on eHealth that have an impact on the health of populations and health systems. Designed to collect data on a wide range of eHealth related questions, the results of this survey provide an important foundation on which to base future studies and actions in this rapidly evolving field.

Survey instrument

The instrument focused on issues relating to processes and outcomes in key eHealth action lines previously identified by the WSIS, which had received strong support by WHO as a framework for action.

It aimed to:

- identify and evaluate measures taken in key action areas to support the development of eHealth in countries;
- determine the value to Member States of the provision of generic eHealth tools and services; and
- construct eHealth profiles of participating Member States.

Table 1 shows the survey's seven thematic areas assessed.

Theme	Action
Enabling environment	Create an enabling environment for the development of eHealth through policy formulation and implementation
Infrastructure	Develop infrastructure in a health context
Content	Provide access for health professionals and the community to digital health content
Cultural and linguistic diversity	Create and disseminate multicultural digital health content
Capacity	Build ICT knowledge and skills in the health sector
National centres for eHealth	Expand the eHealth international network
eHealth tools and services	Query and respond to Member States' requirements for eHealth tools and services

Table 1. GOe survey themes

The survey instrument was developed at WHO headquarters, Geneva, in collaboration with eHealth professionals from the WHO regional offices. It was piloted in two countries before being distributed globally.

Survey informants

Countries were the unit of analysis for the global eHealth survey. Each participating country submitted a single national survey that was completed by a focus group of eHealth specialists. This method was chosen to enhance the response rate and to provide collective support for timely completion.

WHO country offices chose informants from their extensive network of experts. On average, each country chose five informants to complete the survey; some countries had as few as three informants, others had as many as 10. Typically, focus groups were comprised of multi-disciplinary teams to reflect the nature of eHealth and to cover the breadth of the survey. Experts were selected from ministries of health; ministries of information technology; ministries of telecommunications; and public health, medical, and ICT fields. A list of informant's names and institutional affiliation are on the GOe web site.

Survey process

The survey process (Table 2) required considerable coordination between those working in Geneva, and the regional and national offices. In particular, the regional offices were required to liaise with their national coordinators as the national offices were closest to the informants and were usually involved in arrangements for the focus groups.

Meetings were held so that the questions could be discussed and answered by all informants at the same time. Where there were differences of opinion, the survey facilitator would request that the group reach a consensus. Meetings lasted between four and eight hours, with most reporting that it took one full day.

To facilitate country responses, the survey instrument, guidelines for completion, and glossaries of survey and eHealth terms were provided in all six official United Nations languages. All of these are available online.

Stage	Action	Comments
1	G0e headquarters distributes surveys and briefs regional coordinators	<ul style="list-style-type: none"> Regional coordinators receive translated survey instruments, procedures and timelines
2	Country coordinators briefed	<ul style="list-style-type: none"> WHO regional coordinators work directly with country coordinators and liaison officers to advise them of the process; survey materials in local languages provided
3	Country coordinators select key informants and distribute survey materials	<ul style="list-style-type: none"> Country coordinators provided with guidelines to assist with the selection of suitable key informants
4	Informants conduct research prior to attending survey meeting	<ul style="list-style-type: none"> Informants given two weeks to conduct the background research required to complete the survey
5	Survey meetings held	<ul style="list-style-type: none"> Key informants meet; focus groups work for up to one day to complete survey Meetings facilitated by survey administrator Endorsement by WHO representative or designated officer obtained before survey returned to WHO—to encourage quality control and to ensure that specified survey guidelines were met
6	Completed surveys returned to WHO	<ul style="list-style-type: none"> 112 out of 192^a Member States responded by the time of publication 102 were included in the data analysis as the remaining 10 were submitted after the completion deadline for analysis (Feb. 2006) Country profiles were generated for all 112 responding countries
7	Validation of country data	<ul style="list-style-type: none"> After analysis of data, country profiles were sent to countries for validation Feedback from countries incorporated into final eHealth country profiles before publication

Table 2. G0e survey process

a. Number of Member States at the time of survey closure by mid-August 2006.





Quality assurance

Various measures were taken to assure the quality of the survey process, data and implementation. A careful selection of institutions was performed by the WHO regional offices and initial piloting took place in the Democratic Republic of the Congo and Jordan before global distribution. Translation of the survey materials (survey, guidelines and glossary of terms)¹ was provided in all official United Nations languages to promote common understanding of questions and consistency of response. Instructions were made available to the survey coordinators on the procedures for conducting the survey. As the initial deadline proved to be too tight, extensions were given to allow as many Member States as possible to participate. Completed surveys were returned to WHO headquarters for data entry and analysis. All data were checked before analysis and after reporting. A high level of teamwork was involved through the survey respondents, survey coordinators, WHO regional and country offices, and WHO headquarters, which assured efficient and streamlined processing. The country profiles were returned to the Member States for validation before publication and changes requested were incorporated where possible.

Limitations

While reviewing the findings, it emerged that a particular sub question was often difficult to answer, or reach consensus on; this was the rating of the “effectiveness” of a particular action. Countries were asked to attribute a score for each eHealth action ranging from *not effective* to *unknown* with the gradations in between of *slightly*, *moderately*, *very* and *extremely effective*. The rating is based on the “perceived effectiveness” by the group rather than on evidence. Reference to scientific evaluation of programmes was not required. To simplify analysis and to gain a more accurate view, it was decided to aggregate these scores in the reporting of the results into four broader groups: *not* and *slightly effective*; *moderately effective*; *very* and *extremely effective*; and *unknown*.

Every effort was made to select the best national experts to complete the instrument, however, due to the broad scope of the survey it is not possible to determine whether the focus groups had the collective eHealth knowledge to tackle each question.

Finally, while the survey was circulated with a set of detailed instructions and terminological definitions, there is no guarantee that these were used when responding.

Data processing

On receipt of the completed questionnaires, all textual responses were translated into English. Data modification for the purposes of analysis did not occur unless multiple responses were provided when a single response was required. In this case a null response was entered.

The data were analysed using Stata software to produce an initial overview and analysis of each of the questions, and provided a predefined cross-question analysis. The data were then imported into “R”, another statistical program.² Analysis of the responses to individual questions were matched to responses to other questions and grouped by socioeconomic indicators. The R program was also used for ad-hoc analyses that were performed in determining other possible relationships between survey questions.

A number of separate and distinct parameters were introduced for further analysis. The results for each question were presented as percentages under specific headings, that is, adoption of a strategy or action, assessment of effectiveness and future actions. These results were then aggregated and analysed by WHO region,³ World Bank income group⁴ as well as by ICT Diffusion Index,⁵ to provide a more detailed analysis and perspective. The ICT Diffusion Index analysis results were not included in this report, as

¹ <http://www.who.int/GOe>.

² Statistical analysis suite of software developed and maintained as open-source software (<http://www.R-project.org>).

³ See the Annex of this publication.

⁴ World Bank income groups are based on World Bank estimates of 2004 Gross National Income (GNI) per capita: (1) high income, US\$ 10 066 or more; (2) upper-middle income US\$ 3 256–US\$ 10 065; (3) lower-middle income, US\$ 826–US\$ 3 255; and (4) low income, US\$ 825 or less. For more information see <http://www.worldbank.org/> (accessed in February 2006).

⁵ UNCTAD has developed this index to measure the digital divide: *The digital divide: ICT development indices 2004* (14).

there appeared to be little consistency between response patterns and the index of the countries. This outcome had not been anticipated and will need further investigation in future studies.

Table 3 shows the country groupings selected, to aggregate the data, including their strengths and constraints.

Country grouping	Strength	Constraint
WHO region	WHO regional approach integrated into WHO strategic analysis and planning, and operational action	Limited country commonality from an economic, health care or ethnic perspective Less useful for other agencies or institutions wishing to interpret or act on GOe data
World Bank income group	Clear economic definition Consistent application of criteria across all countries and WHO regions Simple four-level scale	Does not account for expenditure aspects such as repayment of foreign debt, ongoing armed conflicts, health of the population or population age

Table 3. Country groupings

Response rate

A total of 112 countries (58% of the total number of WHO Member States, corresponding to 78% of the world population) responded to the survey. Of these, 102 (53% of the total number of WHO Member States, 75% of the world population) (Figure 2) reached the Observatory by February 2006 in time for data processing and analysis and so the results of this report are based on the data provided by these 102 countries. The Annex presents country profiles of all 112 participating Member States. Responses by Member States to the global eHealth survey are the only data sources used as the basis for this report. Tables 4 and 5 show the distribution of the 102 responding countries by WHO region and World Bank income group.

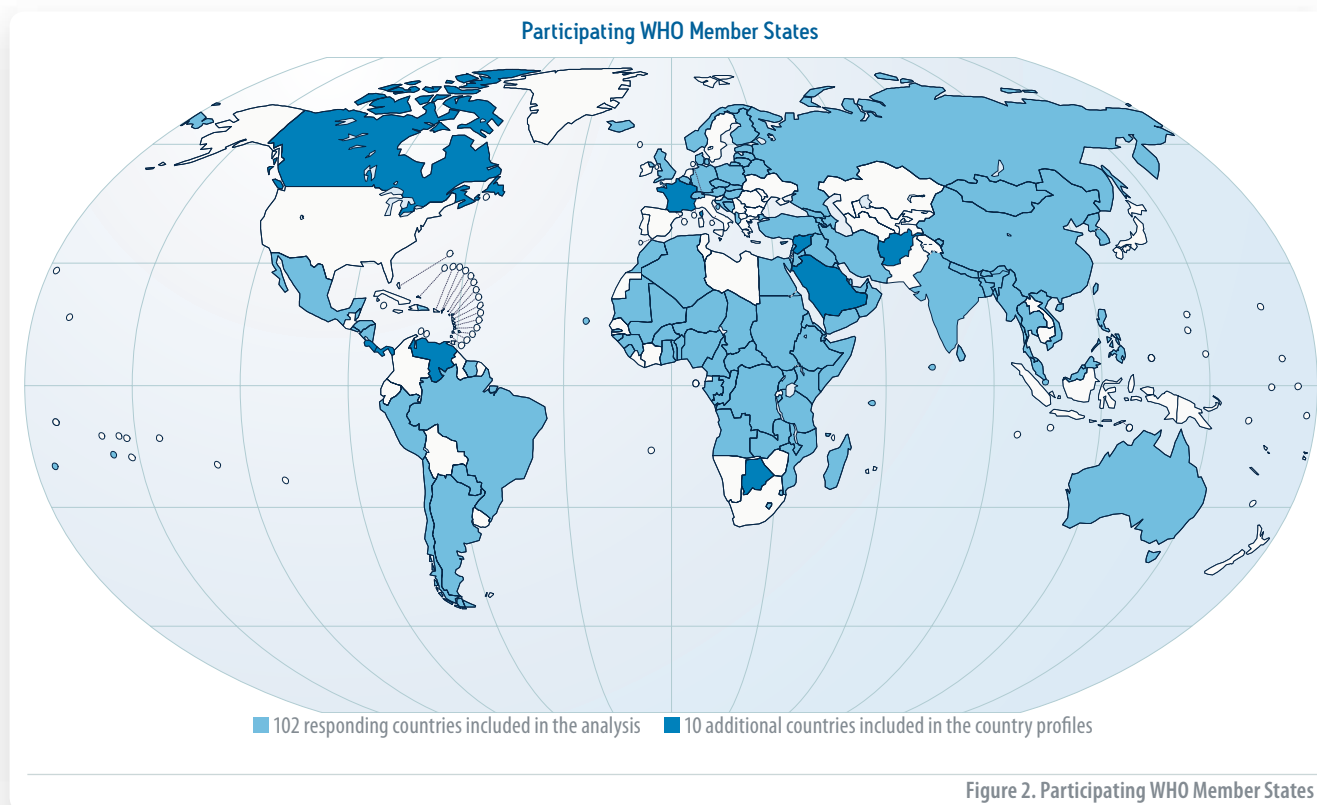


Figure 2. Participating WHO Member States

Response rate by WHO region

Administratively, WHO is made up of six geographical regions. However, the regions themselves are not homogenous. Their Member States are countries with differing characteristics of size, wealth and health care problems. Nevertheless, it is still important to present high-level eHealth analyses at the regional level as this reflects the organizational structure and operational framework of WHO.

A breakdown by WHO regional responses is presented in Table 4. It shows considerable variation ranging from 35% for the Americas to 80% for the South-East Asia Region and 75% for the African Region. European and Eastern Mediterranean Regions average 50% response rates.

	WHO region					
	Africa	Americas	South-East Asia	Europe	Eastern	Western Pacific
Total no. of countries	46	35	11	52	21	27
No. of responding countries	34	12	9	25	11	11
Response rate to nearest 5%	75%	35%	80%	50%	50%	40%

Table 4. Response rate by WHO region (February 2006)

Response rate by World Bank income group

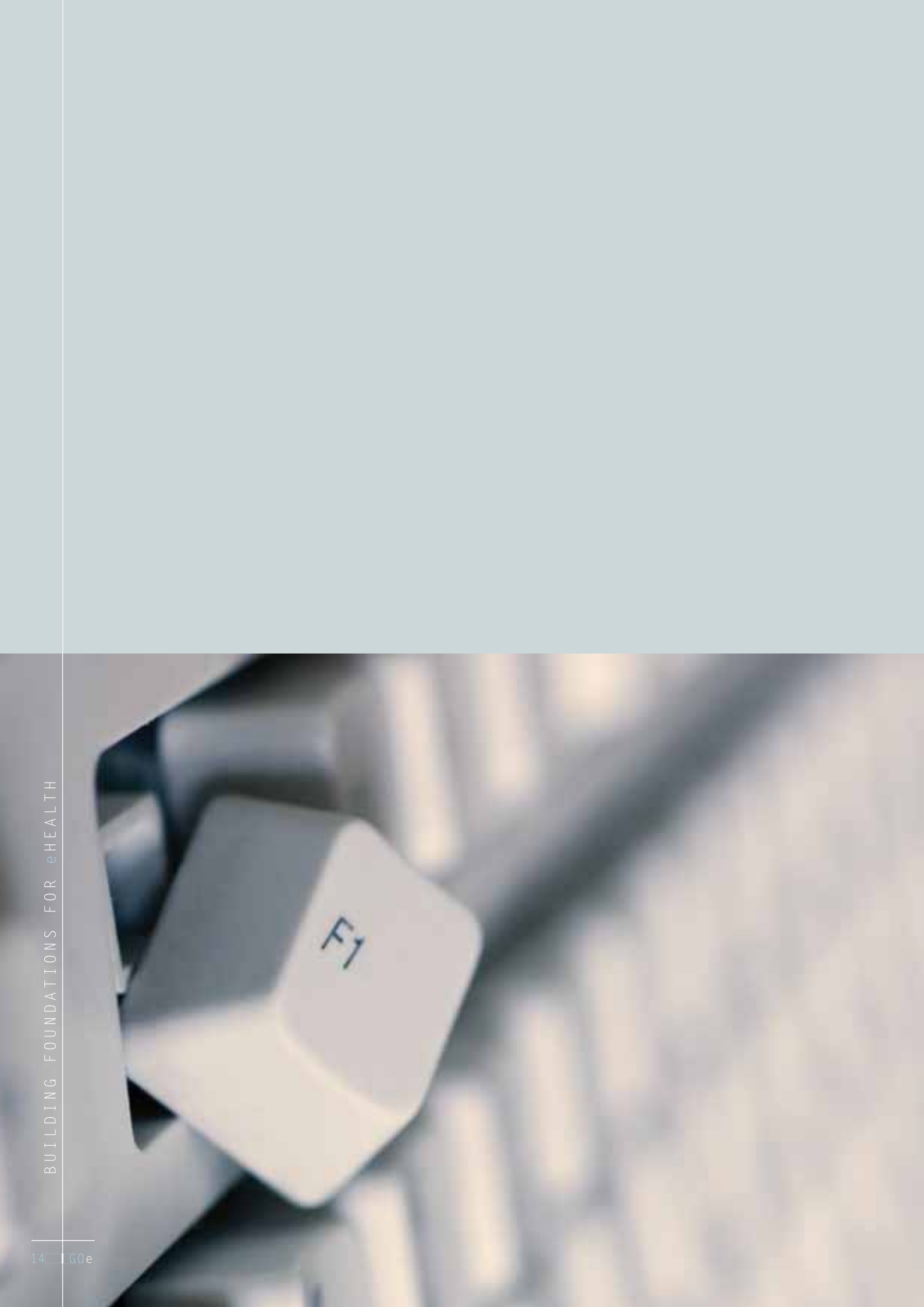
Table 5, presented by World Bank income groups, shows that the high income countries were less likely to respond to the survey than the low income countries. This distribution may be attributed to the fact that the more developed countries may have found the survey relatively elementary for their level of advancement in eHealth.

	World Bank income group			
	High income	Upper-middle income	Lower-middle income	Low income
Total no. of countries	39	38	53	61
No. of responding countries	18	19	25	40
Response rate to nearest 5%	45%	50%	45%	65%

Table 5. Response rate by World Bank income groups (February 2006)

WHO emergency response
team member in Uganda.





Key findings and discussion

■ Introduction

The Global Survey for eHealth is based on the premise that the most favourable approach to the implementation of eHealth at the national level is to have a framework of strategic plans and policies which lay the foundations for development. Furthermore, enabling actions need to take place which ensure that the services provided are accessible to all citizens, regardless of culture, language or geographical location and which protect their privacy and confidentiality. And finally there is the provision of eHealth systems and services which are more likely to be successful if supported by solid foundation actions as well as appropriate enabling policies.

The World Bank's logframe handbook (15) and its associated monitoring and evaluation toolkit (16) provide an excellent, comprehensive guide to strategic planning and implementation, as well as monitoring and evaluation of eStrategies. The eHealth Development Model (Figure 3), which is an adaptation of a similar model found in the Toolkit, presents a structured framework in which to report and consider the survey results.

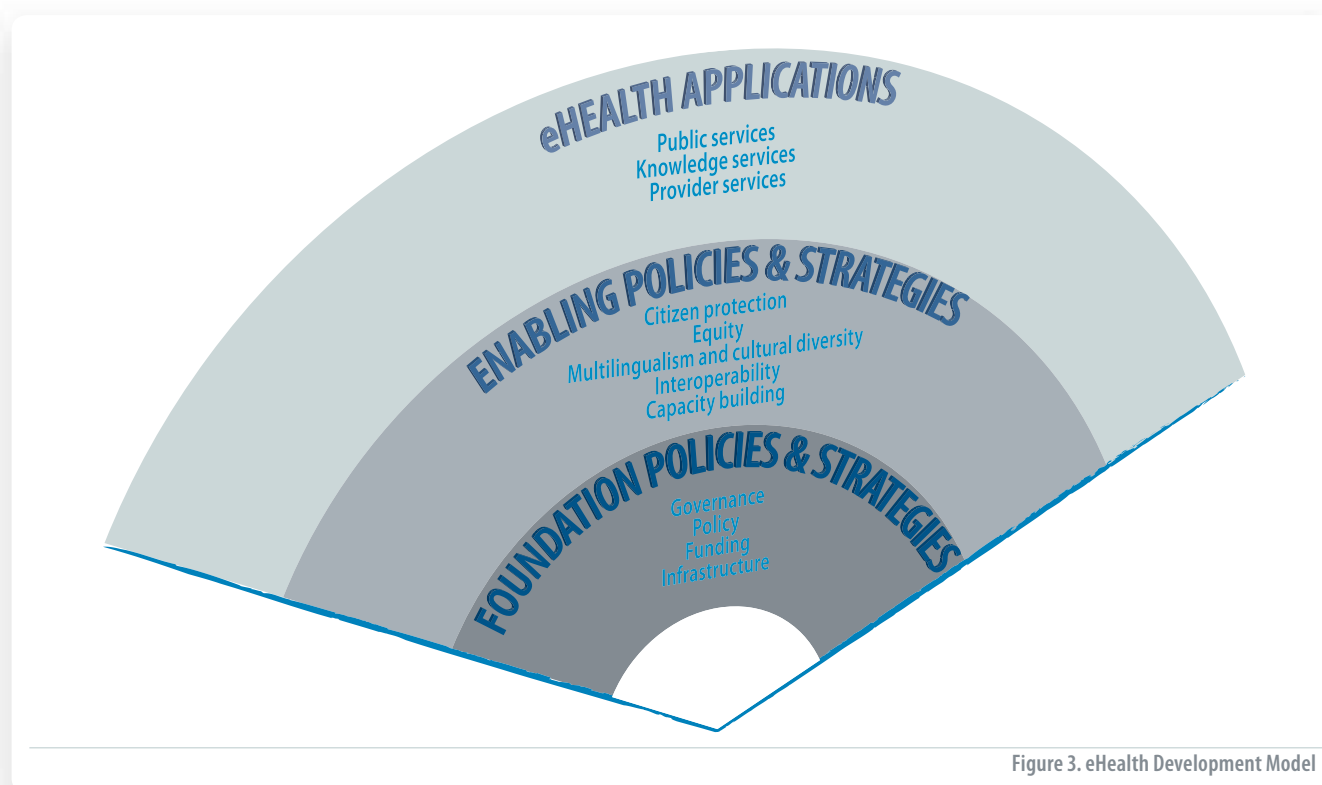


Figure 3. eHealth Development Model

National foundation actions form the basis of eHealth in countries. These include the creation of an appropriate governing body—a multi-stakeholder, national-level, eHealth authority to provide leadership and direction, the development or adoption of eHealth policy to define the vision and action required, the development of a funding framework to support the vision, and mechanisms to develop ICT infrastructure for the provision of eHealth services.

The second layer consists of enabling actions, which broadly act as a bridge between foundation policies and strategies and the planned outcome of providing eHealth services for all. The functions of enabling actions are to protect the citizen, promote access and equity, and to act on the need for multilingualism and multiculturalism in cyberspace. They include eHealth interoperability policies and strategies to ensure that systems can communicate with each other. Finally, they include a component to build the ICT capacity of health professionals and students.

The final layer, eHealth applications, is made up of eHealth systems and services provided for the citizen. The success of these applications is largely dependent on the actions leading up to them, that is, services in this layer will be more effective if the actions in the first two layers have been executed well. Solid foundational layers lead to more effective eHealth systems and services.

Although the range of eHealth applications is now extensive, only a select number were included in the survey. The field is so vast that it would need to be covered in a separate survey.

■ Foundation policies and strategies

A significant component of the survey was dedicated to measuring progress made by countries in establishing basic mechanisms, which play a critical role in the development of eHealth at the national level. Based on the eHealth Development Model, these include areas such as: establishing methods for transparent and responsive eHealth governance; adoption of strategic policies and funding approaches which support eHealth systems and services; and promoting infrastructure development for the health sector.

Governance

Good governance in health care is built on the following four principles, which are applicable across all health system processes including eHealth.

- **Accountability**—the need for public officials in health to be answerable for the decisions and actions of government.
- **Participation**—the involvement of citizens, the private sector and other stakeholders in consultation and planning.
- **Consistency**—the equitable and consistent application of policies and legislation relating to health.
- **Transparency**—making information on policies, regulations and decisions available to the general public.

Key trends

- Approximately 50% of responding countries have established some form of governance mechanisms for eHealth.
- Higher-income countries are more likely to have introduced eHealth governance practices than lower-income countries.

The need for sound governance practices has been gaining increased recognition in recent years with the push in many countries for responsible, participatory and equitable public-sector management. In reality, governance mechanisms are not always established in advance of initiatives themselves. This appears to be the situation in many countries with respect to eHealth governance.

To determine if countries had introduced governance mechanisms in eHealth, survey respondents were asked if their country had a national eHealth task force or advisory board to provide advice in areas such as policy/strategy or programme development and evaluation. In contrast to the majority of the questions in the survey, countries were not asked to “rate the effectiveness” of these bodies or about “future plans”, but instead to respond with “yes/no” and provide any relevant details.

Figure 4 provides an overview by WHO region of the implementation of governance bodies in eHealth for responding countries. At the global level, roughly one in two countries report to have any mechanisms in place. The Western Pacific and European Regions are more developed in this area with between 70% and 80% of responding countries having established mechanisms. The African and Eastern Mediterranean Regions have the lowest number of established eHealth governance mechanisms—40% and 50% of countries respectively. Figure 5 shows the same countries distributed by World Bank income groups. It displays a trend commonly found in this survey, that of high and upper-middle income countries being more likely to have adopted this action than those in the lower-middle and low-income categories.

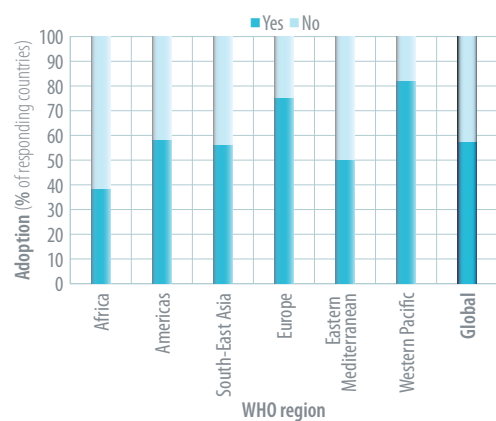


Figure 4. eHealth governance, by WHO region and globally

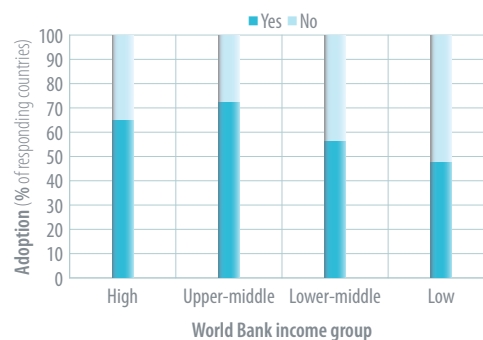


Figure 5. eHealth governance, by World Bank income group

Conclusion

The implementation of effective eHealth systems and services hinges on the successful collaboration of multiple stakeholders with a diverse range of interests and agendas. It is therefore critical that governments establish sound governance mechanisms to manage the complex process of collaboration, which will lead to successful implementation of eHealth systems and services. The survey results indicate that there is considerable work to be done in this area, as half of the responding countries do not have governance mechanisms in place.

Resolution WHA58.28 on eHealth (1) urges Member States to consider drawing up long-term strategic plans for the development and implementation of eHealth services. It calls on governments to form national eHealth bodies, which would be responsible for providing crucial guidance in areas such as policy and strategy development in eHealth including data security, privacy, interoperability, cultural and linguistic issues, infrastructure, funding, monitoring and evaluation.

WHO recommends that each Member State establish a national-level body for eHealth, which is formally supported by the ministry of health as a key instrument in implementing the WHA eHealth resolution.



Policy framework

Three interrelated policy/strategy areas were surveyed and are listed below. For the purpose of this report, the terms policy and strategy are used interchangeably. The survey questions did not ask respondents to differentiate between whether they had introduced a policy or a strategy. The intent was to ascertain if action had been taken in a particular area.

- **National information policy**—a framework and approach governing a wide range of aspects regarding national information (in digital and analogue form). Issues covered can include quality of information, access, legal deposit, intellectual property, freedom of information, data protection and privacy. Such policies or strategies aim to be comprehensive and cover issues across multiple sectors.
- **National ePolicy**—a framework and approach for incorporating ICT across national government sectors, established by government with the intent of advancing the use of ICT. Unlike a national eHealth policy, which focuses on ICT for health, these policies are multisectoral and could include the use of ICT in education, welfare, commerce and other sectors.
- **National eHealth policy**—a framework and approach for developing eHealth in a country, established by government with the intent of achieving health goals. In this survey it referred specifically to the use of ICT in the health sector.

Key trends

- Globally and regionally the highest rate of policy adoption is for national information policies and the lowest is for eHealth policies.
- Developed countries are more likely to have all three policies in place than developing countries.
- The adoption of eHealth policies in particular is anticipated to grow more than the other two policy frameworks.
- The African Region shows the lowest rate of adoption across all three policy areas and the highest percentage projected growth. The region may therefore require extra support in policy formulation.

Table 6 provides a profile of the global rates of policy adoption across the three frameworks as well as projections for adoption levels by 2008. The results show a clear trend in policy adoption rates with the highest levels being enactment of national information policies followed by national ePolicies and then eHealth policies. This trend is influenced by at least two factors. First, information policies are broader than the other frameworks and are generally introduced first by governments. Second, eHealth is still in its infancy in many countries, particularly developing countries, so specific eHealth policy development is likely to be lagging behind the broader information and ePolicy frameworks.

	2005	2008 ^a	Projected relative growth ^b
National information policy	78%	92%	+18%
National ePolicy	76%	90%	+18%
National eHealth policy	63%	85%	+35%

Table 6. Global trends in policy adoption

- ^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.
- ^b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).

It appears that there may be a relationship between a country having an information policy and its likelihood of introducing related 'e' policies. For example, the survey found that for those countries with an information policy already in place, 90% have also adopted an ePolicy and 75% have an established eHealth policy. For those countries without an information policy framework, only 30% have either an ePolicy or eHealth policy framework in place. An information policy therefore appears to provide the foundation upon which later policy adoption depends.

The earliest reported date of adoption for national information policies was 1971. However, the earliest date of adoption for a national eHealth policy was over 20 years later in 1994. Subsequent uptake of eHealth policies by countries was slow until 1999—by which time 30% of responding countries introduced these policies. However, between 2000 and the end of 2005, there was a peak in adoption, most notably from 2002 onwards.

National information policy

Most WHO regions show a high level of uptake of information policies, ranging from 80% of responding countries to almost 100% (in the case of the European Region). The exceptions are the African Region and the Region of the Americas, where policy adoption has been slower. Nonetheless, projections indicate that most regions will have around 90% or higher adoption by 2008. Countries in the African Region are anticipating much growth in this area (see Figure 6).

Figure 7 provides a breakdown by World Bank income group. It shows a clear tendency for countries in the low-income group to be less advanced in the process of implementing an information policy before 2005. That being said, countries in all income categories plan to be around the 90% implementation rate by 2008.

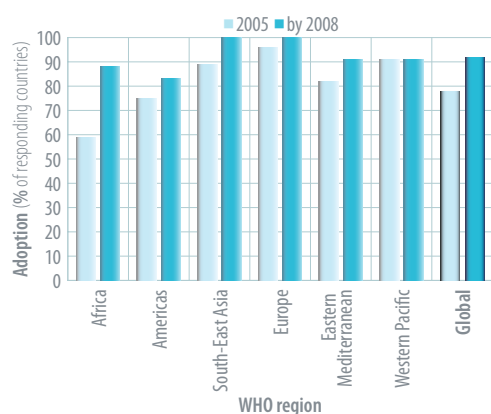


Figure 6. National information policies, by WHO region and globally

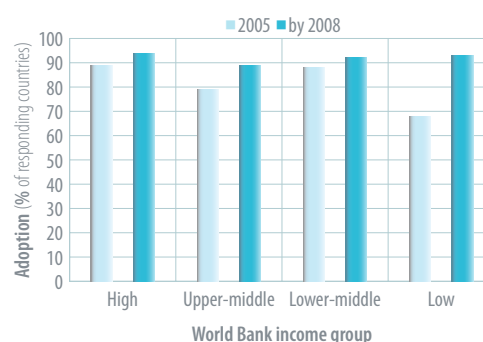


Figure 7. National information policies, by World Bank income group

National ePolicy

Figures 8 and 9 show very similar trends as those presented in Figures 6 and 7. With the exception of the African Region, all other regions have an adoption rate for national ePolicies of over 80%. The African Region has a rate of 55% and forecasts growth to 85% by 2008. As stated earlier, there is a clear relationship between country wealth and introduction of a national ePolicy, with industrialized countries more likely to have them than developing countries.



Figure 8. National ePolicies, by WHO region and globally

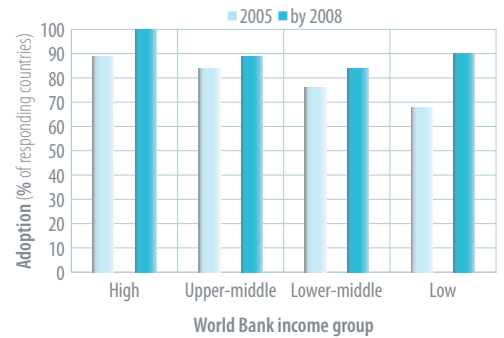


Figure 9. National ePolicies, by World Bank income group

eHealth policy

Figure 10 shows that all but the African Region currently have an eHealth policy adoption rate of 60% or higher, and all regions anticipate growth in this area to 80% or higher by 2008. As with the other two policy frameworks, countries in the African Region exhibit the lowest rate of eHealth policy adoption—40%. There is keen interest to progress in this area among African nations. Countries in this region anticipate an approximate doubling of their adoption rate of these specialist policies by 2008.

Figure 11 shows a clear trend between income groups and policy adoption. It again displays a marked gap between the high and the upper-middle income countries and the lower-middle and low-income countries, with industrialized countries presenting higher rates of adoption than developing countries.

Figure 12 portrays a global view of the adoption of eHealth policy by participating Member States.



Figure 10. National eHealth policies, by WHO region and globally

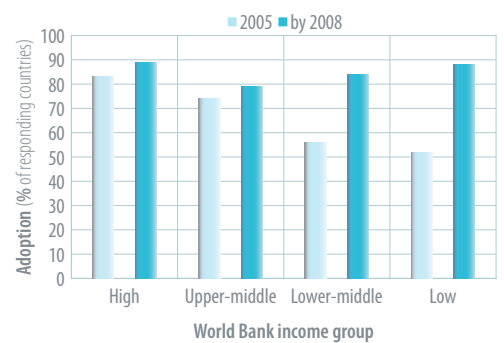
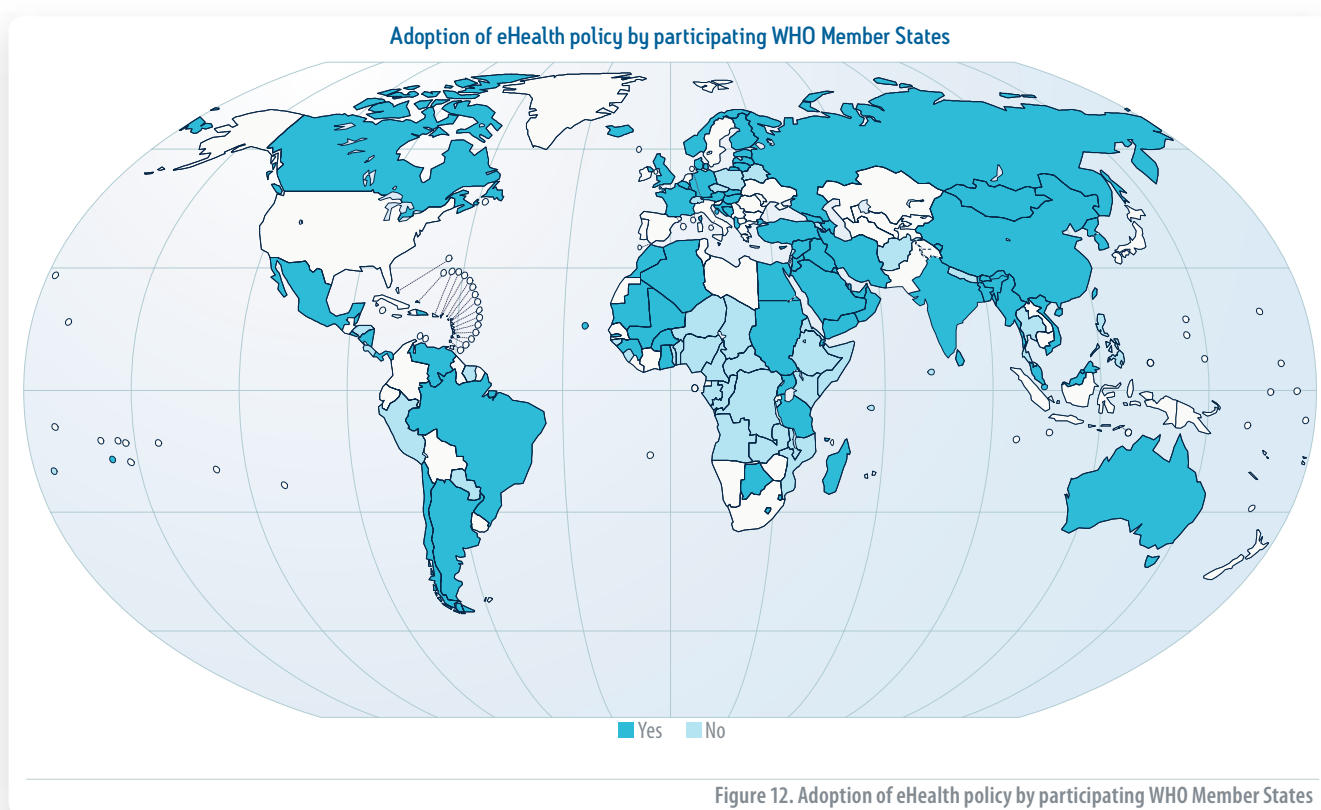


Figure 11. National eHealth policies, by World Bank income group



eHealth in action: policy adoption

■ Mexico

Within the framework of the 2001–2006 national health programme and of the national e-Mexico system, the health sector is implementing an eHealth programme of action with the following objectives: to improve the population's health and to expand the coverage of health services with priority for the inhabitants of the most marginalized localities using a telematics system that is tailored to the needs of society; to make health information available online; and to offer education and training for health workers.

■ Turkey

In Turkey, the National Health Information System project was implemented in January 2003 under the Ministry of Health. Ten working groups comprising members from governmental institutions, the private sector, nongovernmental organizations, universities and social partners conducted inter alia an assessment of the technological situation within their respective fields. The eHealth Working Group, coordinated by the Ministry of Health and developed in the context of 'eTransformation Turkey', has developed modules of eHealth services. The eHealth Project Proposal, prepared by the Health Transformation Programme and eTransformation Turkey has been accepted by the International Telecommunications Union (ITU). As a further step the eHealth Implementation Plan has been developed.

Box 1. Policy adoption

Building a common framework enables success: eHealth in the European Union

The European Union represents 25 of the 53 countries in the WHO European Region, a diverse region. Each country is responsible for its own health care system. The eHealth domain is far from homogenous: eHealth policies and strategies vary across countries, as does the degree of implementation and level of sophistication.

An action plan adopted by the European Commission in April 2004* shows how information and communication technologies (ICT) can be used to deliver better-quality health care throughout Europe. The 'eHealth action plan' covers everything from electronic prescriptions and computerized health records to using new systems and services that cut down waiting times and reduce errors. For example, broadband-speed Internet connections enable hospital consultants and general practitioners to exchange vital medical records and complex test results before surgical operations, and doctors are increasingly using ICT to stay in close contact with outpatients and monitor their progress at home. Specific research programmes and European-wide funding support these actions. The success of the strategy is dependent not only on the actions taken by the European Commission in its coordination efforts, but also the member countries in developing their own internal systems and infrastructure.

The action plan sets out a road map for greater use of technologies, and new services and systems built around an objective of a 'European e-Health Area'. It identifies practical steps to achieve this through work on electronic health records, patient identifiers and health cards, and faster rollout of high speed Internet access to enable optimum interactions among health-care professionals and with the general public. It also calls on member countries to develop national and regional eHealth strategies. By the end of the decade, the EU should be well positioned to measure the impact of eHealth technologies on the quality and efficiency of services, as well as overall productivity. eHealth will become commonplace for health professionals, patients and citizens alike.

eHealth forms an important part of the European Union's eEurope strategy. It will play a vital role in achieving stronger growth and creating jobs requiring higher qualifications within a dynamic, knowledge-based economy, resulting in real gains in the advancement of eHealth within the European Region.

*Europe's Information Society Thematic Portal (http://europa.eu.int/information_society/activities/health/policy_action_plan/index_en.htm, accessed 1 November 2006).

Box 2. Case study: eHealth in the European Union

Conclusion

The results of the survey clearly show that responding Member States have not yet adopted eHealth policies to the extent that they have for 'broader' policies (e.g. national information policies or ePolicies). As eHealth policies are the most specialized within this framework they generally follow the introduction of the broader policies. There are strong indications that most governments now see the need to shape the development and management of the eHealth domain, given the tremendous potential benefits this area can bring to the health of citizens in particular and health systems in general. This will entail much policy development activity across all regions, and in particular in the African Region where the greatest growth is anticipated.

To support Member States in their efforts to shape eHealth policy, the Global Observatory for eHealth will establish a thematic working group to develop a set of tools and guidelines for adaptation and adoption by countries.

Funding

The success of even the most progressive of eHealth policies is at risk if an adequate and complementary funding environment does not exist to support it. The approaches taken to funding eHealth are critical elements in ensuring these policies can maximize their potential, as illustrated in the eHealth Development Model in the beginning of this chapter (Figure 3).

The following approaches to funding were explored:

- **Public funding**—providing ongoing public funding for ICT support of programmes addressing national health priorities.
- **Private funding**—securing private funding, through grants or private investments, for ICT support of programmes addressing national health priorities.
- **Public-private partnerships**—partnerships formed between public organizations and private entities to foster the use of ICT in the health sector.
- **Procurement policy**—guidelines and procedures developed by institutions or government to guide software, hardware and content acquisition in the health sector.

Key trends

- Public funding remains the primary means of support for eHealth activities.
- Of all funding approaches surveyed, public-private partnerships are projected to grow the most by 2008.
- Procurement policies are rapidly being recognized as an effective mechanism in maximizing ICT purchasing budgets, and are projected to be a key element in funding approaches by 2008.

Table 7 shows the global overview of country responses and their projections for 2008. eHealth depends primarily upon public funding with a far lesser proportion of countries also using private funding or public-private partnerships to support activities. This pattern is likely to continue through 2008. Growth is anticipated in all funding areas over the next three years, but particularly in the use of public-private partnerships where a 40% increase is projected as well as in the introduction of procurement policies with a 60% projected growth.

	2005	2008 ^a	Projected relative growth ^b
Public funding	68%	79%	+16%
Private funding	37%	49%	+32%
Public-private partnerships	43%	60%	+40%
Procurement policy	50%	79%	+58%

Table 7. Global trends in funding approaches

^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.

^b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).



Public funding

The majority of Member States in the WHO regions depend on high levels of public funding for eHealth (70% or more), whereas only half of the responding countries from the African Region are supported by this approach (Figure 13). Countries in the higher- income World Bank groups utilize public funding more than those in the lower-income groups (Figure 14). The heavy reliance of the health sector on government funding is likely to remain the same although other combinations of funding scenarios will gain importance as public funds become increasingly strained.

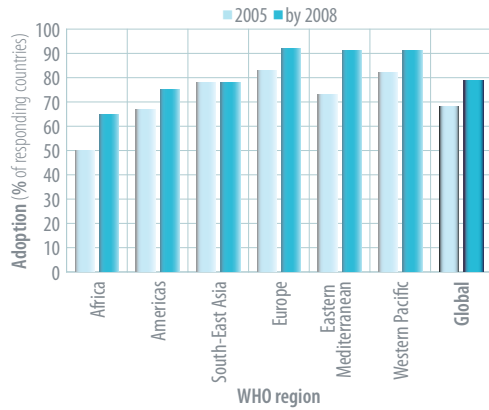


Figure 13. Public funding, by WHO region and globally

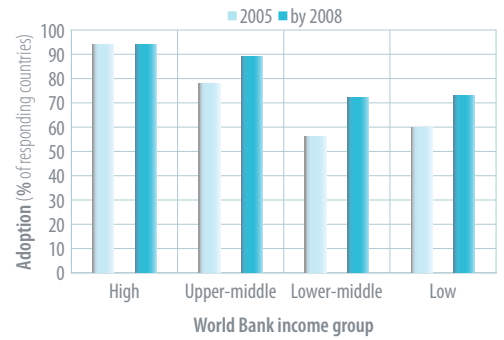


Figure 14. Public funding, by World Bank income group

Private funding

Private funding sources are far less widespread than public and are used by less than half of the responding countries (40%). It is interesting to note that there is quite some variation across regions as far as the use of private funding approaches are concerned (Figure 15) compared to the pattern of adoption for public funding. The Region of the Americas and the Eastern Mediterranean Region show the lowest use of this approach (25% and 0% respectively of responding countries). The European Region reports the highest adoption (60%). In this domain the African Region's use of private funding is close to the global mean, and is projected to exceed it by 2008.

Figure 16 illustrates an unusual trend: countries in both the high- and low-income groups display a similar pattern in the degree of adoption of private funding approaches. As the survey did not explore the types of sources of private funding it is not possible to provide further analysis. However, given global funding trends it is likely that developing countries receive donor grants for development in eHealth and that this would constitute most of the private funding sources. In contrast, it is generally recognized that industrialized countries receive funding from a blend of government loans, private sources, research grants and investments.



Figure 15. Private funding, by WHO region and globally

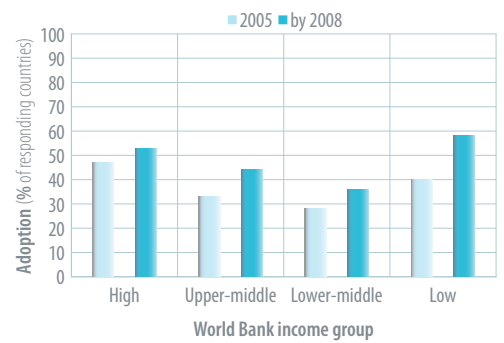


Figure 16. Private funding, by World Bank income group

Public-private partnerships

Globally, less than one half of the responding countries have currently introduced public-private partnerships (PPP) to support eHealth, with robust growth anticipated by 2008—35% more countries intend to explore this approach. Figure 17 shows that the highest adoption rate is in the Western Pacific Region and the lowest in the African and Eastern Mediterranean Regions. The latter regions are also projecting substantial increases in partnership building (i.e. between 70% and 100% more countries adopting this approach). Figure 18 suggests that there is no clear relationship between country wealth and the tendency to cultivate PPP.

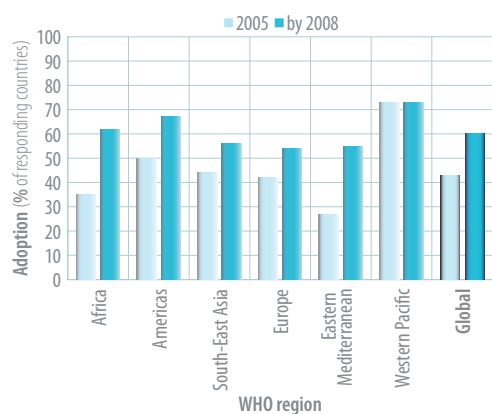


Figure 17. Public-private partnerships, by WHO region and globally

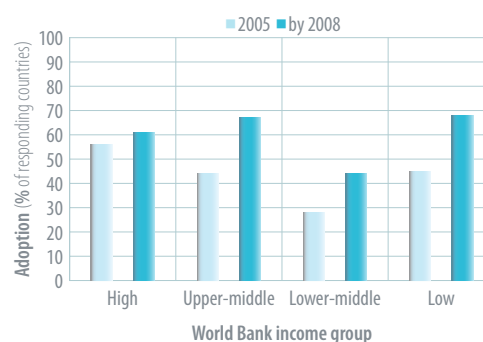


Figure 18. Public-private partnerships, by World Bank income group

By its very nature, eHealth is particularly well suited to PPP. The fact that the ICT industry is primarily driven by the private sector means that it can offer significant value to any partnerships within the health domain, which can include technical expertise, equipment, training, project exposure and financial support. However, the importance of working in the context of clear guidelines and sound project governance cannot be overstated as these partnerships can be delicate and complex.

As the concept of PPP evolves and more partnerships are formed, new and innovative experiences will emerge in all sectors, which in turn will provide valuable lessons for future endeavours. The following case study highlights the role the citizen can play in these relationships as a “private partner” contributing his or her computer computation power for the collective benefit of a public health programme in Africa (Box 3).



Creative partnering for eHealth: Africa@home “Putting your computer to work to fight against malaria in Africa”

Malaria is one of Africa’s greatest health challenges with around one million deaths per year. Launched in July 2006, Africa@home* is an initiative that seeks to enlist the aid of volunteers around the world to help prevent its spread. Based on Grid technology,** and initiated by the physics laboratory CERN, the project’s aim is to use the computational power of thousands of local computers, linked through the Internet, to run a program called MalariaControl.net (<http://www.malariacontrol.net/>).

The simulation is so computer-intensive that it would take years to conduct on a handful of computers. Partnering with thousands of volunteers—through the use of their computers—greatly reduces the time it takes to model the ways in which malaria spreads, so that researchers can better understand malaria vector routes and improve the impact of new treatments.

Volunteers, or private partners in this project, are a critical element in this network of partners. Through their combined donations of computer power they are effectively providing hundreds of thousands of dollars in computing time and project support. Without them, the project could not be carried out. In fact, the programme has already shown that by linking the computers of volunteers, it can run simulations equivalent to what would take 150 years of processing time on a single PC.

To participate, they simply download the required software from the Africa@home web site. All of the calculations are carried out in the background of the computer with no action required by the volunteer. The results are returned automatically at regular intervals to a central server at the University of Geneva, where they are analysed.

The range of partners in this project include:

- **Private partners**, citizens who offer the computational power of their computers for the public good.
- **CERN** (from the French, Conseil Européen pour la Recherche Nucléaire), the European Organization for Nuclear Research, the world’s leading laboratory for particle physics. (<http://public.web.cern.ch/Public/Welcome.html>).
- **The Swiss Tropical Institute**, based in Basel, Switzerland, operates worldwide to contribute to the improvement of the health of populations (<http://www.sti.ch/>).
- **The University of Geneva**, the second largest university in Switzerland, pursues three missions: teaching, research, and service to the wider community (<http://www.unige.ch/>).
- **ICVolunteers**, an international nongovernmental organization that recruits, trains and coordinates volunteers for non-profit projects. Its CyberVolunteers programme works with information and communication technology specialists who offer their skills and time to development projects (<http://cyber.icvolunteers.org/>).
- **Informaticiens sans Frontières** (ISF), an independent organization of international volunteers that aims to help bridge the digital divide. ISF focuses on free open source solutions, and proposes a range of solutions that cover most problem areas of the digital divide (<http://isf.cern.ch/isf/>).
- **The Geneva International Academic Network** (GIAN), an international research network whose primary objective is to reinforce cooperation among international organizations and academic institutions (<http://www.ruig-gian.org/>).

* Africa@home (<http://africa-at-home.web.cern.ch/africa%2Dat%2Dhome/africa.html>).

** The Grid is an emerging computing model which solves large-scale computation problems through the sharing of computer power and data storage capacity over the Internet.

Box 3. Case study: Africa@home

Procurement policies

Policies on procurement impact directly on the funding available for eHealth systems or services. They influence how resources are spent as well as how effectively they are deployed. They can streamline ICT business processes and lead to dramatic savings at national, regional and district levels. As they deal with not only the issue of cost-effectiveness in purchasing, but also cost reduction, they should be considered by all governments as an integral part of the funding approach.

Given that these policies are aimed at cost saving, it is perplexing that only half of the countries that responded had implemented them by the end of 2005. Globally, however, a 60% increase in this area is projected by 2008—the highest of any projections for actions in this cluster of questions. This would indicate that governments are realizing the potential of this approach.

The WHO regional response shows the African Region, the Region of the Americas and Eastern Mediterranean Region currently with the lowest adoption rates, but all projecting increases towards 80% (Figure 19).

Figure 20 shows that countries in the World Bank's high income group have adopted these policies the most readily; the lower-middle and low-income groups lag behind. The latter two project the greatest increases in uptake by 2008. It is also unusual to see the upper-middle income group of countries so relatively low in uptake of policies.

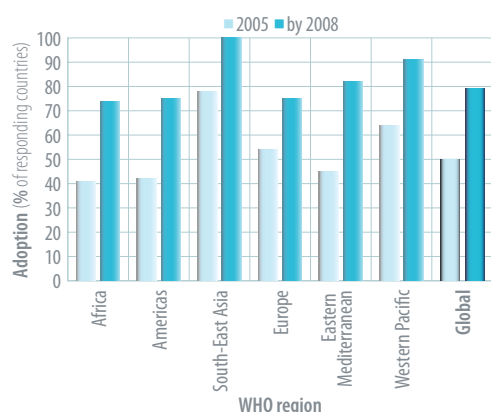


Figure 19. Procurement policies, by WHO region and globally

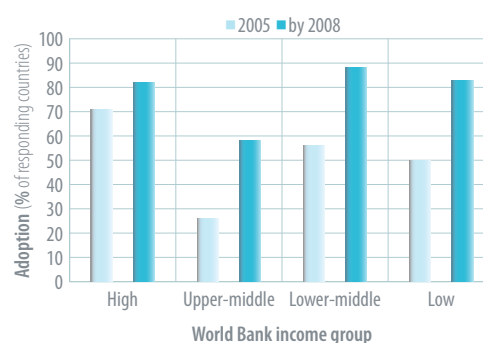


Figure 20. Procurement policies, by World Bank income group

One reason for a lower rate of adoption of procurement policies in developing countries could be their lower level of ICT purchasing power compared to industrialized countries. In the past, many of these countries have relied on the provision of equipment from donors, either new or used; therefore such policies would have been of little relevance. The intention to adopt procurement policies across all regions, and all World Bank income groups, however, is shown by the marked projected growth in the figures. It sends a clear message that countries, both industrialized and developing, see this approach as an effective way of maximizing their often over-stretched health sector budgets when it comes to the purchase of ICT.



eHealth in action: funding scenarios in developing countries

■ India

More than one hundred pilot projects in telemedicine have been created in India with funding support from the Indian Space Research Organization. This has led to a significant increase in experience and expertise in the sphere of telemedicine and advanced several policy initiatives, the most important being the IT Infrastructure in Health policy. Further, the Ministry of Finance has mandated that 3% of the budget of all government spending will go to ICT, which will foster a culture of ICT usage in government.

■ Mongolia

In Mongolia, international aid and donor support has been most effective in providing health organizations in all the provinces and the capital with equipment and Internet access. All of the provincial health departments are reported to use the Internet increasingly for data transfer. The government has taken measures to exempt ICT technology from customs duty and value added tax; the results include a significant increase in the availability of affordable technology products.

Box 4. Funding

Conclusion

The lack of funding is a major barrier to the progress of eHealth, particularly in developing countries. Public funding is by far the most common source of finance. As government budgets are continually stretched, eHealth must compete with other public services for its share of limited resources. In order to garner such funds, governments must be convinced that money allocated to eHealth will not only improve health services in the short-term, but will be a solid investment in the future of their nation's health care system. Provision of evidence-based eHealth project success stories and best practices would inform and assist ministries with their bids for funding.

In addition, more countries are exploring avenues such as public-private partnerships, as such collaborations are increasingly being utilized to good effect. Although the benefits of such partnerships are clear, project partners should not enter into such an arrangement without a legally binding agreement or Memorandum of Understanding, which lays out the expectations and obligations of all parties including any intellectual property implications.

The WHA eHealth resolution urges Member States to foster closer partnerships with private- and nongovernmental-sectors in ICT to advance public services for health. WHO is further mandated by the WHA resolution to draw up frameworks for the governance of eHealth partnerships, which will facilitate national cooperation and international exchange, as reported by the Secretariat in eHealth: proposed tools and services to the 117th Session of the Executive Board (2). Finally, the Global Observatory for eHealth will develop a worldwide database of eHealth best practices to promote such practices and facilitate the process of eHealth initiatives' application for funds from governments and donors.

The WHA eHealth resolution urges Member States to foster closer partnerships with private- and nongovernmental-sectors in ICT to advance public services for health. All Member States are further encouraged to introduce guidelines for the governance of public-private partnerships in eHealth based on the guiding principles developed by WHO.

Infrastructure

This cluster of questions surveyed national approaches used to build infrastructure for the health sector and, by extension, for the support of eHealth systems and services. Infrastructure is considered to be the connectivity, hardware and software required to deliver and process digital content. As eHealth cannot exist without a technical infrastructure for its creation and delivery it has been classified as one of the key foundation actions in the eHealth Development Model (Figure 3).

The three complementary measures surveyed included:

- **Intersectoral and nongovernmental cooperation**—working with other sectors and nongovernmental partners, such as the private sector, aid agencies or other bodies, to promote infrastructure development.
- **National ICT in health development plan**—a plan, or “road map” (also referred to as a “technology road map”), for the national deployment and development of ICT infrastructure, services and systems in the health sector.
- **Affordability policy**—implementing a national policy to reduce the costs of ICT infrastructure for the health sector, for example of computing equipment, software, Internet or communications.

Key trends

- Intersectoral and nongovernmental cooperation is the most widespread approach to building infrastructure for eHealth.
- National plans for the development of ICT in health are gaining recognition and acceptance as an integral part of the process of infrastructure building.
- Affordability policies have a low rate of adoption but substantial growth is expected by 2008, an indication that their perceived value is increasing.

When viewed globally, intersectoral and nongovernmental cooperation is the most widespread approach being used by responding countries to build infrastructure for the health sector, and this is likely to remain the case through 2008 (Table 8). The earliest reported adoption of these forms of collaboration was in the African Region in 1960. It was not until 1985, however, that this approach began to gain acceptance and become more widely used. Two thirds of the responding countries that now have adopted these policies introduced them between 2000 and 2005.

	2005	2008 ^a	Projected relative growth ^b
Intersectoral and nongovernmental cooperation	75%	81%	+8%
National plan for the development of ICT in health	55%	81%	+47%
Affordability policy	35%	62%	+77%

Table 8. Global trends in approaches to infrastructure development

^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.

^b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).



Intersectoral and nongovernmental cooperation

The fact that four WHO regions—African, South-East Asian, European and Eastern Mediterranean—display similarly high levels of adoption (70–80%) is a testament to the popularity and utility of intersectoral and nongovernmental cooperation (Figure 21). The collaborative partners in each of the regions are likely to differ depending on a country’s particular state of development. For instance, in most of the regions, except perhaps Europe, country collaboration would be more frequent with NGOs, aid agencies and donors with little input from the private sector. Conversely, in the more industrialized countries, cooperation tends to include more private sector participation. Projections from the African Region through 2008 are also indicative of the region’s situation: the very high projected level of adoption (95%) reflects this region’s aspiration for development through collaboration. The Americas show a comparatively low level of activity. These results need further investigation to find an explanation for this trend.

The trend by World Bank income group shows that all categories, except for the upper-middle income countries, have a high rate of intersectoral and nongovernmental cooperation; and most groups anticipate growth in this area (Figure 22).



Figure 21. Intersectoral and nongovernmental cooperation for infrastructure development, by WHO region and globally

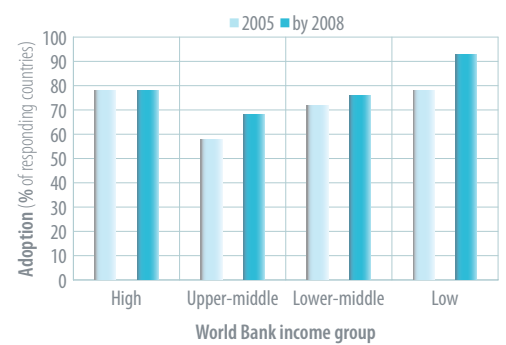


Figure 22. Intersectoral and nongovernmental cooperation for infrastructure development, by World Bank income group

National plan for the development of ICT in health

Approximately half of the responding countries have implemented national plans and strong relative growth (45%) is projected through 2008. Globally, it is anticipated that up to 80% of responding countries will have created ICT development plans by that time. A relatively new approach in the field of eHealth, the first reported country adoption was in 1995 with the vast majority of countries (80%) following between 2000 and the end of 2005.

Given the high rate of overall adoption, it is clear that countries recognize the importance of national plans for the development of ICT in health in the building of national infrastructure. The South-East Asian, Eastern Mediterranean and Western Pacific Regions display the highest levels of adoption (Figure 23) and are likely to remain in the forefront by 2008 with projected levels of 90% uptake in these regions. The American and African Regions show the lowest levels of uptake at present, though both regions anticipate substantial growth by 2008—a doubling of the number of countries with development plans in the African Region.

The trend by World Bank income groups (Figure 24) shows that the industrialized countries are more likely to have introduced this approach than developing countries. This kind of infrastructure planning often reflects the level of advancement of eHealth in countries.

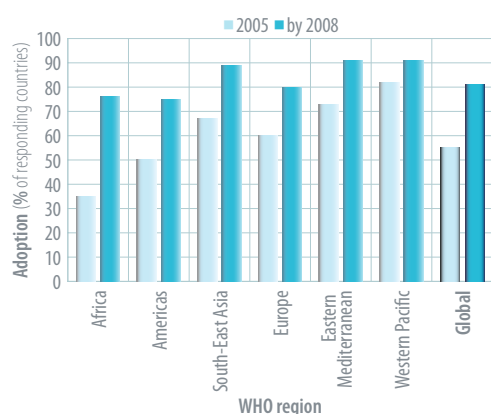


Figure 23. National plan for the development of ICT in health, by WHO region and globally

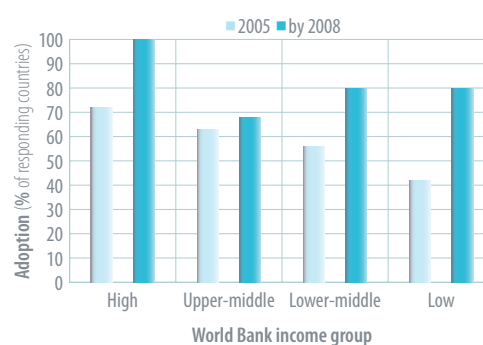


Figure 24. National plan for the development of ICT in health, by World Bank income group

Solar powered satellite connection for a rural hospital of Dimmbal, Mali.



Modernizing the nation's health information systems through collaboration and co-investment

The Canada Health Infoway Inc* was established in 2001 as an independent not-for-profit corporation. Infoway has been working in collaboration with the federal, provincial and territorial governments to put into place the basic elements of an interoperable electronic health record (eHR) system to serve 50% of the population by the end of 2009. By co-investing with the provinces and territories, Infoway and governmental partners are developing and implementing nine programmes: infostructure, registries, diagnostic imaging, drug information systems, lab information systems, telehealth, health surveillance, interoperable eHR, and innovation and adoption.

For the past five years, Infoway has been Canada's main entity dealing with ICT procurement policies or strategies; ongoing public funding for ICT support; any private funding for ICT support to programmes; and adoption of eHealth standards for systems, services or applications. It has benefited from substantial funding on three occasions—in 2001, 2003 and 2004.

Infoway works with the federal, provincial and territorial governments which participate as equals towards the common goal of modernizing Canada's health information systems. This collaborative approach is intended to reduce overall costs by:

- avoiding duplication of effort—build once and replicate in other jurisdictions;
- achieving economies of scale;
- increasing system interoperability; and
- maintaining a consistent approach based on the eHR.

Infoway's Board of Directors includes members of the Federal Health Department; all of Canada's provinces and territories are represented as well, and participate in every aspect of strategy and standards development.

■ Co-investment with Provinces and Territories

In 2005/06, Infoway increased its percentage of co-investment from 50% to 75%, making it easier for provinces to provide their share of funding for eHR projects, and also agreed to fund up to 100% of costs for eligible projects with the Yukon Territory, Northwest Territories and Nunavut, which are smaller jurisdictions. Over the same period, Infoway approved CAD\$ 381.4 million in new investments—a 95% increase over the previous year. Fifty-seven new projects in the nine priority areas were launched across Canada, reaching a total of 160 projects to date.

■ Evaluation of achievements

An evaluation of Infoway in 2006 found that the corporation has successfully implemented a variety of programmes (e.g. pan-Canadian vision), and has had positive impacts on ieHR (interoperable electronic health records) in Canada; such records are increasingly confidential.

The review found that Infoway and its partners had developed the standards, an electronic health records architecture, a privacy and security framework and registries to uniquely identify patients and providers: all necessary infrastructure elements to permit development of interoperable electronic health records by jurisdictions. The evaluation also noted that with over 160 electronic health records projects in the implementation or planning stages, solid progress is being made in a variety of areas that will contribute to reductions in patient wait times in Canada.

* <http://www.infoway-inforoute.ca/>.

Affordability policy

It may be expected that affordability policies, which aim to reduce the costs of infrastructure for the health sector, would be ubiquitous worldwide. If developed and administered correctly they contribute towards maximizing savings on purchasing investments which results in stretching the buying power of fixed budgets. Therefore it is odd to note that only a small proportion (35%) of responding countries have introduced such guidelines. This can perhaps be explained by the fact that affordability policies are relatively new and not yet well-tested to determine their efficacy. Considering that while the earliest policy adoption reported was in the South-East Asian Region in 1996, it took four more years before another country was to draft and adopt such a policy. Ninety per cent of the countries that have adopted affordability policies have done so since 2000.

The Western Pacific and South-East Asian Regions display the highest rates of adoption of affordability policies and the African Region follows closely behind (Figure 25). The European and Eastern Mediterranean Regions display much lower rates of adoption. What is clear from the country projections is that every region expects to see substantial growth in the implementation of these policies over the next few years.

It is worth noting that the World Bank income groups also show a trend rarely seen in this survey (Figure 26), which is adoption rates are reasonably uniform across all income groups, as is the projected uptake by 2008. It suggests that affordability policies, which are connected to reducing costs on infrastructure spending, are of equal importance and relevance to countries irrespective of their wealth and that there is strong intention to proceed with adoption. Indeed, the relative projected growth by 2008 is 80% (Table 8).



Figure 25. Affordability policy, by WHO region and globally

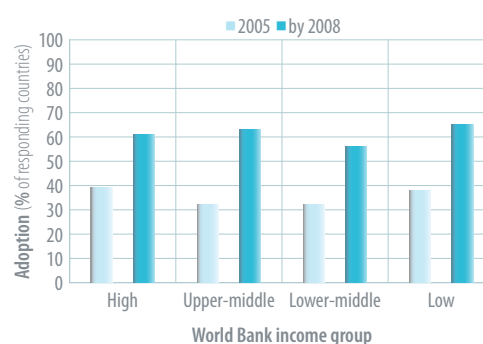


Figure 26. Affordability policy, by World Bank income group

Conclusion

Implementation of national plans for the development of ICT in health and the introduction of affordability policies are two actions within the area of infrastructure development that hold the promise of significant growth in the future. National plans for ICT development in health represent a sound approach to the systematic design, establishment and integration of infrastructure for eHealth. Member States forecast a great deal of growth in this area, recognition by governments of its benefits. The adoption of affordability policies for infrastructure is expected to increase even more as governments begin to realize financial and technical gains. Increasingly, countries will need to introduce affordability policies to help maximize ICT budgets. Certainly, developing these guidelines requires an investment of staff time—but this is a relatively small investment compared to the substantial savings that can be made through cohesive and well-implemented policies.

WHO recommends that Member States identify policies and practices that will maximize affordability of access and infrastructure development in sustainable ways, for example, by participating in national, regional and global partnerships.

■ Enabling policies and strategies

Enabling actions facilitate and support eHealth development. They are the bridge between foundation actions and the provision of eHealth services, and as such aim to protect citizen data and confidentiality, promote equity of access, and advance the need for multilingualism and cultural diversity in cyberspace. They also facilitate the development of eHealth standards to ensure systems can communicate with each other, and build human resources capacity so that health professionals are well trained in the use of eHealth applications.

Citizen protection

Citizens must have confidence that their privacy and confidentiality are being protected when using eHealth systems. Broadly, citizen protection involves implementing regulations and legislation by governments to protect the privacy and security of individual patient data in the eHealth domain.

Developments in the areas of the protection of citizens' data and confidentiality in the eHealth domain are limited; only one of two countries have introduced these actions (Table 9). Responding countries anticipate marked growth, however, in the next few years.

Key trends

- The adoption rate of policies around citizen protection is low, particularly in developing countries.
- A marked increase is anticipated in the initiation of citizen protection policies worldwide and particularly in developing countries.
- If projected increases in policy adoption are achieved, almost four of five countries will have them in place by 2008.

	2005	2008 ^a	Projected relative growth ^b
Citizen protection	51%	78%	+53%

Table 9. Global trends in adoption of citizen protection policies

- a.* 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.
- b.* Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).

Although not a new field in health services, the rate of adoption of citizen protection policies in the eHealth arena has been slow. For example, half of the countries that now have these policies in place introduced them after 2000.

The European and Western Pacific Regions show the highest rate of adoption (between 70% and 80%). The African Region, with less than 30%, expects a high growth rate. All regions project there will be growth in this area by 2008, with responding countries in the Western Pacific and South-East Asian Regions anticipating 100% adoption (Figure 27).

Figure 28 shows a clear pattern between World Bank income groups and the adoption of citizen protection policies with almost all countries in the high-income group having implemented these policies compared to only one in three of those in the low-income group. While all categories anticipate growth in this area by 2008, particularly those in the lower-middle and low-income categories are expected to progress the most. The highest income group projects 100% adoption by that time.

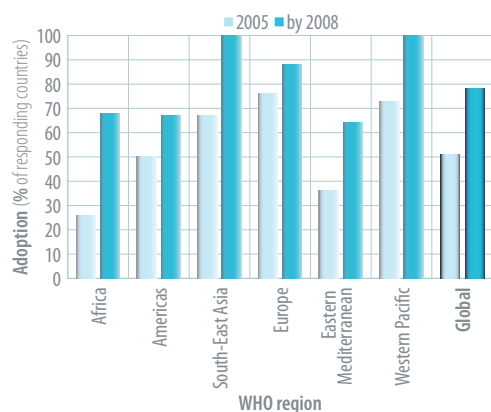


Figure 27. Policies to protect patient data, by WHO region and globally

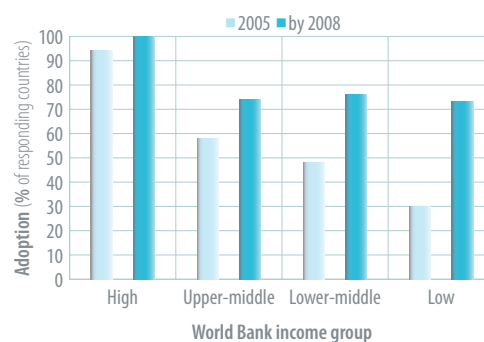


Figure 28. Policies to protect patient data, by World Bank income group

The trends in these figures follow a logical progression in the development of eHealth and its associated policy actions—regularly noted in this report: the more developed countries, most of which have introduced eHealth services and systems, have addressed citizen security issues at the policy and legislative level ahead of countries that are still in their early stages of eHealth development. Although there is currently a striking difference in the rate of adoption between industrialized and developing countries, it is encouraging to observe that there is a strong desire on the part of developing countries to address this critical and sensitive area.

Equity

Equity is recognized as a core value of health development. It is determined by policies to promote inclusiveness and equitable access to eHealth irrespective of culture, education, language, geographical location, physical and mental ability, age and gender. Paradoxically those with the greatest potential to benefit from eHealth may be those who are excluded from it—the “inverse care law” (17). Governments have a responsibility to ensure that these groups also benefit from the advances in health and eHealth.



Concerns over inclusiveness and equitable access to health care, like those of citizen protection, are not new. However, the survey findings indicate that they have yet to be adequately addressed within the eHealth domain. The rate of adoption of equity policies by responding countries is low, and just under that of citizen protection (Table 10). If projections are reliable, 70% of countries will have adopted equity policies by 2008, still leaving many countries needing to take action.

Key trends

- Adoption patterns for equity closely resemble those of citizen protection.
- Adoption of policies promoting equitable access to eHealth is low, particularly in developing countries, however, a marked increase in adoption is projected by 2008.
- If projected increases in policy adoption are achieved, approximately two of three countries will have them in place by 2008.

	2005	2008 ^a	Projected relative growth ^b
Equity	44%	69%	+57%

Table 10. Global trends in adoption of equity policies

- a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.
 b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).

All WHO regions except the African Region currently have an adoption rate of 45% to 65%, with the Eastern Mediterranean Region showing the highest adoption rate. The African Region is well below the global mean (Figure 29). Projected relative growth in this region is a massive, threefold increase to 60%.

Figure 30 illustrates a familiar trend between country income groups and the likelihood of adopting these policies. The highest income countries currently exhibit a greater level of adoption (70%) than the lowest income countries (30%), although this gap is predicted to decrease by 2008.



Figure 29. Policies to promote equitable access to eHealth, by WHO region and globally

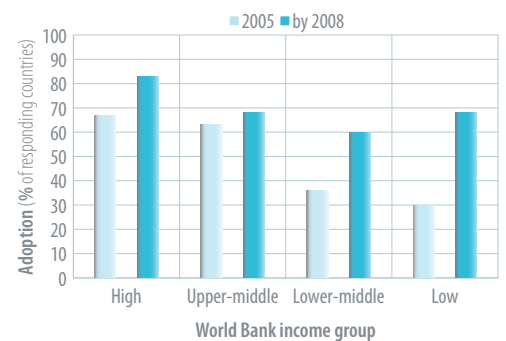


Figure 30. Policies to promote equitable access to eHealth, by World Bank income group

The success of eHealth systems and services can be determined, in part, by government approaches to both access and citizen protection. As early as 2001, Eysenbach (4) assessed the 10 “e promises” in eHealth—one of which is equity. He expressed strong concern that eHealth could indeed widen the digital divide, a view now shared by many. He argued that those without money, access to computers

or adequate skills to use them are least likely to benefit from eHealth services such as online health information.

Even access alone may not be sufficient. Citizens must also feel confident that their personal health information will remain private and confidential before they will utilize eHealth services. It is therefore important that governments position the issues of privacy and equity in the eHealth domain high on the political agenda. Unfortunately, in resource-poor countries it is likely that these issues will have a lower priority than fundamental actions related to strengthening infrastructure or increasing funding opportunities.

eHealth in action: citizen protection

■ United Kingdom of Great Britain and Northern Ireland

One of the most significant challenges has been securing public and professional confidence in the information governance arrangements and privacy and confidentiality measures around holding and processing sensitive health information electronically. This has been dealt with through extensive consultation with the public and health professionals, and maintaining transparent policies regarding the use of health data. A framework for information governance has been established, developed in full consultation with health-care professionals (arising out of the Caldicott review, all NHS bodies have senior clinicians appointed to oversee the confidentiality of patient data). The National Programme for IT infrastructure is being implemented with rigorous security measures including the use of smartcards for health-care professionals and mechanisms for patients to define what information they wish to be shared and under what circumstances.

Box 6. Citizen protection

Conclusion

The introduction of policies to protect citizens in the eHealth domain, as well as actions to promote equitable access to services have been slow in gaining political support. Half of the countries surveyed do not legally protect the confidential medical data of their citizenry. Nor do citizens have legal recourse should their privacy be compromised while using eHealth services. This issue is linked closely with equity policies, where it is often the case that citizens most in need of eHealth services are those who are currently excluded from access.

One of the six key eHealth work areas identified by *eHealth: proposed tools and services (2)* is the need to establish a WHO eHealth legal and ethics committee. This committee will be charged with the provision of practical guidance on the promulgation of laws and regulations. It will also prepare draft frameworks for adaptation to specific country needs.

The WHA eHealth resolution (1) urges Member States to promote equitable, affordable and universal access to the Internet and eHealth services, which includes communities in remote areas, and vulnerable groups. It further calls on Member States to advance the principles of confidentiality of information and privacy in the eHealth domain.



Multilingualism and cultural diversity

Promoting multilingualism and cultural diversity can also be considered activity in support of equitable access. Citizens are more likely to benefit from information and services provided in their own language, and are potentially excluded if these are not offered in a language they can read or understand. For this reason, it is accepted that the creation of electronic health content in local languages, and which recognizes cultural values, is essential in promoting cultural identity and linguistic diversity in the information society.

Three complementary actions were assessed:

- **Multilingualism and cultural diversity policy**—implementing policies or strategies that promote the availability of information in local languages and recognize cultural diversity.
- **Multilingual projects**—introducing special projects to promote the development and use of new electronic health content in multiple languages.
- **Translation and cultural adaptation**—supporting the translation and cultural adaptation (localization) of existing high-quality content created either locally or abroad.

Key trends

- The production of multilingual eHealth content does not appear to be as high on the agenda of governments as other actions as demonstrated by the limited activity in this field.
- Attention should be drawn to the fact that eHealth services may well be excluding citizens on the basis of language.
- Multilingual policy adoption is low, and concrete action taken by countries in developing multilingual eHealth services is even lower.
- Translation of content is marginally more widespread than original content development and both approaches are projected to show limited growth in the medium-term future.
- Developing countries are likely to be the most disadvantaged in this area.

Table 11 illustrates a further trend which adds to the concern already seen for privacy and equity issues. Not only does it appear that on average only half of responding countries have developed multilingual/multicultural policies, but they do not seem to be having the desired outcome, that is, stimulating the development of multilingual eHealth content. Only 25% of countries report that they are actively working on these initiatives. Even the projected figures indicate limited growth. Results show that this policy has one of the lowest levels of adoption when compared to the other themes studied in this survey.

	2005	2008 ^a	Projected relative growth ^b
Multilingualism and cultural diversity policy	49%	62%	+27%
Multilingual projects	23%	35%	+52%
Translation and cultural adaptation	31%	42%	+35%

Table 11. Global trends in multilingual policies and projects

- ^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.
- ^b. Projected relative growth is the percentage increase from the original 2005 baseline (n 2008 / n 2005 – 1).

Multilingualism and cultural diversity policy

Figure 31 shows the level of implementation of policies to promote availability of eHealth information in local languages. When compared to other survey questions, the figure shows an irregular distribution of policy uptake. It is important to note, however, that the number of countries in this data set is small ($n = 50$), so even minor variations in numbers may appear disproportionately large in regions where only a small number of countries responded. Nevertheless, the figure shows that 90% of countries responding from the Eastern Mediterranean Region have introduced policies with as little as 30% of responding countries in the Americas having done so. The African Region shows 55% adoption. The European Region results are also low with under half of the responding countries having taken action but this situation may be redressed in the near future with the introduction of the European Commission's new strategy for multilingualism (18). One of the aims of the strategy is to encourage language learning and promoting linguistic diversity in society. While countries in the European Region only project a small amount of growth over the next few years, this is likely to change once the multilingualism strategy takes effect.

Figure 32 provides an additional perspective. It illustrates an unusual pattern in that both the highest and lowest World Bank income groups share a similar rate of policy adoption. Although countries in the low-income group expect to introduce supportive policies by the end of 2008, no activity is expected in those of the high-income group. This trend implies that the generation of multilingual policies and therefore the intent to promote multilingualism and multiculturalism does not necessarily bear a relationship to country wealth, but rather it is most likely to be driven by perceived or demonstrated need.



Figure 31. Policies to promote the creation of multilingual eHealth content, by WHO region and globally

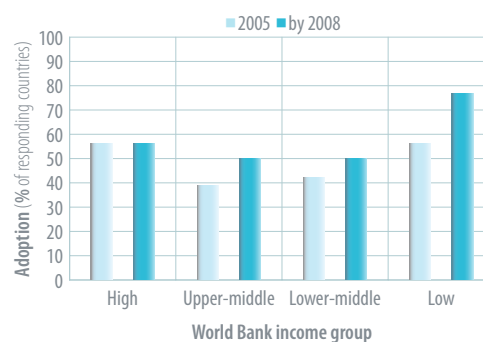


Figure 32. Policies to promote the creation of multilingual eHealth content, by World Bank income group

Multilingual projects

The previously identified pattern of policy adoption in this area does not adequately describe the level of multilingual project activity in countries. There are marked differences between intent and direct action. Figure 33 shows the current and projected status of multilingual eHealth projects across the WHO regions. Low levels of activity, 10% of responding countries in the African Region and Region of the Americas are represented. Activity is somewhat higher in the remaining regions—between 30% and 40%.

A trend becomes evident if the data for multilingual policy adoption (Figure 31) are compared with those for developing multilingual eHealth projects. With the exception of the European and Western Pacific Regions, all other regions appear to be less active in these programmes than their policy commitments would suggest. For instance, in the Eastern Mediterranean and South-East Asian Regions, only 50% of countries with multilingual policies have actually introduced multilingual eHealth programmes. The situation appears even more serious for the African Region and the Region of the Americas, with between 20% and 30% of countries with policies having implemented programmes. Even if the

projections for growth by 2008 are achieved, it is likely that there will still be a shortfall in most WHO regions between policy intent and action.

Comparing Figures 32 and 34 shows a similar trend, that is, there is a gap between policy and action in countries when viewed by World Bank income group. The difference is markedly higher for countries in the lower-middle and low-income groups compared to those in the upper-income groups. This suggests that industrialized countries are more likely to invest in multicultural programmes than developing countries. Unlike the scenario of policy development described above, which is not resource intensive, developing original multicultural health content is labour intensive, requires specialist skills and is expensive, thus limiting some countries' activities in this field.

Figure 35 portrays a global view of the development of multilingual eHealth content by participating Member States.



Figure 33. Multilingual eHealth content, by WHO region and globally

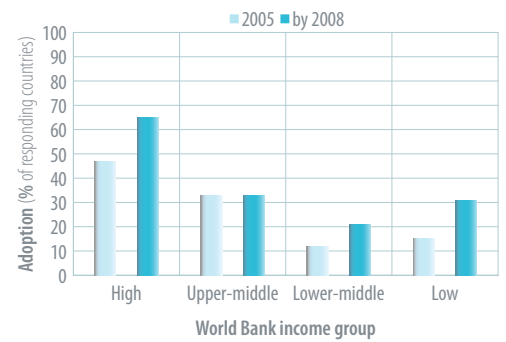


Figure 34. Multilingual eHealth content, by World Bank income group

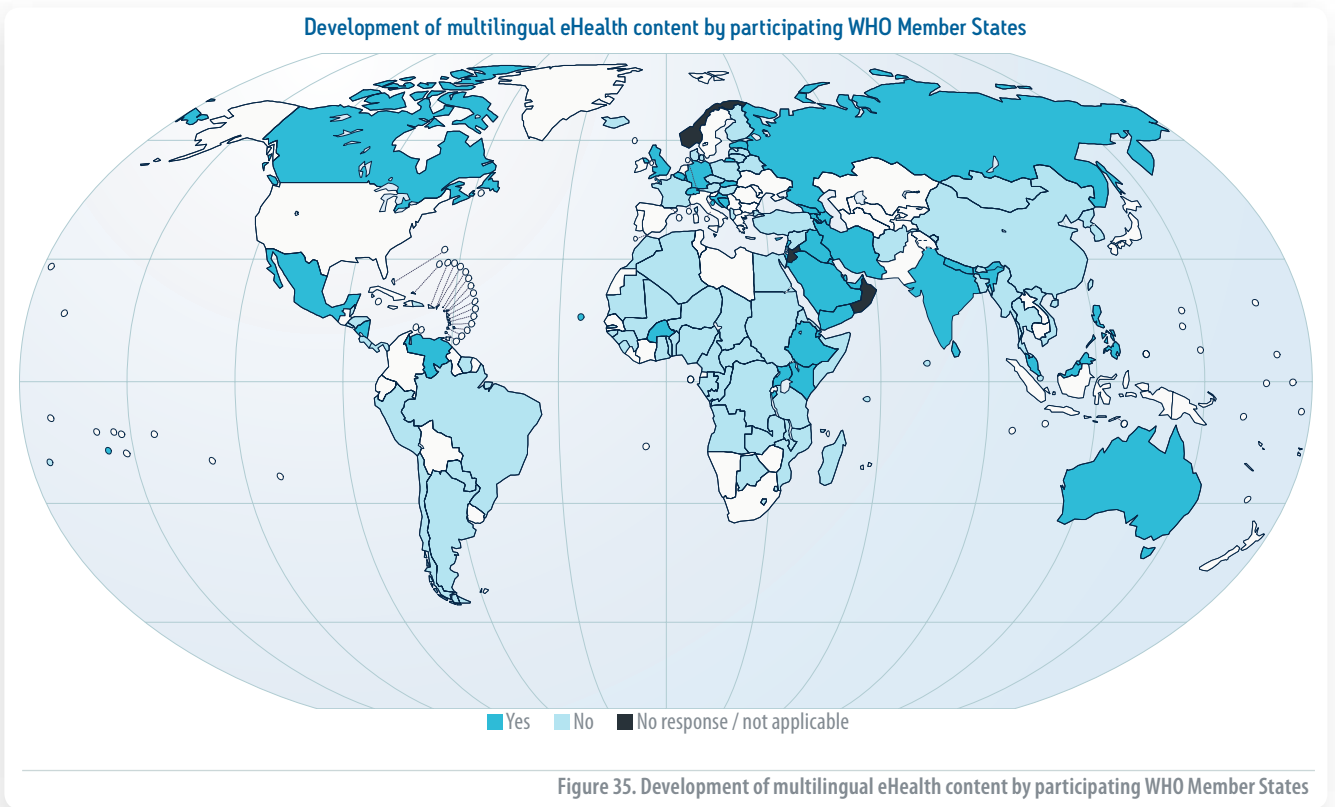


Figure 35. Development of multilingual eHealth content by participating WHO Member States

Translation and cultural adaptation

The previous section addressed the issue of creating original multilingual and multicultural health materials in electronic format. In this section country activities are assessed on the basis of translation and cultural adaptation of existing health materials—either produced nationally or abroad. The important difference is that the content is not original. This means that in principle the process may be easier, faster and more cost-effective, although professional translation and cultural adaptation skills are still required. The global trends indicate that this approach, compared to developing original content, is marginally more adopted by countries and is likely to remain that way in the near future.

This is evident when Figures 33 and 36 are compared. In all regions the number of countries translating health materials is higher than those producing original multilingual content. The difference is most obvious in the African Region and the Region of the Americas where translation of existing materials is far more prevalent than the production of original health content.

Trends by World Bank income group (shown in Figures 34 and 37) suggest that the greatest difference in approaches exists in countries in the lower-middle and low-income groups which translate content rather than write original material in their own language(s).

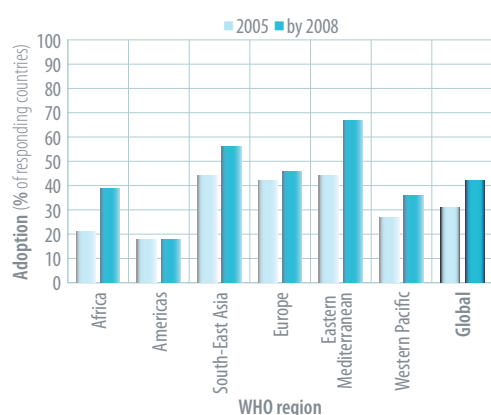


Figure 36. Translation and cultural adaptation of eHealth content, by WHO region and globally

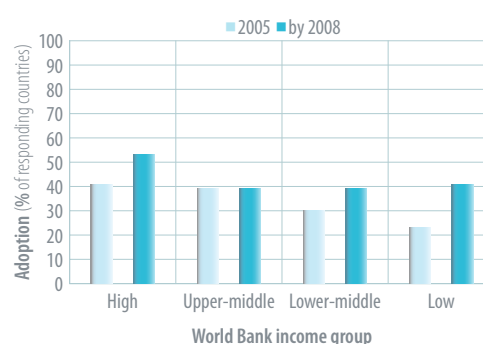


Figure 37. Translation and cultural adaptation of eHealth content, by World Bank income group

eHealth in action: multilingualism and cultural diversity

■ India

Computers capable of multilingual use are being developed and promoted in India by the Centre for Development of Advanced Computing (CDAC). Highlighted are the CDAC initiative and Indian Institute of Technology Kanpur programmes for providing guidelines for prevention and control of major diseases, and provision of information in local languages for health workers in various disease control programmes.

■ Islamic Republic of Iran

Since 2004, work is being conducted on a semantic project based on “Wordnet”, to empower the multilingual capabilities of software. Providing a “rule engine” through the use of “Protégé” software has advanced the semantic capabilities of Wordnet.

■ Nepal

Radio and television are, due to their accessibility, described as the most effective electronic media for disseminating multicultural health content with over one third of the population owning a television.

■ Philippines

Highlighted is the development of the Community Health Information Tracking System (CHITS), which is designed for government health centres to track and monitor patients. Of particular importance is the embedded localization module that enables translation into local languages.

■ Switzerland

According to Switzerland’s constitution, any social programme must take cultural and linguistic diversities into consideration. The Swiss Federal Office of Public Health therefore provides public health information on its web site in German, French, Italian and English.

Box 7. Multilingualism and cultural diversity

Conclusion

Multilingualism and cultural diversity, in the context of the provision of eHealth services, is the least developed area of any examined in this survey. It appears that these issues, which directly impact citizen access to information, are not high on the current agenda of many governments. While policies may exist in half of the responding countries, in reality the production of multilingual eHealth content is limited to around one in five countries. Even the projected figures for growth show limited progress towards addressing the problem. Some of the reasons for this are likely to be lack of funds to support this activity or a shortage of qualified professionals to create or translate suitable health materials in digital format. If this trend continues, many citizens will continue to be excluded from eHealth services due to language barriers.

WHO, with partners such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), must continue to work to raise the profile and importance of multilingualism and multiculturalism in cyberspace. In particular, the Global Observatory for eHealth will establish a thematic working group to propose strategies for the international sharing of eHealth information products in multiple languages among Member States to avoid duplication of effort.

WHO recommends that Member States pay increased attention to the production and sharing of multilingual eHealth content in accordance with public demand in their respective countries.

Health-care workers
in Malawi using ICT to
record sample information
and transmit results to
the central hospital.



Interoperability

Interoperability is defined by the Alliance for Telecommunications Industry Solutions as: “the ability of systems, units or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together” (19).

Interoperability allows for the integration of diverse systems and services, which in turn enable rapid and secure access to information such as public health data sets or patient information. The scenario is complex as it relies on the standardization of many interrelated system components such as health information systems, the architecture of electronic health records and patient identification services. Standards allow information system purchasers (typically governments) to establish a multi-vendor environment that protects investments already made and keeps legacy systems useful. Standards allow for interoperability between health system operations within an institution, a region, a country and internationally. The greater the standardization, the greater the freedom of choice a user has when working within the system—without compromising the basis for communication.

Additionally, standards have a strong impact on eHealth financing. When governments establish standards, the transaction costs between systems drop considerably, therefore the process of transferring data and information between systems becomes more economical.

For the purpose of the survey, eHealth standards were defined as “technical specifications developed by multiple stakeholders through a consensus approach to promote interoperability among systems for the deployment of eHealth applications”. Member States were asked if they had adopted norms and standards for eHealth systems, services or applications.

These standards could include:

- technical security components;
- semantic and code translation to enable transferred data to be understood and used by the receiving clinician and the patient being treated; and
- data interchange standards—to be known, understood and implemented in both supplying and purchasing organizations.

Key trends

- eHealth standards have been gaining increased recognition since 2000.
- The adoption of eHealth standards is a mid- to long-term activity. While slow to start, government support is increasing.
- There are clear indications that industrialized countries have advanced much further in the introduction of standards for eHealth than developing countries.

Table 12 shows that 55% of responding countries have adopted standards with a projected growth up to 80% by 2008.

	2005	2008 ^a	Projected relative growth ^b
Adoption of standards	56%	80%	+43%

Table 12. Global trends in adoption of standards

^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.

^b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).

The survey results show that policies on implementing standards in eHealth began in the European Region in 1980. Growth in this field was slow, however, through the 1990s (during this decade only 30% of countries introduced such policies; countries in regions outside of Europe only started adopting standards around 1997). Appreciation of the importance of standards in eHealth by governments and the broader eHealth community has increased markedly in the past six years: 70% of responding countries have implemented standards for regulating eHealth since 2000.

Figure 38 shows that the European Region is well advanced in this area and almost all responding countries project that they will have adopted policies on standards by 2008. The difference between early adoption and widespread uptake of standards may indicate that building the “consensus approach” between stakeholders to adopt national standards is a mid- to long-term (10–20 year) activity. It may also be due to the fact that standards for the use of ICT in health were not a priority before mid-1990 for many governments due to the lower profile of eHealth at that time.

In sharp contrast is the situation in the African Region with adoption by only 30% of responding countries. Although the region predicts a marked increase in policies by 2008, countries there, as well as those in the Eastern Mediterranean Region are likely to remain less advanced than other regions in this area.

Most of the early work on ICT standardization has been carried out in Europe and North America, which is an indication that these regions are more advanced in overall eHealth standardization development and uptake than the others.

In reviewing progress by World Bank income group a clear trend emerges between country income and the tendency of a country to have adopted a standards policy (Figure 39). Countries in the low- and lower-middle income groups show greatly reduced adoption rates compared to those in the higher income groups. However, these country groupings also project a large increase in the number of countries adopting eHealth standards by 2008. This is an indication of their readiness and intent to take serious action in this area.

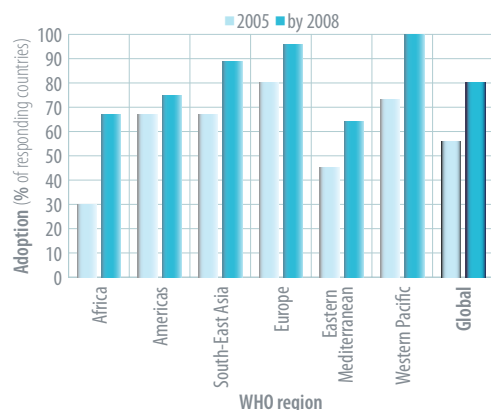


Figure 38. eHealth standards, by WHO region and globally

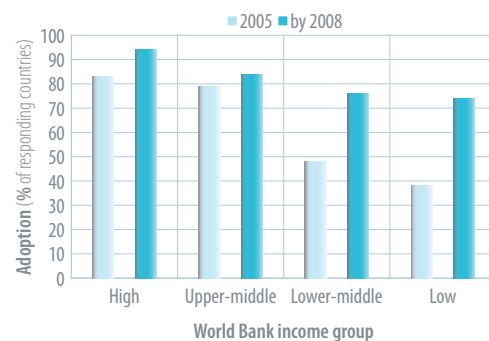


Figure 39. eHealth standards, by World Bank income group

There have been some significant developments in the field of standards and interoperability. The Telemedicine Alliance, an international cooperation between WHO, the European Space Agency and ITU was formed in 2003 to study interoperability and eHealth uptake. The Alliance found that interoperability requires concerted action and coordination at various levels to be successful, ranging from the local to the global, with an important component coming from technical experts. Interoperability requires so much effort, that it is predicted to be the most significant challenge facing wide scale adoption of health care ICT (20).

More recently, an eHealth Standardization Coordination Group¹ has been established, with the mission to promote better coordination among key players in eHealth standardization. WHO, in association

¹ <http://www.ehscg.org>.

with other group members, works to identify areas that require further standardization, assess the requirements for development paths of existing standards, and promote awareness of existing standards globally. The Coordination Group has produced an annotated list of the most significant standards in technical and non-technical areas of eHealth; it is available on the Internet (21).

WHO and partners are also actively addressing the problematic issues of health information standards for the semantic content, coding classification and ontologies (data models), working on the principle of developing open standards as an international “public good”.

The Danish Health Data Network: a new era in health sector communications

The Danish Health Data Network initiative* was launched in 1994 to address the growing need for seamless electronic communication, which is increasingly a necessity in modern health care. The goal was to provide a continuous streamlined information flow to primary care services: to and from hospitals, laboratories, pharmacies, radiology departments, etc. The first generation of services, which are still functioning, is based on standardized electronic data interchange for administration, commerce and transport (EDIFACT) eMessages that are pushed (i.e. sent) from one computer to another. Today these messages can be converted from EDIFACT to XML (Extensible Markup Language) and HL7 (Health Level 7 interchange). This means that information once entered (i.e. prescriptions, discharge letters, or laboratory results) can be re-used by the recipient. Since the advent of this system, users realized text-based eMessages would not be suitable for transmission of high quality digital images. The Danish Health Data Network, therefore, constructed a secure network based on Internet technology to work alongside the old one. Today, this next generation Health Data Network is fully operational and the shift in technology to an Internet-based pull strategy has been very important—the recipient rather than the sender handles communication.

The Internet-based network constitutes the infrastructure for the national Health Portal (<http://www.sundhed.dk>), which brings together the entire Danish health service on the Internet. The Health Portal not only provides useful general information about the health care sector but it also enables people with a public national digital signature (OCES) to review their own data (i.e. a complete electronic medicine file), and communicate with their doctor (including appointment booking). In addition, health-care professionals can search for information about their patients through the Health Portal. One new feature being developed is an electronic antenatal record. This service will enable pregnant women and health professionals to share and review information (such as sonograms and other digital images) throughout the pregnancy and maternity periods.

Denmark is not the only country that has established a secure national Internet-based Health Data Network. Norway and Sweden have also done so, and the next step is to create a cross-national Baltic Health Network (BHN), which will be one of the outcomes of the EU-funded project called Baltic eHealth (<http://www.baltic-ehealth.org>). This project will not only unite the three Scandinavian national networks but also two hospital networks from Lithuania and Estonia, respectively. The objective of BHN is to eliminate the technical barrier for collaboration between health professionals and is currently the only cross-national health network being built in Europe. Once the usefulness of the BHN is documented in the Baltic Sea Region, the BHN is likely to be a strong candidate for a universal European model for the next generation health network.

* <http://www.medcom.dk>.

Box 8. Case study: The Danish Health Data Network

Conclusion

Adoption of standards is a complex and time consuming process and can be influenced by many factors. Some of these include: government awareness of the importance and relevance of standards in eHealth, the challenges of gaining multi-stakeholder consensus, choosing between competing standards, costs involved to license and use certain standards, accessibility, and the need for technical expertise for implementation. Further, if eSociety is not a priority area for governments, then they are unlikely to invest in the process of implementing standards in any sector including eHealth. The current level of adoption of standards among responding countries is low, with approximately one in two countries having taken action. Substantial growth in this area is anticipated by 2008.



WHO is committed to providing support to Member States to promote the development, application and management of national standards of health information. It will collect and collate information with a view to establishing national standardized health information systems that can easily and effectively exchange information among Member States.

To assist WHO in this effort, Member States should actively participate in multisectoral efforts to determine evidence-based eHealth norms and standards.

Capacity building

ICT skills and knowledge are recognized as essential elements that contribute to the development of an information society. Now, more than ever, health professionals in practice and in training need to develop ICT competencies to ensure they can maximize the benefits from the technological solutions becoming available through eHealth. Capacity building in ICT is classified as an enabling action in the eHealth Development Model (Figure 3). That is, once the basic foundation policies and strategies have been established to cultivate eHealth, the health care work force needs to be trained in preparation for the use of the eHealth applications being deployed.

Two capacity building measures were surveyed:

- **ICT training for health sciences students**—offering ICT skills courses as part of university curricula (undergraduate or postgraduate) for health sciences students.
- **Continuing education in ICT**—providing ICT skills programmes in the ongoing training of health professionals.

Key trends

- There is a strong indication that governments have recognized, and are acting on, the need to strengthen the ICT capacity of their health-care professionals and students.
- ICT training, both at the university level and in continuing education, has been introduced in over two thirds of responding countries and further growth is projected by 2008.
- Adoption levels are high across most WHO regions. The African Region and Region of the Americas are likely to need extra support to implement these initiatives.

Table 13 shows that the global rate of adoption for both approaches to ICT capacity development are currently running in parallel and are anticipated to grow at the same rate. This is not an unexpected trend given that countries recognizing the importance of ICT training for health-care professionals are equally likely to extend this to undergraduate and postgraduate courses for health-care students.

	2005	2008 ^a	Projected relative growth ^b
ICT training for health sciences students	69%	80%	+16%
Continuing education in ICT	70%	79%	+13%

Table 13. Global trends in ICT capacity building

^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.

^b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).

ICT training of health sciences students

The training of undergraduate and postgraduate health sciences students in ICT, coupled with the introduction of courses in specialist areas such as medical informatics and telemedicine are critical to the development of a well-trained workforce and the ongoing development of eHealth.

Figure 40 shows the rate of adoption across WHO regions. Both the European and Western Pacific Regions show very high rates of introduction of ICT training with 90% of responding countries now offering courses. The remaining regions are just below the global average except for the Region of the Americas, which displays a lower rate of 35%. This may be due to the dearth of responses from that region. Consistent with the relatively high level of development of eHealth in the European Region, it would follow that this region also has a high proportion of countries providing education and training activities. The reason for the high rate of adoption in the Western Pacific Region may be attributed to the work of the Pacific Open Learning Health Network (POLHN), which provides continuing education programmes to health workers in the many island nations within the region.

When viewed by World Bank income group, the results show an unusual trend: most income groups are at approximately the same level of adoption of ICT capacity-building initiatives—between 70% and 75% (Figure 41). Only countries in the low income group are not as active in this area, but this is expected to change by 2008, and if so, will bring these countries in-line with the other country groups. It should be noted, however, that the question did not ask countries to qualify the types of courses offered (e.g. individual units, degrees, undergraduate, postgraduate, electives) so detailed comparisons of the extent of educational activities between countries and regions are not possible.

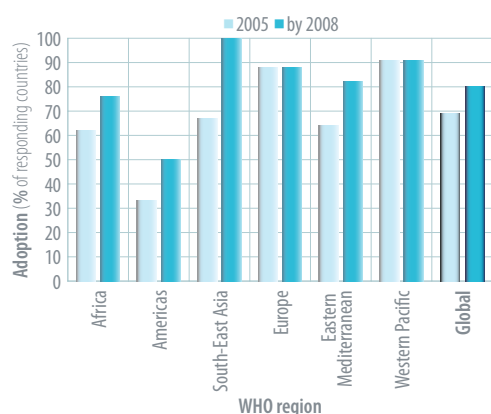


Figure 40. ICT training of health science students, by WHO region and globally

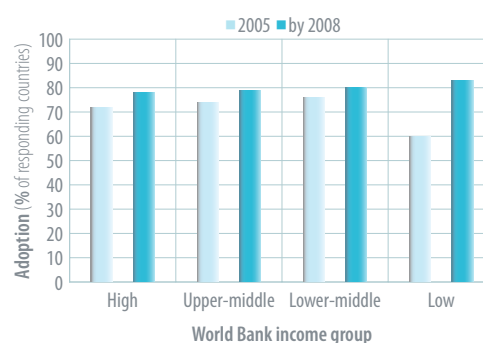


Figure 41. ICT training of health science students, by World Bank income group

Continuing education in ICT

The focus in this area was to determine the extent of the introduction of ongoing training courses in ICT for health-care practitioners as opposed to students. There was no investigation into the kind of training provided, its source, or whether it was accredited by a professional body.

Figure 42 shows by WHO region a similar pattern in the introduction of continuing education courses as for the provision of ICT courses for students. As previously mentioned, parallel patterns in university education and continuing education are to be expected as government recognition of the importance of ICT education for health professionals and students would be consistent within countries.

Patterns in the provision of continuing education by World Bank income group (Figure 43) appear more defined than for student training. Countries in the higher income groups are more likely to offer continuing education than those in the lower income groups. However, all groups project growth in this area.

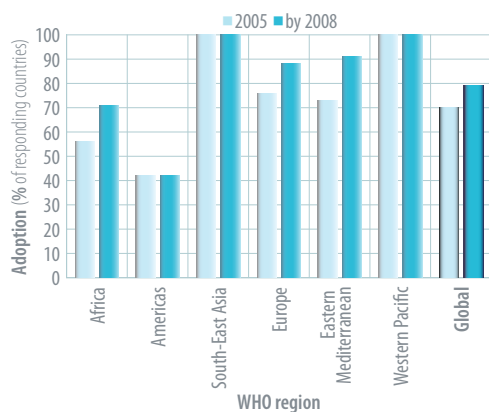


Figure 42. Continuing education in ICT of health professionals, by WHO region and globally

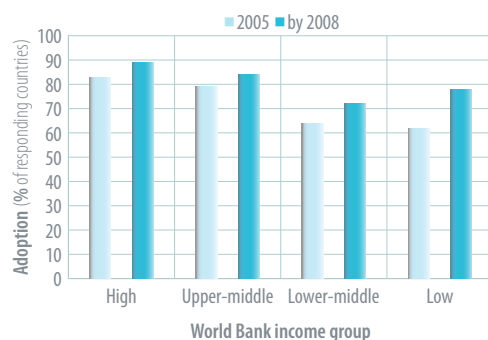


Figure 43. Continuing education in ICT of health professionals, by World Bank income group

Professional training in health informatics

Another emerging area in eHealth is the increasing recognition of the need for qualified health informatics specialists. Undergraduate and postgraduate programmes in health informatics, which aim to produce highly skilled professionals to bridge the fields of computer systems and health are already being established, and more will need to follow as demand increases. Although the survey did not focus on these specialist education programmes, the need to build capacity at this level is increasingly evident and was often reported by responding countries.

Well before the introduction of other such courses, the school of Health Information Science from the University of Victoria, British Columbia, Canada,¹ pioneered training for this profession in 1982, and continues as a leader in terms of curriculum and practical application of health informatics. More recently, the Yorkshire Centre for Health Informatics (YCHI)² of the University of Leeds in the United Kingdom is also offering courses in health informatics, specifically in preparation for the NHS information strategy "Information for Health". The YCHI was developed by partners from the NHS, industry and academia and provides evidence-based education and training through a variety of highly specialized courses.

¹ <http://hinf.uvic.ca/>.

² <http://www.ychi.leeds.ac.uk/ychi/aboutus.aspx>.

eHealth in action: Capacity building—preparing health professionals and students for eHealth

■ Brazil

The current reform of training curricula of health professionals to include ICT for health components has been very effective. Various experiments with distance learning in the health sphere, at intermediate and higher levels, have also led to the successful expansion of ICT.

■ Guinea-Bissau

The introduction of compulsory courses of informatics at the faculty of medicine has been very effective in building ICT capacity in the health sector in Guinea-Bissau.

■ Norway

A range of parallel ICT capacity building initiatives are being conducted in Norway including: basic ICT training courses awarding a certificate; a Masters programme in telemedicine and eHealth; ICT training for health-care professionals; the inclusion of ICT training as part of the general education for health professionals; and the provision of online training courses for those who have not yet received their basic training.

■ Zambia

The most effective approach for Zambia is based on a train-the-trainers model. ICT instructors are first trained centrally and then sent to health centres in the provinces to teach the health professionals.

Box 9. Capacity building

Conclusion

One of the most frequently cited barriers to eHealth implementation was the lack of suitably trained or qualified staff. Another was the problem of attitude—the fear of technology and a resistance to change. Such issues can best be addressed by education, which will demystify programs and processes. The trends show that solid progress has been made already in the training of health sciences students and health professionals in the use of ICT for health. Nevertheless more work needs to be done in order to keep up with the rapid advances in technology and the ever-increasing demand for qualified staff.

The use of ICT in support of human resources for health is identified as one of the key WHO work areas. A framework is being drafted for the training of professionals and students in the use of ICT for health.

WHO recommends that Member States continue to build on their existing achievements in ICT capacity building by implementing the WHO guidelines for the training of health professionals and students.

PDA use in the
University Hospital,
Geneva, Switzerland.





■ eHealth applications

Up to this point, the policies and strategies reviewed have fallen under the first two tiers of the eHealth Development Model (Figure 3). These foundation or enabling actions prepare and support countries for the final objective of offering eHealth services. The significance of these actions may not be recognized if they are well in place. However, if there are considerable weaknesses in these levels, the provision of eHealth services is likely to suffer. Ultimately it is the quality, reliability and scope of these end products, all of which are influenced by the foundation and enabling actions, that will shape how eHealth is perceived by citizens, health practitioners and policy-makers.

This final section examines developments in three broad areas of eHealth applications including:

- **Public services**—information services provided to the citizen, usually via the Internet.
- **Knowledge services**—electronic information and education services aimed at health-care professionals in training and practice.
- **Provider services**—eHealth tools and services used in the provision of health care to citizens.

Key trends

- The vast majority of responding countries are providing electronic health information for the general public and this trend will continue.
- There is a lower level of electronic health information provision among developing countries than among industrialized nations.
- Emerging priorities for countries are enhancing access to information and ensuring quality of content.

Public services

Country progress in the creation and provision of health information in digital format for the general public was assessed. This included a variety of content creation and delivery options such as production by governments, NGOs or health agencies and distribution through outlets such as libraries, community centres, health centres, public kiosks and private access from home.

Table 14 shows an unusually high level of adoption for actions studied in this survey. Not only is the current uptake by countries high, but it is also projected to be near 90% among responding countries by 2008.

	2005	2008 ^a	Projected relative growth ^b
Health information for the general public	79%	88%	+11%

Table 14. Global trends in the provision of eHealth information to the general public

^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.

^b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).

The first reported online health information projects for the public commenced in 1990 in the European Region. Over the next ten years, almost half of the responding countries followed with similar initiatives. In the majority of WHO regions, uptake has ranged from 80% to as high as 95% (in the European Region). The African Region shows the lowest level of adoption with 60% of countries currently offering these services. Little regional growth is expected by 2008 except for the African and Eastern Mediterranean Regions (Figure 44).

The relationship between World Bank income group and provision of health information to the public is illustrated in Figure 45. As with many actions studied, there is a clear trend between country wealth and the adoption of an eHealth action. All of the countries in the high-income group are already actively providing health information in electronic format compared to 70% of those from the low-income group.

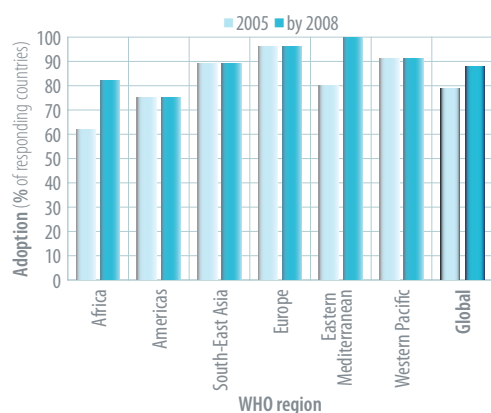


Figure 44. eHealth information to the general public, by WHO region and globally

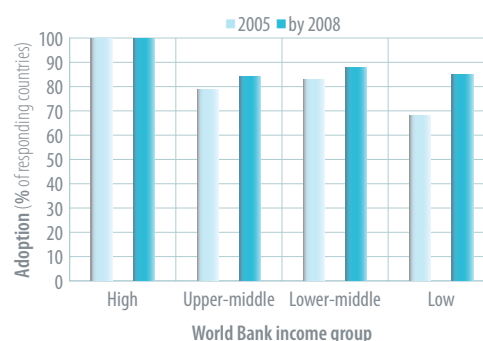


Figure 45. eHealth information to the general public, by World Bank income group

These results are not surprising. Trends in eHealth evolution are inextricably linked with advances in the Internet. The development of eHealth content should grow in tandem with the expansion and integration of the Internet in public services. Given the level of diffusion of the Internet, particularly in developed countries, it would be rare to find a ministry of health, NGO or professional association without a Web presence providing health information for the general public. This is not as widespread in developing countries. However, given the momentum of the World Wide Web, the growing expectations of citizens to have services and information available via the Internet, and the ever increasing ease in producing web sites, all countries will move in this direction eventually.

As public services mature, so too does the standard of quality of those services. Many countries are no longer primarily concerned with how and when to provide health information services; that is a given. They are increasingly focused on meeting high standards in terms of quality. This is especially true with respect to technically advanced countries, which are now less concerned with the “access” variable given their developed infrastructures, and can now more readily focus on “quality” issues. John Mack, President of the Internet Healthcare Coalition (22) argues that the Internet can only contribute to the improvement of the quality of health worldwide if access to information is matched with high-quality content. If that is true, the disadvantage to developing countries is twofold: they often lack the infrastructure sufficient to provide broad access, much less to make quality of content a top priority.

The work of WHO and partners should be noted in using regional strategies to enhance national information provision. Regional language-specific eHealth networks are being developed in support of regional knowledge communities. These include Spanish information and publications in the Region of the Americas and Arabic in the Eastern Mediterranean Region. Recently, an ambitious inter-regional initiative, ePORTUGUESe,¹ has been established by WHO to support, generate, manage, share and use knowledge through any information channels necessary to strengthen health systems in the Portuguese speaking Member States.

The Geneva-based Health on the Net Foundation²(HON) was launched in 1996 to address the problem of low quality health information on the Internet. Since then it has developed a comprehensive code of conduct for medical and health web sites and offers its guidelines in over 30 languages. It is a site of great importance for professionals working in the field of online health information. The organization’s code sets out a series of guidelines that are designed to assist the content and web site developers to

¹ <http://www.who.int/eportuguese/en>.

² <http://www.hon.ch/Project/>.

ensure that a reader is always aware of the source and purpose of the information. These guidelines aim to ensure the authority, confidentiality, attribution, justifiability and validity of the medical advice and information provided. In addition, sites that subscribe to the HONcode commit themselves to providing transparent information on site sponsorship (e.g. making the clear distinction between advertising and editorial content). It is a well-designed, multilingual site and should be a central resource for producers of health content for the Web. HON has also become a partner of WHO's Global Health Library.⁷

eHealth in action: online health information for the general public

■ Australia

The development of a proposal for a national consortium of libraries to purchase a range of electronic information resources, and HealthInSite, an Australian Government initiative funded by the Department of Health and Ageing aims to improve the health of Australians by providing easy access to quality online medical information.

■ Hungary

Hungary has established a web- and call centre-based health information source, Dr.Info also known as HealthLine, which provides high-quality health information for citizens and health care providers. HealthLine operates via Internet and telephone, as an integrated health information service provider for local health care services, such as information on physicians, dentists or pharmacies; general medical information; drug interactions, disease descriptions, extra health care services; and self-help and support organizations.

■ Mexico

The government is in the process of upgrading information technology and telecommunications in order to improve the health services provided to the population, in particular to marginalized and vulnerable groups. The eHealth portal was developed by the health sector in Mexico, the first of its kind to be offered to the general public. Since its launch, the following initiatives have begun: an institutional page titled "Advice on health care and prevention from ISSSTE" [Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado]; a section entitled "How can we look after our health?" on the page of the national public health institute; and creation of the IMSS [Instituto Mexicano del Seguro Social] journal "Here's to your health".

Box 10. Online health information for the general public

Conclusion

Governments have made significant progress in providing health information online to the general public. Four out of five responding countries already provide these services and this is projected to rise to nine out of ten by 2008. In many countries the focus is now shifting to content issues concerning the quality and reliability of the information provided to citizens, as concerns about access are gradually being addressed. Governments and content providers need to become more aware of international bodies that assist health-content owners with guidelines on quality assurance; by familiarizing themselves with such organizations, governments can form partnerships with them and incorporate these best practices into the development of their own information products.

As one of the key eHealth priority work areas, WHO will launch an initiative that promotes the adoption of quality criteria among Member States for health content and encourages content development appropriate for different target audiences.

Member States should adopt WHO guidelines in the development of eHealth content. These guidelines will help countries consider the differing needs of target audiences when they create online health information.

⁷ <http://www.who.int/ghl/en/>.

Knowledge services

ICT dramatically enhances the possibilities and formats for providing information and knowledge. Content created anywhere can be shared instantly across the globe via the Internet. Until now, digital information could only be transmitted between computers. Increasingly, consumers can send and receive information through mobile telephones, PDAs, and other mobile devices.

The survey assessed country provision of national and international electronic journal services to medical and allied health practitioners, scientific researchers, academics and students in health sciences. Additionally, country progress was investigated in the development of national digital open archives services in biomedical and health research.

Information services were defined in the survey as:

- **International electronic journals**—peer reviewed journals published in electronic format by international publishers (either online or as a CD-ROM).
- **National electronic journals**—peer reviewed journals published in electronic format within a country.
- **National open archives**—usually initiated at the national level by academic institutions, special interest groups or governments. The operational model is one in which authors deposit their works in digital format, before or after publication, in one or more repositories that then make them available to readers around the world at no cost.

Key trends

- There is a high rate of provision of international electronic journals across most WHO regions.
- National electronic journals show lower rates of provision than international ones.
- The variation of provision of information services between countries in the higher and lower income groups is less marked than for other areas assessed.
- There is currently a low rate of adoption for national open archives, though growth in this area is projected.

The rate of adoption of information services (Table 15) mirrors the historic development of content, connectivity, delivery format, and pricing policies of electronic journal services for scholarly communities. The first international eJournal services were developed in the late 1980s by European and American commercial enterprises as well as government bodies. They provided access to bibliographic databases and small collections of electronic journals. As online access was charged on a per minute basis, these services were extremely expensive and well out of the reach of academic institutions in developing countries; often they were unaffordable even in developed countries. In time, pricing models were re-evaluated to broaden access and the advent of the CD-ROM led to radical changes. Use of this format meant that information could be accessed without a well-developed connectivity infrastructure and came with a fixed price—both qualities which are particularly relevant for developing countries.

More recently, new models based on publishers collectively providing eJournals for highly discounted prices for the exclusive use of developing countries has emerged. In 1999, the Open Society Institute, a part of the Soros Foundation's Network,¹ launched such an initiative—the first of its kind. Electronic Information for Libraries (eIFL)² negotiated with publishers and journal aggregators to provide academic and research institutions with a collection of eJournals in social sciences and humanities, and later the health sciences. The service of over 2000 journals was offered at highly discounted rates, or at no cost, by the Open Society Institute to all countries of the former Soviet Union, Central and Eastern Europe and

¹ <http://www.soros.org/>.

² <http://www.eifl.net/index.html>.



selected countries in Central America and South-East Asia. Five years later this project continues to grow and has become an independent foundation.

Around the same time as eIFL was being established, WHO was placing increasing emphasis on enhancing access to health information. In 2000, the Secretary General of the United Nations launched the Health InterNetwork (HIN), with WHO as its head. HIN's mission was to bring together public and private partners under the principle of ensuring equitable access to health information. The core interrelated elements of the programme included content, Internet connectivity and capacity building.

In 2001, HIN launched a highly successful project called the Health InterNetwork Access to Research Initiative (HINARI).¹ HINARI strives to improve global public health through the provision of vital biomedical and health sciences information. It now makes available over 3300 electronic journals to health professionals, research workers and students in 113 countries in the lower-middle and low-income groups (as defined by the World Bank). The service is either free (for countries in the low-income group) or highly discounted (for those in the lower-middle group).

The success of HINARI in delivering electronic journals in health sciences to developing countries is clear. The HINARI model is now being adopted by other international agencies and current sister projects in agriculture and environment include Access to Global Online Research in Agriculture (AGORA)² led by the United Nations Food and Agriculture Organization (FAO) and Online Access to Research in the Environment (OARE)³ led by the United Nations Environment Programme (UNEP).

The importance of a solid regional approach to access to information services should also be noted. For over three decades, the Latin American and Caribbean Center on Health Sciences Information (BIREME)⁴ has been striving to provide equitable access to scientific and technical health information to the Latin American and Caribbean region. Central to BIREME's model of operation are the concepts of decentralization, cooperation and sharing. These principles have led to a highly effective network of countries actively participating in the development and sharing of health information. In the 1990s, BIREME was connected to the Internet, which led to a paradigm shift in its operations. It led to the creation of the Virtual Health Library (VHL)⁵ which was conceived based on the new opportunities offered by the Internet. The VHL is now recognized as an exemplar model of a regionally created online information service providing access to research written primarily in Spanish, Portuguese and English.

Table 15 shows the availability of online information repository services by type and the projected growth in this area by 2008. Currently, international electronic journal services are the most widespread, followed by national eJournals; the creation of open archives is the least advanced. All countries project growth in these areas by 2008.

	2005	2008 ^a	Projected relative growth ^b
International electronic journals	73%	83%	+14%
National electronic journals	52%	70%	+35%
National open archives	40%	61%	+53%

Table 15. Global trends in provision of online access to research

a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.

b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).

¹ <http://www.who.int/hinari/en/>.

² <http://www.aginternetwork.org/en/>.

³ http://www.unep.org/library/OARE_project.asp.

⁴ <http://www.bireme.br/local/Site/bireme//homepage.htm>.

⁵ <http://www.bireme.br/php/index.php>.

International electronic journals

Although the first international electronic journals service was introduced in 1990, further adoption was slow over the following decade, which can be mainly attributed to cost and connectivity issues. From 2000 to 2005 the introduction of international eJournal services rose dramatically, with over 50% of the responding countries introducing them during that time.

Responses shown in Figure 46 display an unusual pattern compared to most other themes studied in the survey. It shows high global means for 2005 as well as for projections to 2008. Currently, 80–90% of countries in three regions have adopted these services in practice. The projected trends look very promising with all regions striving for between 70% and 100% of countries providing services by the end of 2008.

When viewed by World Bank income group, the trend is also unusual (Figure 47); in this case it is the high-income and low-income countries which share the lowest rates of introduction of services. The reason for this is not clear.

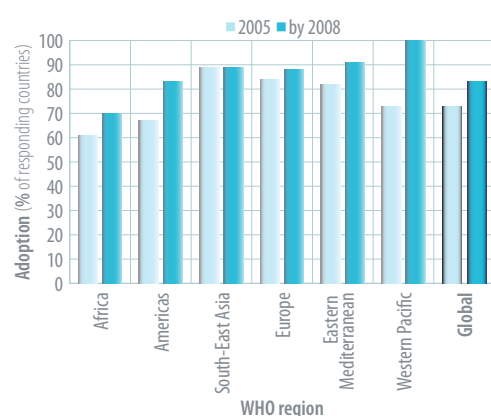


Figure 46. International electronic journals, by WHO region and globally

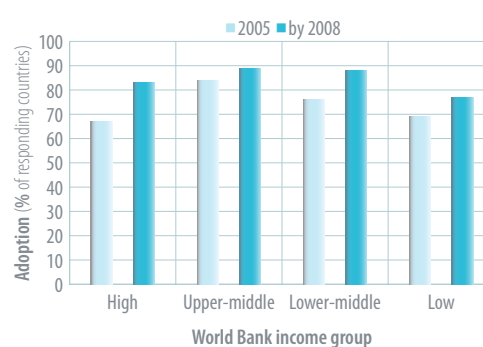


Figure 47. International electronic journals, by World Bank income group

The fact that 70% of countries in the low-income group are currently offering international eJournal services can best be explained by the introduction of services such as HINARI. The same would apply to countries in the lower-middle income group. While no countries in the high- or upper-middle income groups are eligible for free services, they are in many cases achieving more affordable prices through national or regional consortia.

The rate of adoption by countries in the high-income group appears to be lower than may have been expected. After many years of providing electronic access to the literature it should follow that the vast majority of countries with a high income would be offering eJournal services to their users.

National electronic journals

Although access to the international medical and scientific literature is vital for researchers, practitioners and students, access to national journals is of equal, and sometimes greater, importance. Reports of national studies on trends and developments in health care, particularly in developing countries, are often not published in international journals or cited in citation indexes. The first reported initiative to publish national eJournals in health was in 1990 in the European Region. Uptake has been slow, with only one-third of responding countries introducing services by 2000. There is growing awareness of the necessity of this method of information dissemination. This is demonstrated by the countries' projections—70% intend to provide access by 2008.

Figure 48 illustrates that most WHO regions have adoption rates of around 60%, with the exception of the South-East Asian Region (90%) and a low rate in the African Region (30%). Growth is predicted in all regions, particularly in the African Region where the number of countries producing eJournals may double by 2008.

There appears to be little relationship between country income groups and the likelihood of producing national electronic journals in health sciences, except for countries in the lowest income bracket which show least activity (Figure 49). However, if the projections for 2008 are realistic, this disparity will not continue. The substantial growth anticipated in this group is likely to be supported by external funding in the way of development grants.

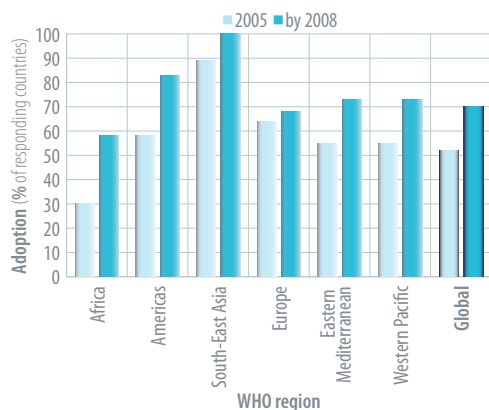


Figure 48. National electronic journals, by WHO region and globally

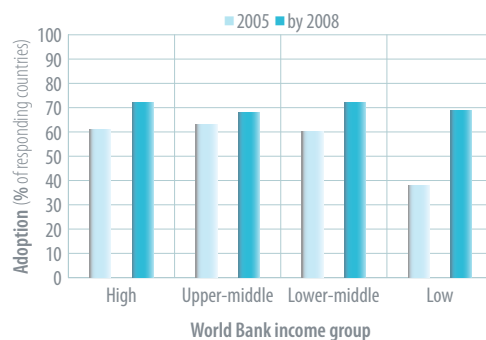


Figure 49. National electronic journals, by World Bank income group

Health students of the University Hospital, Geneva, Switzerland, consulting electronic journals.



National open archives

The emerging model of open archives is potentially a revolutionary approach to the digital storage and dissemination of scholarly publications. Launched in 1999, the Open Archives Initiative (OAI)¹ heralded a new way of thinking about equitable access to scholarly communication worldwide. Central to its mission is the promotion of interoperability standards to facilitate the efficient dissemination of content. By joining the initiative, any institution can gain free access to the vast range of over 30 open source software packages used for the creation and maintenance of archival scholarly materials.² Although the OAI does not necessarily promote the principle that all publications should be free, it supports strongly the need for open access through interoperability.

The work of the OAI is complemented by the Budapest Open Access Initiative,³ which advocates for acceleration in the international effort to make research articles on the Internet in all academic fields available at no cost. Another important feature of open archives is the inclusion of "grey literature", which can contain rich sources of scientific or health information. As this type of literature has not been published in the past it is generally inaccessible to researchers.

The most significant advances in promoting open and free access are being seen in France, Germany, the Netherlands, the United Kingdom and the United States (23), but it will not be long before the movement attracts many more countries worldwide into joining the network.

Figure 50 shows that the global mean for adoption of national open archives policies is currently 40%, with an anticipated increase to 60% by 2008. Adoption is lowest for the Region of the Americas and the African Region. The South-East Asian and Western Pacific Regions show the highest rate of adoption (65%). All regions project growth by 2008, however the African Region and the Region for the Americas project the most dramatic increases.

Figure 51 indicates that there may be a relationship between World Bank income group and the likelihood of having national open archives. In general, developing countries are less advanced in this field than industrialized ones. This is not an unexpected trend as industrialized countries were the first to advocate for open archives and are already well advanced in the field of scholarly publishing. All countries are likely to reap significant rewards by developing open archives, especially those with limited financial and publishing resources. For this reason it is likely that this approach will move into direct competition with international and national eJournals services provided by commercial scientific and medical publishers.



Figure 50. National digital open archives, by WHO region and globally

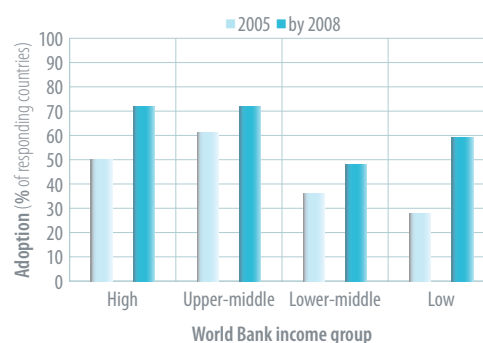


Figure 51. National digital open archives, by World Bank income group

¹ <http://www.openarchives.org/>.

² <http://www.openarchives.org/tools/tools.html>.

³ <http://www.soros.org/openaccess/>.

eHealth in action: access to electronic health content by health professionals and students

■ Argentina

Argentina's digital library provides access to the complete texts of science reviews for all national universities and research institutes. The Scielo Programme ("Reach for the Sky with Science") is also yielding positive results, including online open access to the country's leading health reviews.

■ Ethiopia

Disseminating HIV/AIDS information for health professionals through ICT which has been produced by the HIV/AIDS resource centre has been particularly effective. Ensuring the success of the resource centre is a top priority for the Ethiopian Government in its work on HIV/AIDS prevention.

■ Mauritania

The most effective actions to promote access to electronic health content in Mauritania are offering the Health InterNetwork Access to Research Initiative (HINARI) project and the National Telemedicine Network for health professionals and students.

■ Mongolia

The creation of databases in Mongolia is key to the provision of electronic health content. Various databases in Mongolia cover topics on a diverse range of health issues: human resources; health facilities, inventory of health equipment; drugs and vaccinations; and health situation reports that include research reports, health indicators, publications and guidelines. Additionally, a national health database has been established for policy- and decision-makers.

■ Philippines

A number of approaches have been used in the Philippines including: the creation of the eHealth portal (1995) as a virtual community for Philippine health research, health care delivery, and health science and technology development; the development of the Department of Health web site (1997) providing a source of health information for the general public; the development of the Philippine eLibrary (2004), which links multidisciplinary libraries; and the online public access catalogue (OPAC) (1991) of medical and health libraries. The Health Research and Development Information Network (HERDIN) (1985), a specialized network of documentation and information centres engaged in health research and development activities with a bibliographic information retrieval system for Philippine health research.

■ Slovakia

The national medical bibliography, Bibliographia Medica Slovaca, provides professionals with online access to health content. The creation of a number of health-related web sites established by health institutions has also occurred, along with an initiative providing health-related web sites to the general public. A consortium of Slovak libraries has also been created (project eFL) to provide access to medical databases at affordable rates.

Box 11. Access to electronic health content

Conclusion

The provision of eJournals in health sciences is one of the more developed areas studied in this survey as is evident by the high levels of adoption among responding countries. In the past, access to research literature was primarily dependent on countries' ability to pay, which resulted in most developing countries being severely disadvantaged. Fortunately, this is changing. New global public-private partnerships, as well as consortium-style licensing initiatives, are making high-quality online research information more affordable for developing countries. Today, the birth of the open archives movement offers not only worldwide access to online health research (often at no cost), but should make way for even further advances towards equitable access to research. These developments combined are leading to improved health care as more and more researchers, practitioners and students in

developing countries now have the same access to scientific and medical research and knowledge as their counterparts in the industrialized world.

WHO, with its partners, needs to advocate for countries and institutions to join open archives initiatives, which will facilitate access to their own national research as well as international publications.

Member States should evaluate the benefits of creating open archives for health sciences literature as a cost-effective way of producing, disseminating and accessing national and international research literature.

eLearning in health sciences

Another eHealth application studied in the context of knowledge sharing was the use of eLearning for the education and training of health and medical sciences students. eLearning, effectively used, can improve the quality of education, increase accessibility to geographically isolated students or those who have poor local learning facilities, and make new and innovative forms of learning available.

Key trends

- Interest in and adoption of eLearning in the health sciences has rapidly grown, particularly since 2000.
- The relative growth of eLearning is expected to increase globally by up to 45% by 2008.
- The African and Eastern Mediterranean Regions currently have the lowest rates of eLearning adoption.
- Countries in the World Bank low-income group are the least likely to have adopted eLearning initiatives.

eLearning is still viewed as a new approach to learning in the health sciences by many of the responding countries. Although the first reported eLearning initiative was in 1987 (in the European Region), there was little activity in most of the WHO regions until 2000. The majority of countries now employing eLearning methods adopted them in the past six years.

Table 16 shows that half of the responding countries are currently incorporating eLearning within their teaching methods in the health sciences. However, from the data collected it is not possible to establish to what extent it is being used, nor for which courses or subjects. It is likely that there is great variation in the deployment of eLearning within countries and across regions; in some instances entire courses are provided online while in others only specialized units are offered.

Awareness of the potential impact of this approach is increasing as indicated by the substantial projected growth by 2008. Country projections indicate that there may be increases of up to 45% more countries adopting eLearning for health and medical sciences.

	2005	2008 ^a	Projected relative growth ^b
Use of eLearning in health and medical sciences	50%	72%	+44%

Table 16. Global trends in the provision of eLearning

^a. 2008 estimates are based on data provided by responding countries; the sum of those countries which already have taken action (2005) and those which currently have not but intend to by 2008.

^b. Projected relative growth is the percentage increase from the original 2005 baseline ($n_{2008} / n_{2005} - 1$).



eHealth in action: eLearning

■ Bangladesh

Bangladesh started in January 2003 with a very effective pilot project called eHealth & Learning (eHL). It is supported by the Sustainable Development Networking Programme, which is funded by the European Union in its Asia ICT programme.

■ Dominican Republic

The Dominican Learning for Development Network and the Global Development Learning Network provide virtual courses on nutrition, cancer, gerontology and geriatrics for the country's health workers, together with courses for final-year medical school students at a number of universities: examples are the discussions on communicable diseases (dengue fever, HIV/AIDS and tuberculosis) organized between the Ibero-American University (UNIBE) and Santiago Technical University (UTESA), respectively.

■ Jordan

The private sector in Jordan is more active in the eLearning field than the public sector. The most significant initiative is led by eARABdoctors which develops eLearning programmes and offers them worldwide over the Internet for free (all courses are in English).

Box 12. eLearning

Figure 52 shows that four of the WHO regions are making good progress in providing eLearning—from 60% to as high as 80% of countries (in the Western Pacific Region). Only one in four countries in the African Region are currently implementing eLearning programmes. Clearly there is a strong commitment in all regions to develop virtual learning further as indicated by their projections for the future. Of note is the projected growth in the African and Eastern Mediterranean Regions where the number of countries offering eLearning is expected to double by 2008.

Figure 53 shows that responding countries in all but one of the World Bank income groups exhibit a broadly similar pattern in adoption rates and projections for 2008. The low-income group lags far behind the others with 30% adoption. Projections show that this may double by 2008; even then, however, countries in this group will remain behind those in the other country groups. eLearning is not an inexpensive method of teaching. Given the resources required to produce courses and the infrastructure to deliver them to multiple students in diverse locations, it is likely that it will remain too costly for countries in the low-income group unless additional support is provided.

Figure 54 portrays a global view of the provision of eLearning by participating Member States.



Figure 52. eLearning in health and medical sciences, by WHO region and globally

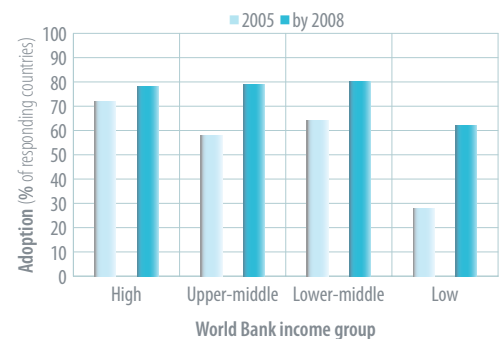


Figure 53. eLearning in health and medical sciences, by World Bank income group

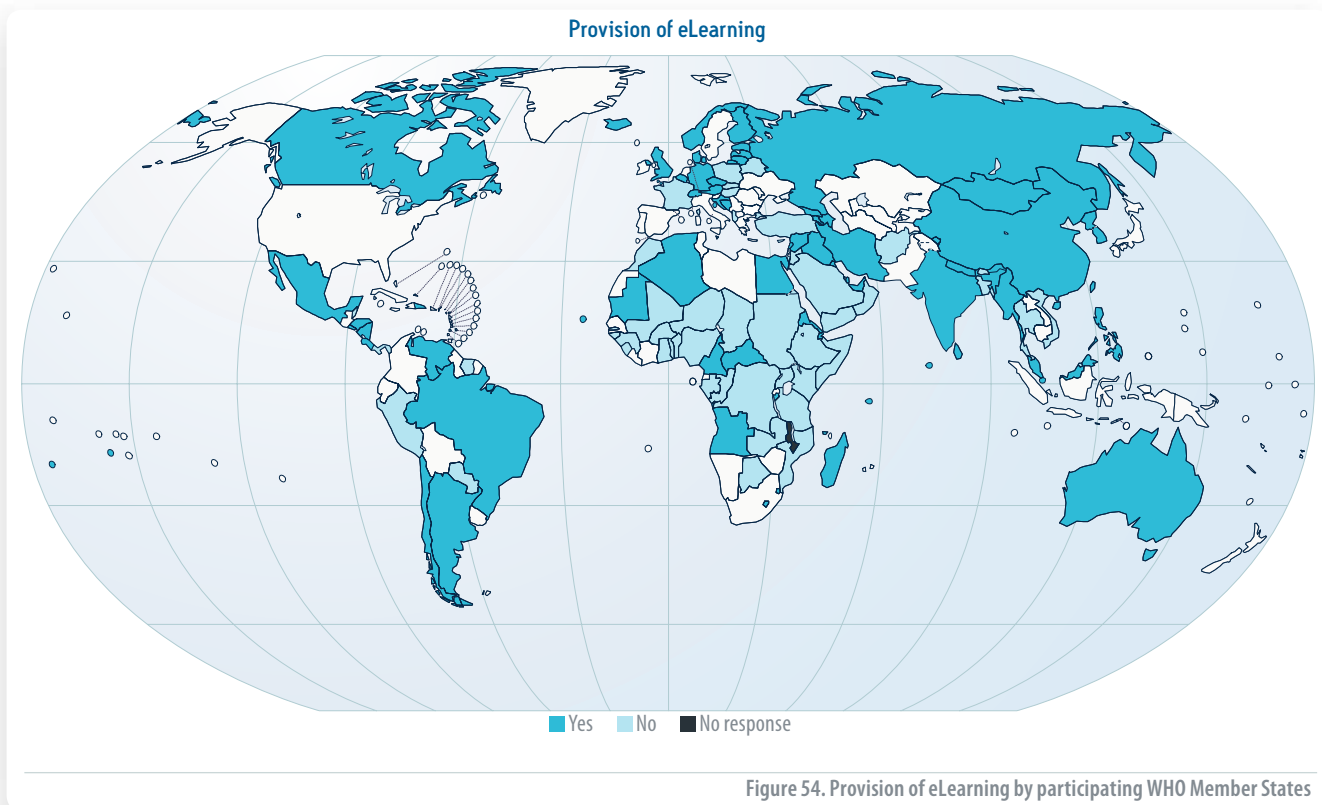


Figure 54. Provision of eLearning by participating WHO Member States

Pupils of the Gama Abdel Nasser School in Cairo, Egypt, following the Health Academy eLearning course.



Students learn about health through ICT

WHO's initiative on Health Information in Tomorrow's World, has laid the foundation for a virtual school of public health, through the Health Academy*. Launched in 2003, the initiative aims to improve disease prevention and reduce health risks by using ICT to provide up-to-date, validated information, in the language of the target population, and in a culturally acceptable form.

The Health Academy transforms students from passive recipients of information to active participants in knowledge acquisition. Using the concept of eLearning, it provides hands-on practice with automated feedback giving the student immediate feedback, and offers effective learning and instruction at the learner's own pace. The Academy targets schools or learning centres with courses on health prepared by WHO technical units. They employ text, audio/visual aids, illustrations, photos and animations to convey health information in an attractive and simple language in a multimedia format. Practical activities, instructional games and quizzes are integral components of the eLearning courses. Available through the Internet, Intranet or on CD-ROM, they can be used as part of the normal school curriculum.

A pilot study of the Health Academy eLearning courses was carried out in Egypt and Jordan during the 2003/2004 academic year. It involved a total of 6785 students (4264 female and 2491 male) aged between 12 and 17 years in 45 schools (both government and private).

A total of four courses were offered covering the health issues associated with blood safety, road safety, substance use and tobacco use. This experience was very well received in all schools by both students and teachers (mentors). The students' evaluation of the courses was most positive and many enjoyed sharing their new-found knowledge with their families.

Evaluation conducted by independent entities in both countries demonstrated an overall increase in knowledge and in some cases a tendency to change attitudes and behaviour. This was particularly noticeable with respect to tobacco use. Having completed the first phases of its development, the Health Academy is now being implemented in more countries.

* <http://www.who.int/healthacademy>.

Box 13. Case study: Health Academy

Pupil and Health Academy
mentor at the Queen
Rania Al Abdala School
in Amman, Jordan.



Global collaborations to advance eLearning

No cost, ready access to proven high-quality eLearning courses was one of the requests for services identified by responding countries. Fostering eLearning requires the development of effective online courses in multiple languages—not an easy task in a field as extensive as health sciences—that can best be achieved through international collaboration. Countries' willingness to share existing resources worldwide signals this collaboration, which promises to significantly boost the adoption of eLearning, particularly in developing countries where the needs are greatest.

The new Global Health Sciences Learning Center, coordinated by Emory University, Atlanta GA, will be launched in the summer of 2007 and is expected to make a significant contribution in this field. Based on the model developed by the Health InterNetwork for HINARI, it will provide free, online access to an impressive collection of comprehensive, pre-existing, high-quality eLearning opportunities. The primary target audience is health professionals in training and practice in developing countries; however, many of the materials will be available to other interested populations around the world. It will be a virtual learning centre for education in medicine, nursing, public health and associated health sciences. Free online access will be provided to health sciences courses; reference libraries with textbooks, databases, and journals; and collaboration spaces for person-to-person interaction. The site is being created through a collaborative effort on the part of: the World Bank; the US Centers for Disease Control and Prevention; the Pan American Health Organization (PAHO/WHO); University of British Columbia, Canada; Massachusetts Institute of Technology (MIT), Cambridge MA; and Johns Hopkins University, Baltimore MD.⁷

Conclusion

eLearning is a rapidly growing field within eHealth. Its use in the education and training of students and professionals of the health sciences makes possible cost-effective delivery of courses to large numbers of people throughout the world. For example, developing countries will progressively adopt such learning techniques as one way of attempting to redress the critical shortage of health professionals. Pilot eLearning programmes currently being conducted in developing countries are showing positive results and more are expected to be introduced — especially in Africa. The early success of the Health Academy in health education for children and adolescents through ICT is of significant interest and has the potential to be adapted for local cultural and linguistic needs by many Member States. Additionally, the imminent launch of the Global Health Sciences Learning Center, which makes virtual courses freely available, is expected to make a considerable contribution to the advancement of eLearning worldwide.

eLearning for the training of health-care professionals is another priority area of the WHO eHealth work plan. A framework is to be drawn up for the education and training of health professionals, especially for their continuing education, using eLearning as well as other complementary methods. The focus will be on in-country training and local language content.

Member States are urged to incorporate eLearning methods, where appropriate, into their training of health sciences students as well as for the ongoing training of health professionals.

⁷ For more information contact erica.frank@ubc.ca at the Department of Health Care and Epidemiology and Department of Family Practice, University of British Columbia, Canada.

Provider services

Tools and services

Most of the survey was concerned with the degree of uptake of eHealth actions by countries. In contrast, questions under this rubric aimed to identify which eHealth tools and services countries wished to have assistance and support from the WHO and its partners. It did not attempt to identify the level of introduction or adoption of these services in countries, or the successes and challenges in the use of various tools. This would need to be the focus of further detailed study.

A separate report, *eHealth tools & services: needs of the Member States*, has previously been published on this theme of the survey in January 2006 (12). It summarizes the needs of WHO Member States and their expectations from the WHO Secretariat.¹ The report has been widely circulated to policy-makers, eHealth practitioners, researchers and academics worldwide.

Key trends

- Member States would welcome the active involvement of WHO in the development of generic eHealth tools, and guidance in creating and implementing eHealth services.
- Countries not belonging to the Organisation for Economic Co-operation and Development (OECD) expressed the need for guidance in a broad range of eHealth areas.²⁹
- OECD countries did not express consistent views of their needs in eHealth areas.
- It is vital to raise the awareness of Member States of which eHealth tools, particularly open source solutions, already exist.

Proposed action

The report recommends that WHO, in collaboration with public and private sector partners, should take action in the following key areas:

- **Provision of generic tools**—WHO should facilitate the development of those generic eHealth tools that are most sought after by its Member States including: tools for monitoring and evaluation of eHealth services; drug registries; institutional patient-centred information systems that could be extended to include electronic health record systems; and directories of health-care professionals and institutions.
- **Access to existing tools**—as a parallel and complementary action, electronic directories of existing eHealth tools and services should be created with an emphasis on open source solutions.
- **Facilitating knowledge exchange**—an international knowledge exchange network to share practical experiences on the application and impact of eHealth initiatives should be built. This would be Internet based and could be complemented by international eHealth conferences to facilitate networking.
- **Providing eHealth information**—WHO should create a digital resource of eHealth information to support the needs of Member States in key areas such as eHealth policy, strategy, security and legal issues.
- **Education**—The use of eLearning programmes for professional education should be promoted in the health sciences as well as in ongoing professional development. Collaborations should be developed to generate databases of existing eLearning courses. WHO should advocate for the inclusion of eHealth courses within university curricula.

¹ For statistical analysis purposes, responding countries were grouped by OECD/non-OECD membership. <http://www.oecd.org>.

eLearning offers continuing education to health workers on remote Pacific islands

This case study demonstrates it is possible to establish a regional eLearning programme in challenging settings such as geographically remote and scattered islands with an underdeveloped telecommunications infrastructure.

The Pacific Open Learning Health Net (POLHN) was recently initiated in response to an assessment of the ongoing learning needs of health professionals in Pacific island countries, where travel abroad for training is both expensive and time consuming. Its mission is to enhance continuing education through distance learning and to pilot the use of eLearning in the process.

POLHN's vision is to integrate online learning in the human resource development plans of ministries of health throughout the Pacific by providing access to a variety of courses and digital health resources through the Internet. By offering the theoretical components of continuing education, the network can reduce the amount of time away from home as well as the costs involved for overseas study. These cost savings can be used to provide opportunities for continuing education to a larger number of health professionals.

Fifteen learning centres in 10 Pacific island countries have been developed with two additional centres in the planning or construction stages.* Each learning centre includes a server and up to 20 networked computers with Internet connections, learning facilities and educational resources. An interactive web site** has been created for the distribution of the open learning materials and participation in online courses and a complementary site has been developed for students to access relevant international publications. So far 25 courses have been offered to over 600 health professionals in key areas of relevance to the region such as mosquito-borne diseases, HIV/AIDS and tuberculosis, diabetes and hypertension.

An external evaluation conducted in 2004 reported that POLHN effectively provided access to continuing health education, IT skills and Internet training in an affordable and relevant manner—all for health professionals who previously had no access to such opportunities. Further, the evaluation noted that combining work and study allows students to immediately apply their learning to the work place.

Some lessons learned from this project include:

- Costs are lower through POLHN than traditional on-site training. For example, a graduate degree that formerly required 18 months of on-site attendance at a New Zealand university can now be completed with only three months of on-site attendance, with the rest of the course work delivered online. The savings in per diem and other costs are sufficient to fund one to two additional participants.
- Course design is important to the success of online learning. The most popular courses are the ones that are six weeks long or less. Interactivity must be a key component of courses and allow for peer learning. Problem-based learning and group assignments provide the opportunity for participants to engage in peer-to-peer learning.
- Course trainers and mentors are required to be present in the training centres as students working in the eLearning and open learning environment still need guidance. A one-week introductory course on online learning for new POLHN students accommodates this need.
- Training and support of instructors is also an important component. Many content experts have a thorough knowledge of teaching in a face-to-face environment but very limited knowledge and experience in teaching in an online environment. Engaging students through interaction requires different strategies in an online course than in a traditional one. In addition, interactive strategies that work well in high bandwidth situations often need to be modified for low bandwidth ones.
- Meetings and workshops can be made more effective by incorporating pre- and post-meeting online experiences. Workshop attendees can arrive prepared to concentrate on tasks and can receive assistance in implementing new learning through continuing online support after returning home.
- POLHN shows that online learning can be effective in meeting the continuing education needs of health professionals. The potential exists to enhance the capacity of the health workforce in the region and link this workforce to other eHealth initiatives throughout the world. However, it requires a paradigm shift among senior health officials from a reliance solely on face-to-face training to a mix-mode method that includes online learning in those areas where it can be most effective.

* Learning centres are in the Cook Islands, Fiji, Kiribati, the Marshall Islands, Federated States of Micronesia (Ponhpei State), Palau, Samoa, Solomon Islands, Tonga and Vanuatu. A POLHN centre for Nauru is under construction and one for Tuvalu is in the planning stages.

** POLHN web site <http://www.polhn.com/>.

Box 14. Case study: POLHN



eHealth today and tomorrow

The findings of the global survey for eHealth confirm that the use of ICT is steadily being integrated into health systems and services worldwide. The survey found that there has been strong growth since 2000 in many areas assessed and that the majority of countries have ambitious plans for further development by 2008. A consistent relationship was found between World Bank income groups and the uptake of eHealth policies or actions by Member States. Countries in the high and upper-middle income groups are generally more advanced in their eHealth development than the lower-middle and low-income groups. Clearly, developing countries, in particular, will require extra guidance and support from WHO and its partners if they are not to be left behind in the rapidly evolving information society.

The actions and recommendations that follow are based on the spirit of collaboration and cooperation, and of the international sharing of experiences, products and best practices.

■ Foundation policies and strategies

Overall, solid advances in building the foundation policies and strategies for eHealth were reported along with positive growth projections for 2008. One area requiring particular attention due to its strategic significance is eHealth governance. Almost half of the responding countries have no governance mechanisms in place for eHealth. Establishing such mechanisms will ensure that national eHealth planning and implementation can be more effectively and transparently managed based on intersectoral collaboration as well as participation of all key stakeholders.

The development of eHealth policies will be the focus of attention of many governments in the coming years, particularly those of developing countries. Member States report they are seeking guidance from WHO in undertaking these policy initiatives. Best practices as well as lessons learned from failures must be documented and published by WHO to help streamline the process in countries and to ensure the creation of robust and visionary policies.

Public-private partnerships are increasingly being utilized in moving forward—to build infrastructure and to advance specific eHealth programmes. This approach is gaining acceptance as a way in which to attract funding or in-kind support for eHealth development. It is a positive sign as funding eHealth initiatives was reported as being a major challenge for many Member States.

The level of infrastructure development varies substantially across countries and the need for its systematic and coordinated implementation has become increasingly clear. There is a growing tendency to use “technology roadmaps” or blueprints to assist with the planning process. These are national plans for the development of ICT in health, and are central to facilitating the systematic design and implementation of national infrastructure. Fortunately the trend in this area is positive, with more responding countries developing such plans.

WHO actions

Recommendations to Member States

Governance	
The Fifty-eighth World Health Assembly in May 2005, adopted Resolution WHA58.28 establishing an eHealth strategy for WHO.	The WHA resolution on eHealth urges Member States to consider drawing up long-term strategic plans for the development and implementation of eHealth services. It calls on governments to form national eHealth bodies, which would be responsible for providing crucial guidance in areas such as policy and strategy development in eHealth including data security, privacy, interoperability, cultural and linguistic issues, infrastructure, funding, monitoring and evaluation. WHO recommends that each Member State establish a national-level body for eHealth, which is formally supported by the ministry of health as a key instrument in implementing the WHA eHealth resolution.
Policy framework	
To support Member States in their efforts to shape eHealth policy, the Global Observatory for eHealth will establish a thematic working group to develop a set of tools and guidelines for adaptation and adoption by countries.	
Funding	
WHO is mandated by the WHA resolution to draw up frameworks for the governance of eHealth partnerships, which will facilitate national cooperation and international exchange, as reported in <i>eHealth: proposed tools and services (2)</i> . Finally, the Global Observatory for eHealth will develop a worldwide database of eHealth best practices to promote such practices and facilitate the process of eHealth initiatives' application for funds from governments and donors.	The WHA eHealth resolution urges Member States to foster closer partnerships with private- and nongovernmental-sectors in ICT to advance public services for health. All Member States are further encouraged to introduce guidelines for the governance of public-private partnerships in eHealth based on the guiding principles developed by WHO.
Infrastructure	
	WHO recommends that Member States identify policies and practices that will maximize affordability of access and infrastructure development in sustainable ways, for example, by participating in national, regional and global partnerships.

Table 17. Foundation policies & strategies

■ Enabling policies and strategies

The survey found that the layer of enabling policies and strategies, which can help citizens to benefit from eHealth, was not well developed. Almost all of the actions under this rubric need increased attention; working closely with Member States, WHO and its partners will need to increase their efforts to address these issues.

Although growth is anticipated, the responses for both citizen protection and equity of access show that only one in two countries have adopted policies. Concerted action by governments, with the support of WHO, will give citizens the assurance they need that their personal electronic health data is secure from potential misuse, as well as extend access of eHealth services to all societal groups.

Notably, the creation of multilingual eHealth content for the general public represented the lowest level of activity of any area studied, and growth projections are limited. Strategies need to be developed to facilitate the sharing of common language eHealth content among countries which can then be localized if necessary.

Interoperability and the issues around the development and adoption of eHealth standards also appear to be low on the agenda of many governments at present. However, a marked increase in activity is expected as Member States recognize the critical operational importance of adopting these measures to ensure that eHealth systems can communicate effectively with each other. Indeed, this is recognized as one of the greatest technical challenges facing the future of eHealth.

ICT capacity building of health professionals and students was the only enabling action where good progress was reported and Member States are keen to build on these initiatives. WHO is drafting a framework for action which will build on the existing country successes and take these efforts further.

ENABLING POLICIES & STRATEGIES

WHO actions	Recommendations to Member States
Citizen protection & equity of access	
One of the six key eHealth work areas identified by <i>eHealth: proposed tools and services (2)</i> is the need to establish a WHO eHealth legal and ethics committee. This committee will be charged with the provision of practical guidance on the promulgation of laws and regulations. It will also prepare draft frameworks for adaptation to specific country needs.	The WHA eHealth resolution urges Member States to promote equitable, affordable and universal access to the Internet and eHealth services, which includes communities in remote areas, and vulnerable groups. It further calls on Member States to advance the principles of confidentiality of information and privacy in the eHealth domain.
Multilingualism & cultural diversity	
WHO, with partners such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), must continue to work to raise the profile and importance of multilingualism and multiculturalism in cyberspace. In particular, the Global Observatory for eHealth will establish a thematic working group to propose strategies for the international sharing of eHealth information products in multiple languages among Member States to avoid duplication of effort.	WHO recommends that Member States pay increased attention to the production and sharing of multilingual eHealth content in accordance with public demand in their respective countries.
Interoperability	
WHO is committed to providing support to Member States to promote the development, application and management of national standards of health information. It will collect and collate information with a view to establishing national standardized health information systems that can easily and effectively exchange information among Member States.	To assist WHO in this effort, Member States should actively participate in multisectoral efforts to determine evidence-based eHealth standards and norms.
Capacity building	
The use of ICT in support of human resources for health is identified as one of the key WHO work areas. A framework is being drafted for the training of professionals and students in the use of ICT for health.	WHO recommends that Member States continue to build on their existing achievements in ICT capacity building by implementing the WHO guidelines for the training of health professionals and students.

Table 18. Enabling policies & strategies

■ eHealth applications

A select number of eHealth applications were studied in the survey. For this reason it is not possible to make overall conclusions about the trends in adoption of the wide range of systems and services available. However, for those eHealth applications chosen for assessment, the rates of adoption were highly encouraging.

It may not be surprising that the highest rate of adoption of any actions in the survey was the provision of health information to the general public through web sites. Four out of five countries are already providing these services and projections for 2008 anticipate this will rise to nine out of ten countries.

Knowledge services for health professionals and students are also growing strongly. International electronic journal services are already accessible in most countries and the growth in access in developing countries is very encouraging. As a complementary and often free source of research information, national open archives for health sciences shows considerable potential and are predicted to grow worldwide. eLearning offers a viable approach to the education and training needs of health professionals and students and will become a powerful tool—especially in developing countries. It is already being integrated into learning processes and promises to evolve in the coming few years.

Finally, the growing interest and commitment to the introduction of eHealth systems and services by Member States is clearly reflected by their responses to their requirements for eHealth tools and services. Many countries responded overwhelmingly positively to the usefulness of the listed tools and services.

eHEALTH APPLICATIONS

WHO actions	Recommendations to Member States
Public services	
As one of the key eHealth priority work areas, WHO will launch an initiative that promotes the adoption of quality criteria among Member States for health content and encourages content development appropriate for different target audiences.	Member States should adopt WHO guidelines in the development of eHealth content. These guidelines will help countries consider the differing needs of target audiences when they create online health information.
Knowledge services	
WHO, with its partners, needs to advocate for countries and institutions to join open archives initiatives, which will facilitate access to their own national research as well as international publications. eLearning for the training of health-care professionals is another priority area of the WHO eHealth work plan. A framework is to be drawn up for the education and training of health professionals, especially for their continuing education, using eLearning as well as other complementary methods. The focus will be on in-country training and local language content.	Member States should evaluate the benefits of creating open archives for health sciences literature as a cost-effective way of producing, disseminating and accessing national and international research literature. Member States are urged to incorporate eLearning methods, where appropriate, into their training of health sciences students as well as for the ongoing training of health professionals.
Provider services	
<p><i>eHealth tools & services: needs of the Member States (12) recommends that WHO, in collaboration with public and private sector partners, should take action in the following key areas:</i></p> <ul style="list-style-type: none"> • Provision of generic tools • Access to existing tools • Facilitating knowledge exchange • Providing eHealth information • Education 	

Table 19. eHealth applications

■ Taking action for tomorrow

Much has already been achieved by countries in their ambitions to introduce the power and benefits of ICT into their health systems and services. Every indication points to the fact that Member States are eager to proceed along this path. The experiences of the more advanced countries can provide useful insights into best practices, as well as the likely challenges that countries with less experience will face along the way.

Those challenges are numerous. Member States are not just grappling with funding issues, growing infrastructural requirements or striving towards interoperability of systems; they are also often struggling with the need to change entrenched attitudes regarding technology—often in the health work force itself, among other challenges. Proceeding in a way that not only strengthens capacity, but also preserves cultural integrity and increases the access to such technologies for those who need it most must remain a goal. It is the poor and marginalized in our societies that have the most to gain from advances in health care and eHealth; sadly they are often the groups who benefit the least.

WHO works to attain the best possible health for the peoples of the world. There is no doubt that global health will be determined by advances in science and technology. eHealth will be central to this process. Countries need to develop sound policies and mechanisms to manage emerging eHealth systems and services while preserving the notion of equity, as eHealth has tremendous potential to serve all.

eHealth is a global phenomenon. Member States are likely to achieve the best results in the implementation of eHealth if they learn from other country or regional successes as well as failures. Collaboration is key in this process: the guiding principle for WHO in advancing the eHealth agenda worldwide is fostering collaboration with international and national bodies, NGOs, the private sector and other key stakeholders.

Together we must work to build a healthier world—a world where information and communication technologies help support and enhance health care services and are available for all.





Selected indicators and survey responses

Selected ICT-related indicators and survey responses

Member State ^a	Selected ICT-related indicators				Survey responses (GOe Global eHealth Survey 2005) ^f					
	World Bank category ^b	ICT Diffusion Index (2002) ^c	Internet users (per 100 inhabitants) (2004) ^d	Adult literacy rate (2004) ^e	national information policy	national ePolicy	national eHealth policy	standards policy	citizen protection policy	equity policy
Afghanistan	4	...	0.10		no	no	no	no	no	no
Albania	3	0.1966	2.35	98.7	yes	yes	yes	yes	no	no
Algeria	3	0.2309	2.61	69.8	yes	yes	yes	yes	no	yes
Angola	3	...	1.22	66.8	yes	no	no	no	no	no
Argentina	2	0.3460	16.10	97.2	yes	yes	yes	yes	no	yes
Armenia	3	0.2813	4.91	99.4	yes	no	no	no	yes	no
Australia	1	0.6511	65.28	...	yes	yes	yes	yes	yes	yes
Austria	1	0.5699	47.52	...	yes	yes	yes	yes	yes	yes
Bahamas	1	...	29.34	...	yes	yes	yes	yes	yes	yes
Bahrain	1	0.4229	20.67	87.7	no	yes	yes	yes	yes	yes
Bangladesh	4	0.1711	0.22	41.1	yes	yes	yes	yes	no	no
Belarus	3	0.3329	24.98	99.6	yes	yes	no	no	no	no
Belgium	1	0.5389	40.62	...	yes	yes	yes	yes	yes	yes
Belize	2	0.2994	13.41	76.9	no	yes	yes	yes	yes	yes
Benin	4	0.0984	1.38	33.6	yes	yes	no	no	no	no
Bhutan	4	...	2.56	...	yes	yes	yes	no	no	no
Botswana	2	0.2830	3.50	78.9	yes	yes	yes	no	yes	yes
Brazil	3	0.3256	12.18	88.4	yes	yes	yes	yes	yes	yes
Brunei Darussalam	1	0.4159	15.30	92.7	yes	yes	yes	no	yes	yes
Burkina Faso	4	0.1296	0.40	12.8	yes	yes	yes	no	yes	yes
Burundi	4	0.1818	0.35	58.9	yes	no	no	no	no	no
Cameroon	4	0.2079	1.02	67.9	no	no	no	no	no	no
Canada	1	0.6216	62.36	...	yes	yes	yes	yes	yes	yes
Central African Republic	4	0.1712	0.23	48.6	no	no	no	...	no	no
Chad	4	0.1505	0.68	25.5	no	yes	no	no	no	no
Chile	2	0.3787	27.90	95.7	yes	yes	yes	yes	no	yes

Member State ^a	Selected ICT-related indicators				Survey responses (GOe Global eHealth Survey 2005) ^f					
	World Bank category ^b	ICT Diffusion Index (2002) ^c	Internet users (per 100 inhabitants) (2004) ^d	Adult literacy rate (2004) ^e	Adoption of					
					national information policy	national ePolicy	national eHealth policy	standards policy	citizen protection policy	equity policy
China	3	0.2115	7.23	90.9	yes	yes	yes	yes	no	no
Comoros	4	0.1603	1.01	56.2	yes	yes	yes	no	no	no
Congo	4	0.1452	0.94	82.8	yes	no	no	no	no	no
Costa Rica	2	0.3560	23.54	95.8	no	no	no	yes	no	no
Croatia	2	0.4240	29.51	98.1	yes	yes	yes	yes	yes	yes
Cyprus	1	0.5250	36.93	96.8	no	no	yes	yes	yes	yes
Czech Republic	2	0.4524	49.97	...	yes	yes	no	yes	no	no
Democratic People's Republic of Korea	4	...	...	...	yes	yes	yes	yes	yes	yes
Democratic Republic of the Congo	4	...	0.09	65.3	no	no	no	no	no	no
Denmark	1	0.7200	60.41	...	yes	yes	yes	yes	yes	no
Djibouti	3	0.1613	1.32	...	yes	yes	yes	no	no	no
Dominican Republic	3	0.2842	9.10	87.7	yes	yes	yes	no	no	no
Egypt	3	0.2254	5.57	55.6	yes	yes	yes	yes	yes	yes
El Salvador	3	0.1604	8.88	79.7	yes	yes	yes	yes	yes	yes
Eritrea	4	0.1905	11.84	...	no	no	no	no	no	no
Estonia	2	0.4867	51.22	99.8	yes	yes	yes	yes	yes	yes
Ethiopia	4	0.1708	0.16	41.5	no	yes	no	no	no	no
Fiji	3	0.2762	7.20	92.9	yes	yes	yes	yes	yes	yes
Finland	1	0.6908	63.00	...	yes	yes	yes	yes	yes	yes
France	1	0.5453	41.37	...	yes	yes	yes	yes	yes	yes
Gabon	2	0.2366	2.96	...	no	no	no	no	no	no
Gambia	4	0.1842	3.35	...	yes	yes	yes	yes	yes	yes
Germany	1	0.6114	42.67	...	yes	yes	yes	yes	yes	yes
Ghana	4	0.2183	1.72	54.1	yes	yes	yes	no	no	no
Guinea	4	0.2345	0.53	...	no	no	yes	yes	no	no
Guinea-Bissau	4	0.0685	1.99	...	no	no	no	no	no	no
Honduras	3	0.2234	3.18	80.0	no	no	no	no	no	no
Hungary	2	0.4248	26.74	99.3	yes	yes	yes	yes	yes	yes
Iceland	1	0.7547	77.00	...	yes	yes	yes	yes	yes	no
India	4	0.2081	3.24	61.0	yes	yes	yes	yes	yes	yes
Iran (Islamic Republic of)	3	0.2801	7.88	77.0	yes	yes	yes	yes	yes	yes

Member State ^a	Selected ICT-related indicators				Survey responses (GOe Global eHealth Survey 2005) ^f					
	World Bank category ^b	ICT Diffusion Index (2002) ^c	Internet users (per 100 inhabitants) (2004) ^d	Adult literacy rate (2004) ^e	Adoption of					
					national information policy	national ePolicy	national eHealth policy	standards policy	citizen protection policy	equity policy
Israel	1	0.5764	46.63	96.9	yes	yes	no	yes	yes	yes
Jordan	3	0.2948	10.69	89.9	yes	yes	yes	no	no	no
Kenya	4	0.2193	4.63	73.6	yes	yes	no	yes	no	no
Latvia	2	0.3816	35.43	99.7	yes	yes	yes	no	no	no
Lebanon	2	0.3050	16.90	...	no	no	no	no	no	yes
Lesotho	4	0.2153	2.39	81.4	yes	yes	yes	yes	yes	yes
Lithuania	2	0.3724	28.09	99.6	yes	yes	yes	yes	yes	no
Luxembourg	1	0.7236	59.00	...	yes	yes	no	no	yes	no
Madagascar	4	0.1911	0.50	70.6	no	yes	yes	yes	no	no
Malawi	4	0.1866	0.37	64.1	no	no	no	no	no	no
Malaysia	2	0.4042	38.62	88.7	yes	yes	yes	yes	yes	yes
Maldives	3	0.3565	5.79	96.3	no	no	no	no	yes	no
Mali	4	0.1404	0.45	19.0	yes	yes	yes	no	yes	no
Mauritania	4	0.1562	0.47	51.2	yes	yes	yes	no	no	no
Mexico	2	0.2969	13.38	90.3	yes	yes	yes	yes	yes	yes
Mongolia	4	0.2704	7.60	97.8	yes	yes	yes	no	no	yes
Morocco	3	0.1877	11.71	50.7	yes	yes	yes	no	no	yes
Mozambique	4	...	0.73	46.5	no	yes	no	no	no	no
Myanmar	4	...	0.12	89.7	yes	yes	yes	yes	yes	yes
Nepal	4	0.1794	0.48	48.6	yes	yes	no	yes	no	yes
Niger	4	0.1176	0.19	14.4	yes	yes	no	no	no	no
Nigeria	4	0.1136	1.39	66.8	yes	yes	yes	no	no	yes
Norway	1	0.6859	39.37	...	yes	yes	yes	yes	yes	yes
Oman	2	0.3104	10.14	74.4	yes	yes	yes	yes	no	yes
Panama	2	0.2235	9.46	91.9	yes	yes	yes	yes	no	yes
Paraguay	3	0.2755	2.49	91.6	yes	yes	no	no	no	no
Peru	3	0.2710	11.61	87.7	yes	yes	no	yes	yes	no
Philippines	3	0.2940	5.32	92.6	yes	yes	no	no	no	no
Poland	2	0.3424	23.35	...	yes	yes	no	yes	yes	no
Republic of Korea	1	0.6160	65.68	...	yes	yes	yes	yes	yes	no
Russian Federation	2	0.2620	11.10	99.4	yes	yes	yes	yes	yes	yes

Member State ^a	Selected ICT-related indicators				Survey responses (GOe Global eHealth Survey 2005) ^f					
	World Bank category ^b	ICT Diffusion Index (2002) ^c	Internet users (per 100 inhabitants) (2004) ^d	Adult literacy rate (2004) ^e	national information policy	national ePolicy	national eHealth policy	standards policy	citizen protection policy	equity policy
Saudi Arabia	1	0.3148	6.36	79.4	yes	yes	yes	yes	yes	no
Seychelles	2	...	24.69	91.9	no	no	no	no	yes	no
Sierra Leone	4	0.2457	0.19	29.6	yes	no	no	no	no	no
Singapore	1	0.6630	56.12	92.5	no	yes	yes	yes	yes	no
Slovakia	2	0.3299	42.27	99.6	yes	yes	yes	yes	no	no
Somalia	4	...	1.67	...	no	no	no	no	no	no
Sri Lanka	3	0.2545	1.44	90.4	yes	yes	yes	yes	yes	yes
Sudan	4	0.1962	3.30	59.0	yes	yes	yes	yes	yes	yes
Suriname	3	0.3864	6.83	88.0	no	no	no	no	no	no
Swaziland	3	0.2424	3.32	79.2	yes	yes	yes	yes	yes	yes
Switzerland	1	0.6507	47.20	...	yes	no	no	no	no	no
Syrian Arab Republic	3	0.2456	4.39	82.9	yes	yes	yes	no	no	no
Thailand	3	0.3049	11.25	92.6	yes	yes	no	no	yes	no
Togo	4	0.1888	4.41	53.0	no	no	no	no	no	no
Tonga	3	0.2526	2.88	98.9	yes	no	no	yes	yes	no
Turkey	2	0.3033	14.13	88.3	yes	yes	yes	yes	yes	yes
Uganda	4	0.1546	0.75	68.9	yes	no	yes	yes	yes	yes
United Arab Emirates	1	0.5724	31.85	77.3	yes	yes	yes	yes	yes	yes
United Kingdom	1	0.6085	62.88	...	yes	yes	yes	yes	yes	yes
United Republic of Tanzania	4	0.1886	0.88	69.4	yes	yes	yes	yes	yes	no
Venezuela (Bolivarian Republic of)	2	0.3053	8.84	93.0	yes	yes	yes	yes	yes	yes
Viet Nam	4	0.2531	7.12	90.3	yes	yes	yes	yes	yes	no
Yemen	4	0.1881	0.87	49.0	yes	yes	yes	no	no	no
Zambia	4	0.2029	2.11	67.9	yes	yes	no	yes	yes	yes

Table 20. Selected ICT-related indicators and eHealth survey responses

... Not available.

^a List of countries that have responded to the GOe "Global eHealth Survey 2005".

^b World Bank income groups, based on World Bank estimates of 2004 Gross National Income (GNI) per capita: (1) high income, US\$ 10 066 or more; (2) upper-middle income US\$ 3 256–US\$ 10 065; (3) lower-middle income, US\$ 826–US\$ 3 255; and (4) low income, US\$ 825 or less. Accessed in February 2006 at: <http://www.worldbank.org/>

^c *The digital divide—ICT development indices 2004*, New York/Geneva, United Nations, 2005 (UNCTAD/ITE/IPC/2005/4).

^d International Telecommunications Union. Accessed in February 2006 at: <http://www.itu.int/ITU-D/ict/statistics/>.

^e Core Health Indicators from WHO sources, including *World Health Statistics 2006* and the *World Health Report 2006: working together for health*. Accessed in November 2006 at: http://www3.who.int/whosis/core/core_select.cfm.

^f Response to question whether the selected policy had been implemented by the time of the survey (mid-August 2005 – mid-August 2006). For more detail see chapter "First global survey on eHealth".

Demographic and socioeconomic indicators

Member State ^a	Population (000s) (2003) ^b	GDP per capita (international dollars) (2003) ^c	Total health expenditure (% of GDP) (2003) ^c	Total health expenditure per capita (international dollars) (2003) ^d	Life expectancy at birth (years) (2004) ^d		Child mortality (per 1000) (2004) ^d	
					Males	Females	Males	Females
Afghanistan	27 231	405	6.5	26	42	42	258	256
Albania	3 094	5 626	6.5	366	69	74	19	18
Algeria	31 866	4 475	4.1	186	69	72	41	39
Angola	15 047	1 726	2.8	49	38	42	276	243
Argentina	38 005	11 939	8.9	1 067	71	78	20	16
Armenia	3 037	5 049	6.0	302	65	72	34	30
Australia	19 873	30 253	9.5	2 874	78	83	6	5
Austria	8 121	30 601	7.5	2 306	76	82	5	5
Bahamas	315	19 034	6.4	1 220	70	76	14	12
Bahrain	706	19 928	4.1	813	73	75	11	11
Bangladesh	136 615	1 987	3.4	68	62	63	81	73
Belarus	9 866	10 359	6.4	570	63	74	11	9
Belgium	10 376	30 072	9.4	2 828	75	81	5	4
Belize	259	6 866	4.5	309	65	72	44	33
Benin	7 919	813	4.4	36	52	53	152	153
Bhutan	2 071	1 888	3.1	59	62	65	80	80
Botswana	1 772	6 709	5.6	375	40	40	123	109
Brazil	181 408	7 843	7.6	597	67	74	38	31
Brunei Darussalam	358	19 334	3.5	681	76	78	10	8
Burkina Faso	12 418	1 206	5.6	68	47	48	193	191
Burundi	7 037	486	3.1	15	42	47	196	184
Cameroon	15 749	1 516	4.2	64	50	51	156	143
Canada	31 660	30 324	9.9	2 989	78	83	6	5
Central African Republic	3 937	1 171	4.0	47	40	41	201	185
Chad	9 133	792	6.5	51	45	48	212	188
Chile	15 951	11 539	6.1	707	74	81	10	9
China	1 300 039	4 958	5.6	278	70	74	27	36
Comoros	757	951	2.7	25	62	67	24	17
Congo	3 769	1 176	2.0	23	53	55	113	103
Costa Rica	4 176	8 471	7.3	616	75	80	14	11
Croatia	4 522	10 804	7.8	838	72	79	8	7

Member State ^a	Population (000s) (2003) ^b	GDP per capita (international dollars) (2003) ^c	Total health expenditure (% of GDP) (2003) ^c	Total health expenditure per capita (international dollars) (2003) ^d	Life expectancy at birth (years) (2004) ^d		Child mortality (per 1000) (2004) ^d	
					Males	Females	Males	Females
Cyprus	816	17 735	6.4	1143	77	82	5	5
Czech Republic	10 202	17 325	7.5	1302	73	79	5	4
Democratic People's Republic of Korea	22 271	1 276	5.8	74	65	68	56	54
Democratic Republic of the Congo	54 231	357	4.0	14	42	47	217	192
Denmark	5 391	30 731	9.0	2 762	75	80	5	5
Djibouti	765	1 265	5.7	72	54	57	131	120
Dominican Republic	8 641	4 796	7.0	335	64	70	34	30
Egypt	71 267	4 042	5.8	235	66	70	36	36
El Salvador	6 643	4 655	8.1	378	68	74	30	26
Eritrea	4 054	1 127	4.4	50	58	62	89	75
Estonia	1 341	12 753	5.3	682	66	78	10	6
Ethiopia	73 795	338	5.9	20	49	51	175	158
Fiji	834	5 873	3.7	220	66	71	21	19
Finland	5 220	28 401	7.4	2 108	75	82	5	3
France	59 768	28 632	10.1	2 902	76	83	5	4
Gabon	1 341	5 754	4.4	255	55	59	102	80
Gambia	1 438	1 186	8.1	96	55	59	129	115
Germany	82 534	27 143	11.1	3 001	76	82	5	5
Ghana	21 212	2 159	4.5	98	56	58	113	111
Guinea	9 003	1 741	5.4	95	52	55	160	150
Guinea-Bissau	1 494	795	5.6	45	45	48	212	194
Honduras	6 893	2 588	7.1	184	65	70	42	40
Hungary	10 130	15 166	8.4	1 269	69	77	9	7
Iceland	290	29 666	10.5	3 110	79	83	3	2
India	1 070 800	1 691	4.8	82	61	63	81	89
Iran (Islamic Republic of)	68 172	7 659	6.5	498	68	72	39	36
Israel	6 475	21 482	8.9	1 911	78	82	6	6
Jordan	5 412	4 670	9.4	440	69	73	28	26
Kenya	32 734	1 502	4.3	65	51	50	129	110
Latvia	2 330	10 629	6.4	678	66	76	11	11
Lebanon	3 504	7 152	10.2	730	68	72	35	26
Lesotho	1 800	2 018	5.2	106	39	44	87	76

Member State ^a	Population (000s) (2003) ^b	GDP per capita (international dollars) (2003) ^c	Total health expenditure (% of GDP) (2003) ^c	Total health expenditure per capita (international dollars) (2003) ^d	Life expectancy at birth (years) (2004) ^d		Child mortality (per 1000) (2004) ^d	
					Males	Females	Males	Females
Lithuania	3 455	11 484	6.6	754	66	78	10	9
Luxembourg	448	54 013	6.8	3 680	76	81	6	5
Madagascar	17 626	910	2.7	24	55	59	128	117
Malawi	12 339	492	9.3	46	41	41	179	172
Malaysia	24 437	9 761	3.8	374	69	74	14	11
Maldives	313	5 894	6.2	364	66	68	47	44
Mali	12 736	809	4.8	39	44	47	230	208
Mauritania	2 893	1 427	4.2	59	55	60	134	115
Mexico	103 718	9 445	6.2	582	72	77	31	25
Mongolia	2 583	2 100	6.7	140	61	69	60	45
Morocco	30 568	4 324	5.1	218	69	73	47	38
Mozambique	19 052	957	4.7	45	44	46	154	150
Myanmar	49 463	1 838	2.8	51	56	63	116	93
Nepal	26 053	1 219	5.3	64	61	61	74	79
Niger	13 052	644	4.7	30	42	41	256	262
Nigeria	125 912	1 011	5.0	51	45	46	198	195
Norway	4 565	37 031	10.3	3 809	77	82	4	4
Oman	2 511	13 017	3.2	419	71	77	13	12
Panama	3 119	7 255	7.6	555	73	78	26	22
Paraguay	5 878	4 148	7.3	301	70	74	25	23
Peru	27 162	5 309	4.4	233	69	73	31	27
Philippines	80 166	5 490	3.2	174	65	72	40	28
Poland	38 205	11 530	6.5	745	71	79	8	7
Republic of Korea	47 849	19 274	5.6	1 074	73	80	5	7
Russian Federation	144 618	9 832	5.6	551	59	72	18	14
Saudi Arabia	23 326	14 431	4.0	578	68	74	29	24
Seychelles	79	10 204	5.9	599	67	78	14	13
Sierra Leone	5 119	975	3.5	34	37	40	296	269
Singapore	4 220	25 964	4.5	1 156	77	82	4	3
Slovakia	5 380	13 118	5.9	777	70	78	9	8
Somalia	7 708	...	...	...	43	45	222	228
Sri Lanka	20 394	3 516	3.5	121	68	75	16	12

Member State ^a	Population (000s) (2003) ^b	GDP per capita (international dollars) (2003) ^c	Total health expenditure (% of GDP) (2003) ^c	Total health expenditure per capita (international dollars) (2003) ^d	Life expectancy at birth (years) (2004) ^d		Child mortality (per 1000) (2004) ^d	
					Males	Females	Males	Females
Sudan	34 856	1 250	4.3	54	56	60	98	84
Suriname	444	3 907	7.9	309	65	70	42	36
Swaziland	1 035	5 578	5.8	324	36	39	163	150
Switzerland	7 339	32 805	11.5	3 776	78	83	5	5
Syrian Arab Republic	18 129	2 244	5.1	116	70	74	19	14
Thailand	63 145	7 776	3.3	260	67	73	23	20
Togo	5 836	1 107	5.6	62	52	56	151	128
Tonga	102	4 581	6.5	300	71	70	32	17
Turkey	70 713	6 969	7.6	528	69	73	33	31
Uganda	26 869	1 027	7.3	75	48	51	144	132
United Arab Emirates	4 031	18 820	3.3	623	76	79	8	7
United Kingdom	59 554	29 825	8.0	2 389	76	81	6	5
United Republic of Tanzania	36 919	676	4.3	29	47	49	134	117
Venezuela (Bolivarian Republic of)	25 816	5 127	4.5	231	72	78	20	17
Viet Nam	82 000	3 007	5.2	164	69	74	24	22
Yemen	19 702	1 616	5.5	89	57	61	118	104
Zambia	11 291	945	5.4	51	40	40	190	173

Table 21. Demographic and socioeconomic statistics

... Not available.

^a List of countries that have responded to the GOe "Global eHealth Survey 2005".

^b United Nations Population Division, data for year 2003 as at April 2006 (<http://www.un.org/esa/population/unpop.htm>).

^c WHO, National Health Accounts (NHA) Unit, (EIP/HSF/CEP), (2006).

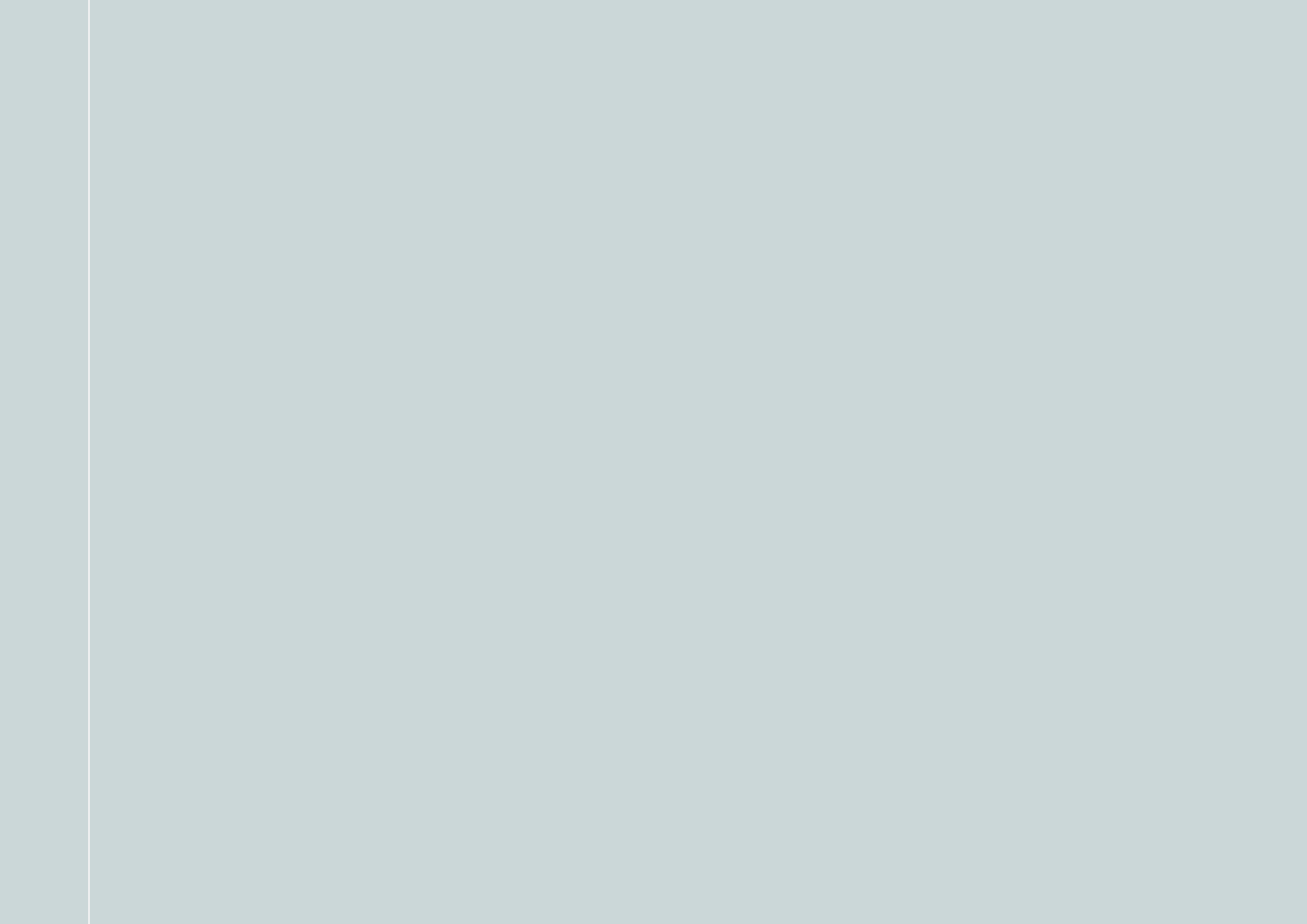
^d Core Health Indicators from WHO sources, including *World Health Statistics 2006* and the *World Health Report 2006: working together for health*. Accessed in November 2006 at: http://www3.who.int/whosis/core/core_select.cfm.





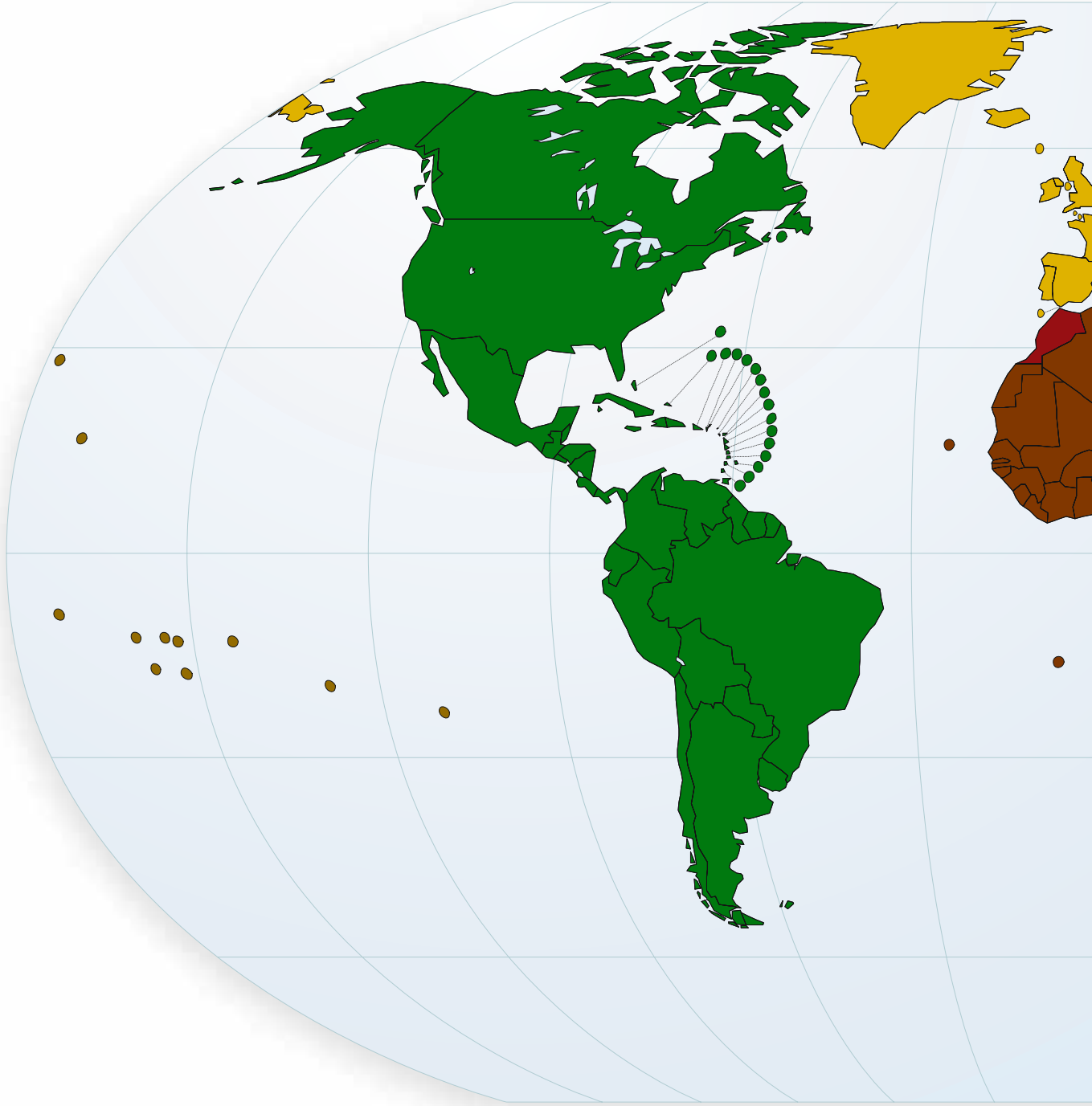
References

1. Resolution WHA58.28. eHealth. In: *Fifty-eighth World Health Assembly, Geneva, 16–25 May 2005*. Volume 1. Resolutions and decisions, and list of participants. Geneva, World Health Organization, 2005 (WHA28/2005/REC/1):108–110.
2. *eHealth: proposed tools and services*. Report by the Secretariat to the 117th Session of the Executive Board. Geneva, World Health Organization, 2005 (EB117/15). (http://www.who.int/gb/ebwha/pdf_files/EB117/B117_15-en.pdf, accessed 1 November 2006.)
3. Oh H et al. What is eHealth (3): a systematic review of published definitions. *Journal of Medical Internet Research*, 2005, 7(1):e1. (<http://www.jmir.org/2005/1/e1/>, accessed 1 November 2006.)
4. Eysenbach G. Editorial. What is eHealth? *Journal of Medical Internet Research*, 2001;3(2):e20. (<http://www.jmir.org/2001/2/e20/>, accessed 1 November 2006.)
5. *eHealth history, real time data transfer, advised therapy, distant sufferer, telephony, videoconferencing*. United Kingdom eHealth Association. (http://www.ids-healthcare.com/hospital_management/global/UK_EHealth_Association/EHealth_History_Telephony_Videoconferencing/5_0/g_supplier_5.html, accessed 1 November 2006.)
6. Subcommittee on Telemedicine. Emergency Medicine Practice Committee. *Telemedicine in emergency medicine*. American College of Emergency Physicians, 1998. (<http://www.acep.org/NR/rdonlyres/BA992307-A653-43EA-8331-0CB0964B7D2/0/telemedicine.pdf>, accessed 1 November 2006.)
7. Dick RS, Steen EB, Detmer DE, eds. *The computer-based patient record: an essential technology for health care*. Washington DC, National Academy Press, 1991.
8. Kohn LT, Corrigan JM, Donaldson MS, eds. *To err is human: building a safer health system*. Washington DC, National Academy Press, 2000.
9. Institute of Medicine (U.S.). Committee on Quality of Health Care in America. *Crossing the quality chasm*. Washington DC, National Academy Press, 2001.
10. Chaudhry B et al. Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. *Annals of Internal Medicine*, 2006, 144 (10):742. (<http://www.annals.org/cgi/content/short/144/10/742>, accessed 1 November 2006.)
11. *ITU Internet reports 2005: the Internet of things*. Geneva, International Telecommunications Union, 2005.
12. WHO Global Observatory for eHealth. *eHealth tools & services: needs of the Member States*. Geneva, World Health Organization, 2006 (WHO/EHL/06.1). (http://www.who.int/kms/initiatives/tools_and_services_final.pdf, accessed 1 November 2006.)
13. Dzenowagis J, Kernen G. *Connecting for health: global vision, local insight: country profiles*. Geneva, World Health Organization, 2006. (<http://www.who.int/ehealth/resources/en/>, accessed 1 November 2006.)
14. *The digital divide: ICT development indices 2004*. New York/Geneva, United Nations, 2005 (UNCTAD/ITE/IPC/2005/4). (http://www.unctad.org/en/docs/iteipc20054_en.pdf, accessed 1 November 2006.)
15. *The logframe handbook: a logical framework approach to project cycle management*. Washington DC, World Bank, 2000.
16. *E-Strategies monitoring and evaluation toolkit*. Washington DC, World Bank, 2005 (INF/GICT V6.1B). (http://siteresources.worldbank.org/INTEDEVELOPMENT/Resources/estراتيجياتToolkit_Jan2005.pdf, accessed 1 November 2006.)
17. Hart JT. The inverse care law. *Lancet*, 1971, 27:405–412.
18. Commission of the European Communities. *A new framework strategy for multilingualism*. Brussels, European Commission, 2005 (COM[2005]596 final). (http://ec.europa.eu/education/policies/lang/doc/com596_en.pdf#search=%22policy%20directive%20multilingualism%20europe%22, accessed 1 November 2006.)
19. Alliance for Telecommunications Industry Solutions. *ATIS telecom glossary*. Washington DC, ATIS, 2001 (T1523-2001) (<http://www.atis.org>).
20. ESA. *Towards interoperable eHealth for Europe: Telemedicine Alliance strategy*. A joint project of European space Agency, World Health Organization and International Telecommunications Union funded by the European Union. Noordwijk, ESA, WHO, ITU, 2005 (BR-255). (<http://www.esa.int/telemedicine-alliance>, accessed 1 November 2006.)
21. eHealth Standardization and Coordination Group. [online] *Standards list*. Geneva, World Health Organization. (http://www.who.int/ehscg/resources/en/ehscg_standards_list.pdf, accessed 1 November 2006.)
22. Mack J. Global eHealth ethics. *WMA Business Briefing: Global Healthcare*, 2002:23–26. (<http://www.wma.net/e/publications/pdf/2001/mack.pdf>, accessed 1 November 2006.)
23. Vogel G, Enserink M. Europe steps into the open with plans for electronic archives. *Science*, 2005, 308(5722):623–624. (<http://www.sciencemag.org/cgi/content/full/308/5722/623>, accessed 1 November 2006.)

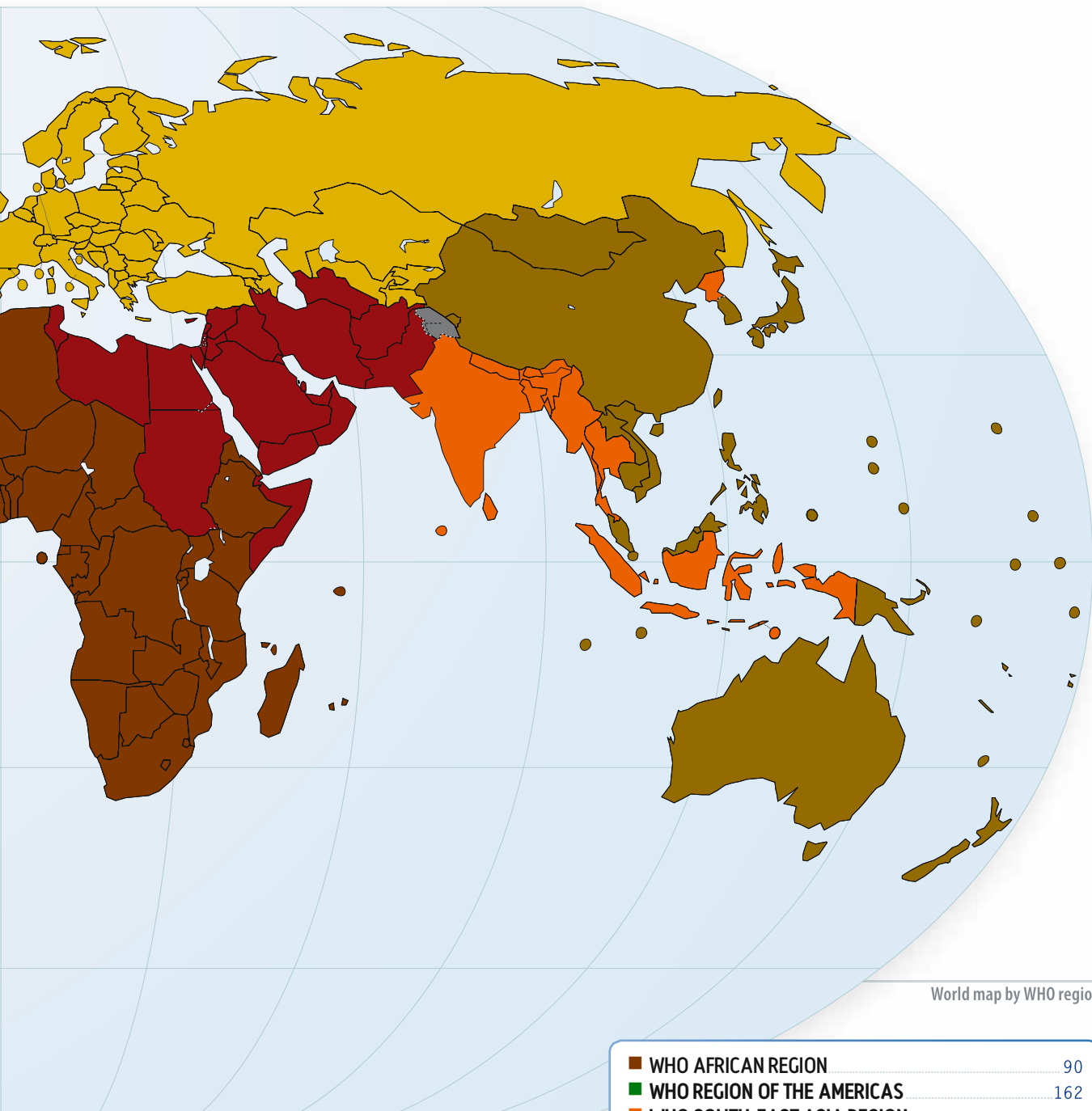


ANNEX

eHEALTH COUNTRY PROFILES



eHEALTH COUNTRY PROFILES



World map by WHO region

WHO AFRICAN REGION	90
WHO REGION OF THE AMERICAS	162
WHO SOUTH-EAST ASIA REGION	196
WHO EUROPEAN REGION	216
WHO EASTERN MEDITERRANEAN REGION	270
WHO WESTERN PACIFIC REGION	302

Explanatory notes

This annex presents eHealth country profiles of the 112 responding Member States listed by WHO region. Due to the lay-out of this document, additional information provided by the Member States, could not be included in these profiles but is available on the GOe website: <http://www.who.int/GOe>.

The text and tables in this annex present information on the status of eHealth in WHO Member States collected between mid-2005 and mid-2006. It is reported across six eHealth themes:

- Enabling environment: policies and strategies to support the information society (Annex: Figures 1);
- Infrastructure: access to information and communication technologies (Annex: Figures 2);
- Cultural and linguistic diversity, and cultural identity (Annex: Figures 3);
- Content: access to information and knowledge (Annex: Figures 4);
- Capacity: human resources and skills (Annex: Figures 5);
- eHealth tools and services (Annex: Figures 6 and 7).

Each theme briefly describes the highlights of the figures, the successes and challenges, and other pertinent information presented by the survey respondents.

■ Quality assurance

A range of concrete measures were taken to assure the quality of the country profiles. Initially, the quality assurance of the survey process (see chapter: First global survey on eHealth). The country profiles were created on the basis of the survey information to provide a “snapshot” of the status of eHealth in WHO Member States (August 2005–August 2006). Member States were invited to validate the country profiles prior to publication and changes requested were incorporated where possible. Twenty percent of the responding countries requested minor changes. All data were double checked before entry and after lay-out for publication. The questionnaire can be found on the GOe web site.

■ Limitations

As text was used from the surveys, significant editing as well as interpretation of incomplete text, bullet points, and notes was often necessary. In other cases, countries provided lengthy explanations of success stories or barriers to implementation of policies or other actions which had to be condensed for publication purposes. This means that in some cases information was omitted from the hard copy. To provide ready access, the GOe will publish the full data set on its website, including the individual country profiles for downloading.

■ Country indicators

The following socio-economic indicators were selected for each country to complement the country profile information: population,¹ GDP per capita,² total health expenditure,³ OECD status,⁴ World Bank income group,⁵ ICT diffusion index,⁶ main telephone lines, Internet users, and mobile phone subscribers.⁷

¹ Population (000s) (2003). United Nations Population Division, data for year 2003 as at April 2006. <http://www.un.org/esa/population/unpop.htm>

² GDP per capita (international dollars) (2003): World Health Organization (WHO), National Health Accounts (NHA) Unit, (EIP/HSE/CEP), (2006).

³ Total health expenditure (% of GDP) (2003): WHO, NHA Unit, (EIP/HSE/CEP), (2006).

⁴ Country grouping by OECD and non-OECD membership. For more information, see: <http://www.oecd.org>.

⁵ World Bank income groups, based on World Bank estimates of 2004 Gross National Income (GNI) per capita: (1) high income, US\$ 10 066 or more; (2) upper-middle income US\$ 3 256–US\$ 10 065; (3) lower-middle income, US\$ 826–US\$ 3 255; and (4) low income, US\$ 825 or less. Accessed in February 2006 at: <http://www.worldbank.org/>

⁶ ICT diffusion index (2002): *The digital divide—ICT development indices 2004*, New York/Geneva, United Nations, 2005 (UNCTAD/ITE/IPC/2005/4). Also available at : http://www.unctad.org/en/docs/iteipc20054_en.pdf.

⁷ Main telephone lines, internet users and cellular phone subscribers (per 100 inhabitants) (2004): ITU data for 2004, accessed in February 2006 at: <http://www.itu.int/ITU-D/ict/statistics/>. Number within square brackets next to indicator, e.g. 1.66 [03] means that data is from, in this case, 2003.

■ Examples

The following are a sample of three typical figures to be found in the country profiles with descriptions as to how they should be interpreted.

Figures 1, 2, 3, 4 and 5

- A national eHealth policy or strategy was introduced in 2001. It has been extremely effective and will be continued (C).
- Public funding was provided between 1999 and 2002. It was slightly effective and future action is yet to be decided (U).
- Norms and standards for eHealth systems were adopted in 2004. Their effectiveness is so far unknown but the action will be continued (C).
- Standards to protect the privacy of patient data have not yet been implemented but will start over the next few years (S).
- Policies to promote equitable access to eHealth were implemented and have been very effective. The start date is unknown and the action will be reviewed and continued (RC).

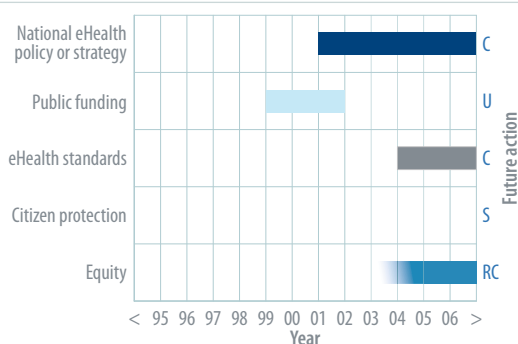
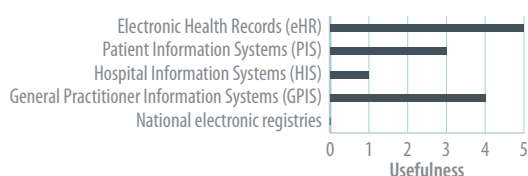
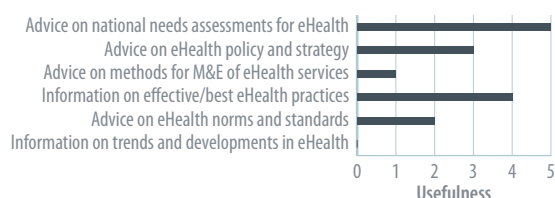


Figure 6 eHealth tools



Electronic Health Records (eHR) are considered extremely useful if WHO could offer generic prototypes for adaptation. Patient Information Systems (PIS) moderately useful, Hospital Information Systems (HIS) not useful, General Practitioner Systems (GPIS) very useful and no data was available for national electronic registries.

Figure 7 eHealth services



Advice on national needs assessments for eHealth is considered an extremely useful eHealth service, advice on eHealth policy and strategy moderately useful, advice on methods for monitoring and evaluation (M&E) of eHealth services not useful, information on effective/best eHealth practices very useful, advice on eHealth norms and standards slightly useful, and no data was available for information on trends and developments in eHealth.

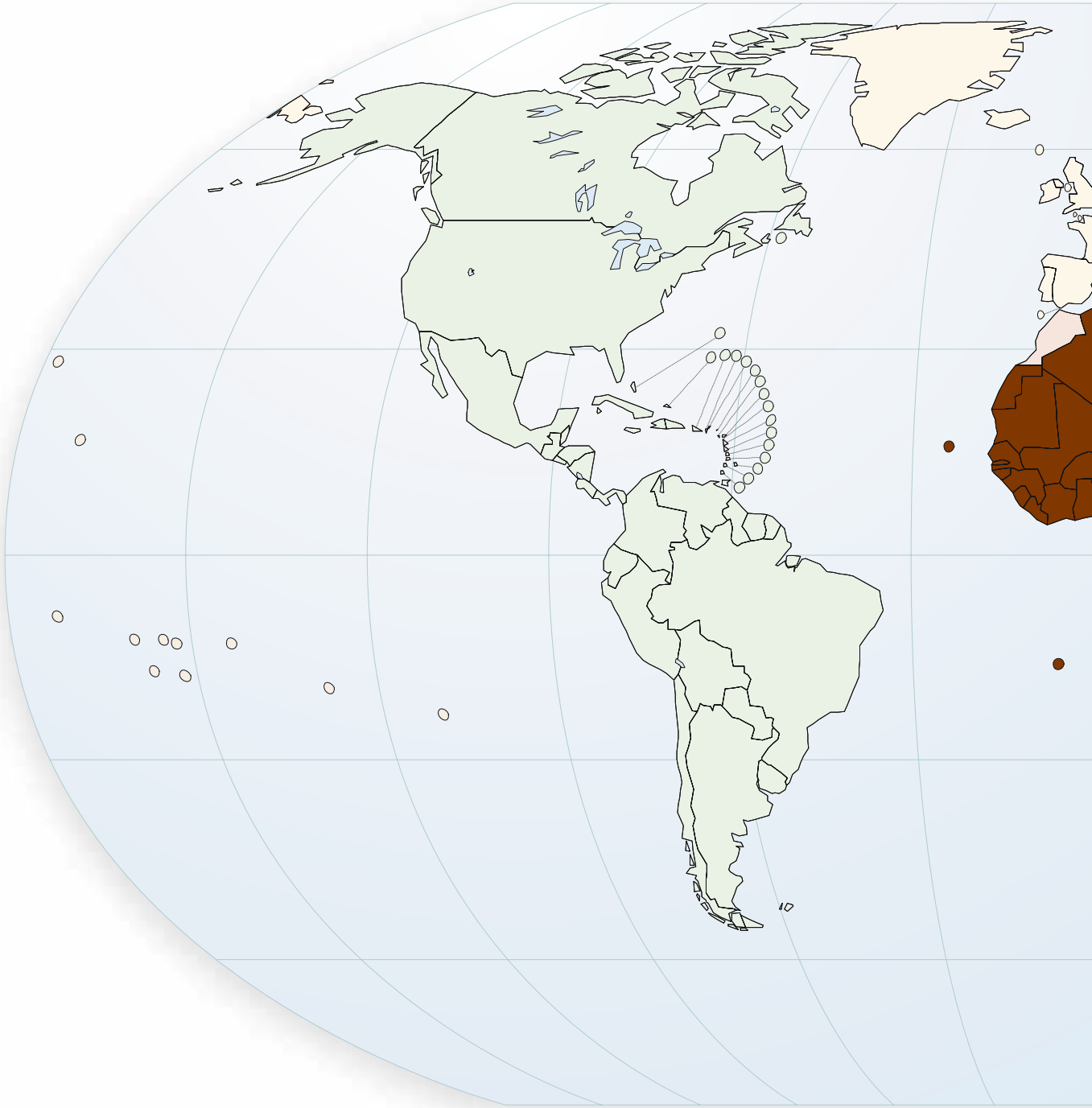
■ Legend

A legend is provided to assist in the interpretation of the figures:

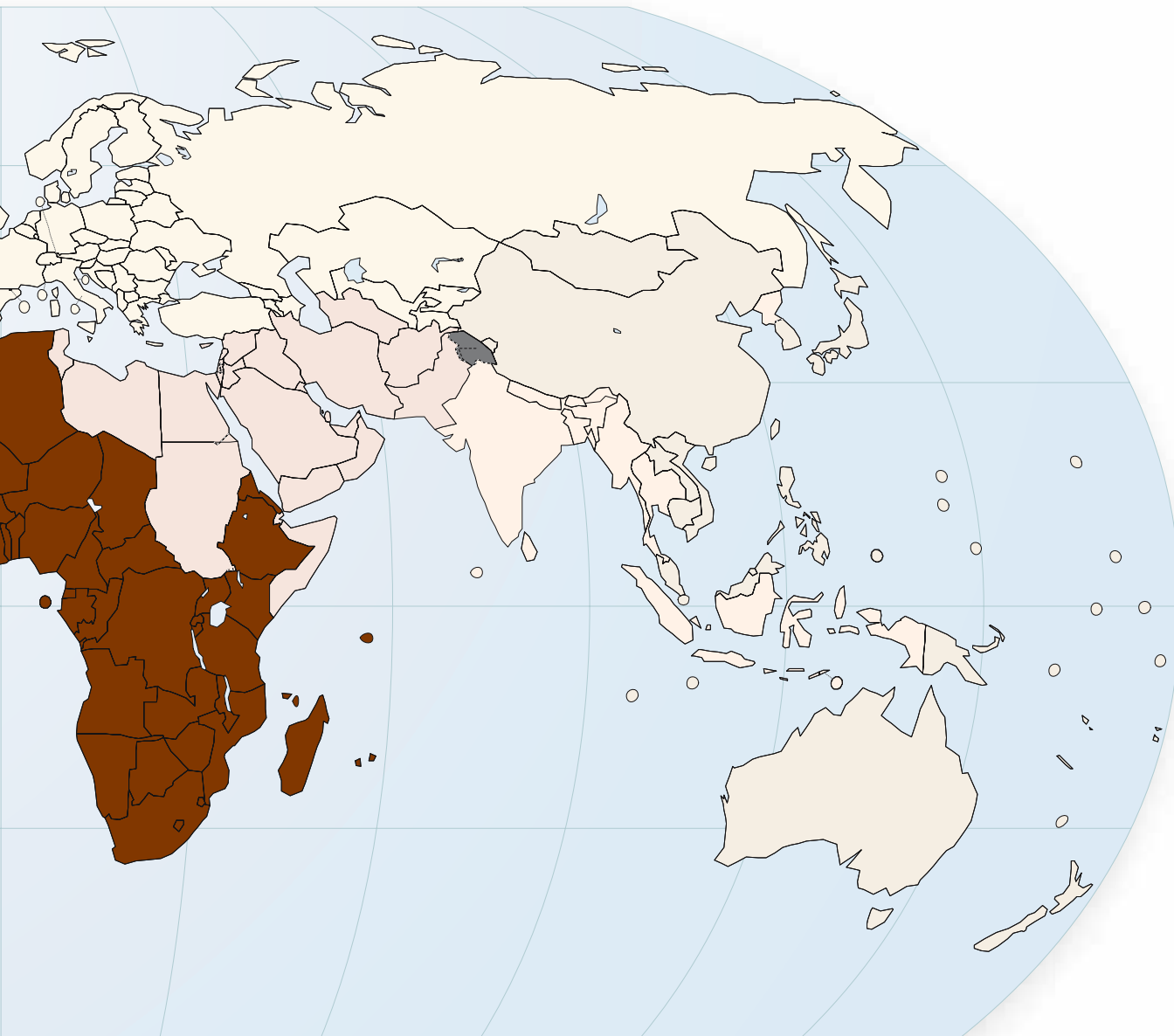
- perceived effectiveness of action—indicated by a shade of blue or grey
- future action to be taken—expressed by a letter at the end of the bar
- date range of action—years shown on the x axis, date range indicated by start-and end-point of bar
- usefulness—for Figures 6 and 7, ranging from 0–5 to report a country’s perceived usefulness of selected eHealth tools and services

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants



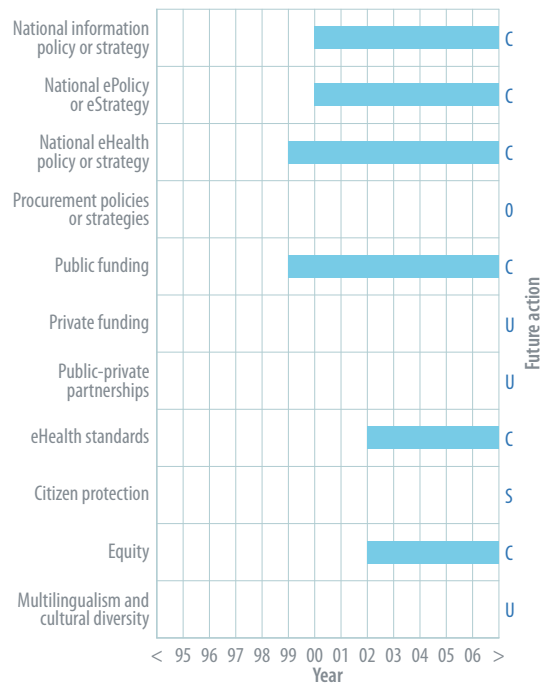
WHO AFRICAN REGION



Algeria	92	Côte d'Ivoire		Lesotho	132	Sao Tome and Principe	
Angola	94	Democratic Republic of the Congo	114	Liberia		Senegal	
Benin	96	Equatorial Guinea		Madagascar	134	Seychelles	148
Botswana**	98	Eritrea	116	Malawi	136	Sierra Leone	150
Burkina Faso	100	Ethiopia	118	Mali	138	South Africa	
Burundi	102	Gabon	120	Mauritania	140	Swaziland	152
Cameroon	104	Gambia	122	Mauritius		Togo	154
Cape Verde		Ghana	124	Mozambique	142	Uganda	156
Central African Republic	106	Guinea	126	Namibia		United Republic of Tanzania	
Chad	108	Guinea-Bissau	128	Niger	144		158
Comoros	110	Kenya	130	Nigeria	146	Zambia	160
Congo	112			Rwanda		Zimbabwe	

Algeria

Enabling environment – policies and strategies to support the information society



Algeria reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated as moderately effective. They will continue over the next two years. Regulations to protect the privacy and security of individual patient data where eHealth is used will be implemented by 2008. The establishment of the "Health Algeria" network, a tool for data collection and exchange among the different actors in the health sector, is rated as the most effective action to date in promoting an enabling environment for ICT in the health sector. The most significant challenge in this field has been strengthening the ICT infrastructure.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

All of the listed actions to support ICT infrastructure development for the health sector have been taken since 2002 and are rated as moderately effective. They will continue over the next two years. Algeria highlights the installation of local area networks in order to promote resource sharing through interconnectivity both to the "Health Algeria" intranet and globally. The most effective action in this area has been the provision of fibre optic links; these links have enabled the health sector to benefit from faster connectivity. The most significant challenge is expanding the Health Algeria network to certain regional and local areas, where there is a lack of infrastructure.

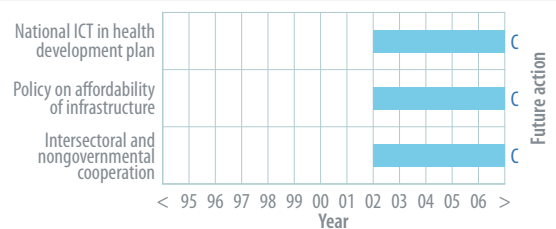
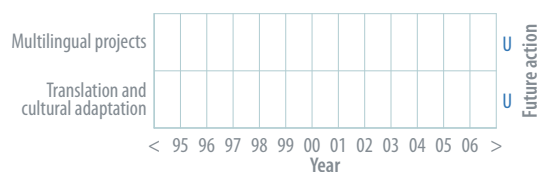


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	31 866	OECD country	No	Main telephone lines*	7.08
	GDP per capita (Int \$)	4 475	World Bank category	3	Internet users*	2.61
	Total health expenditure (% of GDP)	4.1	ICT Diffusion Index	0.2309	Mobile phone subscribers*	14.48

Content – access to information and knowledge

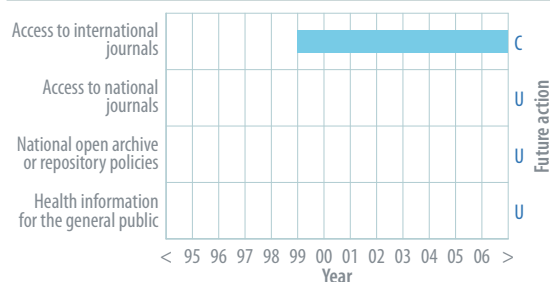


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Since 1999, Algeria has provided online access to international journals in biomedicine and social sciences for the medical and research communities. This has been rated as moderately effective and will continue over the next two years. A decision has yet to be made as to which actions will be taken for the provision of access to national electronic journals and creating national open archives. Algeria highlights the effective online publication of the Yearbook of Health Establishments (both public and private). The most effective action taken to promote access to electronic health content has been the introduction of the official Portal of the Ministry of Health. A significant challenge in this field is the low level of computer use in households and by medical practitioners.

Capacity – human resources knowledge and skills

All actions listed have been taken to build ICT capacity in the health sector. Algeria has been offering ICT skills courses as part of the university curricula for health sciences students since 2002. This is rated as moderately effective and will continue over the next two years. A decision has yet to be made as to what action will be taken with respect to continuing education on ICT and eLearning in health sciences. Algeria highlights the successful establishment of the National Teaching Institute for Paramedical Training. One of the most effective actions reported in building ICT capacity in the health sector is the provision of training in computer skills for health personnel. A significant challenge in this field has been the lack of contracts for computer staff, which has adversely affected job stability and motivation.

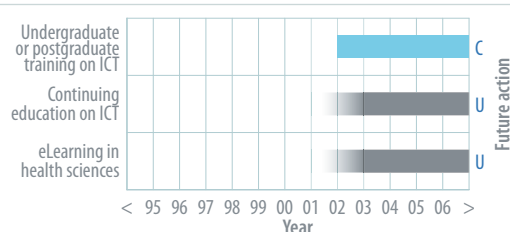


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

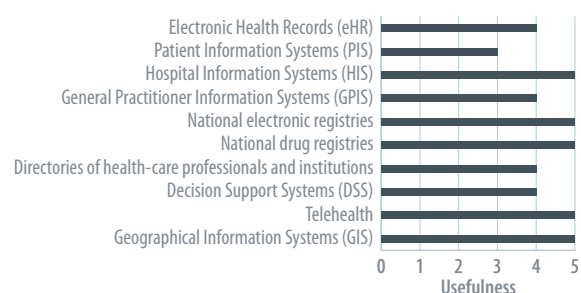


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

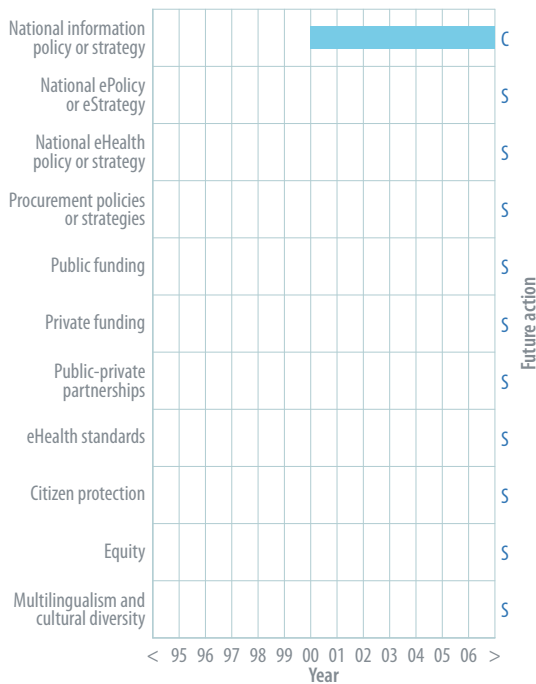
Hospital Information Systems (HIS), national electronic registries, national drug registries, telehealth and virtual libraries are highlighted as extremely useful, if the World Health Organization could offer these eHealth tools as generic prototypes for adaptation. All other listed eHealth tools and eHealth services are rated moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Angola

Enabling environment – policies and strategies to support the information society



Angola reports that it implemented a national information policy to support the information society in 2000. This has been rated as moderately effective and will continue over the next two years. All other listed actions are planned to be started over the next few years. The adoption of a national action plan for the information society has been the most effective initiative taken to build an enabling environment for the use of information and communication technologies (ICT) in the health sector. The most significant challenges in this field have been the lack of infrastructure and human resources.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

In 2005, Angola implemented a national plan for the development of ICT in health, which sets targets for health sector connectivity; this will continue over the next two years. That same year the government initiated a national policy to reduce the costs of ICT infrastructure in the health sector. In 2004, Angola started working with intersectoral and nongovernmental partners to promote infrastructure development.

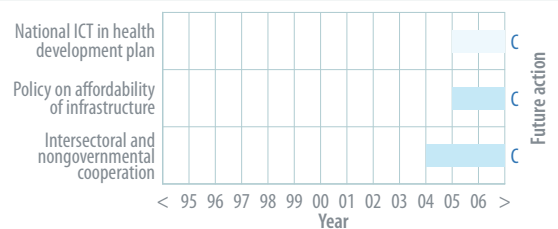
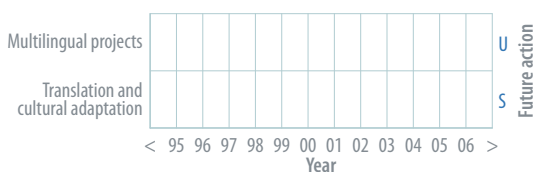


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

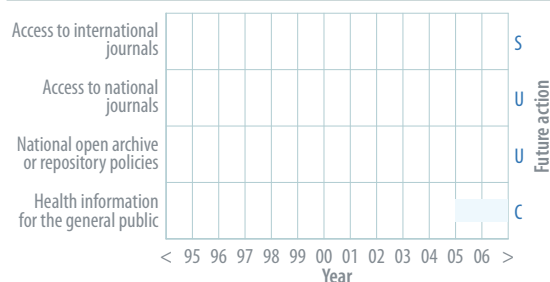


By 2008, Angola intends to begin supporting the translation and cultural adaptation of existing high-quality health content (created either locally or abroad). It is not yet decided if special projects to promote the development and use of new electronic health content in multiple languages will be introduced.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	15 047	OECD country	No	Main telephone lines*	0.67 [03]
	GDP per capita (Int \$)	1 726	World Bank category	3	Internet users*	1.22
	Total health expenditure (% of GDP)	2.8	ICT Diffusion Index	...	Mobile phone subscribers*	6.68

Content – access to information and knowledge



Creating health information and providing it electronically for the general public started in 2005 and will be continued over the next two years. Angola intends to start providing access to online international journals in biomedicine and social sciences for the medical and research communities by 2008. A decision remains to be made on providing access to national electronic journals and developing an open archive for scientific research.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

All actions listed to build ICT capacity in the health sector have been taken since 2002/2003. They are rated as slightly effective and will continue over the next two years. The most effective action has been the connection of the Faculty of Medicine to the National University Network and Internet. A significant challenge to building ICT capacity in the health sector is the lack of financial and human resources.

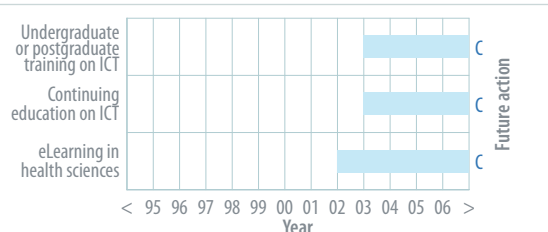


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

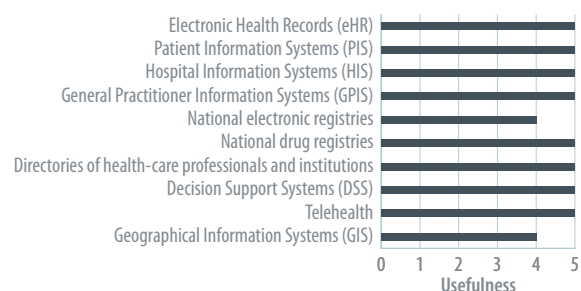


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

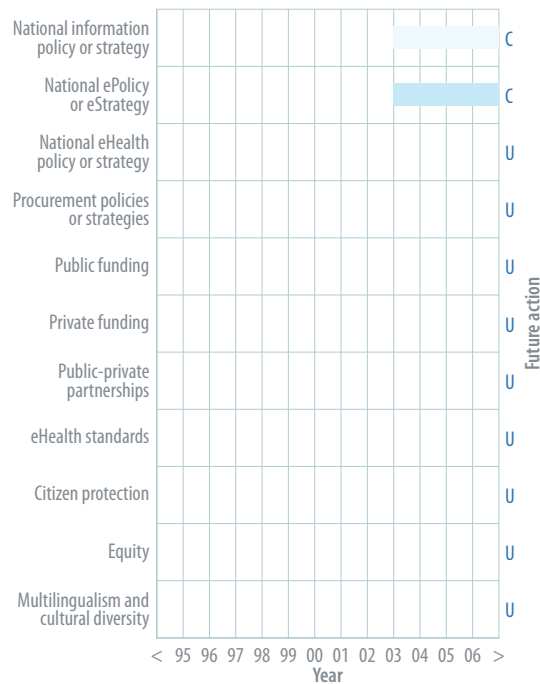
All eHealth tools and eHealth services listed, with the exception of national electronic registries, Geographical Information Systems (GIS), and information on effective/best eHealth practices (rated as very useful), were reported to be extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Benin

Enabling environment – policies and strategies to support the information society



Benin reports that it implemented a national information policy to promote an information society in 2003. Reported as ineffective so far, it will be continued over the next two years. In 2003 the government also implemented a national ePolicy, which sets out the vision and objectives to promote the use of information and communication technologies (ICT) across all sectors. This is rated as slightly effective and will be continued over the next two years. None of the other listed actions in this area have been taken and a decision remains to be made on future actions. Significant challenges in this area include the limited use of computer resources, low levels of Internet connectivity and very high costs of telephone calls.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Benin indicates that it works with nongovernmental partners and others (e.g. the private sector) to promote infrastructure development, and will continue to do so. In 2002 the government implemented a national policy to reduce the costs of ICT infrastructure for the health sector and will continue this over the next few years.

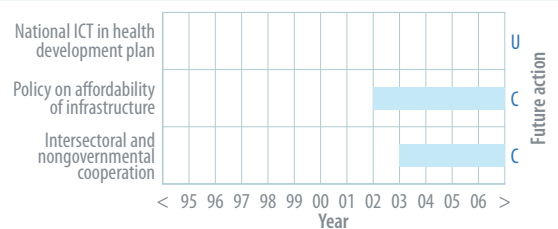
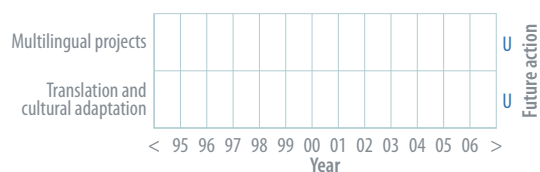


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

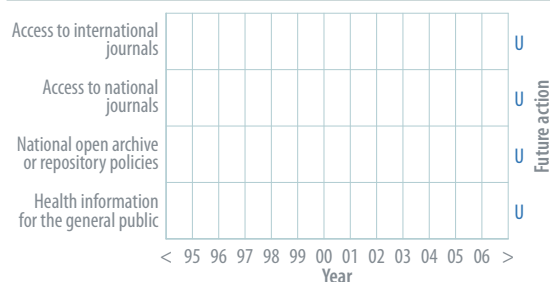


So far, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	7 919	OECD country	No	Main telephone lines*	1
	GDP per capita (Int \$)	813	World Bank category	4	Internet users*	1.38
	Total health expenditure (% of GDP)	4.4	ICT Diffusion Index	0.0984	Mobile phone subscribers*	5.33

Content – access to information and knowledge



To date, none of the specified actions to promote online access to health content have been adopted and a decision remains to be made as to which actions will be taken.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Currently, none of the specified actions to build ICT capacity in the health sector have been taken and a decision remains to be made as to which actions will be pursued. Benin highlights, however, the existence of a virtual health university at the Faculty of Health Sciences at Abomey Calavi University.

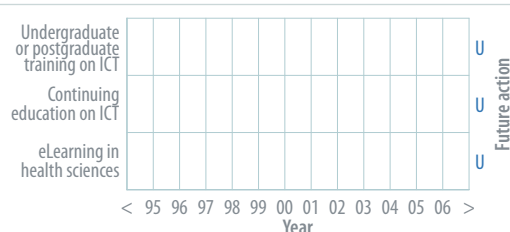


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

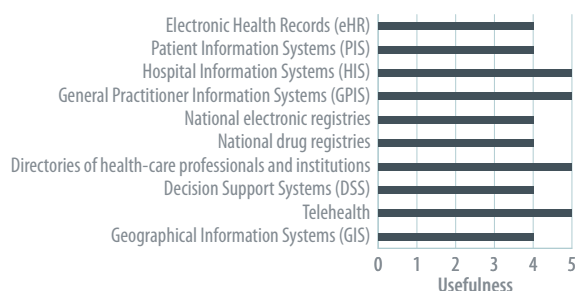


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

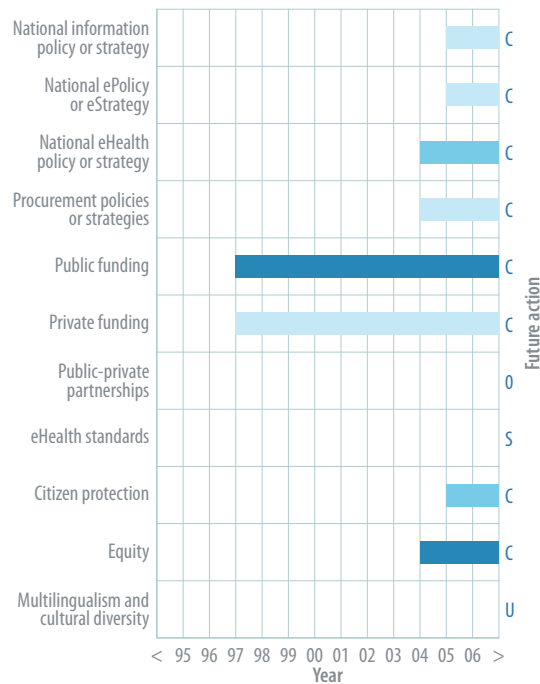
Hospital Information Systems (HIS), General Practitioner Information Systems (GPIS), telehealth, and directories of health-care professionals and institutions are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Information on effective/best eHealth practices, advice on human resources development for eHealth, information on trends and developments in eHealth and advice on the purchase of equipment for installation in eHealth facilities are rated as extremely useful services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Botswana

Enabling environment – policies and strategies to support the information society



Botswana reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are likely to continue. Public and private funding for ICT support of programmes addressing national health priorities has been provided since 1997. Public funding rated as very effective. The rest of the actions were introduced between 2004 and 2005 of which policies to promote inclusiveness and equitable access to eHealth is considered a very effective initiative. Norms and standards for eHealth systems, services or applications are likely to be adopted by 2008. No decision has been made, to date, on whether availability of information in local languages to recognize cultural diversity will be adopted in the next two years.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2003, and a national policy to reduce the costs of ICT infrastructure for the health sector in 2000. Intersectoral and nongovernmental cooperation commenced in 1997. All these actions are rated as very effective and are likely to continue.

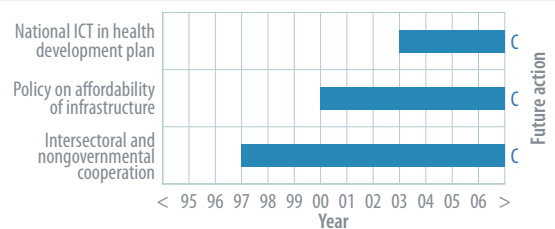
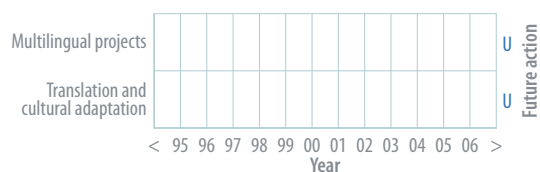


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

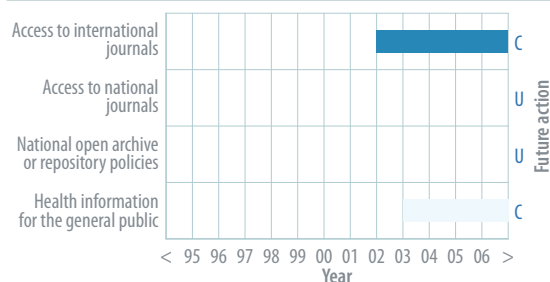


Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	1 772	OECD country	No	Main telephone lines*	7.96
	GDP per capita (Int \$)	6 709	World Bank category	2	Internet users*	3.5
	Total health expenditure (% of GDP)	5.6	ICT Diffusion Index	0.283	Mobile phone subscribers*	33.31

Content – access to information and knowledge



Health professionals have had access to international electronic journals since 2002. This has been rated as very effective and is expected to continue. In 2003, Botswana began creating and providing health information in electronic format for the general public. These services are expected to continue. To date, no decision has been made as to which of the remaining listed actions will be implemented in the next two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Botswana has been providing ICT skills courses as a part of university curricula for health sciences students since 1999. This is rated as extremely effective. ICT skills programmes in the ongoing training of health-care professionals have been offered since 2002 and are rated as moderately effective. These educational programmes are predicted to continue. There is, at this stage, no plan to introduce health sciences courses through eLearning for health professionals in the coming two years.

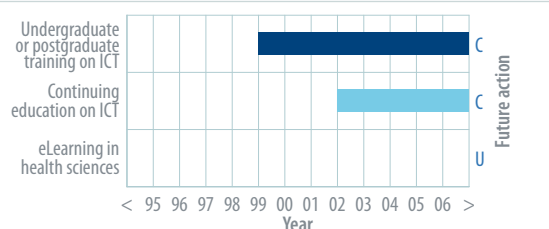


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

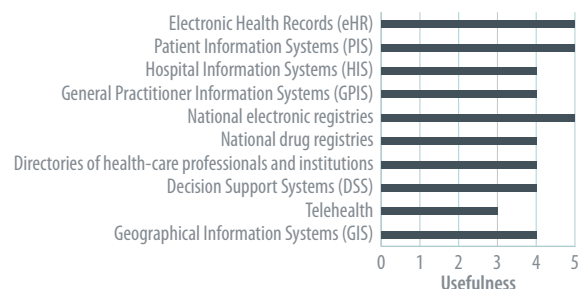


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are considered from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Botswana. The specified eHealth services are considered moderately to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Burkina Faso

Enabling environment – policies and strategies to support the information society

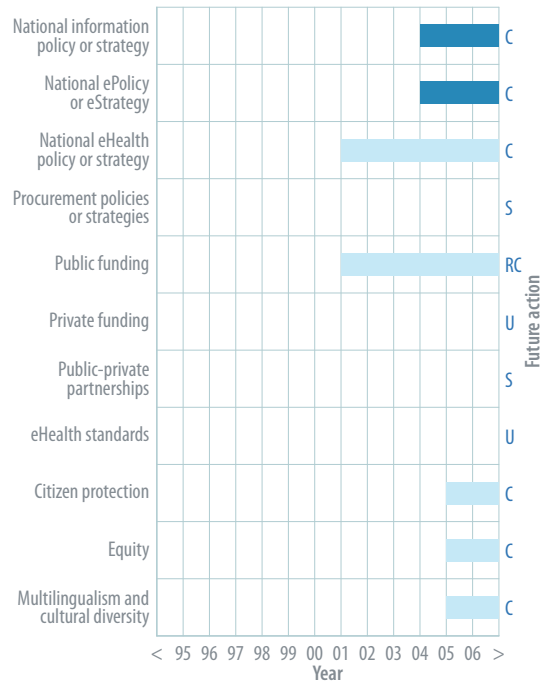


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Burkina Faso reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. These actions are rated from slightly to very effective, and will continue over the next two years. The implementation of procurement policies to guide software, hardware and content acquisition in the health sector will be started by 2008. Burkina Faso will foster the use of ICT within the health sector through public-private partnerships over the next two years. Highlighted as moderately effective actions are the introduction of a national health information system, the establishment of a RAC communication system, Internet connectivity in health districts and the introduction of a stock management system. The development of a national eHealth strategy and the establishment of sectoral steering committees charged with implementing the national eStrategy within the framework of sectoral development policies have been the most effective actions in building an enabling environment for the use of ICT in the health sector. The most significant challenges in this field are the lack of funds and skilled human resources to develop and implement the sectoral eStrategy.

Infrastructure – access to information and communication technologies

By 2008 Burkina Faso will have implemented a national plan for the development of ICT in health. Additionally it plans to start working with intersectoral and nongovernmental partners to promote infrastructure development over the next two years. The government has decided to set up a nationwide Intranet, which will include the health sector. It has also defined a policy for universal access to ICT and has set up a fund for that purpose. The introduction of a RAC communication system has been the most effective action to build infrastructure for the health sector. Lack of funds and skilled human resources are the most significant challenges in this field.

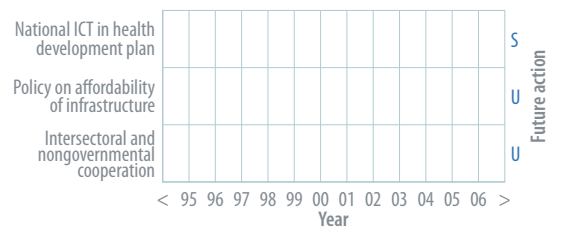


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

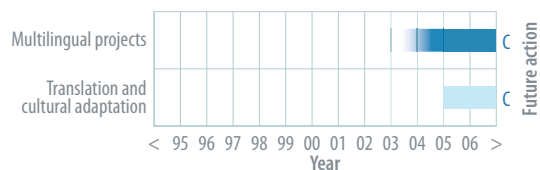
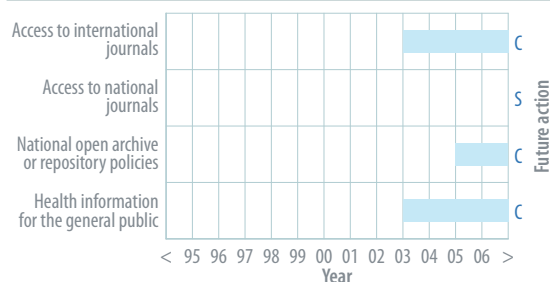


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Burkina Faso reports to have successfully promoted the development of electronic multicultural health content, and will continue to do so over the next two years. The national communication policy led to the development of a national eStrategy, which is improving awareness of the importance of ICT. The most significant challenges in this field are a lack of funds and skilled human resources.

Country indicators	Population (000s)	12 418	OECD country	No	Main telephone lines*	0.61
	GDP per capita (Int \$)	1 206	World Bank category	4	Internet users*	0.4
	Total health expenditure (% of GDP)	5.6	ICT Diffusion Index	0.1296	Mobile phone subscribers*	2.97

Content – access to information and knowledge



All but one of the listed actions to promote online access to health content have been taken. These services are rated as slightly effective and will continue over the next two years. Burkina Faso reports that by 2008 it will be providing online access to national journals in biomedicine and social sciences for the medical and research communities. Highlighted is a project (currently under way) to produce multimedia content in national languages. The government's initiative to develop a web site for each institution and ministry has been most effective.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

The provision of ICT skills programmes in the ongoing training of health professionals has been very effective in Burkina Faso and will continue. ICT skills courses will be offered as part of university curricula for health science students by 2008. Over the next two years health sciences courses will be offered through eLearning for health professionals in training and practice. The adoption of the national eStrategy has helped build ICT skills. Lack of funds and human resources are the greatest challenges in building ICT capacity in the health sector.

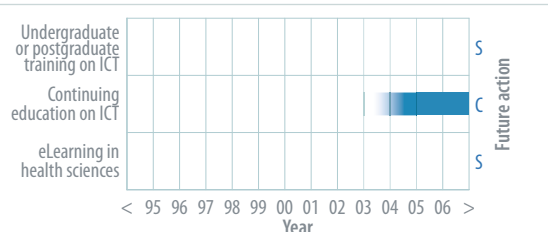


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

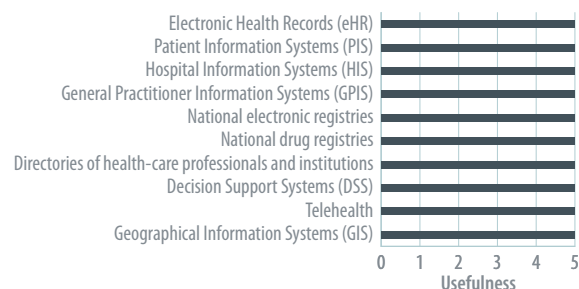


Figure 6. Preferred generic eHealth tools to be provided by WHO

All listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. All listed eHealth services are rated as extremely useful.



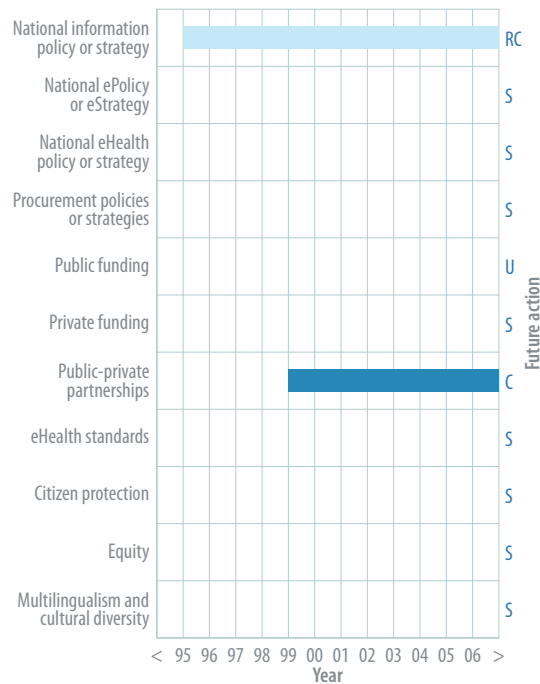
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Burundi

Enabling environment – policies and strategies to support the information society



Burundi reports that a national information policy to promote an information society was implemented in 1995, and has been slightly effective. Public-private partnerships to foster the use of information and communication technologies (ICT) within the health sector have existed since 1999. They are rated as very effective and will be continued over the next two years. The majority of other listed actions to promote an enabling environment for ICT in the health sector will be started by 2008. In 2004, with the collaboration of and funding from the United Nations Development Programme (UNDP), Burundi's Ministry of Communication provided overall coordination among all public- and private-sector actors involved in ICT to formulate a national ICT strategy. Approval of the strategy by the Council of Ministers and amendment by the National Assembly is currently pending.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Burundi indicates that it works effectively with intersectoral and nongovernmental partners to promote infrastructure development, and will continue to do so. The government plans to implement a national ICT in health development plan and a policy on affordability of infrastructure by 2008. Internet connections and subscriptions for different health services have made it possible to develop a network of health information and management systems linking the central and intermediate levels of the health system. In addition, the increase in computer and Internet capacity of the World Health Organization (WHO) documentation centres, the National Public Health Institute, the Faculty of Medicine and the secretariat of the National AIDS Control Council have made access to international publications possible. The most significant challenges to date in building infrastructure for the health sector are finding funds to assess eHealth needs, and implementing the measures provided by the national strategy for the development of ICT 2004–2010.

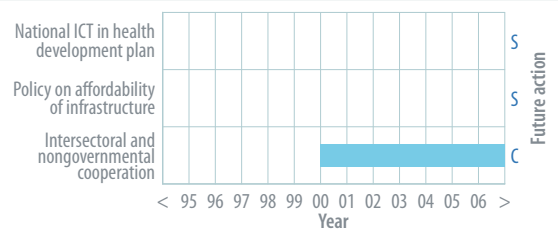


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

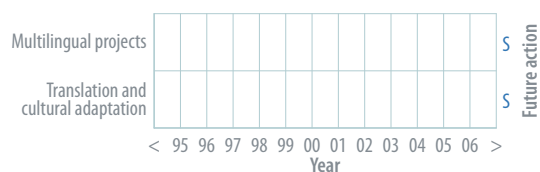


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been taken. However, special projects are planned to be introduced in Burundi over the next two years to promote the development and use of new electronic health content in multiple languages. Translation and cultural adaptation of existing high-quality content, which has been created either locally or abroad, will also commence over the next few years.

Country indicators	Population (000s)	7 037	OECD country	No	Main telephone lines*	0.34 [03]
	GDP per capita (Int \$)	486	World Bank category	4	Internet users*	0.35
	Total health expenditure (% of GDP)	3.1	ICT Diffusion Index	0.1818	Mobile phone subscribers*	0.9

Content – access to information and knowledge

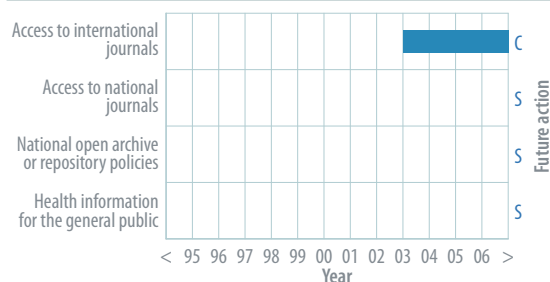


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals was introduced in 2003. This service has been very effective and will continue. Access to national electronic journals, the implementation of a policy for a digital national open archive and the creation and provision of health information for the general public are all planned to commence over the next two years. Funding to extend Internet use to all health services in need poses a significant challenge in promoting access to electronic health content. Through the implementation of the national health development plan 2006—2010, the Ministry of Health will continue to mobilize partners to develop eHealth and eLearning programmes in accordance with the country's needs.

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health professionals began in 2000 and are rated as moderately effective. They will continue over the next two years. The other listed actions to build ICT capacity in the health sector will start by 2008. The most effective actions in this field include an eLearning centre for volunteers in a broad range of fields (established in the capital city of Bujumbura) and the beginning of online university training (also in Bujumbura) by the Lumière university in partnership with Laval University in Canada. The intersectoral strategies set forth in the national strategy for the development of ICT 2004–2010 have not been approved by the government and the various ministries are having difficulties finding funding to implement them. The return of international cooperation after the recent democratic elections will allow Burundi to receive technical and financial support in this area, which may impact on its social and economic development.

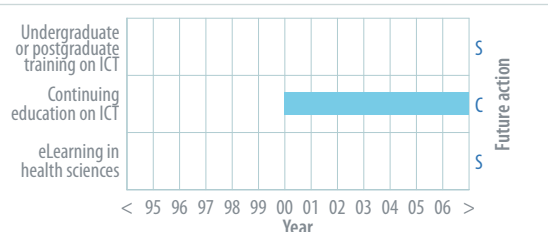


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

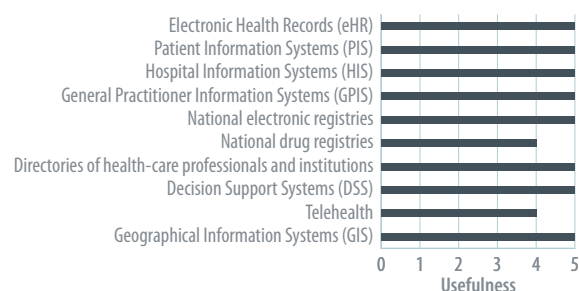


Figure 6. Preferred generic eHealth tools to be provided by WHO

National drug registries and telehealth are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. All other listed eHealth tools are considered extremely useful. Information on trends and development in eHealth is considered to be a very useful eHealth service. All other listed eHealth services are rated extremely useful.



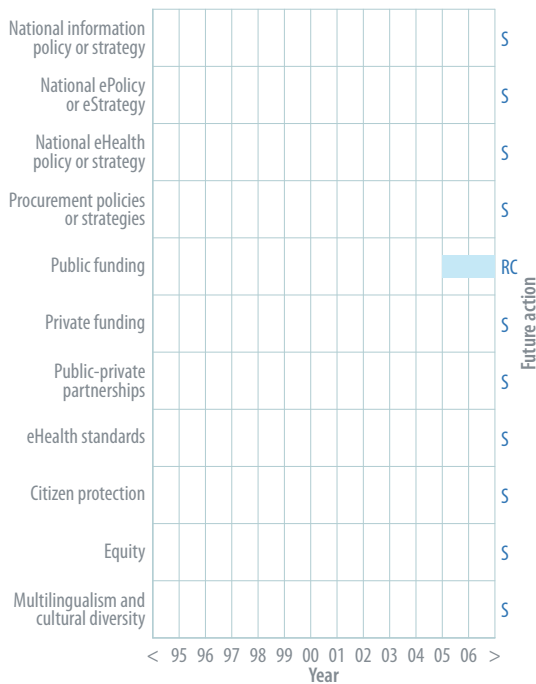
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Cameroon

Enabling environment – policies and strategies to support the information society



Cameroon reports that policies and strategies to support the information society will be introduced by 2008. The country started providing ongoing public funding for information and communication technologies (ICT) support to programmes addressing national health priorities in 2005 and rates it as slightly effective. Most likely this action will be reviewed and continued within the next two years. The most effective action to build an enabling environment for the use of ICT in the health sector has been the development of a project proposal for eHealth by the Ministry of Posts and Telecommunications presented to the Ministry of Public Health for approval. The most significant challenge has been the coordination of action on eHealth between the Ministry of Posts and Telecommunication and the Ministry of Public Health.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

To date, none of the listed actions have been taken, however, Cameroon plans to introduce them by 2008. The creation of a computing facility at the Ministry of Public Health has been the most effective action in building infrastructure for the health sector. The most significant challenge has been the maintenance of the computing system and extending ICT infrastructure coverage.

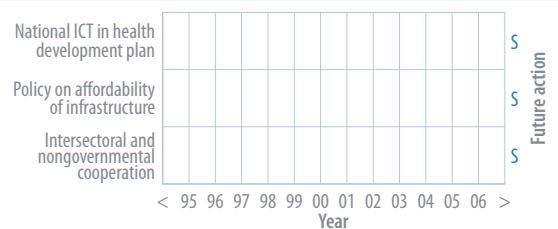
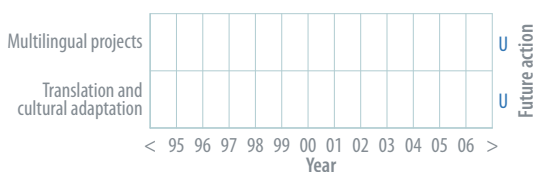


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions have been taken and a decision remains to be made regarding future action in this area. Cameroon indicates that the most significant challenge in providing electronic multicultural health content has been the presence of many local languages.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	15 749	OECD country	No	Main telephone lines*	0.59 [03]
	GDP per capita (Int \$)	1 516	World Bank category	4	Internet users*	1.02
	Total health expenditure (% of GDP)	4.2	ICT Diffusion Index	0.2079	Mobile phone subscribers*	9.43

Content – access to information and knowledge

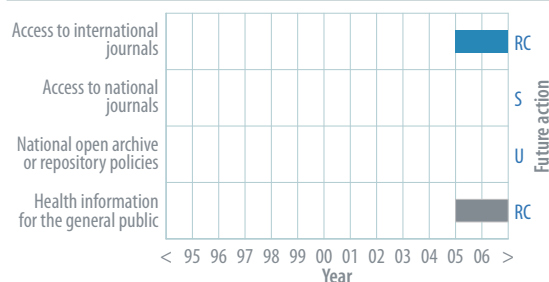


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals was introduced in 2005 and has been rated as very effective. It is anticipated that this action will be reviewed and continued over the next two years. Creating and providing health information for the general public in electronic format also started in 2005; it is too early to evaluate its effectiveness. Nonetheless, this is likely to be reviewed and continued over the next two years. Making online information available for the general public has been the most effective action to promote access to electronic health content but updating this information has proven to be a very significant challenge.

Capacity – human resources knowledge and skills

Undergraduate and postgraduate training in ICT was introduced for health sciences students in 2002 and has been rated as moderately effective. It is expected that these programmes will be reviewed and continued over the next two years. Continuing ICT education for health professionals was introduced in 1997 and stopped in 1999. It was rated as being moderately effective and will commence again in the next two years. eLearning courses in health sciences for professionals and students have been offered since 2003 and are moderately effective. This action is likely to be continued. A project of scholarships for health professionals for public health training including ICT components was highlighted as being very effective. Scholarships to postgraduates are noted as being one of the most effective actions to build ICT capacity in the health sector. Cameroon notes that funding for postgraduate training and establishing local training centres have been the most significant challenges in this field.

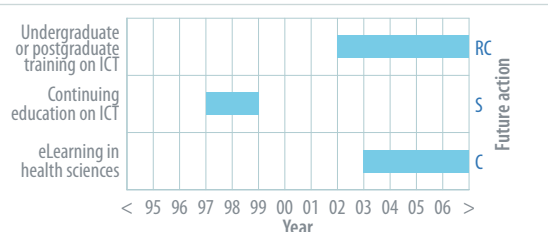


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

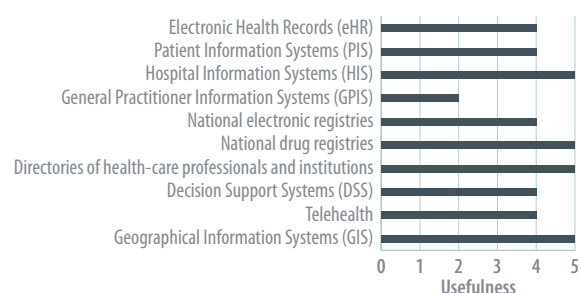


Figure 6. Preferred generic eHealth tools to be provided by WHO

Cameroon reports that eHealth tools such as Hospital Information Systems (HIS), national drug registries, directories of healthcare professionals and institutions and Geographical Information Systems (GIS) would be extremely useful if the World Health Organization could offer these as generic prototypes for national adaptation. eHealth services that offer advice on national needs assessments for eHealth, eHealth policy and strategy, eLearning programmes, and Human resources development for eHealth would be welcomed and are considered extremely useful. All other listed eHealth services are rated as very useful by Cameroon.



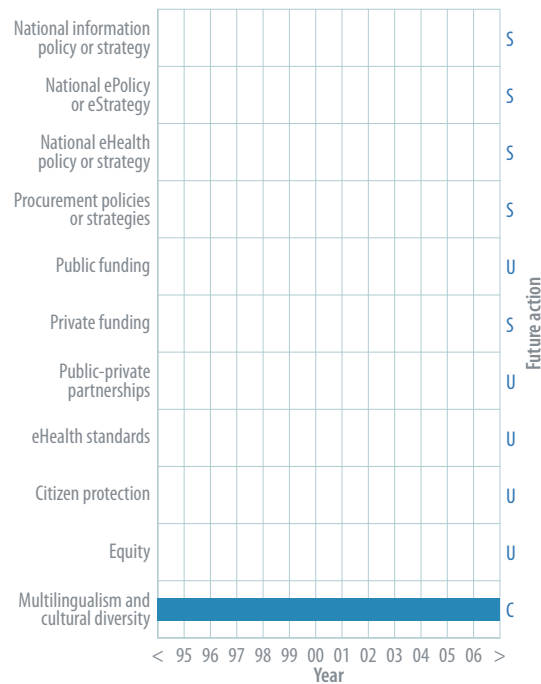
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Central African Republic

Enabling environment – policies and strategies to support the information society



The Central African Republic reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have not been taken but approximately half of them will be started by 2008. The promotion of availability of information in local languages and the recognition of cultural diversity has been very effective and will continue. The government has recently recognized the importance of using ICT in the health sector and the Telecommunications Regulatory Body has drawn up a draft legal instrument to address this issue.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

The Central African Republic indicates that it works effectively with intersectoral and nongovernmental partners to promote infrastructure development and will continue to do so. The government also plans to implement a national plan for the development of ICT in health, which will set targets for health sector connectivity. The most significant challenge to date in building infrastructure for the health sector is the 40% tax applied to the purchase of all computer equipment. There are no indications that this tax will be abolished in the near future.

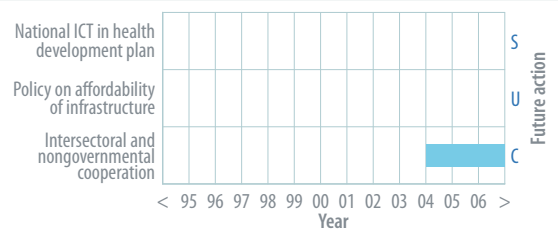
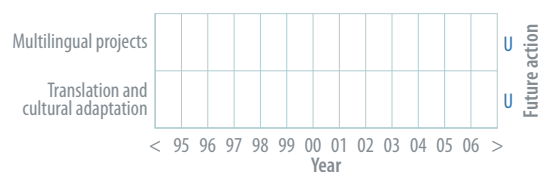


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

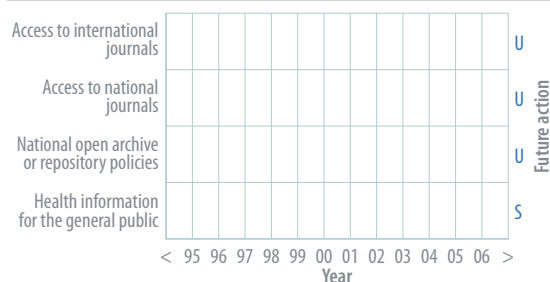


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	3 937	OECD country	No	Main telephone lines*	0.26
	GDP per capita (Int \$)	1 171	World Bank category	4	Internet users*	0.23
	Total health expenditure (% of GDP)	4	ICT Diffusion Index	0.1712	Mobile phone subscribers*	1.53

Content – access to information and knowledge



There are plans to create and provide health information for the general public in electronic format before 2008. The other listed actions to promote online access to health content have not yet been implemented and a decision remains to be made as to which actions will be taken.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses have been offered as part of university curricula for health science students in the Central African Republic since 1999. This has been moderately effective so far and will be continued over the next two years. Health science courses through eLearning for health professionals in training and practice have been offered since 2003 and have also been moderately effective. Reported as a significant challenge in building ICT capacity in the health sector is the need to keep health professionals up-to-date with developments in ICT.

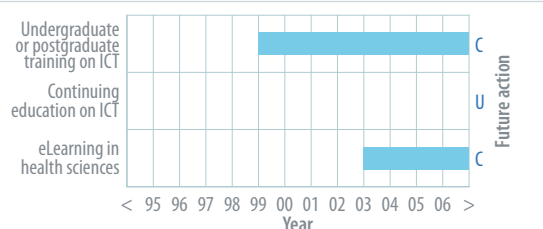


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

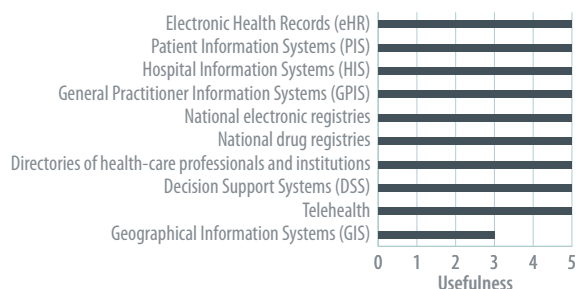


Figure 6. Preferred generic eHealth tools to be provided by WHO

All listed eHealth tools but Geographical Information Systems (GIS) (moderately useful) are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. All listed eHealth services are considered extremely useful by the Central African Republic.



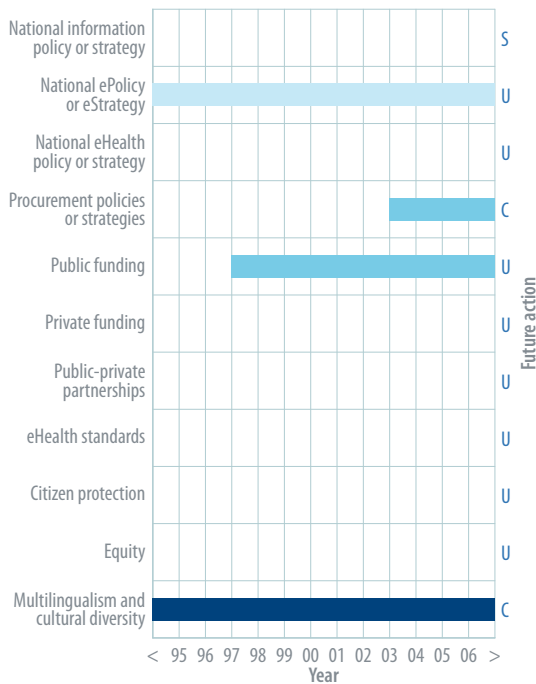
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Chad

Enabling environment – policies and strategies to support the information society



Chad reports that almost half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. These actions are rated from slightly to extremely effective, and will continue over the next two years. There are plans to implement a national policy to promote an information society by 2008. In 1994 Chad implemented a policy to promote health information in local languages; this has been extremely effective.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Since 1998 Chad has been working effectively with intersectoral and nongovernmental partners to promote infrastructure development and will continue to do so. A decision remains to be made on a national plan for the development of ICT in health and on a policy on affordability of infrastructure.

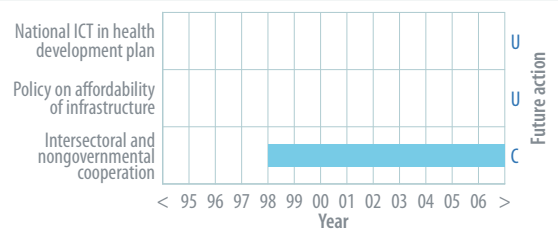
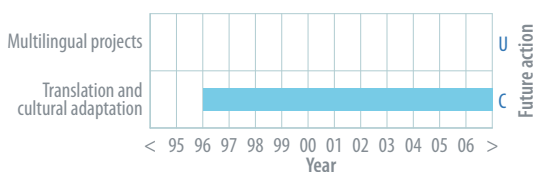


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

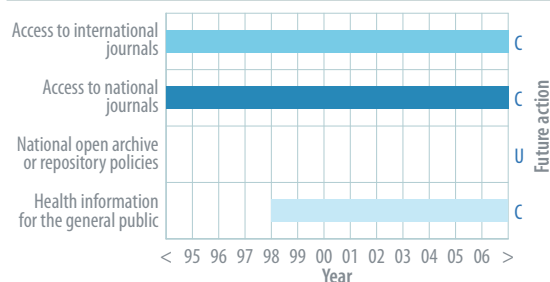


The translation and cultural adaptation of existing high-quality content (created either locally or abroad) has been supported by Chad since 1996 and is rated as moderately effective. A decision remains to be made on introducing special projects to promote the development and use of new electronic health content in multiple languages.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	9 133	OECD country	No	Main telephone lines*	0.15
	GDP per capita (Int \$)	792	World Bank category	4	Internet users*	0.68
	Total health expenditure (% of GDP)	6.5	ICT Diffusion Index	0.1505	Mobile phone subscribers*	1.39

Content – access to information and knowledge



Access to national and international electronic journals was introduced in 1994. These services have been moderately to very effective and will continue. Creating health information and providing it electronically for the general public started in 1998. This action is rated as slightly effective and will continue over the next two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as part of university curricula have been offered to health science students since 2000. This has been moderately effective thus far and will continue. A decision remains to be made regarding continuing education on ICT and eLearning in health sciences.

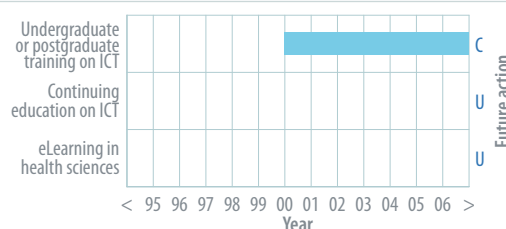


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

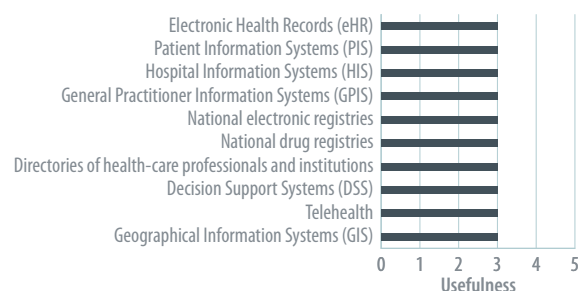


Figure 6. Preferred generic eHealth tools to be provided by WHO

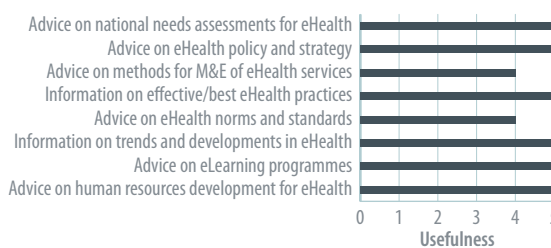


Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools are considered moderately useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on eHealth norms and standards, and advice on methods for monitoring and evaluation of eHealth services (M&E) are rated as very useful. All other listed eHealth services are considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Comoros

Enabling environment – policies and strategies to support the information society

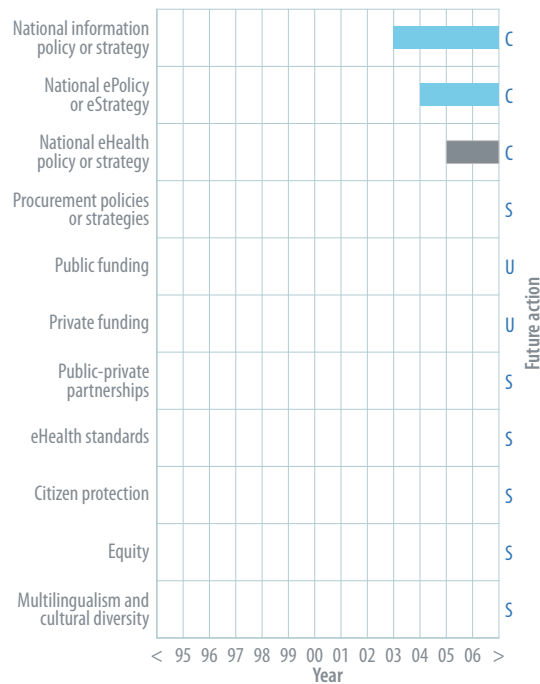


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Comoros reports that the implementation of a national policy and national ePolicy to promote an information society has been moderately effective and will continue over the next two years. More than half of the other listed actions are planned to be started by 2008. It highlights the successful abolition of customs duties on computer material and equipment, the reduction of telephone communications costs and the creation of a centre for access to information as being key enabling factors. The most effective actions taken so far have been the adoption, in 2004, of a national policy on new information and communication technologies (ICT) and the introduction, in February 2005, of a new health policy under which the use of ICT is one of the sector's priorities. Funding for computer infrastructure, equipment and communications poses a significant challenge in building an enabling environment for the use of ICT in the health sector. The Comoros emphasizes that it has recently emerged from a political and social crisis and has to address problems arising from growing poverty.

Infrastructure – access to information and communication technologies

All actions listed to support ICT infrastructure started between 2004 and 2005 and will be continued over the next two years. Among the most significant challenges to date in building infrastructure for the health sector are the absence of both public and private funding for development of health-sector infrastructure and insufficient information on resource mobilization opportunities.

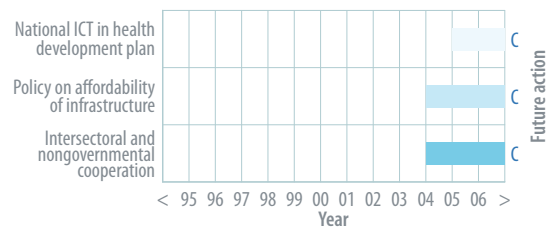


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

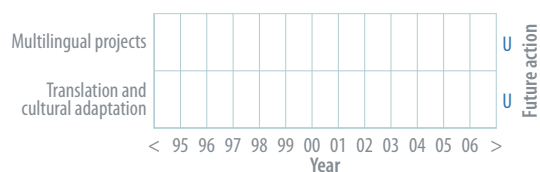
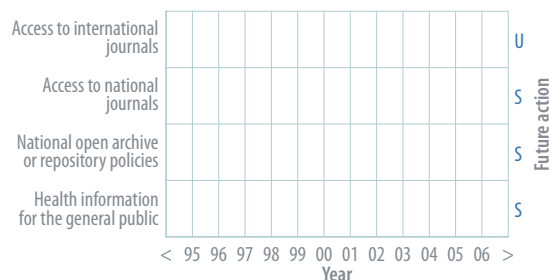


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken. The most significant challenges in this field are the lack of human and financial resources.

Country indicators	Population (000s)	757	OECD country	No	Main telephone lines*	1.66 [03]
	GDP per capita (Int \$)	951	World Bank category	4	Internet users*	1.01
	Total health expenditure (% of GDP)	2.7	ICT Diffusion Index	0.1603	Mobile phone subscribers*	0.25

Content – access to information and knowledge



The majority of the listed actions to promote online access will begin by 2008. The government highlights the successful creation of a socioeconomic database called DevInfo. The Comoros reports on the recent successes in distance health training within the framework of the AUF programme: ICT and knowledge acquisition, face-to-face training on use of ICT and the online dissemination of scientific and technical material. The most significant challenges remain the lack of appropriately trained professionals and financial constraints.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

All of the specified actions to build ICT capacity in the health sector will be initiated by 2008. A successful partnership with AUF to develop ICT and online training has been the most effective action so far to build ICT capacity in the health sector.

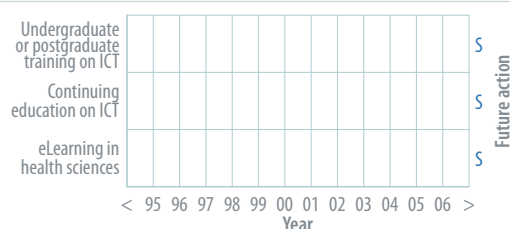


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

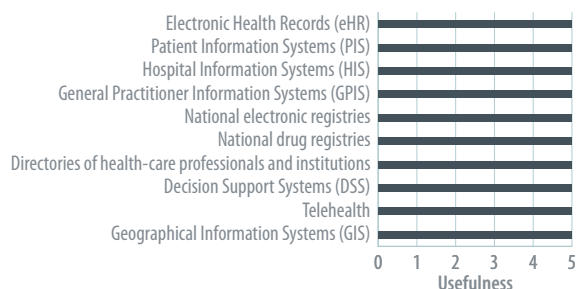


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

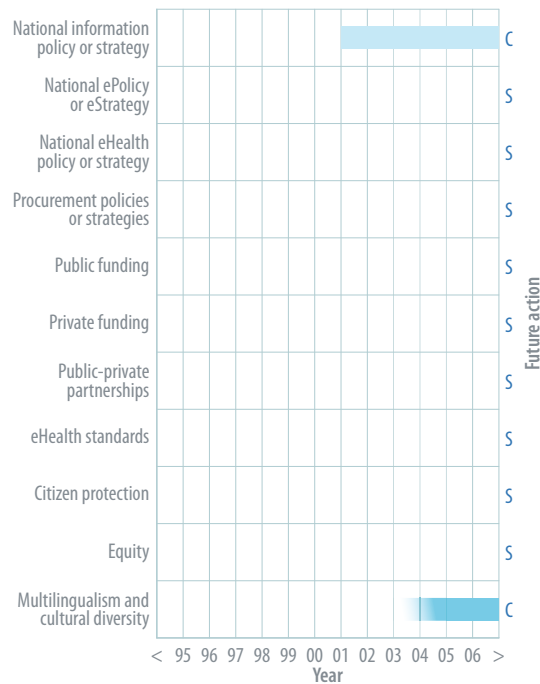
All listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. All listed eHealth services except advice on national needs assessment (very useful) are considered extremely useful by the Comoros.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Congo

Enabling environment – policies and strategies to support the information society



The Congo reports that a national information policy, and a strategy on multilingualism and cultural diversity have been implemented to promote the information society and will be continued over the next two years. All other listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector will start by 2008. Reported as the most effective action to date in this field has been the creation of a new government entity; a directorate for new technologies. In its national policy for the development of ICT, currently being adopted, a 'health space' (computerization of health management systems) is planned. The adoption of the national ICT policy is posing a challenge in developing an enabling environment for the use of ICT in the Congo.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

The Congo indicates that it has been working effectively, since 1990, with intersectoral and nongovernmental partners to promote infrastructure development and will continue to do so. Implementation of a national plan for the development of ICT in health over the next two years will set targets for health sector connectivity. A national policy to reduce the costs of ICT infrastructure for the health sector will also be implemented by 2008. However, the lack of financial resources poses a significant challenge in this field.

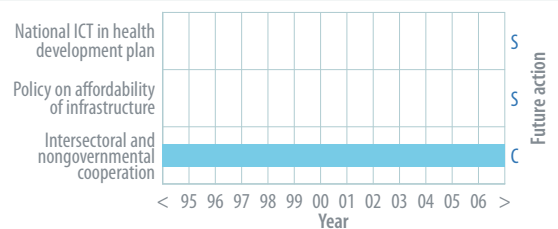
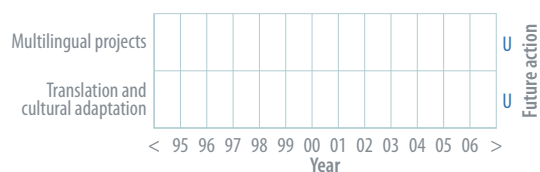


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

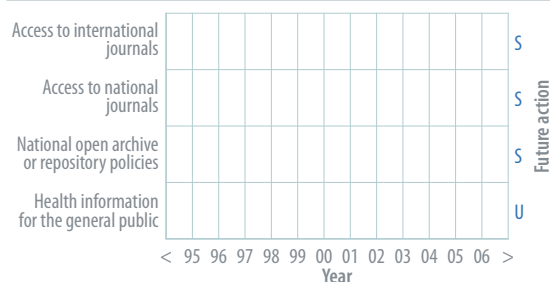


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken. The most significant challenge in providing the Congo with electronic multicultural health content is the lack of financial resources and expertise.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	3 769	OECD country	No	Main telephone lines*	0.36
	GDP per capita (Int \$)	1 176	World Bank category	4	Internet users*	0.94
	Total health expenditure (% of GDP)	2	ICT Diffusion Index	0.1452	Mobile phone subscribers*	10.05

Content – access to information and knowledge



The majority of the listed actions to promote online access to health content will be initiated by 2008. The Congo highlights the existence of an official national health web site but reports that it does not include scientific research.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses for health science students have been offered as part of university curricula in the Congo since 1997 and will be continued. A decision remains to be made as to which actions will be taken for continuing education on ICT and eLearning in health sciences. Lack of financial resources and expertise are the most significant challenges in building ICT capacity in the health sector.

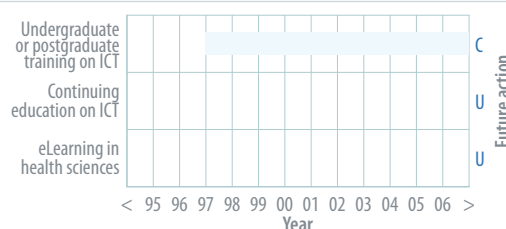


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

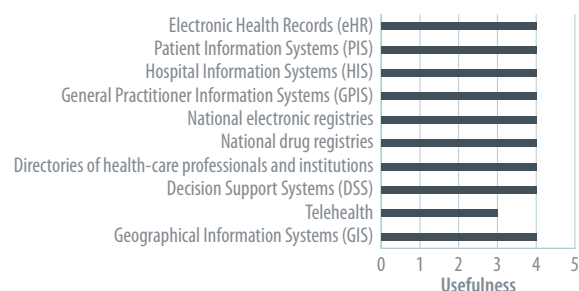


Figure 6. Preferred generic eHealth tools to be provided by WHO

All listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation in the Congo. Highlighted is the request for a national health-information system for specialists. All listed eHealth services are considered very useful.



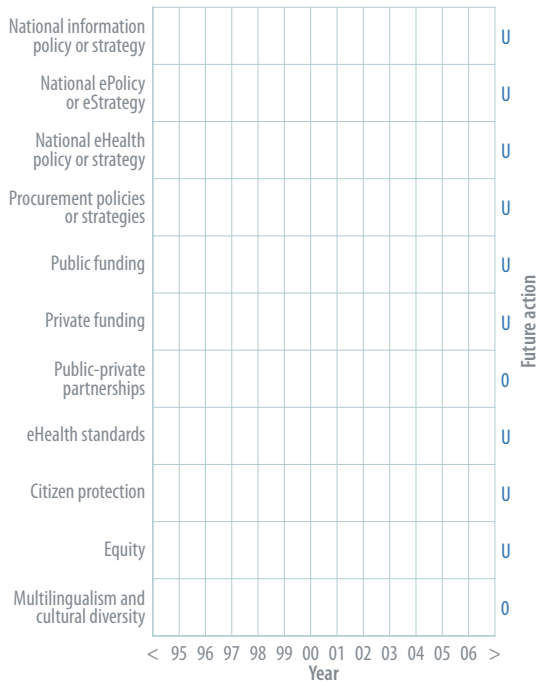
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Democratic Republic of the Congo

Enabling environment – policies and strategies to support the information society



The Democratic Republic of the Congo reports that, to date, none of the specified actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented and a decision remains to be made as to which actions will be taken over the next two years.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

None of the specified actions to support ICT infrastructure development for the health sector have been implemented thus far and a decision remains to be made as to which actions will be taken over the next two years.

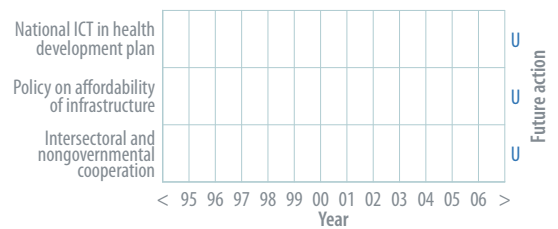
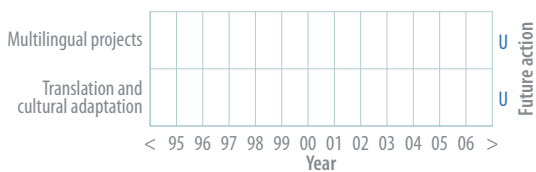


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

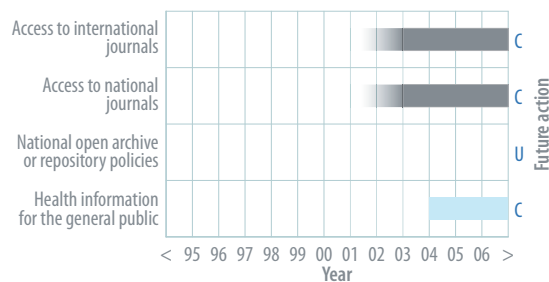


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	54 231	OECD country	No	Main telephone lines*	0.02 [02]
	GDP per capita (Int \$)	357	World Bank category	4	Internet users*	0.09
	Total health expenditure (% of GDP)	4	ICT Diffusion Index	...	Mobile phone subscribers*	1.89

Content – access to information and knowledge



Access to national and international electronic journals has been provided in the Democratic Republic of the Congo and will be continued. Provision of electronic health information for the general public started in 2004. This has been rated as slightly effective and will continue over the next two years. The creation of the Ministry of Health’s website has provided health professionals with access to electronic health data and enabled them to share the data. A significant challenge to the web site’s effectiveness is the infrequent updates of health information.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

The Democratic Republic of the Congo reports that, to date, none of the specified actions to build ICT capacity in the health sector have been implemented and a decision remains to be made as to which actions will be taken over the next two years.

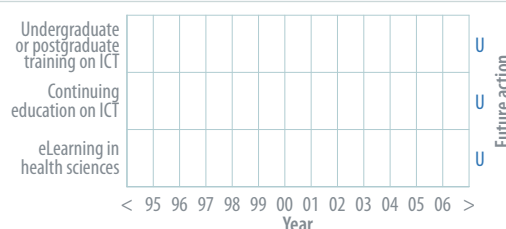


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

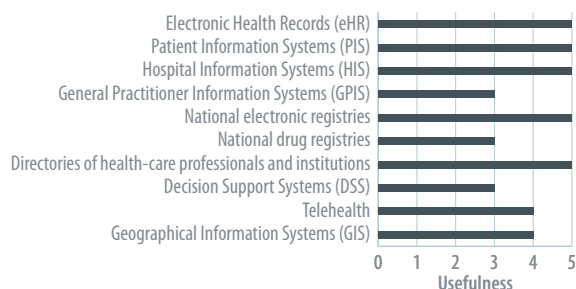


Figure 6. Preferred generic eHealth tools to be provided by WHO

Electronic Health Records (eHR), Patient Information Systems (PIS), Hospital Information Systems (HIS), national electronic registries, and directories of health-care professionals and institutions are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. The Democratic Republic of the Congo considers all listed eHealth services very useful.



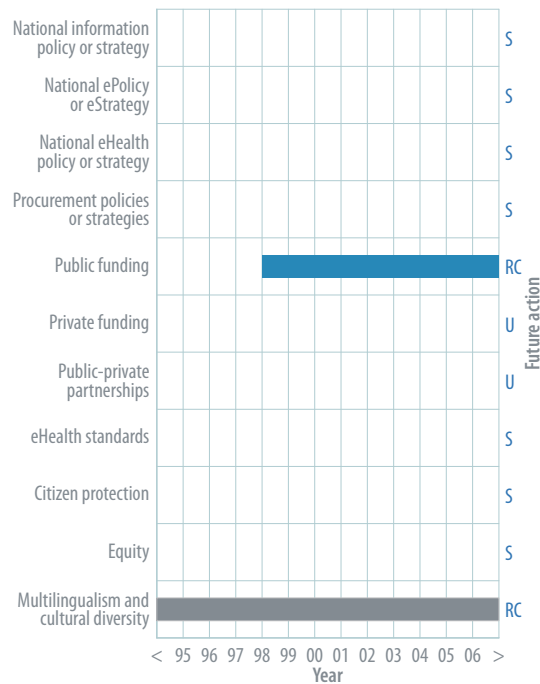
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Eritrea

Enabling environment – policies and strategies to support the information society



Eritrea reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector will begin by 2008. Public funding for ICT support of programmes addressing national health priorities has been ongoing since 1998. Policies to promote availability of information in local languages have been implemented since 1991. Both actions will be reviewed and continued over the next two years. The introduction of Internet services, digitalization of the telecommunication system and encouraging the private sector to invest in ICT have been very effective in building an enabling environment for the use of ICT in the health sector. However, the lack of finances and human resources capacity in ICT are proving to be significant challenges in this field.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health has been implemented effectively since 2002, and infrastructure development has been promoted since 1998 through collaboration with intersectoral and nongovernmental partners. Both actions are likely to continue over the next two years.

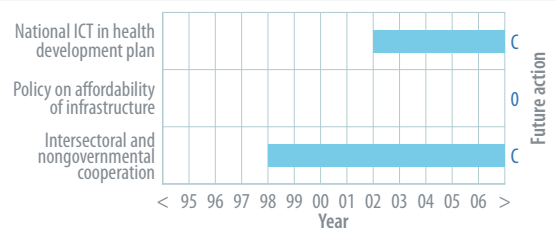
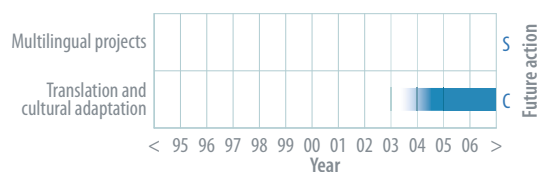


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

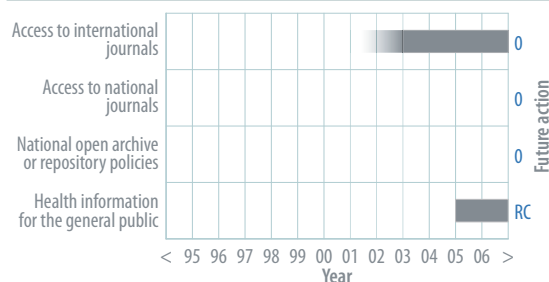


Eritrea has been successfully supporting the translation and cultural adaptation of existing high-quality content (created either locally or abroad). The government indicates that special projects to promote the development and use of new electronic health content in multiple languages will be introduced over the next two years.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	4 054	OECD country	No	Main telephone lines*	9.3
	GDP per capita (Int \$)	1 127	World Bank category	4	Internet users*	11.84
	Total health expenditure (% of GDP)	4.4	ICT Diffusion Index	0.1905	Mobile phone subscribers*	4.74

Content – access to information and knowledge



Creating and providing health information for the general public in electronic format commenced in 2005 and so far, the effectiveness of this action is unknown. Online access to international journals in biomedicine and social sciences for the medical and research communities has also been introduced in Eritrea.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

All actions listed to build ICT capacity in the health sector have been taken. They are rated from moderately to very effective and will continue until at least 2008. Among the most effective actions in this field are the computerization of the health information system at regional level, conducting computer literacy programmes and offering distance learning through e-mail.

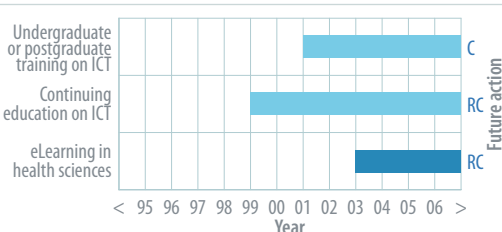


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

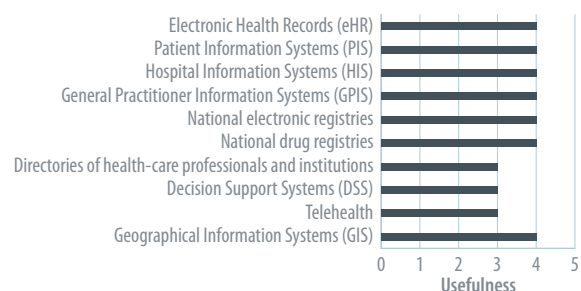


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

Directories of health-care professionals and institutions, Decision Support Systems (DSS), and telehealth are rated as moderately useful if the World Health Organization could offer these as generic prototypes for adaptation. All other listed eHealth tools are rated as very useful. The majority of the listed eHealth services are considered very useful by Eritrea.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Ethiopia

Enabling environment – policies and strategies to support the information society

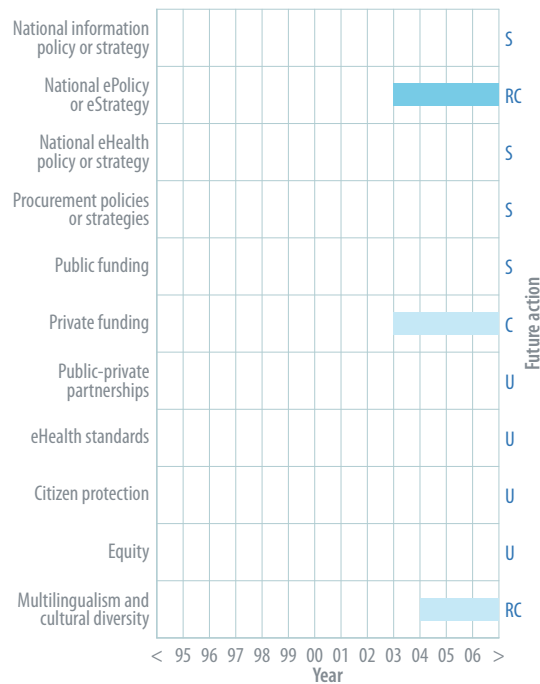


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Ethiopia reports that three of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to moderately effective. They will be reviewed and continued over the next two years. A national information policy, a national eHealth policy, a procurement strategy, and public funding are likely to be implemented by 2008. Other developments in this field are the establishment of the Ethiopian ICT Authority (in 2003), an eGovernment initiative, which creates a favourable platform for eHealth (2002), 'Schoolnet' and 'Woredanet' (named after an Ethiopian district) (2002). Through high-level political commitment, Ethiopia promotes the use of ICT in general, which in turn is predicted to have a favourable effect on the use of ICT in the health sector. There are several significant challenges in this field: the lack of human resources with awareness of ICT, inadequate institutionalized promotion of ICT and the absence of a national ICT strategy. However, Ethiopia is meeting these challenges by initiating ICT training courses at university level and through the development of guidelines on institutionalizing ICT in ministries.

Infrastructure – access to information and communication technologies

Ethiopia indicates that it has been working effectively with intersectoral and nongovernmental partners to promote infrastructure development since 2004 and will continue to do so. The government will also implement a national plan for the development of ICT in health by 2008. A policy to reduce the costs of ICT infrastructure for the health sector will be implemented over the next two years. A significant development in this field is the successful installation of a broadband network at district level in 2003. That same year installation of fibre-optic cable started in cities, and one year later in rural areas. An ineffective network system (slow speed) and the high cost of the more efficient alternative system poses significant challenges, but the government is taking measures to remedy this by reducing the cost of leased lines.

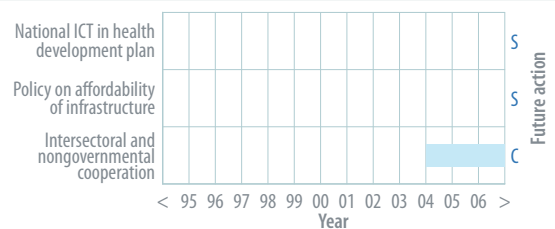


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

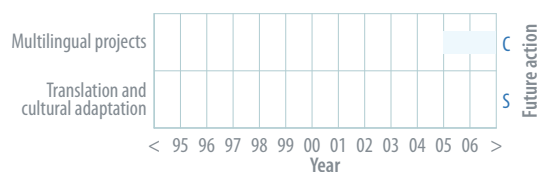


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects to promote the development and use of new electronic health content in multiple languages have been introduced in Ethiopia since 2005. Translation and cultural adaptation of existing high-quality content (created either locally or abroad) is likely to commence over the next two years. A significant challenge in providing electronic multicultural health content has been the limited awareness and use of ICT in general. The government has therefore taken the positive action to endorse and promote the use of ICT across all sectors.

Country indicators	Population (000s)	73 795	OECD country	No	Main telephone lines*	0.63 03
	GDP per capita (Int \$)	338	World Bank category	4	Internet users*	0.16
	Total health expenditure (% of GDP)	5.9	ICT Diffusion Index	0.1708	Mobile phone subscribers*	0.25

Content – access to information and knowledge

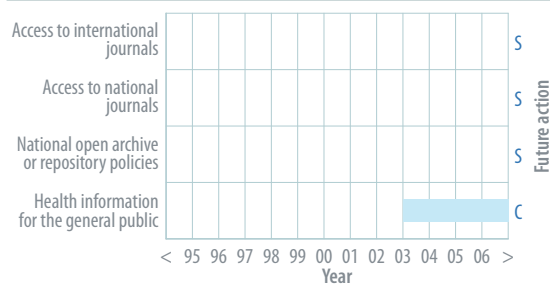


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Creating and providing health information for the general public in electronic format commenced in 2003 and is rated as slightly effective. Access to a national open archive, and national and international electronic journals will be provided over the next two years. Ethiopia highlights the very effective work conducted through the HIV/AIDS resource centre, which has been disseminating information through ICT. Ensuring the success of the resource centre is a top priority for the Ethiopian Government in its work on HIV/AIDS prevention. A significant challenge in promoting access to electronic health content has been the limited awareness of the use of ICT. To remedy this, the few available experts continue to educate staff in ICT; meanwhile the government is also pushing all sectors to begin ICT initiatives.

Capacity – human resources knowledge and skills

Continuing education in ICT and eLearning in health sciences will be offered in Ethiopia over the next two years. A significant challenge in building ICT capacity in the health sector is the ICT illiteracy of graduates in health training programmes, as these do not currently include ICT in their course content.

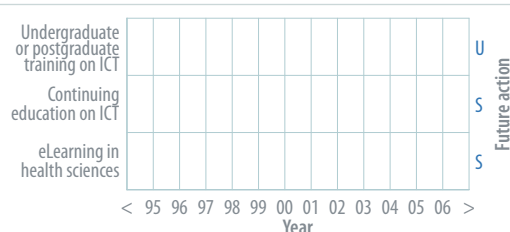


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

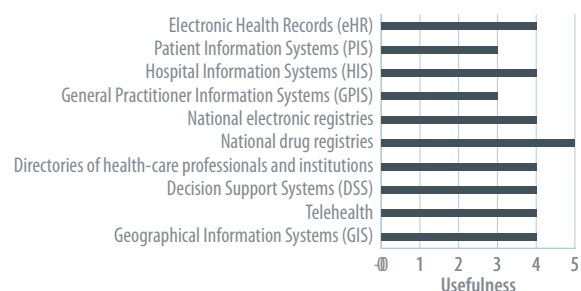


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

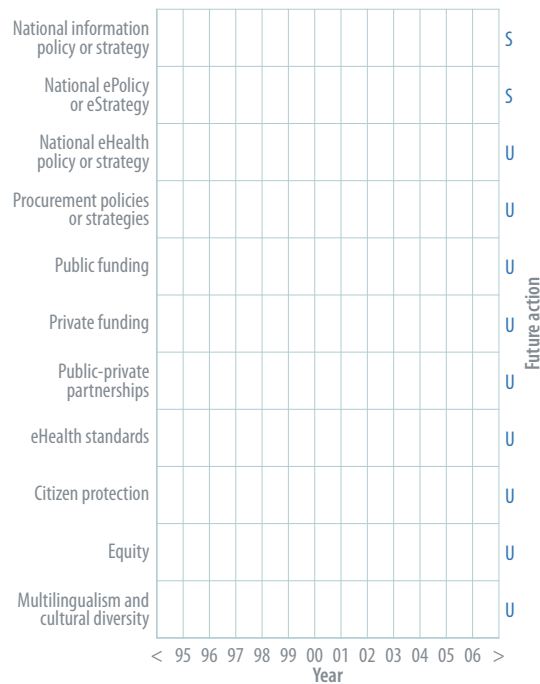
National drug registries are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. All other listed eHealth tools are rated from moderately to very useful. Advice on human resources development for eHealth and advice on national needs assessments for eHealth are considered extremely useful. All other listed eHealth services are considered moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Gabon

Enabling environment – policies and strategies to support the information society



Gabon reports that a national information policy to promote an information society will likely be implemented over the next two years. A national ePolicy that sets out the vision and objectives to promote the use of information and communication technologies (ICT) across all sectors will be implemented by 2008. A decision remains to be made as to which of the other actions will be taken in the next two years.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Collaboration with intersectoral and nongovernmental partners to promote infrastructure development is planned to commence in Gabon over the next two years. Decisions remain to be made on the introduction of a national plan for the development of ICT in health and a policy on affordability of infrastructure.

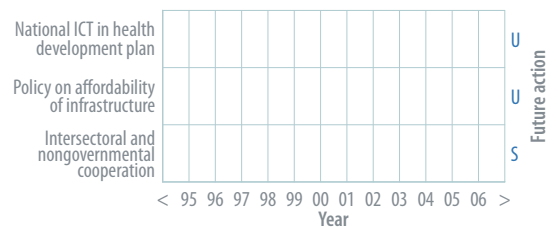
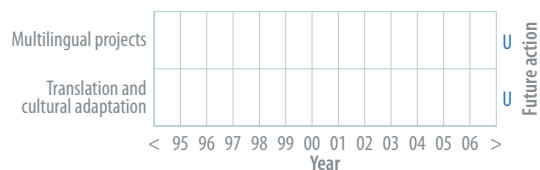


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

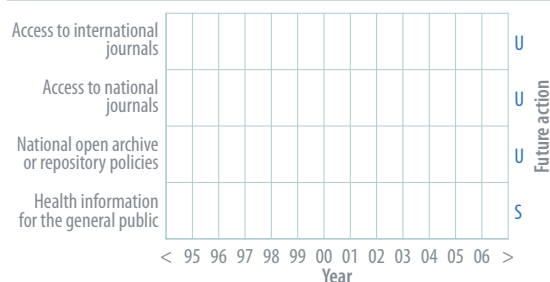


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	1 341	OECD country	No	Main telephone lines*	2.86
	GDP per capita (Int \$)	5 754	World Bank category	2	Internet users*	2.96
	Total health expenditure (% of GDP)	4.4	ICT Diffusion Index	0.2366	Mobile phone subscribers*	36.2

Content – access to information and knowledge



The provision of electronic health information for the general public is planned over the next two years in Gabon. A decision remains to be made as to which actions will be taken for access to national and international electronic journals and on a policy for a digital national open archive for scientific research. In 2002, Gabon introduced a mechanism responsible for preparing the overall health control panel at the Ministry of Health.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

To date, none of the listed actions to build ICT capacity in the health sector have been taken and a decision remains to be made as to which actions will be introduced.

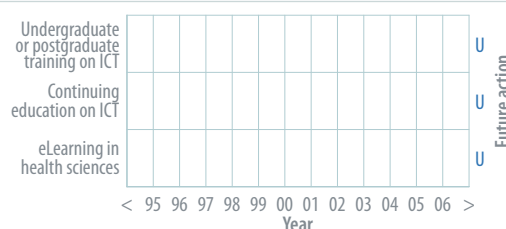


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

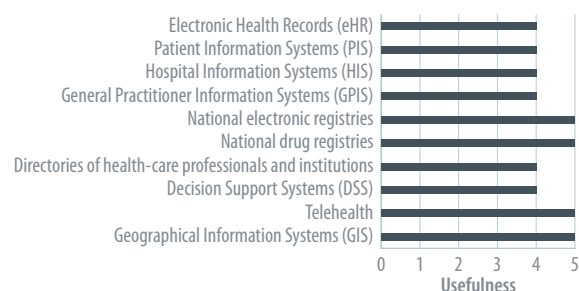


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

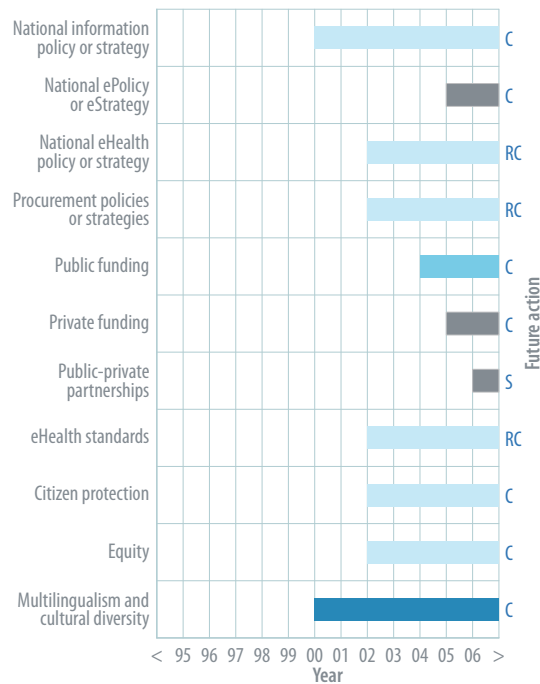
National electronic registries, national drug registries, telehealth, and Geographical Information Systems (GIS) are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. All other listed eHealth tools are rated as very useful. All listed eHealth services are considered very useful by Gabon.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Gambia

Enabling environment – policies and strategies to support the information society



The Gambia reports that all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from unknown to very effective. They will be reviewed and continued over the next two years. The most effective actions to date in this field have been the development and implementation of a health information policy, and the connection of the health divisions to the Local Area Network (LAN), which aid the communication between various divisions and the central operations. Significant challenges in this field are the lack of funding, poor logistics support, inadequately trained personnel, and poor integration and coordination.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

All of the listed actions to support ICT infrastructure development for the health sector have been taken since 2002 and are rated from slightly to moderately effective. They will all be continued over the next two years. The most effective action in building infrastructure for the health sector has been the connection of the central and health divisions' computers to the LAN, which has significantly streamlined resource and information sharing. However, maintenance of power generators at various health divisions and sustaining existing ICT equipment are posing significant challenges.

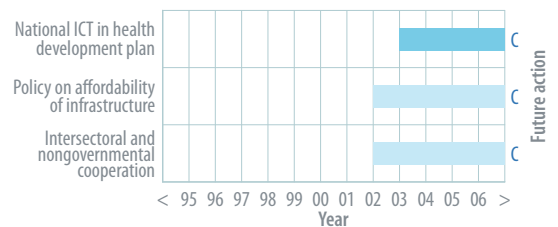
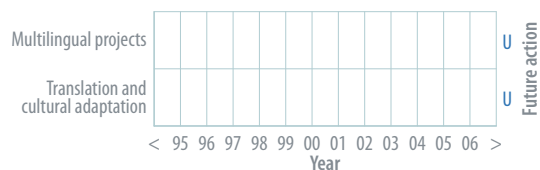


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been taken and a decision remains to be made as to which actions will be implemented.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	1 438	OECD country	No	Main telephone lines*	2.89 [02]
	GDP per capita (Int \$)	1 186	World Bank category	4	Internet users*	3.35
	Total health expenditure (% of GDP)	8.1	ICT Diffusion Index	0.1842	Mobile phone subscribers*	11.97

Content – access to information and knowledge

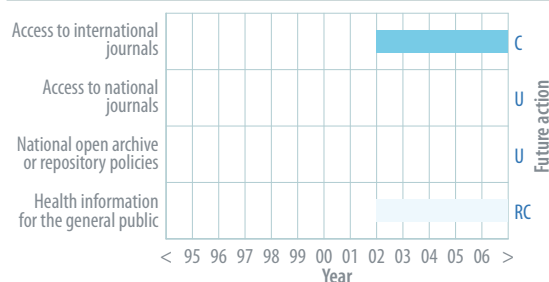


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals was introduced in 2002. This service has been moderately effective and will be continued over the next two years. Creating and providing health information for the general public in electronic format also commenced in 2002 and will be reviewed and continued. The most effective action thus far in promoting access to electronic health content has been the Internet connections through the LAN at both central and divisional levels, which enables easy access to electronic health contents. However, health information for the general public web site is still under development and not yet available.

Capacity – human resources knowledge and skills

Continuing education in ICT for health professionals and ICT skills courses for health science students have been successfully offered since 2003. Training of health professionals in various computer applications has been provided through collaboration with the private sector and other organizations (Quantum Associates and the Young Men's Christian Association). However, this training has now ceased due to a cut in the source of funding.

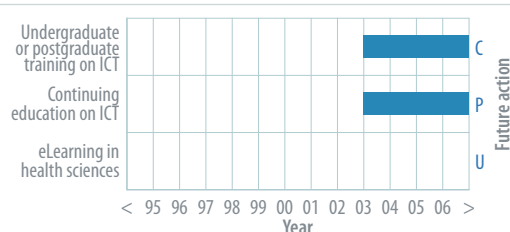


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

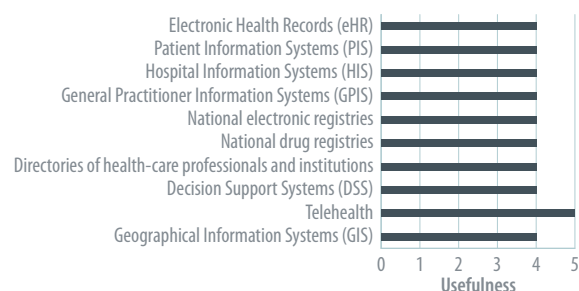


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

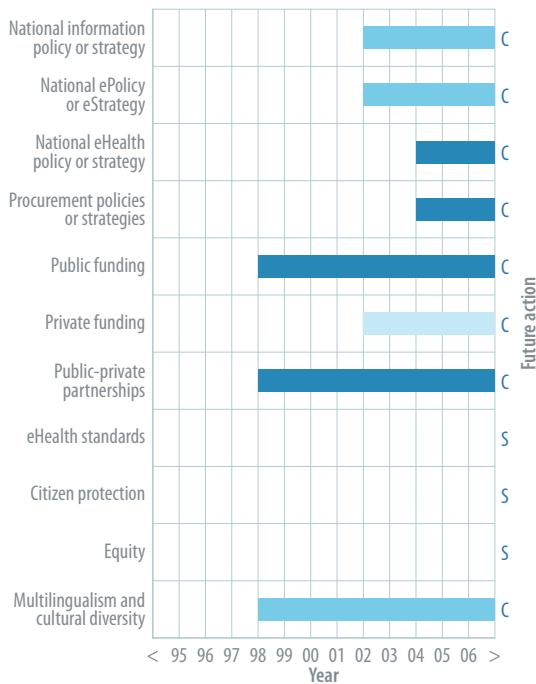
Telehealth is rated as extremely useful if the World Health Organization could offer it as a generic prototype for adaptation. All other listed eHealth tools are rated very useful. Advice on eLearning programmes is rated as extremely useful. All other listed eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Ghana

Enabling environment – policies and strategies to support the information society



Ghana reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to very effective. They are all predicted to continue over the next two years. Norms and standards for eHealth systems, services or applications are likely to be introduced in the near future. Protection and inclusiveness procedures for citizen protection and equitable access to eHealth are also planned to begin over the next two years. Reported as the most effective actions contributing to an enabling environment for the use of ICT in the health sector are the establishment of an ICT unit in the Ministry of Health and the appointment of an ICT focal point at the national level. Complex policy formulation at the sectoral level is posing a significant challenge in this field.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through intersectoral and nongovernmental cooperation. Ghana highlights the establishment of Communication Information Centres in 2002, and the availability of Internet connectivity and mobile telephony. A national ICT in health development plan for health sector connectivity and a national policy to reduce the costs of ICT infrastructure will be implemented by 2008. The decentralization of funding to the sub district level has been an effective action in building ICT infrastructure for the health sector. However, there are still gaps in funding, as well as planning; both are significant challenges in this field.

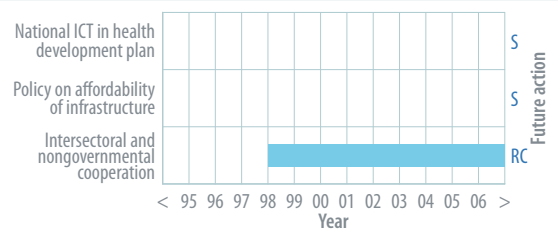
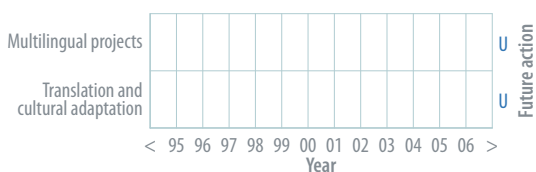


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

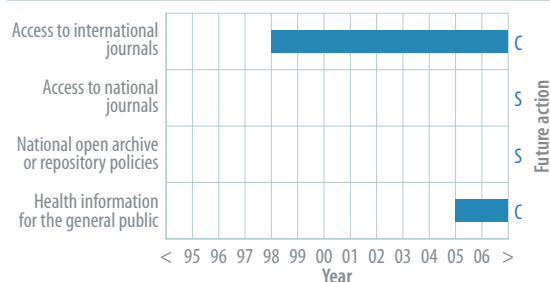


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	21 212	OECD country	No	Main telephone lines*	1.47
	GDP per capita (Int \$)	2 159	World Bank category	4	Internet users*	1.72
	Total health expenditure (% of GDP)	4.5	ICT Diffusion Index	0.2183	Mobile phone subscribers*	7.93

Content – access to information and knowledge



Health professionals have access to online health content through international electronic journals since 1998 and access to national electronic journals will be provided in the next two years. Additionally, Ghana is providing electronic health information for the general public, and plans to implement a policy for a digital national open archive for scientific research in the near future. It also intends to make a bibliography of health research available online. The lack of a national mechanism to promote information sharing is reported as the most significant challenge in access to electronic health content.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity in Ghana has been built through the use of undergraduate or postgraduate training and continuing education in ICT. These actions are rated as moderately to very effective and will continue over the next two years. Health sciences courses through eLearning for health professionals in training and practice will be offered by 2008. Ghana highlights the successful introduction of programmes to promote computer literacy in primary education. Among the significant challenges for Ghana in building ICT capacity in the health sector are the large number of computer illiterate health workers and the lack of technical support.

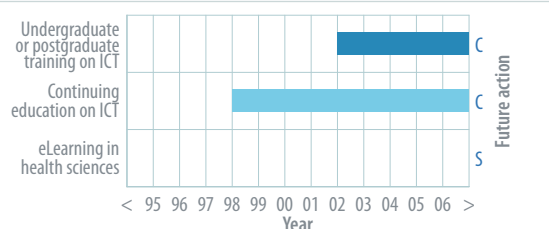


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

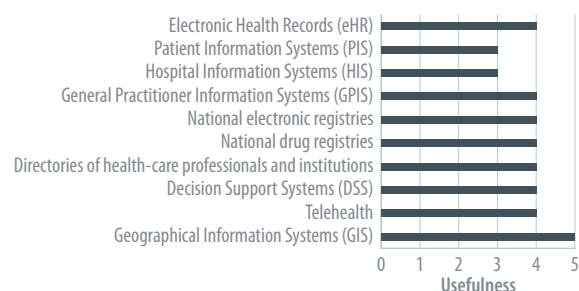


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

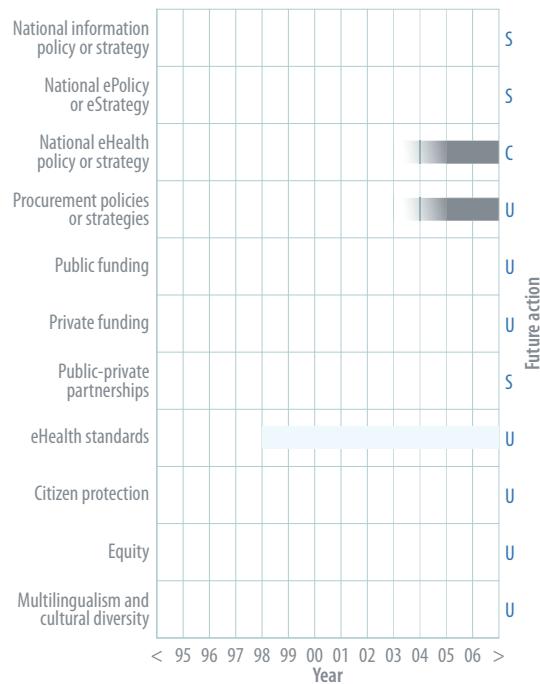
Geographical Information Systems (GIS) is rated as an extremely useful eHealth tool; all other listed tools are rated from moderately to very useful if the World Health Organization could offer these as generic prototypes for adaptation to Ghana. Advice on national needs assessments for eHealth, and advice on eHealth norms and standards are considered very useful services. All remaining listed eHealth services are considered from slightly to moderately useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Guinea

Enabling environment – policies and strategies to support the information society



Guinea reports that three of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. A national eHealth policy has been implemented to promote the use of ICT in the health sector. Guinea highlights a telemedicine pilot project (started in 1998) that is under the aegis of the Ministry of Postal Services and Telecommunications, with the support of the International Telecommunications Union. Its objective was to set up treatment units able to benefit from the specialized services of university teaching hospitals in the capital through video communication, and to develop all the services associated with referral (e.g. in-service training, supervision, evaluation). However, the project is currently on hold. The primary challenge in this field has been the difficulties in developing a favourable environment for the use of ICT. For example, the Ministry of Postal Services and Telecommunications was created very recently (2004). Since its inception it has been occupied with laying the foundations for policy: that is, a regulatory and institutional framework. A national information technologies and telecommunications strategy document, which will provide the basis for an ICT-friendly environment, had been announced and is in preparation.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

To date, none of the specified actions to support ICT infrastructure development have been implemented in Guinea but despite the non-existent institutional framework, national information and communication technologies (NICT) are used by various private health facilities. They include: the hospital of CBG, a mining company with United States capital, which has the necessary infrastructure and equipment to make optimum use of NICT in health; the American Hospital in Conakry; and the Pasteur Clinic. Reported as the most effective action in building ICT infrastructure for the health sector is the establishment of the primary health care programme. It relies on preventive, curative and health promotion actions at the local level and forms the foundation of health policy in Guinea. The programme has led to the improvement of health-sector infrastructure in the country. The main obstacle to further development is funding (provision, operation and maintenance). Guinea proposes strengthening bi- and multilateral partnerships to overcome this.

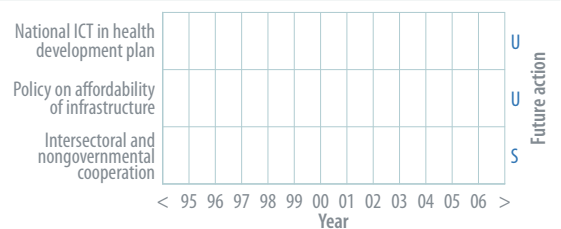
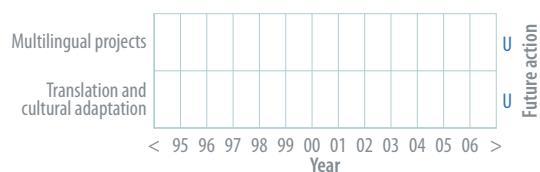


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

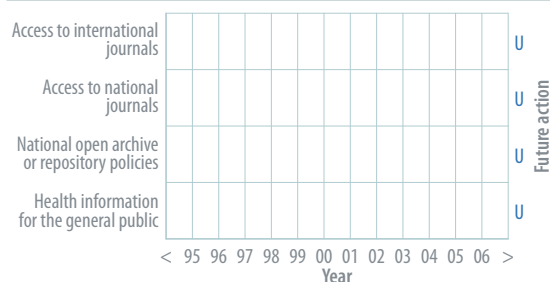


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken over the next two years.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	9 003	OECD country	No	Main telephone lines*	0.34 [03]
	GDP per capita (Int \$)	1 741	World Bank category	4	Internet users*	0.53
	Total health expenditure (% of GDP)	5.4	ICT Diffusion Index	0.2345	Mobile phone subscribers*	1.44

Content – access to information and knowledge



None of the listed actions to promote online access to health content have yet been implemented and a decision remains to be made as to which actions will be taken. However, Guinea reports that even though there is no policy to develop and make health information available to the public, health researchers have endeavoured – either individually or through their professional bodies – in collaboration with foreign partners, to make the results of their research available on the World Wide Web, and thus to the public.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Guinea reports that none of the specified actions to build ICT capacity in the health sector have been implemented and a decision remains to be made as to which actions will be taken in the near future.

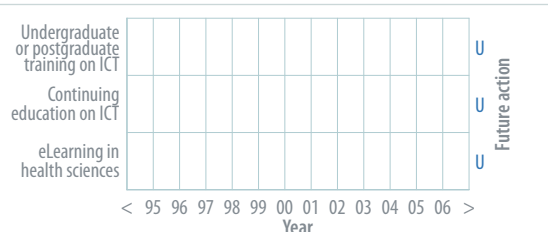


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

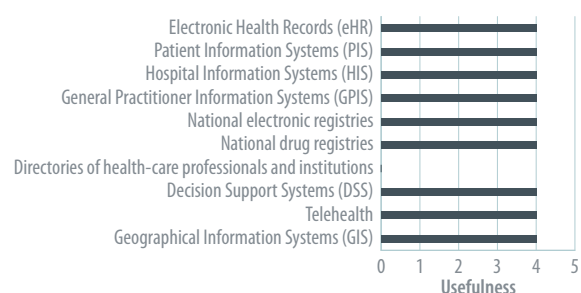


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools except directories of health-care professionals and institutions (no data available) are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation to Guinea. Advice on national needs assessments for eHealth is considered an extremely useful eHealth service; all remaining listed services are considered moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Guinea-Bissau

Enabling environment – policies and strategies to support the information society

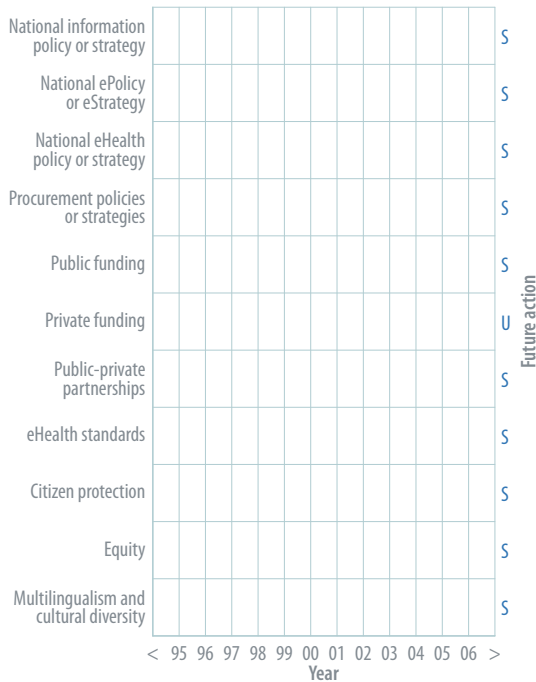


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Guinea-Bissau reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector are planned to begin by 2008. The Ministry of Health is taking measures to promote an enabling environment for access to information through the Internet as the first phase for the effective use of ICT in its country. The most significant challenges to date in building an enabling environment for the use of ICT in the health sector have been the lack of a stable supply of electricity and the high cost of Internet provision.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is promoted in Guinea-Bissau through intersectoral and nongovernmental cooperation. A national ICT in health development plan, which sets targets for health sector connectivity, is planned to be implemented by 2008, as will a national policy to reduce the costs of ICT infrastructure for the health sector. Provision of access to the Internet and the emerging use of broadband technology have proven to be the most effective actions so far in this field. However, the lack of sufficient funds poses a significant challenge to building ICT infrastructure for the health sector.

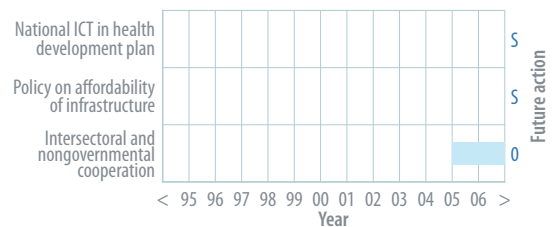


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

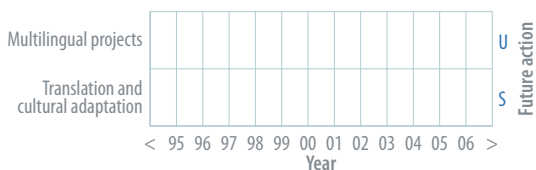
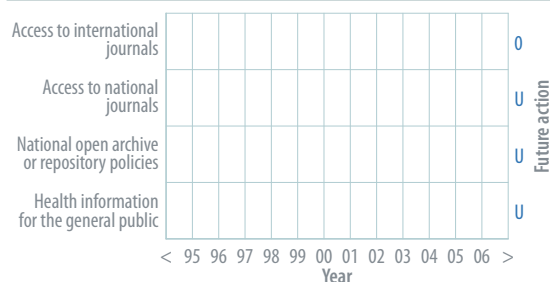


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented in Guinea-Bissau. The translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad) is planned to commence over the next two years. The most significant challenge in providing electronic multicultural health content is the lack of funds and technical support.

Country indicators	Population (000s)	1 494	OECD country	No	Main telephone lines*	0.82 [03]
	GDP per capita (Int \$)	795	World Bank category	4	Internet users*	1.99
	Total health expenditure (% of GDP)	5.6	ICT Diffusion Index	0.0685	Mobile phone subscribers*	0.1

Content – access to information and knowledge



Guinea-Bissau reports that, to date, none of the specified actions listed to promote online access to health content have been implemented and a decision remains to be made as to which actions will be taken in the near future. Lack of sufficient funds is reported as the most significant challenge in this field.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate or postgraduate training in ICT. ICT skills courses, as a part of university curricula for health sciences students, have been offered since 2004 and this action is rated as moderately effective. ICT skills programmes in the ongoing training of health-care professionals are planned to begin by 2008, as well as health sciences courses through eLearning for health professionals. The introduction of compulsory courses of informatics at the faculty of medicine has been a very effective action in building ICT capacity in the health sector.

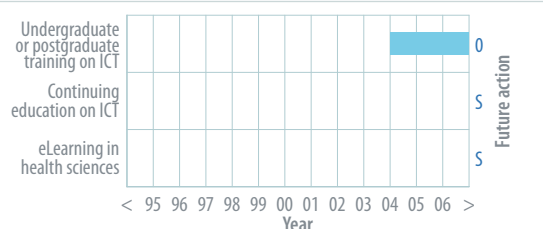


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

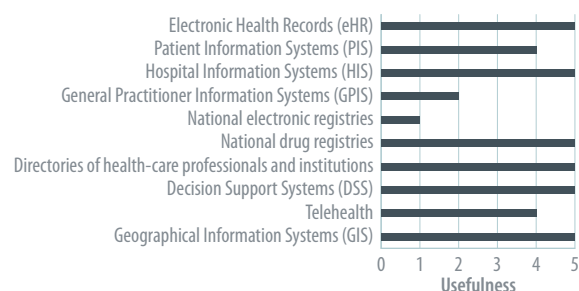


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

Electronic Health Records (eHR), Hospital Information Systems (HIS), national drug registries, Geographical Information Systems (GIS), Decision Support Systems (DSS), and directories of health-care professionals and institutions are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Guinea-Bissau. All listed eHealth services are considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	0 No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Kenya

Enabling environment – policies and strategies to support the information society

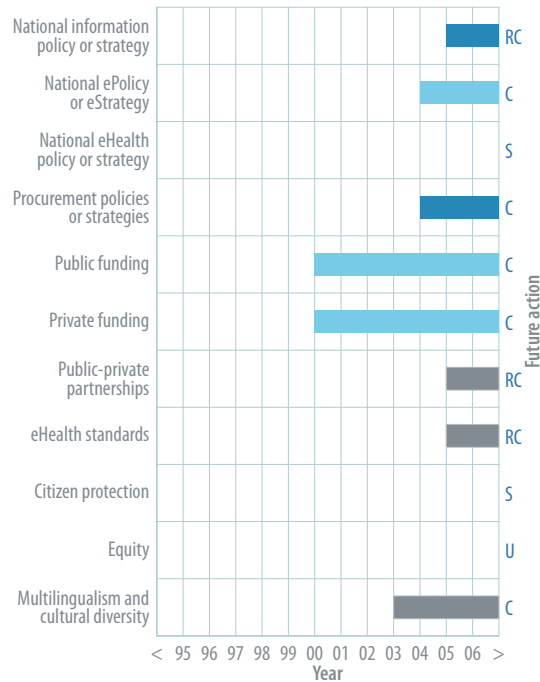


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Kenya reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken between 2000 and 2005. These actions are rated from moderately to very effective and are predicted to continue over the next two years. The implementation of a national eHealth policy, and creation of regulations to protect the privacy and security of individual patient data where eHealth is used are likely to be introduced by 2008. All of the actions already taken in this area are planned to continue. To date, no decision has been made whether policies to promote inclusiveness and equitable access to eHealth will be introduced in the next two years. Kenya notes that the liberalization of the mobile telephone market has promoted communication. The most effective development in building an enabling environment for the use of ICT in the health sector has been the establishment of an eGovernment in the Office of the President; Government Technical Services (GITS) under the Ministry of Finance; and an eHealth Intersectoral Group under the Ministry of Health. The absence of a framework in which to implement the eHealth policy is being identified as the most significant challenge and one of the priorities to be addressed by the eHealth Intersectoral Group.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was implemented in 2005 and has not yet been rated. A national policy to reduce the costs of ICT infrastructure for the health sector (begun in 2003) has been very effective and is planned to continue over the next two years. Intersectoral and nongovernmental cooperation to promote infrastructure development has been in operation since 2000, is rated as moderately effective, and is likely to continue. The most effective action, thus far, in building ICT infrastructure for the health sector is reported to be the reduction of import duty on eEquipment, which has led to a decrease in hardware costs. However, prices still remain high for the general public and this is reported as a significant challenge in the extension of access to the broader community. Another challenge reported is the lack of electric power in rural areas and the frequent power interruptions in towns.

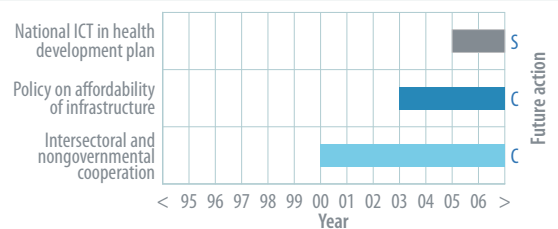


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

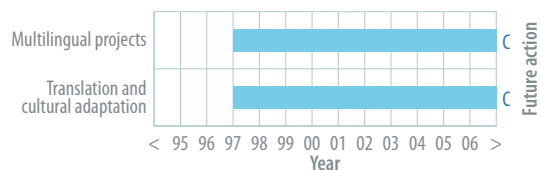
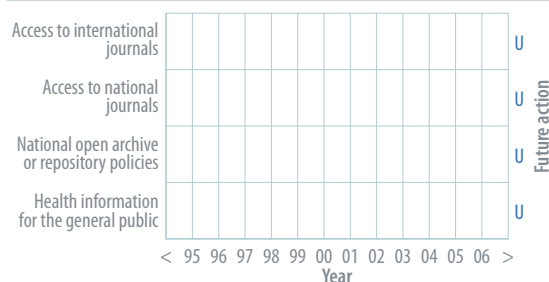


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Both of the listed actions to promote the development of electronic multicultural health content were introduced in the late 1990s. They are considered moderately effective and are expected to continue over the next two years. The most significant challenge to provide electronic multicultural health content is described as being the absence of a well-staffed, -equipped and -supplied government health education centre where these products would be produced.

Country indicators	Population (000s)	32 734	OECD country	No	Main telephone lines*	0.92
	GDP per capita (Int \$)	1 502	World Bank category	4	Internet users*	4.63
	Total health expenditure (% of GDP)	4.3	ICT Diffusion Index	0.2193	Mobile phone subscribers*	7.85

Content – access to information and knowledge



To date, none of the specified programmes to develop or provide electronic health content for the medical or research communities have been implemented and a decision remains to be made as to which actions will be taken over the next two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses were adopted as part of university curricula for health sciences students in the early 1990s. This initiative is reported as very effective and likely to continue over the next two years. No decision has been made, to date, as to which of the remaining educational programmes will be introduced by 2008. A pilot telemedicine project was initiated in 2004 by the African Medical and Research Foundation (AMREF). The project is rated as very effective and will be reviewed and continued over the next two years. The most effective action to build ICT capacity in the health sector has been the supply of computers with e-mail facilities to all districts, as well as the training of users. This is cited as having led to a “tremendous” increase in the rate of reporting of tuberculosis cases and those registered in the Expanded Programme on Immunization (EPI).

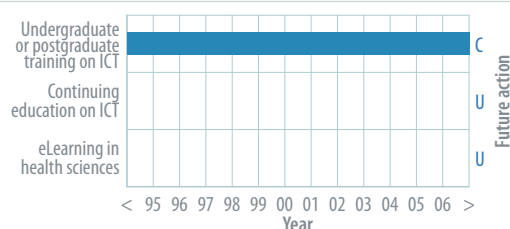


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

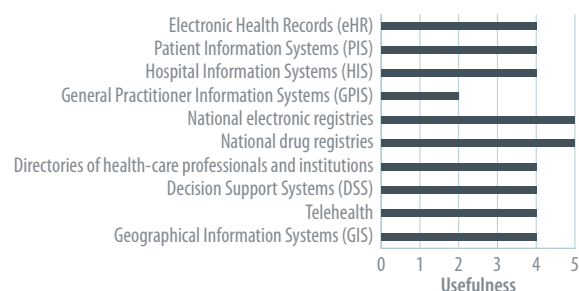


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Kenya. A Patient Information System is being pretested in the Mbagathi hospital in Nairobi and this pilot programme is reported as very useful. The specified eHealth services are all rated from very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Lesotho

Enabling environment – policies and strategies to support the information society

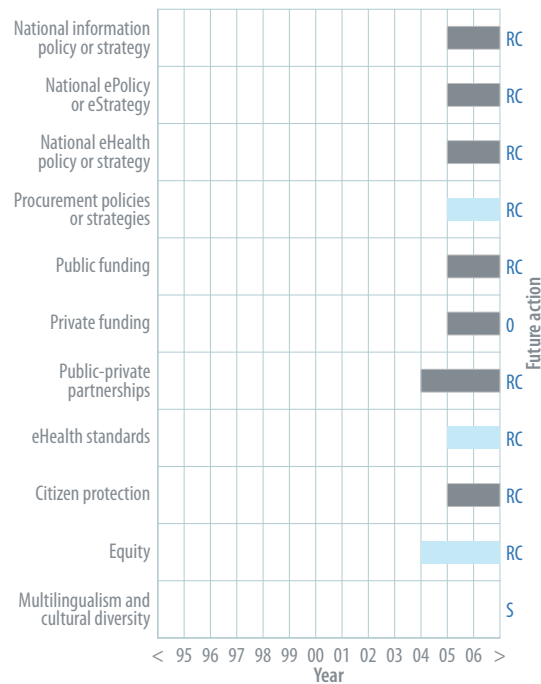


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Lesotho reports that the majority of the specified actions to promote an enabling environment for information and communication technologies (ICT) in the health sector were introduced in 2004/2005, and are expected to be reviewed and continued over the next two years. Policies that promote health information in local languages are likely to be implemented by 2008. Other actions highlighted are the creation of cyber cafes in various districts and the development, by a local company, of software for registration of births and deaths, used in a joint programme by the Ministry of Health and the United Nations Children's Fund (UNICEF). Additionally, several ministries have developed their own web sites for information sharing and dissemination; a government policy mandates that ICT training be taught in high schools and, through the New Partnership for Africa's Development (NEPAD) initiative, to selected primary schools as part of the standard curriculum. The Ministry of Health plans to raise the awareness of ICT among public health workers through training programmes. The use of DEV Registration (software) for the collection and registration of data on nutritional levels, immunization and related issues has successfully been advocated by the United Nations and nongovernmental agencies with the Ministry of Health. Significant challenges are posed by poor electric and technological infrastructure and the lack of standards for data collection. The need for a national joint forum on ICT development is also raised.

Infrastructure – access to information and communication technologies

Actions to support the development of ICT infrastructure for the health sector have been taken and are expected to continue over the next two years. Intersectoral and nongovernmental collaboration has led to the development of a web site for Lesotho. Donors and international agencies/partners have helped in establishing a dial-up Internet connection for the Ministry of Health through the contribution of equipment, training, funds and assistance. The liberalization of the telecommunications sector and the privatization of Telecom have enhanced the connectivity and quality of communications in most parts of the country, which has inadvertently led to an improvement of health services. Access to health care for the general public has therefore also improved, especially in emergency situations. Challenges include: lack of funds; insufficient private-sector participation in the development of ICT in the government and the health sector; lack of trained staff; and outdated equipment.

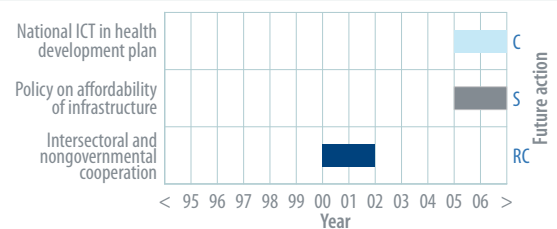


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

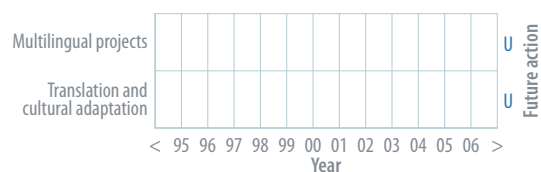


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been introduced and no decision has been made as to which actions will be taken in the next two years. Locally produced software is generally available only in English and targets end-users with a formal education. English is the official language and translation to local languages as well as ensuring correct translations of health content pose significant challenges because of the lack of funds.

Country indicators	Population (000s)	1 800	OECD country	No	Main telephone lines*	2.07
	GDP per capita (Int \$)	2 018	World Bank category	4	Internet users*	2.39
	Total health expenditure (% of GDP)	5.2	ICT Diffusion Index	0.2153	Mobile phone subscribers*	8.83

Content – access to information and knowledge

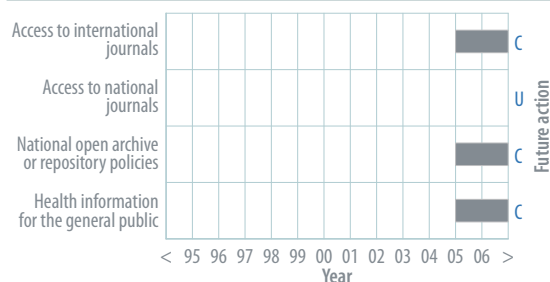


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Actions to promote online access to health content have been introduced in the past year and are expected to continue. However, a decision remains to be made on access to national electronic journals. Lesotho highlights the new Ministry of Health web site and the intention to link to other health-related web sites to provide health information to the general public as the way forward. Significant challenges include insufficient funds for ICT development, lack in training and poor access to computers and the Internet among health staff. Lesotho also needs partners within the health sector for the development of ICT.

Capacity – human resources knowledge and skills

Lesotho has been offering ICT skills courses as a part of university curricula for health sciences students since 1994. This is a very effective programme and likely to continue. In addition, the government is offering scholarships in ICT and health-related subjects in colleges, technical institutions and universities within the country as well as for ICT-related courses abroad. This is described as the most effective action in this area. Since 2001, ICT skills programmes are provided in the ongoing training of health professionals. The government-NEPAD initiative for ICT training in schools and colleges together with the scholarships for higher studies within the country and abroad, in ICT and health, are described as important initiatives. One of the most significant challenges in this area, apart from funding and training, is the difficulty retaining skilled staff.

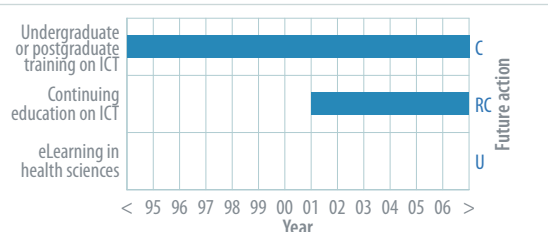


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

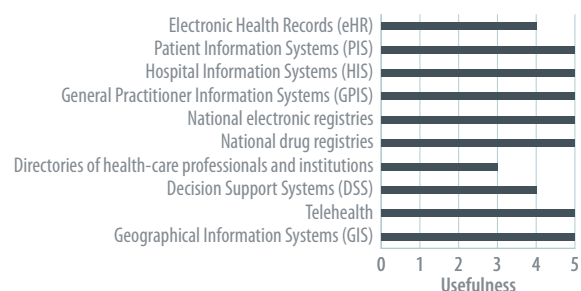


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

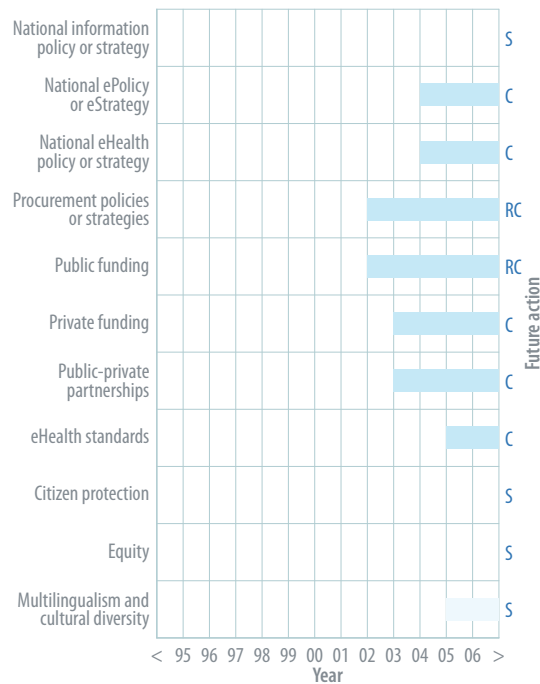
The majority of the listed eHealth tools are reported as very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on national needs assessments for eHealth is rated as an extremely useful eHealth service. The majority of the remaining services are considered moderately to very useful. Access to consultancy services on eHealth is mentioned as an additional service that would be extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Madagascar

Enabling environment – policies and strategies to support the information society



Madagascar reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector began in 2002. These actions are likely to continue over the next two years. A national information policy is likely to be introduced by 2008. The implementation of standards, regulations or legislation to protect the privacy and security of individual patient data where eHealth is used, and policies to promote inclusiveness and equitable access to eHealth are likely to be implemented over the next two years. The initiative to create a network including health districts, health care centres and mobile devices has been the most effective action in this area. Few computers, poor Internet access and high prices on computer equipment are reported as significant challenges.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Actions to support the development of infrastructure for the health sector have been introduced and are expected to continue over the next two years. However, the policy on affordability of infrastructure, an action rated as very effective, ended in 2005 and a decision remains to be made whether it will be continued in the next two years. The most effective action is described as being the installation of SSB Data/Voice/Mobile sets in isolated regions and the interconnection of the six sites to a central level. The most significant challenge is reported to be the limited budget assigned to the development of infrastructure.

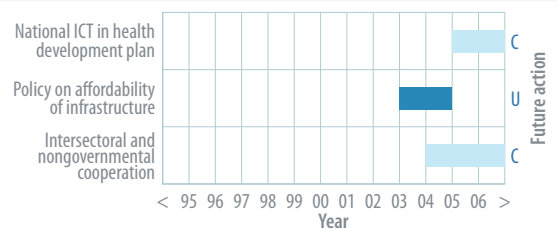
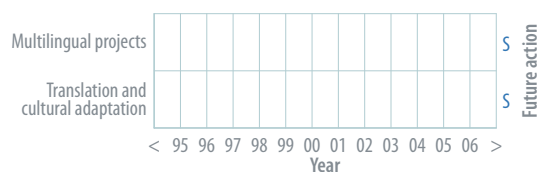


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been taken; they are, however, expected to be introduced by 2008. Making electronic health information accessible poses the most significant challenge in this area.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	17 626	OECD country	No	Main telephone lines*	0.33
	GDP per capita (Int \$)	910	World Bank category	4	Internet users*	0.5
	Total health expenditure (% of GDP)	2.7	ICT Diffusion Index	0.1911	Mobile phone subscribers*	1.87

Content – access to information and knowledge

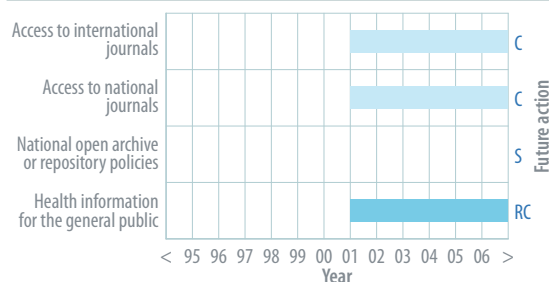


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international and national electronic journals was introduced in 2001. These services are rated as slightly effective and are likely to continue over the next two years. Madagascar plans to implement a national open archive and/or institute a repository policy for scientific research by 2008. The creation and provision of health information for the general public in electronic format commenced in 2001 and is rated as moderately effective. This will continue over the next two years. The increase of access points for Internet connection is described as the most effective action to promote access to electronic health content. The most significant challenge is finding the means to provide students with free Internet access.

Capacity – human resources knowledge and skills

Madagascar has been offering ICT skills courses as a part of university curricula for health sciences students since 1995. This is reported as a slightly effective action and will be reviewed and continued over the next two years. ICT skills programmes provided in the ongoing training of health professionals were introduced in 1998, and health sciences courses through eLearning for health professionals in training and practice in 2003. These educational programmes are reported as slightly and moderately effective, respectively, and they are likely to be continued. Including ICT training as part of the curricula for higher education and in health services establishments is described as the most effective initiative.

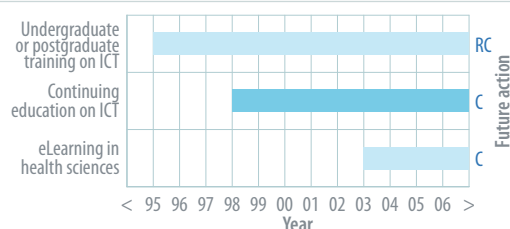


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

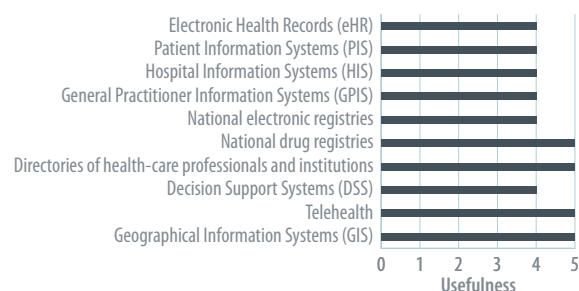


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

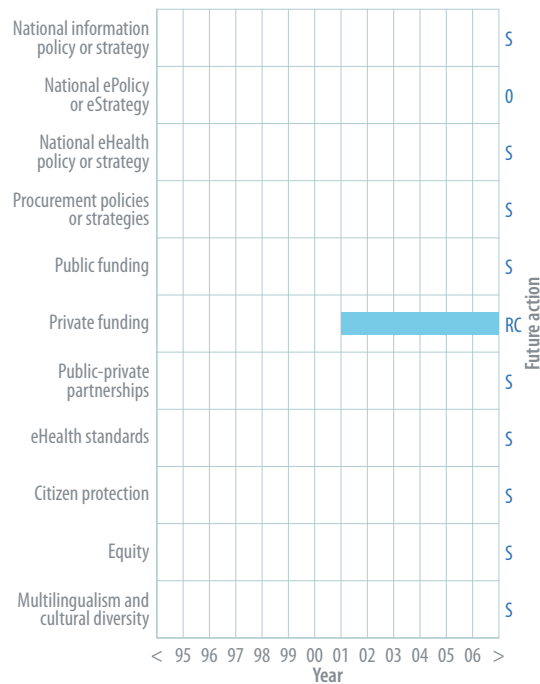
All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Madagascar. The specified eHealth services are also considered from very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Malawi

Enabling environment – policies and strategies to support the information society



Malawi reports that the majority of the listed actions, to promote an enabling environment for information and communication technologies (ICT) in the health sector, will be introduced by 2008. Private funding for ICT support to programmes addressing national health priorities has been provided since 2001. This action has thus far been rated as moderately effective and will be reviewed and continued over the next two years. The most effective action in building an enabling environment for the use of ICT in the health sector is reported to be the national ICT policy, developed through a consultative and collaborative process (stakeholders and individuals), which is now awaiting government approval. Many of the initial challenges have been overcome and the process has been institutionalized.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, is expected to be introduced by 2008. A national policy to reduce the costs of ICT infrastructure for the health sector was implemented in 2003 and it will be reviewed and continued. Malawi indicates that cooperation with other sectors and nongovernmental partners to promote infrastructure development started in 2005 and will continue. Among other actions mentioned in this area are: the drafting and development of a rural telecommunications policy; a fibre optic cable backbone laid by the Electricity Supply Corporation of Malawi (ESCOM) and the Water Board; and cooperation with the common market for eastern and southern Africa (COMESA) and other regional bodies.

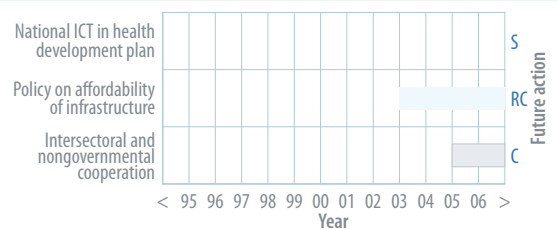
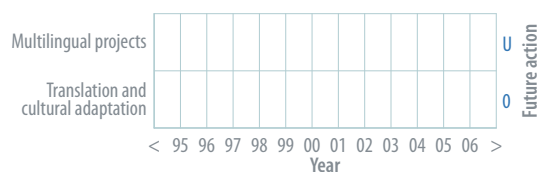


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

The installation of wireless connections to link all the district hospitals is the most effective action to build infrastructure for the health sector. The most significant challenge in this field is the currently inadequate capacity of the health sector.

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	12 339	OECD country	No	Main telephone lines*	0.75
	GDP per capita (Int \$)	492	World Bank category	4	Internet users*	0.37
	Total health expenditure (% of GDP)	9.3	ICT Diffusion Index	0.1866	Mobile phone subscribers*	1.8

Content – access to information and knowledge

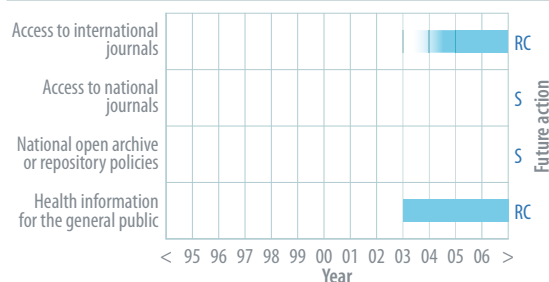


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals has been introduced. This service is rated as moderately effective and will be reviewed and continued. By 2008, Malawi intends to provide access to national electronic journals and to implement a strategy for a digital national open archive or repository for scientific research. Creating and providing electronic health information for the general public commenced in 2003 and is rated as moderately effective; this action will be reviewed and continued. The Malawi Socio-Economic Database (MASEDA) was established in 2001 and is rated as moderately effective and will be reviewed and continued over the next two years. The most effective action to promote access to electronic health content is web site development. Inadequate skills, infrastructure and publicity are mentioned as significant challenges.

Capacity – human resources knowledge and skills

Malawi reports that it has plans to introduce the listed actions for strengthening the ICT capacity in the health sector by 2008. Poor infrastructure is reported as the main challenge in this field.

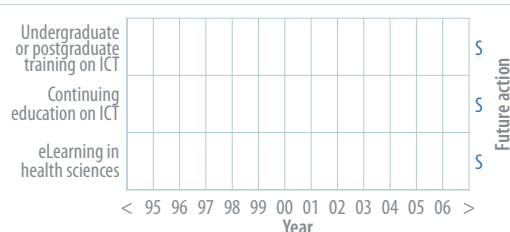


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

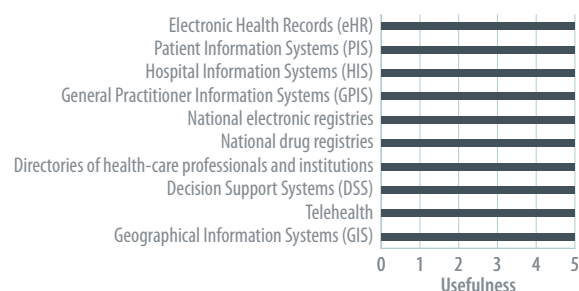


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Malawi. The specified eHealth services are rated as very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Mali

Enabling environment – policies and strategies to support the information society

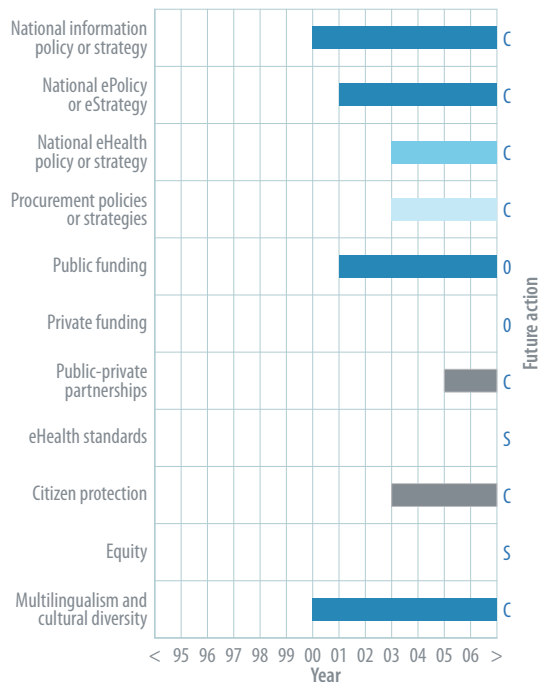


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Mali reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken between 2000 and 2005, and they are predicted to continue over the next two years. The national information policy, introduced in 2000, and the national ePolicy from 2001 are considered very effective. So are the actions to provide public funding and to promote availability of information in local languages, implemented in 2001 and in 2000, respectively. Norms and standards for eHealth systems, services or applications will be adopted by 2008 as will policies to promote inclusiveness and equitable access to eHealth. The most effective action in building an enabling environment for the use of ICT in the health sector is described as the introduction of a telemedicine centre, which has improved the quality and reduced the cost of treatment for cases that would otherwise have required evacuation or referral. Procurement procedures, availability of skilled staff and keeping up maintenance services are mentioned among the challenges.

Infrastructure – access to information and communication technologies

All of the specified actions to support the development of ICT infrastructure for the health sector were implemented between 2001 and 2002. They are rated as very effective and are predicted to continue over the next two years. Provision of computer equipment and the training of health staff have improved data collection and health statistics reporting (i.e. regular electronic transfer of data). Mali highlights as an important action the liberalization of the computer equipment market, which has brought down hardware and software prices. The most significant challenges are reported to be the scarcity of computer facilities and the unreliable supply of electricity in several districts.

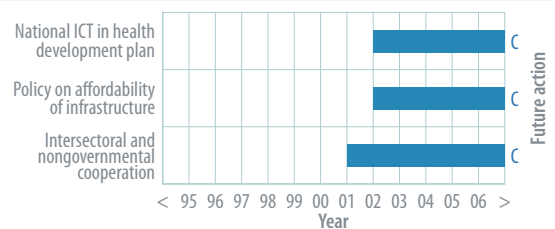


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

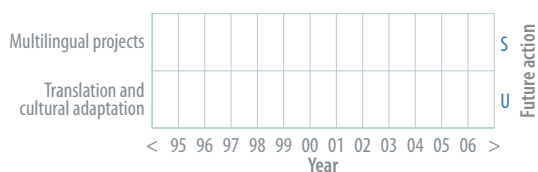
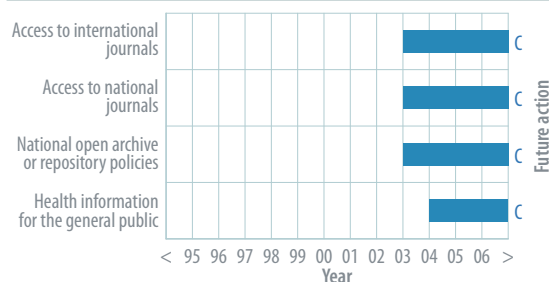


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects to promote the development and use of new electronic health content in multiple languages may be introduced in Mali by 2008. To date, a decision remains to be made as to whether the translation and cultural adaptation of existing high-quality content (created either locally or abroad) will be introduced in the next two years. Mali describes the functional literacy education for the general public and the preparation of health messages in several languages as other important actions in this field. The most significant challenge is reported to be the lack of ICT skills among health professionals and insufficient access to computers by the general public.

Country indicators	Population (000s)	12 736	OECD country	No	Main telephone lines*	0.68
	GDP per capita (Int \$)	809	World Bank category	4	Internet users*	0.45
	Total health expenditure (% of GDP)	4.8	ICT Diffusion Index	0.1404	Mobile phone subscribers*	3.6

Content – access to information and knowledge



All of the specified actions to promote access to electronic health content were taken by Mali between 2003 and 2004. They are reported as very effective and are likely to continue over the next two years. The web sites created by the Directorate of Pharmaceuticals and Drugs, and by several health programmes are considered among the most effective actions in this area. The most significant challenge is reported to be the maintenance and updating of these sites.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals have been offered since 2002. These programmes are rated as very effective and Mali predicts they will continue over the next two years. Health sciences courses through eLearning for health professionals in training and practice are likely to start by 2008. The most effective action in building ICT capacity in the health sector has been the training of physicians in the use of computers. The most significant challenge is reported to be the need for additional human resources to staff all the health districts.

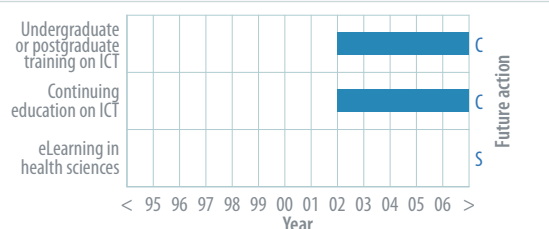


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

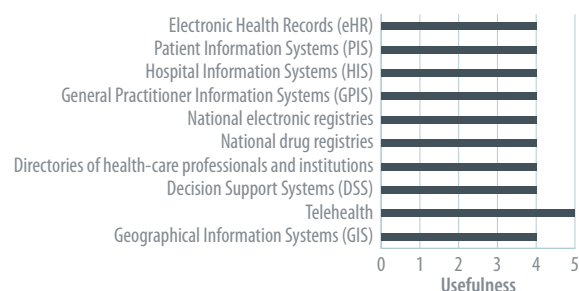


Figure 6. Preferred generic eHealth tools to be provided by WHO

Telehealth is rated as an extremely useful eHealth tool if the World Health Organization could offer this as a generic prototype for adaptation to Mali. The remainder of the listed eHealth tools are rated as very useful. A national health information system is reported as an additional eHealth tool that would be very useful. Advice on eLearning programmes is rated as an extremely useful eHealth service. The rest of the specified services are rated from moderately to very useful. Procurement advice, guidance on hardware installation and eHealth training are mentioned as additional services that would be very useful.



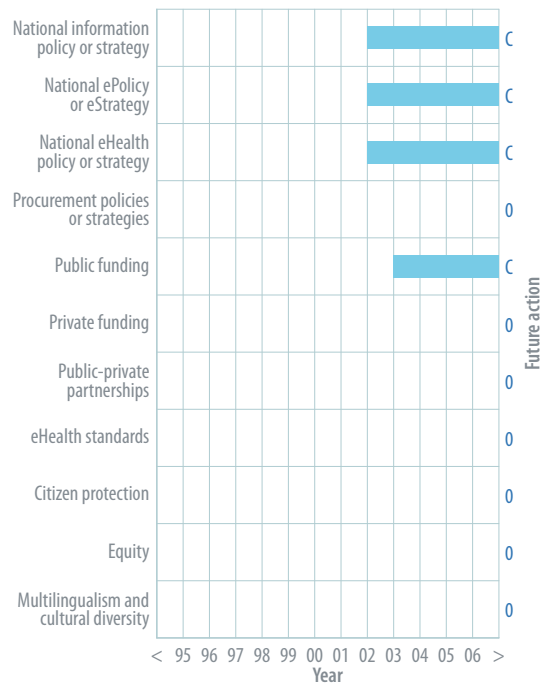
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Mauritania

Enabling environment – policies and strategies to support the information society



Mauritania reports that national mechanisms such as an information policy, an eStrategy and an eHealth policy were introduced in 2002 to promote the use of information and communication technologies (ICT) in the health sector. These actions are rated as moderately effective and will continue over the next two years. Public funding for ICT support to programmes addressing national health priorities has been provided since 2003. This action has been rated as moderately effective and will continue. The remainder of the listed actions have not been introduced at this stage. The National Telemedicine Network that connects all the major hospitals in Nouakchott and all regional hospitals is reported as the most effective initiative undertaken; there are plans to connect district centres as well. The project also includes a pilot programme to connect an isolated village in the desert. The most significant challenge is motivating health professionals to learn and apply eHealth technology. For the Telemedicine project the challenges are lack of training, resources and support for the newly installed network.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Currently, none of the specified actions to support ICT infrastructure development for the health sector have been implemented. The network for the Telemedicine project, mentioned in the section above, is referred to as an effective initiative in developing infrastructure.

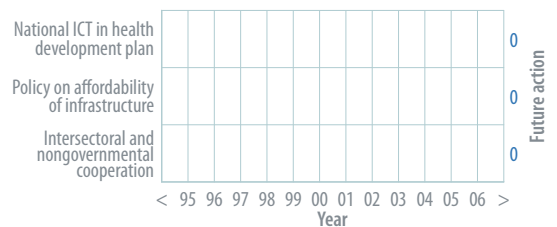
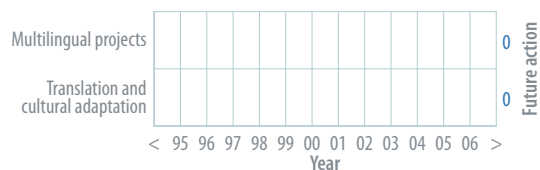


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	2 893	OECD country	No	Main telephone lines*	1.31
	GDP per capita (Int \$)	1 427	World Bank category	4	Internet users*	0.47
	Total health expenditure (% of GDP)	4.2	ICT Diffusion Index	0.1562	Mobile phone subscribers*	17.53

Content – access to information and knowledge

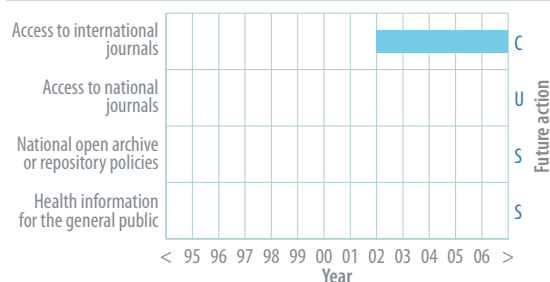


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals was introduced in 2002. This service is rated as moderately effective and will continue. To date, there is no plan to provide access to national electronic journals. A policy for a digital national open archive for scientific research will be implemented by 2008 as will creating and providing health information for the general public in electronic format. Mauritania highlights the plans by the National Institute for Research in Public Health Sciences (INRSP) to start a project for disease monitoring throughout the country. Mapping of discovered diseases through Geographical Information Systems (GIS) will be provided by a central server and the online database will be updated with data from across the country. The most effective actions to promote access to electronic health content are reported to be the

Health InterNetwork Access to Research Initiative (HINARI) project and the National Telemedicine Network. The most significant challenge in this field is the lack of local web sites with adequate information on health.

Capacity – human resources knowledge and skills

Health sciences courses through eLearning for health professionals in training and practice have been offered since 2004 and are reported to be moderately effective and will continue. The National Telemedicine Network has enabled access to online courses for students at the National Institute of Medical Specialties (NSM) and is described as most effective in building ICT capacity in the health sector. Lack of computer training and awareness of online courses and their benefits are mentioned as significant challenges.

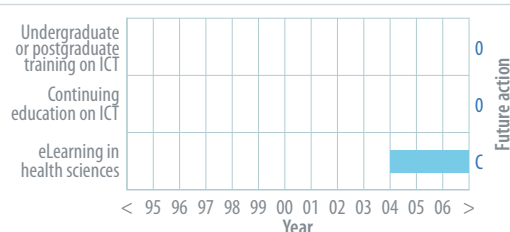


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

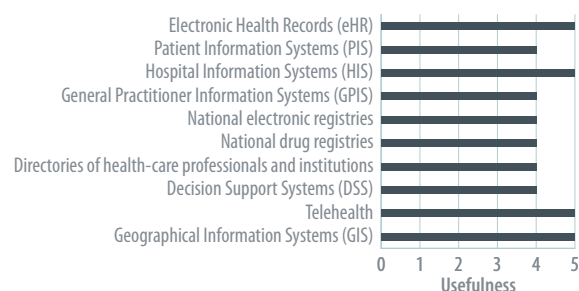


Figure 6. Preferred generic eHealth tools to be provided by WHO

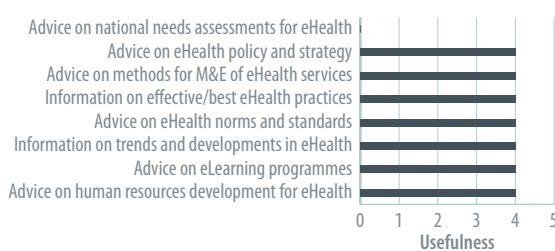


Figure 7. Preferred eHealth services to be provided by WHO

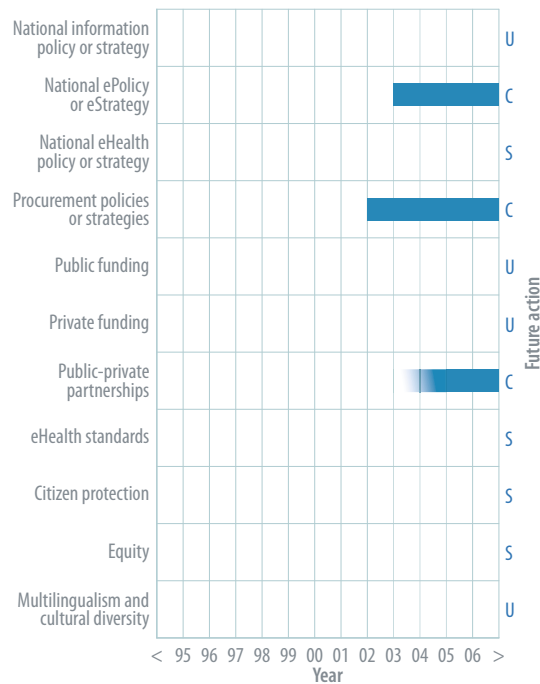
All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. The majority of the specified eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Mozambique

Enabling environment – policies and strategies to support the information society



Mozambique reports that a national ePolicy to promote the use of information and communication technologies (ICT) across all sectors was implemented in 2003. This initiative has been very effective, as has the implementation of procurement policies to guide software, hardware and content acquisition, introduced in 2002. Public-private partnerships to foster the use of ICT within the health sector are also considered very effective in Mozambique. All these actions are likely to continue. By 2008, Mozambique plans to introduce a national eHealth policy; norms and standards for eHealth systems, services or applications; regulations to protect the privacy and security of individual patient data where eHealth is used; and policies to promote inclusiveness and equitable access to eHealth. Currently, no decision has been made as to which of the remaining listed actions will be taken in the next two years. The health procurement policy and standards for the purchase of equipment are highlighted as an important action in this field. A need is expressed for increased capacity, including staff, to be able to develop appropriate policies, strategies and norms for the application of ICT in the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Intersectoral and nongovernmental cooperation was initiated in 2000 to promote infrastructure development. This is rated as slightly effective and will be reviewed and continued in the next two years. At this stage, no decision has been made as to whether the remaining listed actions will be introduced by 2008. Import tax on hardware and software was reduced to 7.5% following a decree in 2001, which was enacted to encourage increased purchase of these products. Other important projects are described as the implementation of the Ministry of Health's network in four provincial health directorates, and in three central and two provincial hospitals; the Ministry of Health's web site (<http://www.misau.gov.mz>); and the connection of the Ministry of Health to the government's network, which enables sharing of online resources and provides access to Internet and e-mail without cost. The operation, management and maintenance of these networks and improvement in communications are considered significant challenges in the provision of access.

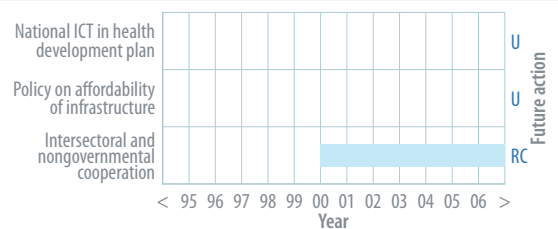
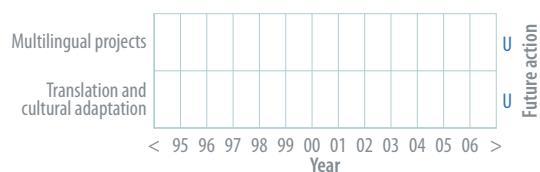


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and no decision has been made as to which actions will be taken in the next two years. However, Mozambique highlights the eGov strategy that is being formulated and will include the development of content into local languages.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	19 052	OECD country	No	Main telephone lines*	0.42 [03]
	GDP per capita (Int \$)	957	World Bank category	4	Internet users*	0.73
	Total health expenditure (% of GDP)	4.7	ICT Diffusion Index	...	Mobile phone subscribers*	3.73

Content – access to information and knowledge

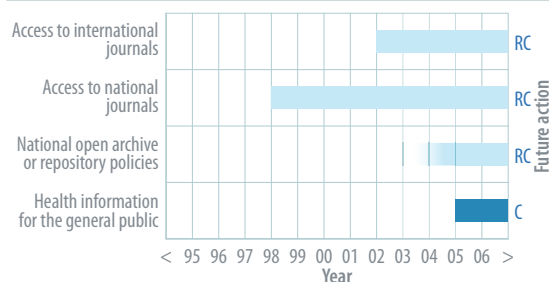


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1998 and 2002, respectively. A policy for a digital national open archive for scientific research in Mozambique has also been implemented. These services are considered slightly effective and will be reviewed and continued. Creating and providing health information for the general public in electronic format commenced in 2005, and is rated as very effective and likely to continue. In 2000 the implementation of Internet access points in schools and communities began. The creation of an Intranet at the Ministry of Health, and the introduction of telemedicine (radiology) are scheduled for 2007. The government's electronic network is considered an important project to promote access to electronic health content

among public servants, and e-mail communication between citizens and public servants. Expansion of access points, and regular and continuous development and dissemination of web-based health content are areas that need increased attention.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1998 and ICT skills programmes in the ongoing training of health-care professionals since 1995. These are rated as moderately effective, and are likely to be reviewed and continued in the next two years. A decision remains to be made as to when health sciences courses through eLearning for health professionals will be introduced. The development and implementation of professional careers for ICT staff and standardization of ICT training content and certificates are among the most significant challenges mentioned to build ICT capacity in the health sector.

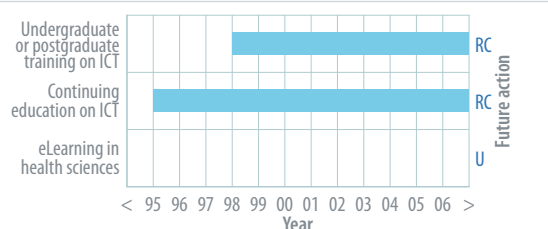


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

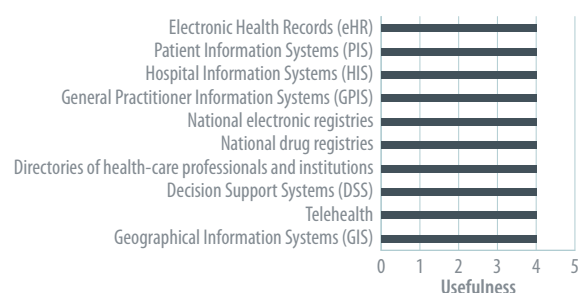


Figure 6. Preferred generic eHealth tools to be provided by WHO

All of the listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation to Mozambique. A health information system is an additional tool that would be very useful. The adaptation of a General Practitioner Information Systems (GPIS) to include traditional healers and providers of alternative medicine is desired as well. All of the specified eHealth services are rated as extremely useful.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Niger

Enabling environment – policies and strategies to support the information society

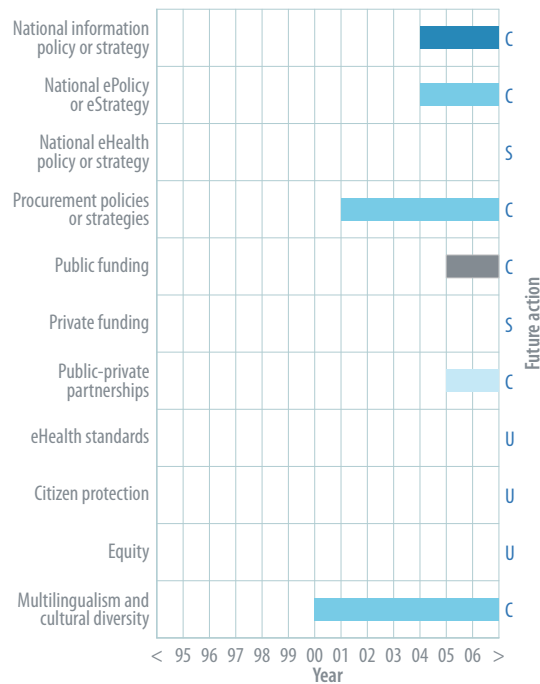


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Niger reports that half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector were adopted between 2000 and 2005. They are likely to continue over the next two years. The national information policy, introduced in 2004, is considered very effective. There are plans to introduce a national eHealth policy to promote the use of ICT across all sectors and private funding for ICT support of programmes addressing national health priorities by 2008. A decision remains to be made whether norms and standards for eHealth systems, regulations to protect the privacy and security of individual patient data where eHealth is used, and inclusiveness and equitable access to eHealth will be adopted in the next two years. The National Plan for Development of Information and Communication Technologies (the NICI Plan), drafted in 2003, is the most effective action in building an enabling environment for the use of ICT in the health sector so far.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was introduced in 2003. A national policy to reduce the costs of ICT infrastructure for the health sector has been successfully implemented, and intersectoral and nongovernmental cooperation to promote infrastructure development commenced in 2003. All of these actions will continue over the next two years. Important initiatives in this area are described to be the introduction of telemedicine and the use of ICT to raise awareness of health issues such as HIV/AIDS, malaria as well as the impact of smoking on health. The lack of funding is posing major constraints in building ICT infrastructure for the health sector.

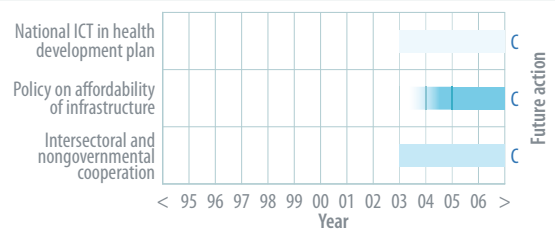


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

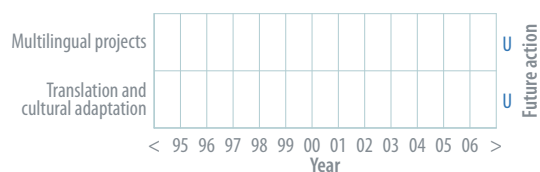
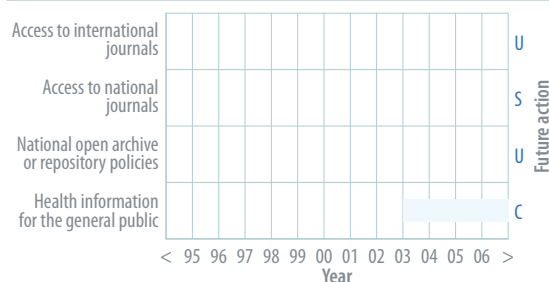


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken over the next two years.

Country indicators	Population (000s)	13 052	OECD country	No	Main telephone lines*	0.19
	GDP per capita (Int \$)	644	World Bank category	4	Internet users*	0.19
	Total health expenditure (% of GDP)	4.7	ICT Diffusion Index	0.1176	Mobile phone subscribers*	1.19

Content – access to information and knowledge



There are plans to provide access to national electronic journals by 2008. Creating and providing health information for the general public in electronic format commenced in 2003. This action has been rated as not useful so far. It will, however, be reviewed and continued. To date, no decision has been made as to whether access to international journals will be provided. Inadequate funding for projects to promote access to electronic health content is considered a significant challenge.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Niger offers ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals. These educational programmes are rated as moderately effective and are predicted to continue over the next two years. A decision has yet to be made as to whether eLearning in health sciences will be introduced. The high cost of ICT is considered a major obstacle in building ICT capacity in the health sector.

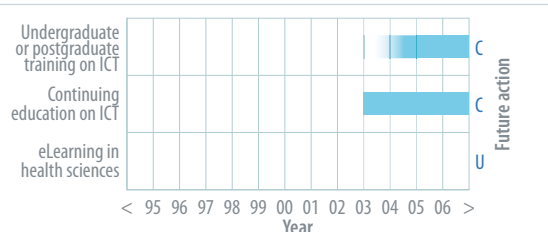


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

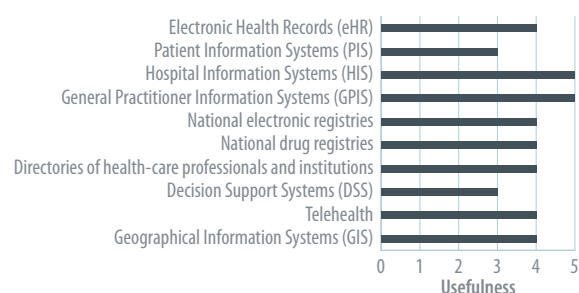


Figure 6. Preferred generic eHealth tools to be provided by WHO

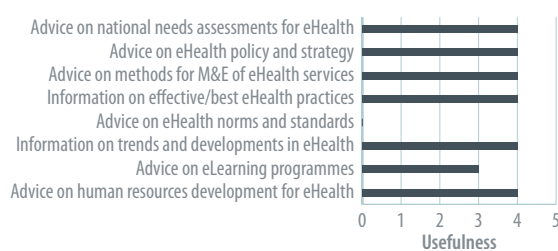


Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Niger. Most of the specified eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Nigeria

Enabling environment – policies and strategies to support the information society

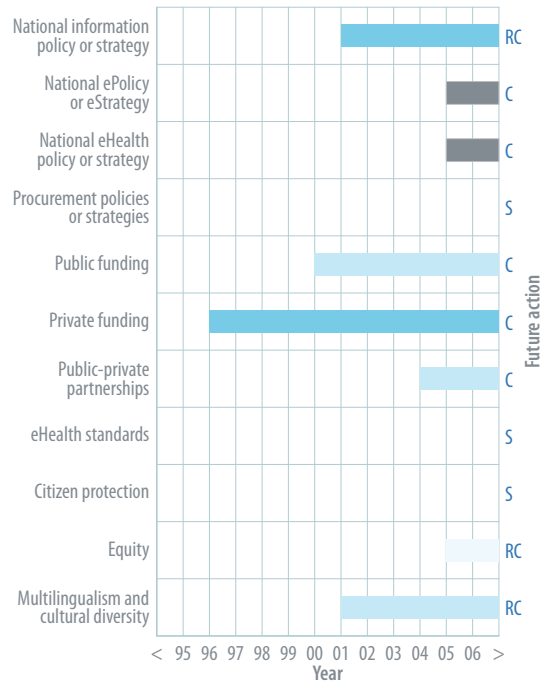


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Nigeria reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken between 2000 and 2005, and are likely to continue. The implementation of procurement policies or strategies to guide software, hardware and content acquisition is planned to start by 2008. Norms and standards for eHealth systems, services or applications will also be adopted in the next two years. Regulations to protect the privacy and security of individual patient data where eHealth is used will be enacted by 2008 as well. Nigeria highlights a psychiatric patient information system developed in some of the country's tertiary health institutions as another important initiative in the introduction of electronic patient management systems. The following are described as the most effective projects in building an enabling environment for the use of ICT in the health sector: a health sector reform programme, which addresses the need to deploy ICT in the health sector; the free flow of ICT hardware and software into the country; and the government's promotion of locally-developed hardware and software, as well as the local assembly of computers. Policy, technical issues, human resources and funding are mentioned as challenges, which are being addressed where possible by government initiatives.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was implemented in 2005 and is expected to continue over the next two years. Intersectoral and nongovernmental cooperation started in 2001, is considered moderately effective and will continue. The implementation of a national policy to reduce the costs of ICT infrastructure for the health sector is likely to start by 2008. Among other actions Nigeria mentions the National Universities Commission currently working on a National Virtual Library project in 11 universities. The Education Tax Fund has provided funding to some of the country's universities/colleges of medicine for Internet connectivity and other eHealth training activities. The launch of eHealth as part of eGovernment is described as an integral component in building ICT infrastructure for the health sector. However, other political priorities, insufficient funding and inadequate technical support pose significant challenges in this area.

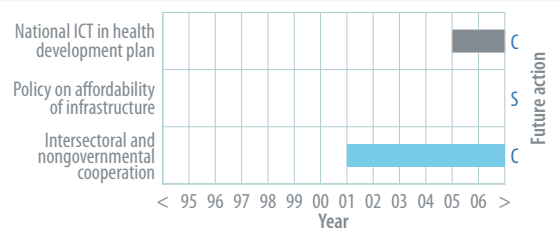


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

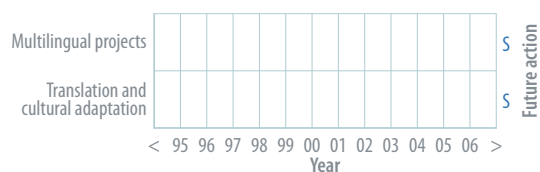


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Nigeria plans to implement the listed actions to promote the development of electronic multicultural health content by 2008.

Country indicators	Population (000s)	125 912	OECD country	No	Main telephone lines*	0.81
	GDP per capita (Int \$)	1 011	World Bank category	4	Internet users*	1.39
	Total health expenditure (% of GDP)	5	ICT Diffusion Index	0.1136	Mobile phone subscribers*	7.2

Content – access to information and knowledge

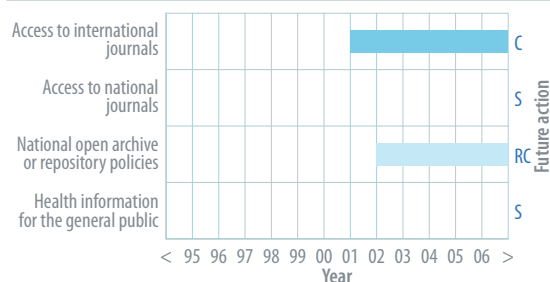


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals was introduced in 2001. This service has been moderately effective and may continue over the next two years. A policy for a digital national open archive for scientific research was implemented in 2002. Reported to have been slightly effective, this policy will be reviewed and continued. Access to national electronic journals and creating and providing health information for the general public in electronic format are services likely to commence by 2008. The most important projects to promote access to electronic health content are reported to be the establishment of an ICT Committee for Health and the development of an ICT work plan for the Federal Ministry of Health. However, infrastructure at all levels of health care delivery needs to be developed further and at this stage poses a significant challenge.

The government is encouraging public-private partnerships to promote access to electronic health content in an attempt to overcome the obstacle of lack of funds.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1996. This educational programme is rated as slightly effective and will be reviewed and continued. The introduction of ICT skills programmes in the ongoing training of health-care professionals, and health sciences courses through eLearning for health professionals (in training and practice) will begin by 2008.

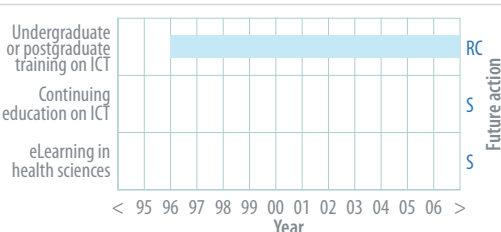


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

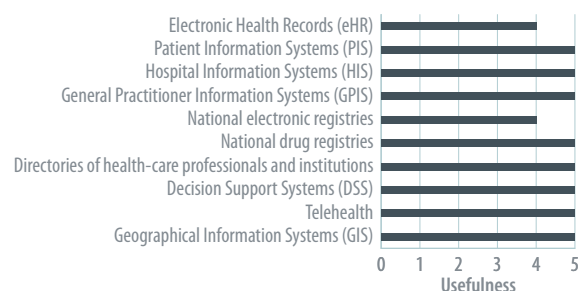


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Nigeria. The specified eHealth services are also considered very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Seychelles

Enabling environment – policies and strategies to support the information society

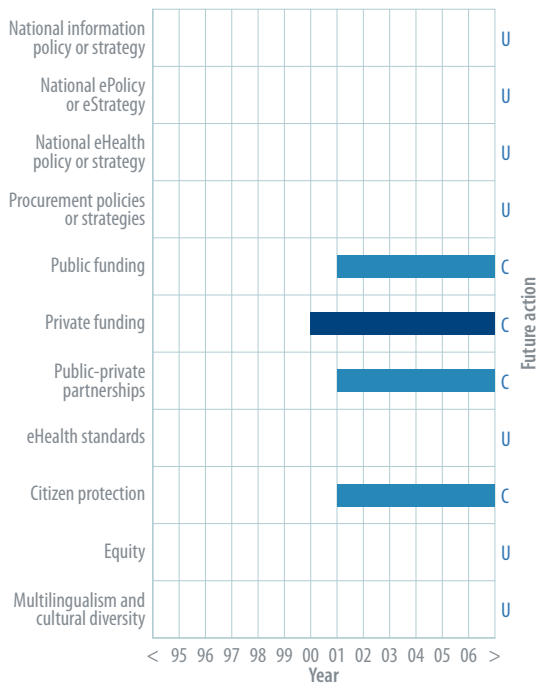


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Seychelles reports that private funding for information and communication technologies (ICT) support to programmes addressing national health priorities has been provided since 2000 and is considered extremely effective. The following policies to promote an enabling environment for ICT in the health sector were very successfully implemented in 2001: public funding for ICT support to programmes addressing national health priorities; forming public-private partnerships to foster the use of ICT within the health sector; and standards, regulations or legislation to protect the privacy and security of individual patient data where eHealth is used. These actions are rated as very effective and are likely to continue. The development of electronically published information in local languages is highlighted. However, there is an absence of policies that promote the availability of this kind of material. The establishment of an Intranet network for the Ministry of Health, comprising 200 users, is described as one of the most effective actions in this field. The network provides access to an online communication system and there are plans to link all 17 health centres (the entire ministry) in the future, which would allow for the continual updating of information. Once established, a telemedicine programme could start. The most significant challenge is described as being the training of staff. To remedy this, a routine has been established to assess ICT competence of health staff in order to provide appropriate training.

Infrastructure – access to information and communication technologies

Working with nongovernmental partners and others to promote infrastructure development began in 2000. This is seen as an extremely effective action and will continue. A national plan for the development of ICT in health is expected by 2008. The previously mentioned Intranet network in the Ministry of Health is an effective action. The establishment of an in-house training centre and the purchase of required hardware to support the network are described as the most effective actions. The most significant challenge is reported to be insufficient funds for building infrastructure.

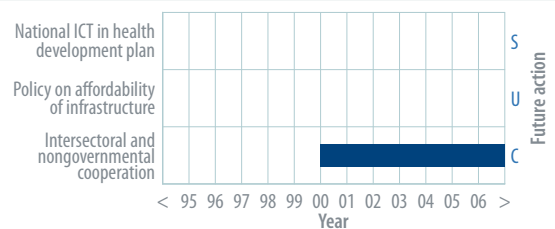


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

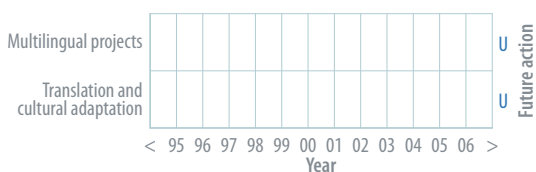


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been taken and a decision remains to be made as to which actions will be introduced.

Country indicators	Population (000s)	79	OECD country	No	Main telephone lines*	26.16
	GDP per capita (Int \$)	10 204	World Bank category	2	Internet users*	24.69
	Total health expenditure (% of GDP)	5.9	ICT Diffusion Index	...	Mobile phone subscribers*	60.78

Content – access to information and knowledge

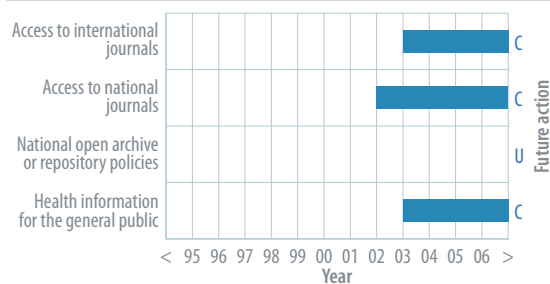


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to national and international electronic journals was introduced in 2002 and 2003, respectively. This service has been very effective and will continue. Creating and providing health information for the general public in electronic format commenced in 2003 and is also rated as very effective. The Ministry of Health provides electronic health information by e-mail. The material is available to all Intranet users and by request from non-staff. This service commenced in 2002 and is considered extremely effective. The most effective action in this area is the network already described. The most significant challenge is raising awareness of the electronic health content available.

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health professionals were introduced in 2003. This is considered an extremely effective action and is expected to continue. The in-house training centre which was set up prior to the process of computerization is described as the most effective action. Of approximately 2000 staff in the Ministry of Health more than 200 have now been trained and awarded certificates. The National Institute for Health has included ICT training as a module in all their courses. Motivating and encouraging staff to follow training is reported as the most significant challenge.

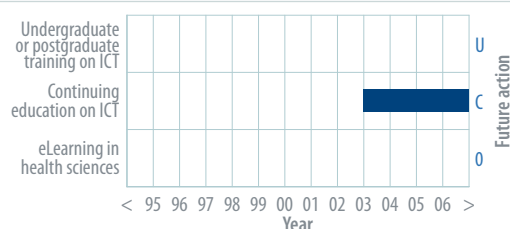


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

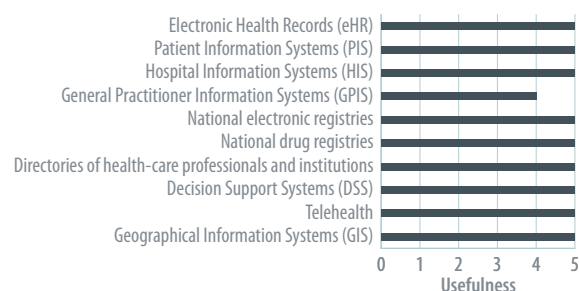


Figure 6. Preferred generic eHealth tools to be provided by WHO

All of the listed eHealth tools are rated as extremely useful, with the exception of General Practitioner Information Systems (GPIS), which is rated as very useful, if the World Health Organization could offer these as generic prototypes for adaptation. Of the listed eHealth services, the majority are considered very useful.

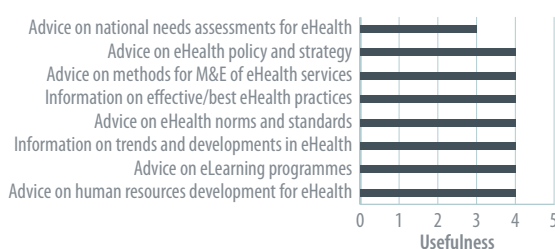


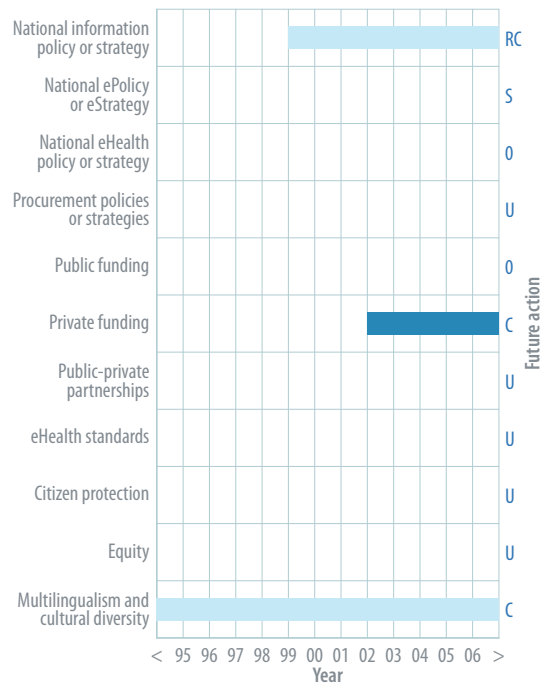
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Sierra Leone

Enabling environment – policies and strategies to support the information society



Sierra Leone reports that a national information policy to promote an information society was implemented in 1999 and is rated as slightly effective and will be reviewed and continued. Private funding for support of information and communication technologies (ICT) for programmes addressing national health priorities has been provided since 2002 and is rated as very effective. Recognition of cultural diversity through the provision of information in local languages has been ongoing since 1990 and is considered slightly effective. Both these actions are expected to continue over the coming two years. There are plans to introduce a national ePolicy by 2008. A decision remains to be made as to which of the remaining listed actions will be taken in the next two years. Availability of Internet service providers and access to Internet facilities countrywide are significant challenges. With the relaxation of the laws that govern Internet service provision, solutions to these problems are now being developed. Additionally, a health project funded jointly by the government of Sierra Leone and the African Development Bank (ADB), and executed by the World Health Organization (WHO), calls for the recruitment of an ICT expert to implement ICT in health projects and this is expected to significantly strengthen ICT in the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health and intersectoral and nongovernmental cooperation, are two initiatives expected to commence by 2008. The absence of a national policy to build infrastructure for the health sector is the most significant challenge thus far in this area.

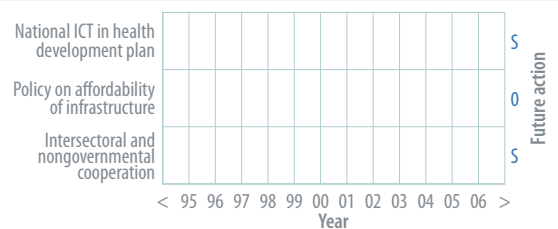
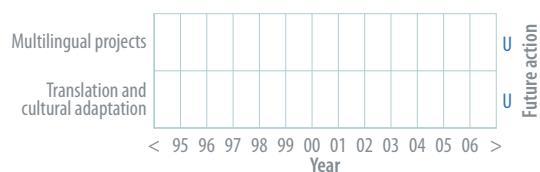


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

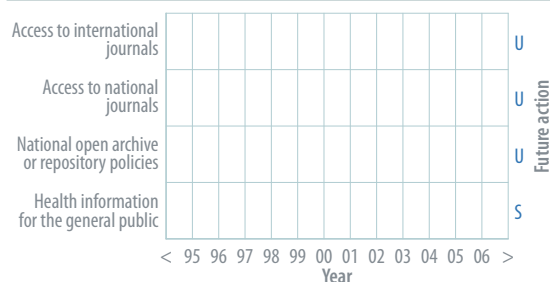


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken in the next two years.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	5 119	OECD country	No	Main telephone lines*	0.48 [02]
	GDP per capita (Int \$)	975	World Bank category	4	Internet users*	0.19
	Total health expenditure (% of GDP)	3.5	ICT Diffusion Index	0.2457	Mobile phone subscribers*	2.28

Content – access to information and knowledge



Creating and providing health information for the general public in electronic format is expected to commence by 2008. A decision remains to be made as to which of the remaining listed services will be introduced. Legislation in this field and the need for a web site with eHealth content are reported as the most significant challenges to promote access to electronic health content.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered in Sierra Leone since 2003 and are rated as very effective. ICT skills programmes in the ongoing training of health-care professionals have been provided since 1996 and are rated as slightly effective. Both these actions are likely to be reviewed and continued. Health sciences courses through eLearning for health professionals in training and practice are likely to be introduced by 2008. The ADB-funded WHO project, mentioned above, is described as an effective action in building ICT capacity in the health sector.

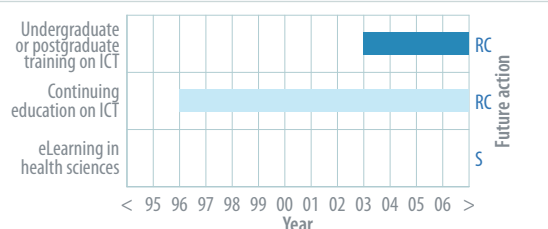


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

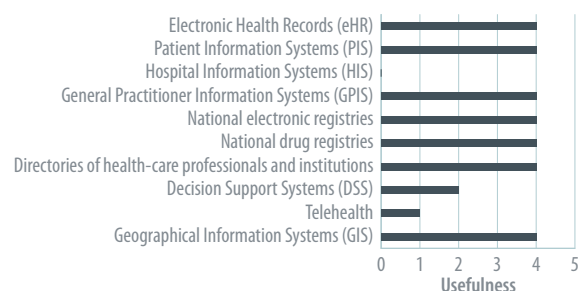


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

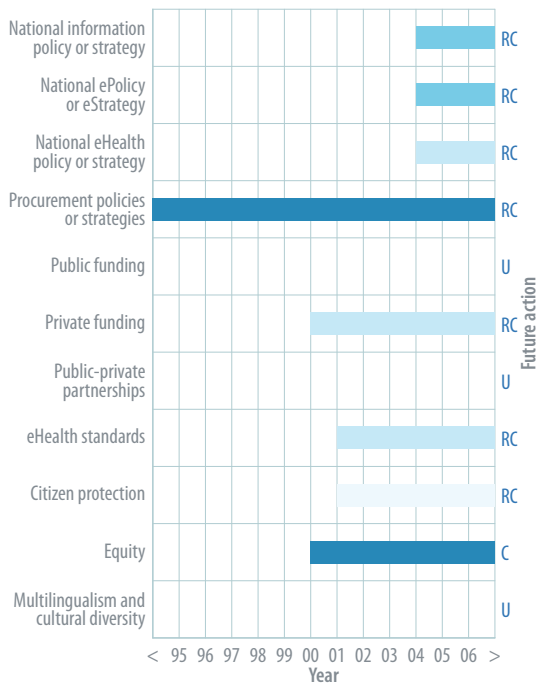
The majority of the listed eHealth tools are rated as very useful if WHO could offer these as generic prototypes for adaptation to Sierra Leone. Advice on human resources development for eHealth is rated as an extremely useful service and the remainder of the specified eHealth services are rated as very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Swaziland

Enabling environment – policies and strategies to support the information society



Swaziland reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They are rated from slightly to very effective and will be reviewed and are likely to be continued over the next two years. Currently, no decision has been made as to which of the remaining listed actions will be introduced by 2008. An important mechanism described is the government initiative to formulate a national ICT policy with the objectives of facilitating the development and implementation of the necessary legal, institutional and regulatory framework and structures to support the development of ICT across sectors. Additionally, the creation of an enabling environment for the cooperation and development of partnerships between the public and private sectors and at national, regional and international levels is also vital. A survey on 'e-readiness' was conducted across all government departments to provide baseline data on the current needs that eHealth programmes would need to address. The existing 'digital divide', infrastructure, policy, legislation and financial constraints are reported as significant challenges in building ICT infrastructure for the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health and a national policy to reduce the costs of ICT infrastructure for the health sector will be implemented by 2008. Intersectoral and nongovernmental cooperation to promote infrastructure development, introduced in 2000, has been rated as moderately effective and will continue. The most effective action is described to be the collaboration with development partners to overcome financial constraints.

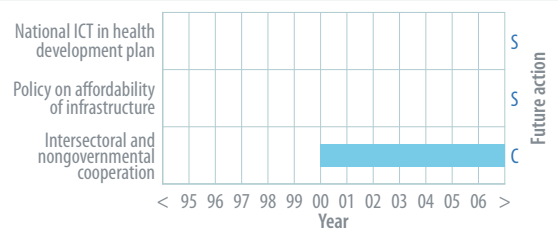
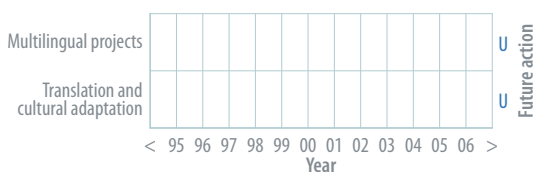


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and no decision has been made as to which actions will be taken over the next two years.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	1 035	OECD country	No	Main telephone lines*	4.43 [03]
	GDP per capita (Int \$)	5 578	World Bank category	3	Internet users*	3.32
	Total health expenditure (% of GDP)	5.8	ICT Diffusion Index	0.2424	Mobile phone subscribers*	10.43

Content – access to information and knowledge

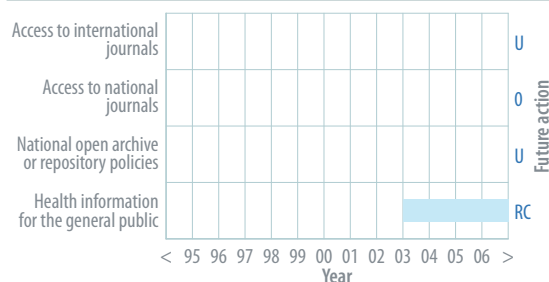


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Creating and providing health information for the general public in electronic format commenced in 2003. It is rated as slightly effective and is likely to be reviewed and continued. There are no plans as yet to provide access to international electronic journals or to implement a policy for a national open archive for scientific research, by 2008. The establishment of the government web site, which has enhanced accessibility to electronic health information for the general public, and the National Emergency Response Council's support of online information on HIV/AIDS are described as important initiatives to promote access to electronic health content. The challenge of maintaining and updating online eHealth information has been met by appointing focal points for these tasks.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students, rated as very effective, have been offered since 2000. ICT skills programmes in the ongoing training of health-care professionals were introduced the same year. Health sciences courses through eLearning for health professionals were introduced in 2002. These programmes are planned to continue over the next two years. Swaziland highlights an eLearning project that has been initiated together with South African institutions for higher learning as being a major step in this direction. An in-service training unit to pursue continuing education for health professionals is described as a very important action. However, lack of financial resources to sustain the project is reported as a significant challenge.

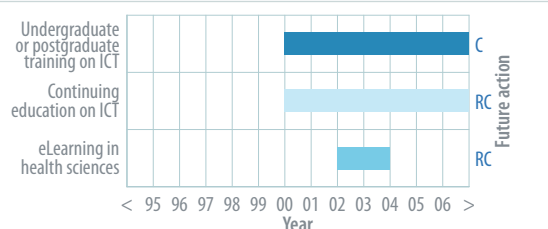


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

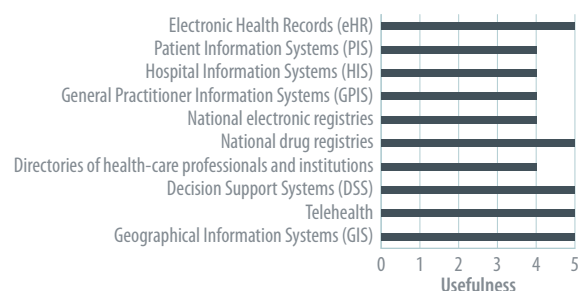


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

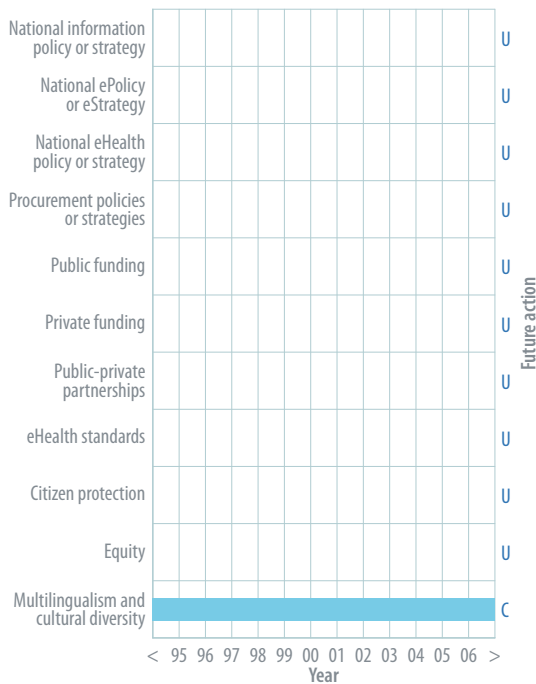
All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Swaziland. The majority of the specified eHealth services are also considered very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Togo

Enabling environment – policies and strategies to support the information society



Togo reports that it has recognized cultural diversity through the provision of information in local languages since 1982. These actions have been moderately effective and will continue over the next two years. To date, none of the remaining listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented, and a decision remains to be made as to which actions will be taken by 2008.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Intersectoral and nongovernmental cooperation to promote infrastructure development has been implemented in Togo and is rated as moderately effective. The country predicts it will continue. A decision remains to be made as to which of the remaining listed actions will be introduced in the next two years.

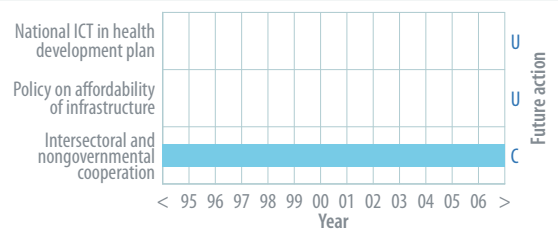
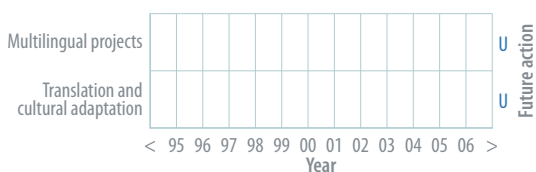


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

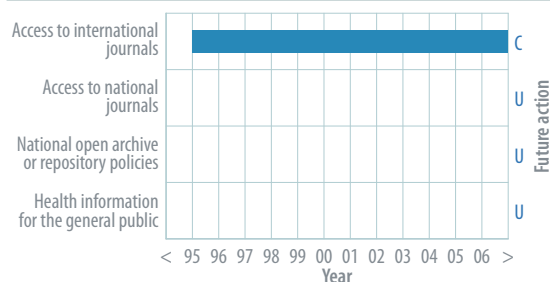


Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and no decision has been made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	5 836	OECD country	No	Main telephone lines*	1.21 [03]
	GDP per capita (Int \$)	1 107	World Bank category	4	Internet users*	4.41
	Total health expenditure (% of GDP)	5.6	ICT Diffusion Index	0.1888	Mobile phone subscribers*	4.4

Content – access to information and knowledge



Access to international electronic journals for health professionals was introduced in 1995. This service has been very effective and will continue. A decision has yet to be made as to which of the remaining listed actions to promote access to electronic health content will be taken over the next two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

At this stage, none of the listed educational programmes to build ICT capacity in the health sector have been implemented and no decision has been made as to which actions will be taken.

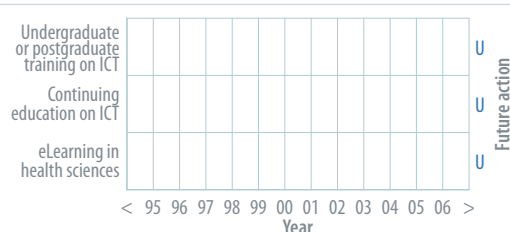


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

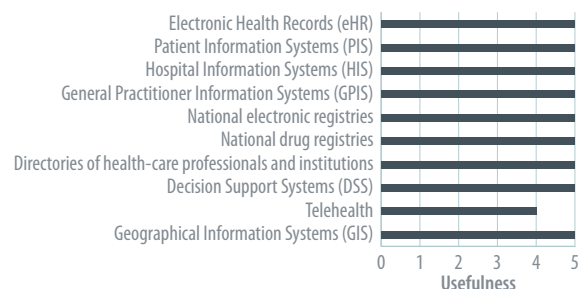


Figure 6. Preferred generic eHealth tools to be provided by WHO

All except one of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Togo. Telehealth is rated as a very useful tool. All of the specified eHealth services are considered extremely useful.



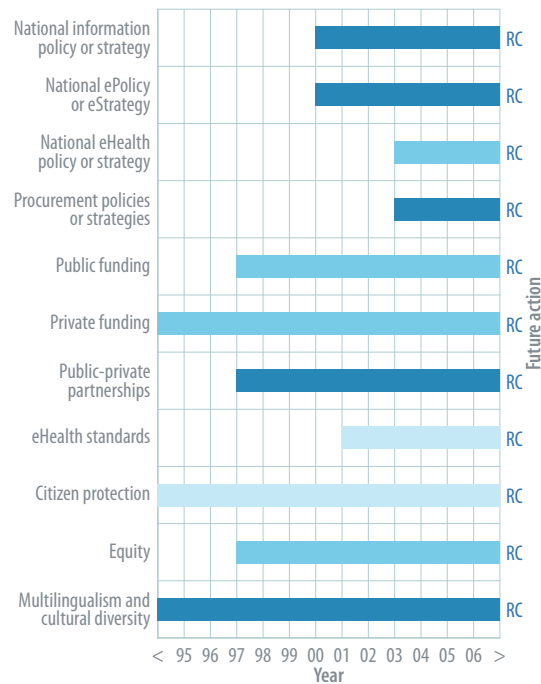
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Uganda

Enabling environment – policies and strategies to support the information society



Uganda reports that all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken, and are likely to be reviewed and continued over the next two years. The country has implemented an eGovernment strategy, which analyses various sectors from an ICT perspective. The most effective action is described as the adoption of ICT policies at the national level as well as within the health sector to ensure harmonization and coordination of initiatives for the use of ICT in health care delivery. Inadequate human and material resources, and slow administrative processes are reported as the most significant challenges.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2005. A national policy to reduce the costs of ICT infrastructure for the health sector was implemented in 2002, and intersectoral and nongovernmental collaboration to promote infrastructure development in 2001. Both are rated as very effective. All these actions are likely to be reviewed and continued in the next two years. The Universal Access Fund is noted as an important initiative that provides increased rural connectivity through access facilities such as pay phones, telephone centres and Internet access points. The target is to have all health centres connected with reasonable (i.e. 128 kbps) bandwidth by 2010. Public-private partnerships are described as the most effective action to build a national infrastructure backbone.

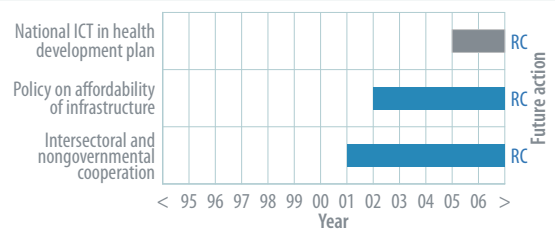


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

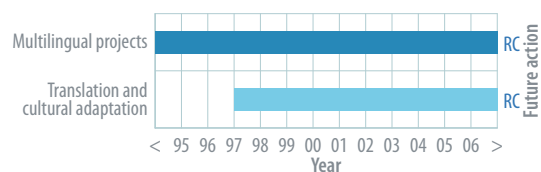


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Both listed actions to promote the development of electronic multicultural health content have been successfully implemented in Uganda and are likely to be reviewed and continued by 2008. Launched in 1988, the dissemination of health-related messages through drama groups (e.g. in the area of HIV/AIDS) has proven to be a very effective initiative. The multitude of languages in Uganda poses a challenge in this field. The government is addressing this by involving various stakeholders in the effort to translate health content into multiple languages.

Country indicators	Population (000s)	26 869	OECD country	No	Main telephone lines*	0.27
	GDP per capita (Int \$)	1 027	World Bank category	4	Internet users*	0.75
	Total health expenditure (% of GDP)	7.3	ICT Diffusion Index	0.1546	Mobile phone subscribers*	4.36

Content – access to information and knowledge

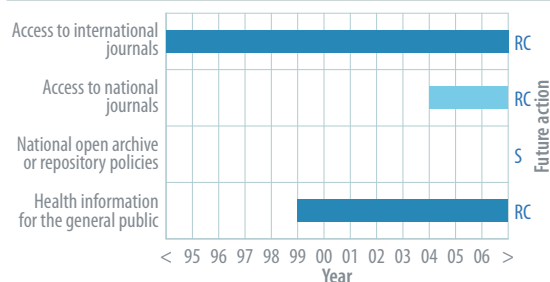


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have access to online health content through international and national electronic journals. The former is rated as very effective, and the latter moderately so. Provision of locally created health information for the general public commenced in 1999 and is considered very effective. These actions are likely to be reviewed and continued. A decision remains to be made as to whether a digital national open archive for scientific research (published within the country) will be introduced by 2008. Uganda notes the production of electronic and print media as important initiatives in this area. The liberalization of the country's radio air space is highlighted as the most effective action. Radio programmes have a great impact in the country because they reach a wide audience; the majority of households have

a radio. The main challenges in this field include widespread low literacy levels, and a lack of culturally diverse programming (first and foremost provision of information in multiple languages). The contribution of key players in the development of health content is vital in addressing these challenges.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1983 and ICT skills programmes in the ongoing training of health-care professionals since 1987. These programmes are rated as very and moderately effective, respectively, and are likely to be reviewed and continued. In 1995 Uganda introduced health sciences courses through eLearning for health professionals (in training and practice), an action considered moderately effective and expected to continue over the next two years. In-service training is considered very effective. This has greatly facilitated the transfer to ICT-based work skills and routines among health professionals.

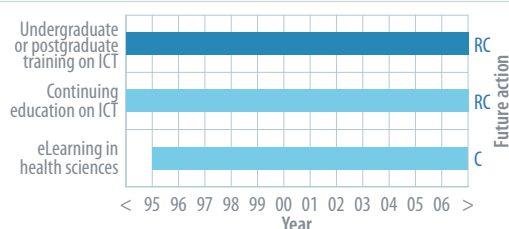


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

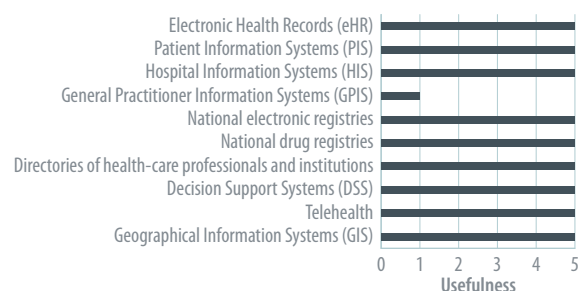


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

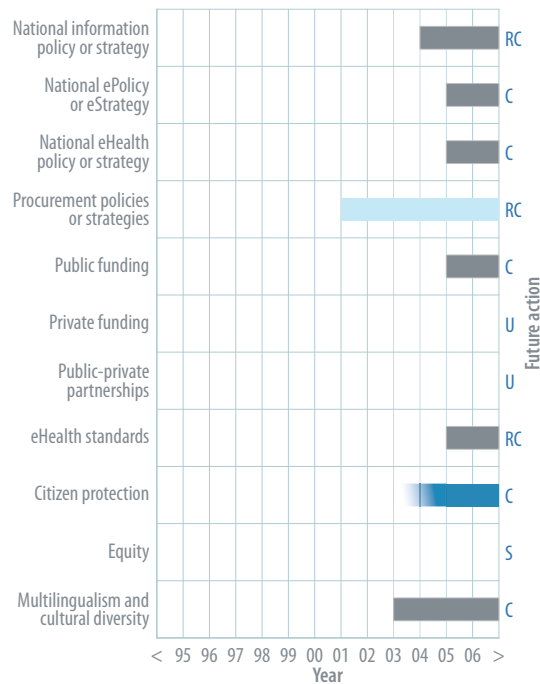
The majority of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Uganda. Most of the listed eHealth services are also considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

United Republic of Tanzania

Enabling environment – policies and strategies to support the information society



The United Republic of Tanzania reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector were introduced between 2001 and 2005, and they are expected to continue over the next two years. The implementation of regulations to protect the privacy and security of individual patient data where eHealth is used has been very effective and is likely to continue. There are plans to implement by 2008, policies to promote inclusiveness and equitable access to eHealth (i.e. access irrespective of culture, education, language, geographical location, physical and mental ability, age and gender). The launch in 2005 of the Ministry of Health's web site is highlighted as an important initiative. Lack of funding and skilled staff are significant challenges in building an enabling environment for the use of ICT in the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health is expected in the next two years. A national policy to reduce the costs of ICT infrastructure for the health sector, and intersectoral and nongovernmental cooperation to promote infrastructure development were both introduced in 2005, and will continue. The provision of computers to health facilities is mentioned as an important action in building infrastructure. Poor supply of electricity in some areas, lack of Internet service providers and inadequate telephone connections are described as significant challenges in this field.

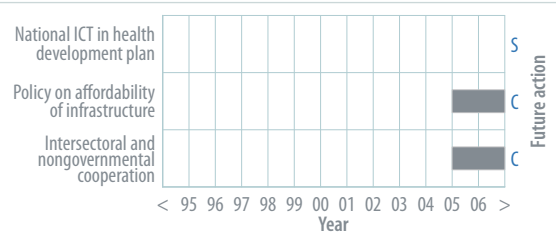
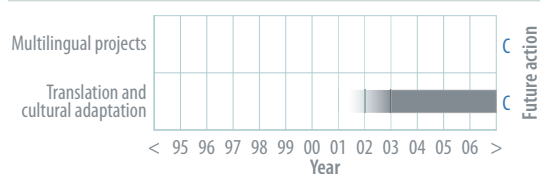


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

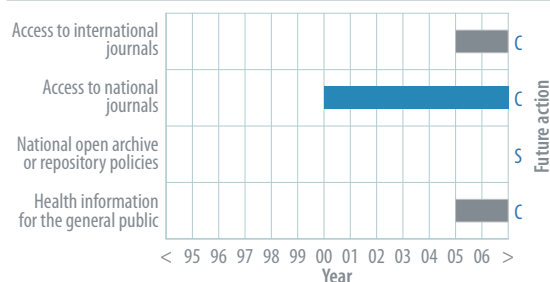


The development of electronic multicultural health content is promoted through the support of translation and cultural adaptation. The United Republic of Tanzania expects that this will continue over the next two years.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	36 919	OECD country	No	Main telephone lines*	0.42 [03]
	GDP per capita (Int \$)	676	World Bank category	4	Internet users*	0.88
	Total health expenditure (% of GDP)	4.3	ICT Diffusion Index	0.1886	Mobile phone subscribers*	4.35

Content – access to information and knowledge



Health professionals have had access to online health content through national and international electronic journals since 2000 and 2005, respectively. Creating and providing health information for the general public in electronic format commenced in 2005. These services are expected to continue over the next two years. There are plans to implement a policy for a digital national open archive for scientific research published in the country, by 2008. The provision of computers at the district level is highlighted as an important initiative to promote access to electronic health content.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students (undergraduate and postgraduate) and ICT skills programmes in the ongoing training of health-care professionals have been offered since 2000. These programmes are rated as very effective and will continue over the next two years. In-service training is provided to selected staff and is considered a very effective initiative. However, lack of human resources is reported to pose a significant constraint to increasing capacity.

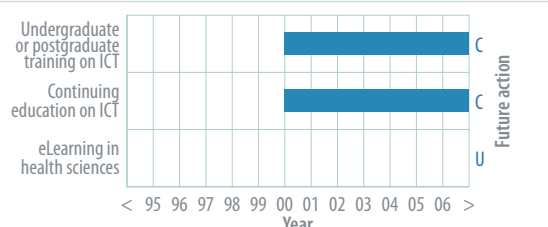


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

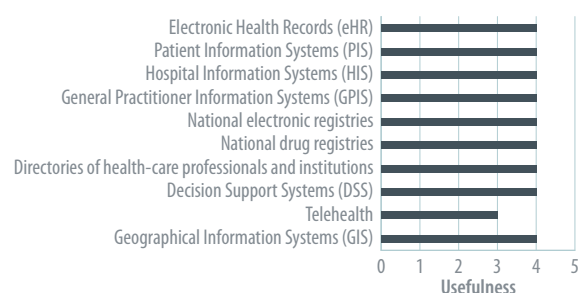


Figure 6. Preferred generic eHealth tools to be provided by WHO

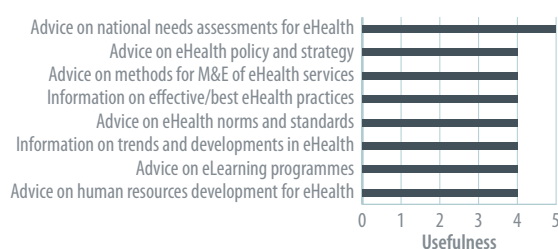


Figure 7. Preferred eHealth services to be provided by WHO

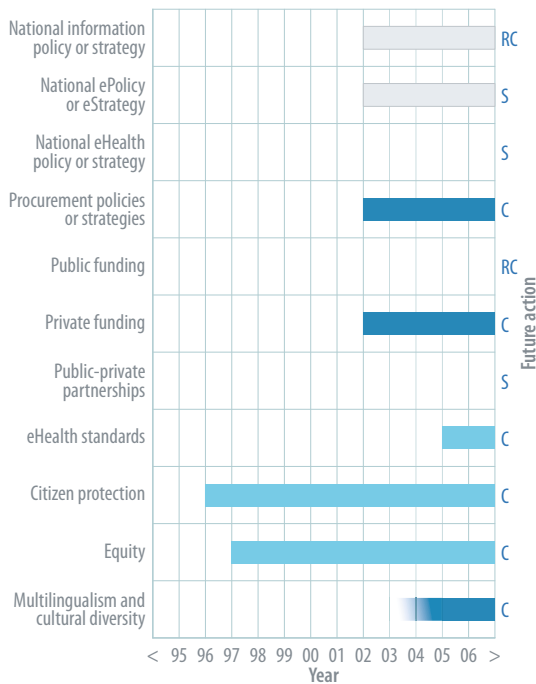
The majority of the listed eHealth tools rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on national needs assessments for eHealth is considered an extremely useful service. The remaining listed services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Zambia

Enabling environment – policies and strategies to support the information society



Zambia reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They are rated from moderately to very effective and will continue over the next two years. A national eHealth policy, public funding for ICT support and public-private partnerships to foster the use of ICT within the health sector are initiatives that are likely to be implemented by 2008. Most of the health-related programmes and the national health database at the Central Board of Health/Ministry of Health were computerized after the 1996/1997 health-care reform. Donor agencies have supported the development of the National Health database. Funding was insufficient, however, to implement the computerized health management information system.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2002 and rated as moderately effective. Intersectoral and nongovernmental cooperation commenced in 1995 and is considered very effective. Both actions will continue. Most of the current projects related to infrastructure have been funded by donors. A programme, implemented in 2004, to link all 72 districts in Zambia into a network is described as an important initiative. Lack of electricity in remote districts poses a challenge that the government is addressing with a project to provide rural areas with electricity.

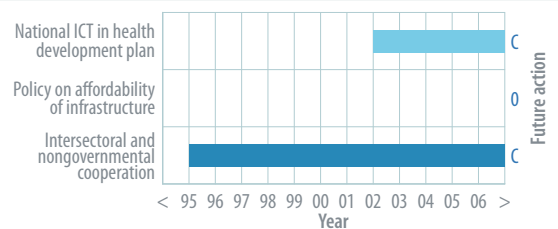
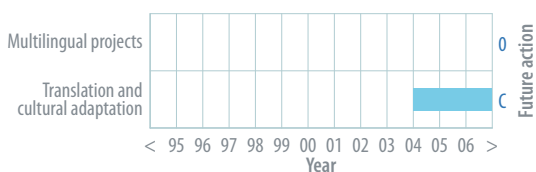


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



The translation and cultural adaptation of existing high-quality health content (created either locally or abroad) has been successfully supported since 2004 and is expected to continue over the next two years.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	11 291	OECD country	No	Main telephone lines*	0.79 [03]
	GDP per capita (Int \$)	945	World Bank category	4	Internet users*	2.11
	Total health expenditure (% of GDP)	5.4	ICT Diffusion Index	0.2029	Mobile phone subscribers*	2.75

Content – access to information and knowledge

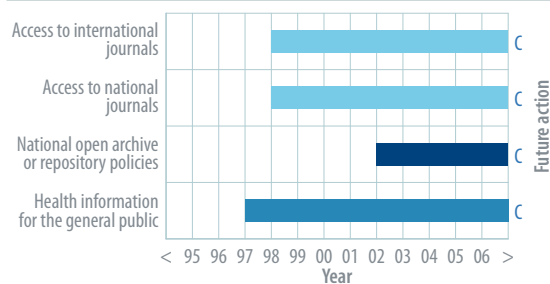


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international and national electronic journals has been provided since 1998 and is rated as moderately effective. A policy for a digital national open archive for scientific research published within the country was implemented in 2002 and is considered extremely effective. In 1997, Zambia began creating and providing health information for the general public in electronic format, an initiative rated as very effective. All of these services are expected to continue. After the decentralization of the health sector in the mid-1990s, which led to the creation of health boards, a number of initiatives such as the Health Management Information System were developed.

Capacity – human resources knowledge and skills

Zambia has been providing ICT skills programmes in the ongoing training of health-care professionals since 2004. This is rated as very effective. Health sciences students will be offered ICT skills courses as a part of university curricula by 2008. Health sciences courses for health professionals through eLearning are also likely to be introduced in the next two years. The most effective action is described as the training of ICT instructors for health centres and health posts in the provinces (a train the trainers model).

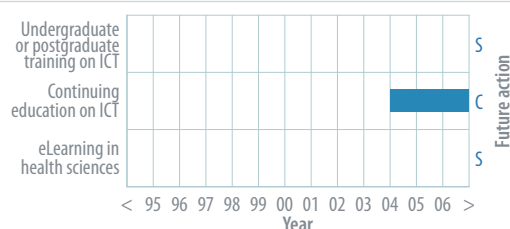


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

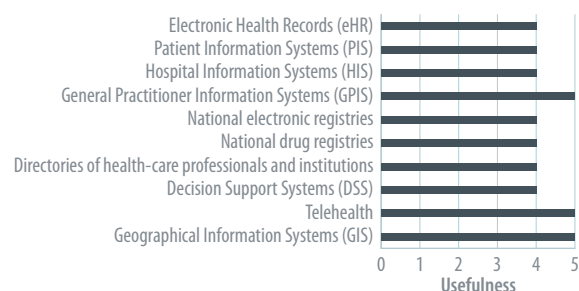


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

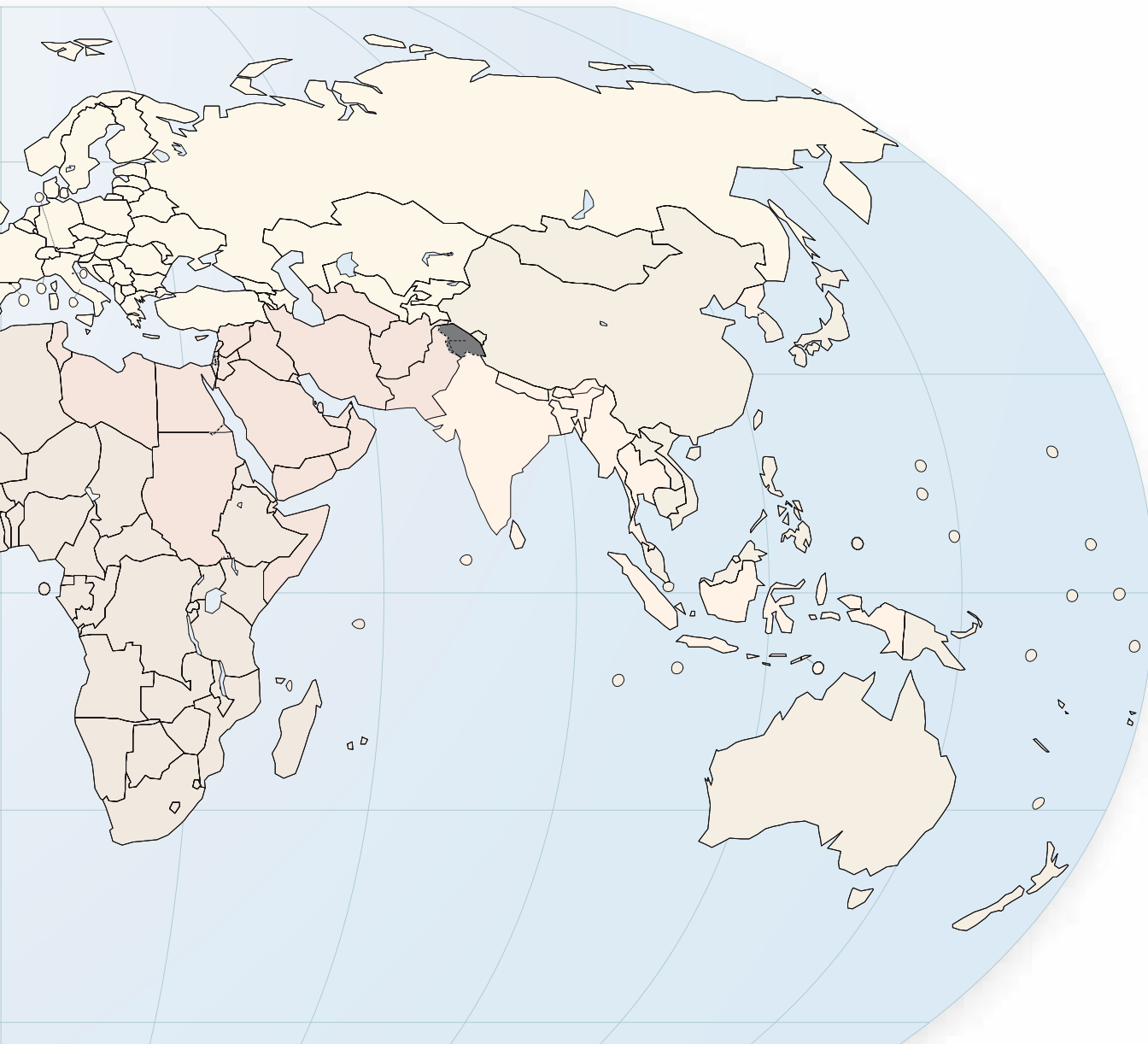
Among eHealth tools, General Practitioner Information Systems (GPIS), telehealth and Geographical Information Systems (GIS) are considered extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. The rest of the listed tools are rated as very useful. The specified eHealth services are considered very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants



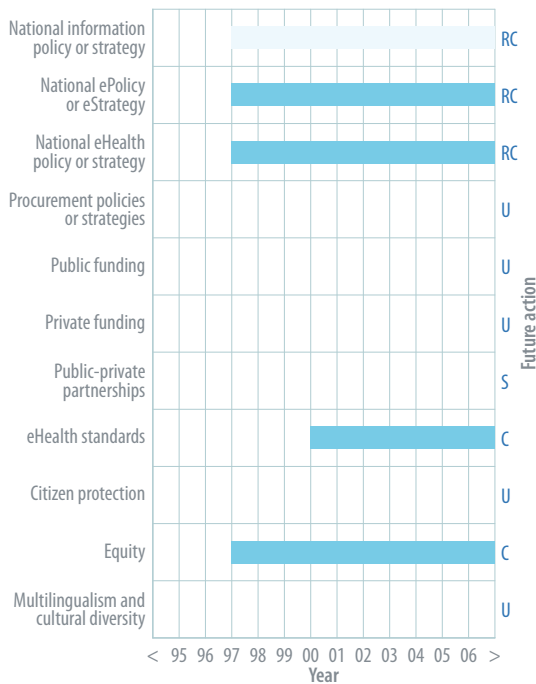
WHO REGION OF THE AMERICAS



Antigua and Barbuda	Costa Rica** 176	Honduras 182	Saint Vincent and the Grenadines
Argentina 164	Cuba	Jamaica	Suriname 192
Bahamas 166	Dominica	Mexico 184	Trinidad and Tobago
Barbados	Dominican Republic 178	Nicaragua	United States of America
Belize 168	Ecuador	Panama** 186	Uruguay
Bolivia	El Salvador 180	Paraguay 188	Venezuela (Bolivarian Republic of)** 194
Brazil 170	Grenada	Peru 190	
Canada** 172	Guatemala	Puerto Rico*	
Chile 174	Guyana	Saint Kitts and Nevis	
Colombia	Haiti	Saint Lucia	

Argentina

Enabling environment – policies and strategies to support the information society



Argentina reports that half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated moderately effective. They will be reviewed and continued over the next two years. The most effective action to build an enabling environment for the use of ICT in the health sector has been the implementation of the National University of Córdoba's telemedicine programme in conjunction with the provincial ministry of health and the Córdoba science agency. The most significant challenge reported is funding; no budget has been allocated for this type of development, and as a result it is difficult to expand it and update the technology.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Argentina indicates that none of the specified actions to support ICT infrastructure development for the health sector have been taken. It plans to commence working with other sectors and nongovernmental partners to promote infrastructure development by 2008. The development of telemedicine software and application of affordable technology for data transfer is highlighted as the most effective action in building infrastructure for the health sector. The most significant challenge is funding to guarantee commencement and continuity of these activities.

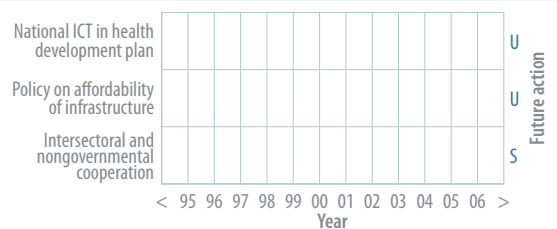
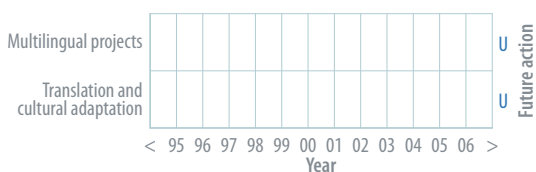


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	38 005	OECD country	No	Main telephone lines*	22.76
	GDP per capita (Int \$)	11 939	World Bank category	2	Internet users*	16.1
	Total health expenditure (% of GDP)	8.9	ICT Diffusion Index	0.346	Mobile phone subscribers*	35.35

Content – access to information and knowledge

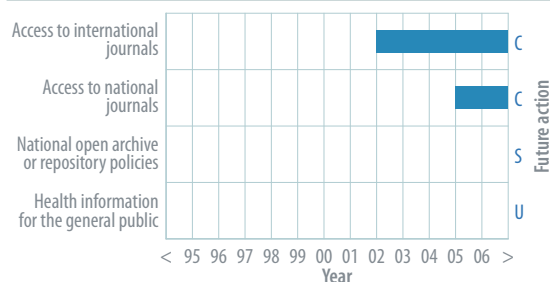


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international and national electronic journals was introduced between 2002 and 2005 in Argentina. These services have been very effective and will be continued. Argentina plans to implement a policy for a digital national open archive for scientific research by 2008. It highlights a very effective regional initiative for a virtual library, which aims to disseminate health-related information on science and technology for decision-making purposes and activities of a scientific and educational nature. The most effective action in providing online access to health content has been the digital library, which provides access to the complete texts of science reviews for all national universities and research institutes. The Scielo Programme (“Reach for the Sky with Science”) is also yielding positive results, including online

open access to the country’s leading health reviews. The most significant challenge in this field is funding, given that the cost of access to international science reviews is very high for Argentina. Purchasing joint subscriptions for the entire scientific community via the digital library has helped to cut costs.

Capacity – human resources knowledge and skills

All actions listed to build ICT capacity in the health sector have been taken. The provision of health sciences courses through eLearning for health professionals in training and practice has been very effective and will continue over the next two years. The most effective action has been the establishment of a virtual faculty of medicine at the University of Buenos Aires. Distance learning of introductory and core courses has been very successful.

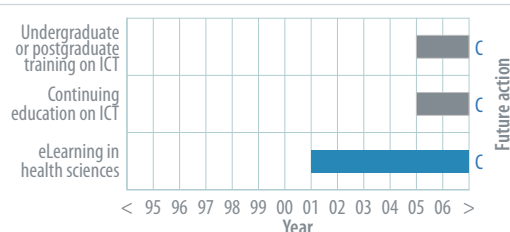


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

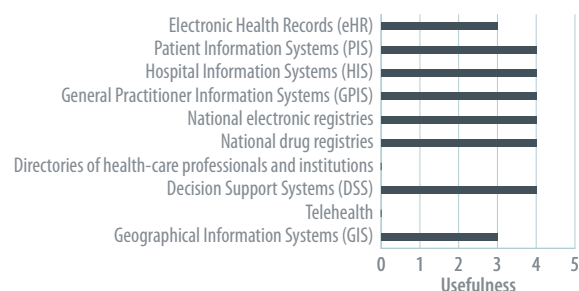


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

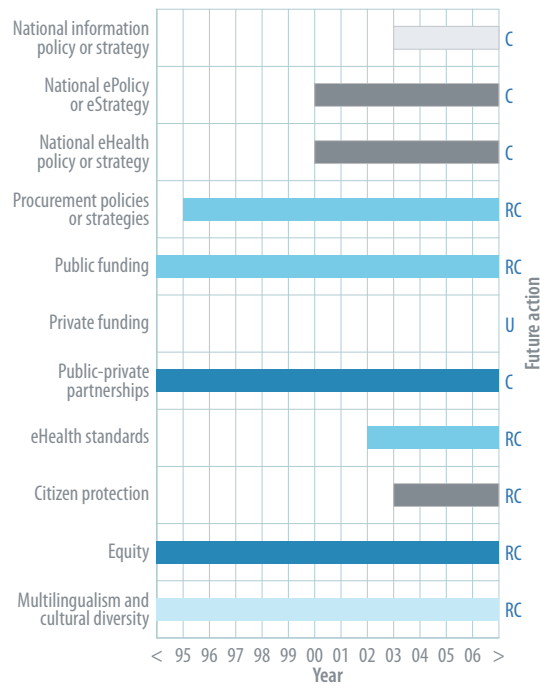
Patient Information Systems (PIS), Hospital Information Systems (HIS), General Practitioner Information Systems (GPIS), national electronic registries, national drug registries, and Decision Support Systems (DSS) are rated as very useful if the World Health Organization could offer these eHealth tools as generic prototypes for adaptation. Advice on methods for monitoring and evaluation (M&E) of eHealth services, information on effective/best eHealth practices and on trends and developments in eHealth are considered extremely useful eHealth services by Argentina.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Bahamas

Enabling environment – policies and strategies to support the information society



The Bahamas reports that all but one of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They will continue over the next two years. Highlighted as very effective is the government Intranet, a central body for information dissemination, which has been in existence since 2002. The most effective action taken thus far is the establishment of an Interactive Public Health Information System (IPHIS), which is designed to link with a centralized database for client health information in conjunction with the national HIS. Funds are allocated from the national budget with these initiatives in mind but are insufficient for sustainability; this poses a significant challenge in building an enabling environment for the use of ICT in the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

All listed actions to support ICT infrastructure development for the health sector have been taken since 2001 and are rated as very effective. They will be reviewed and continued over the next two years.

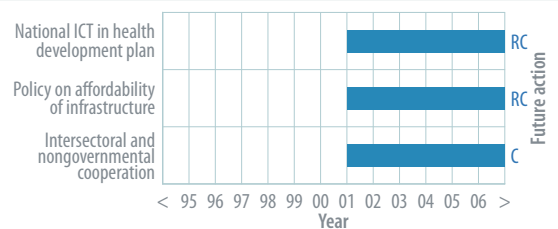
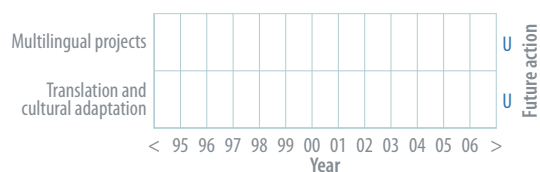


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

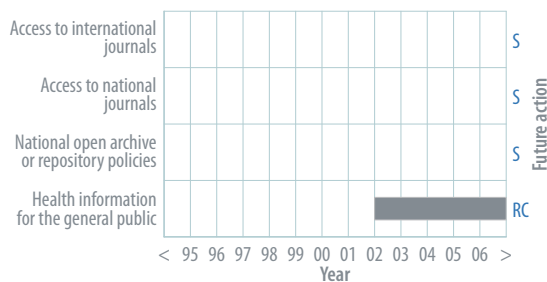


To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	315	OECD country	No	Main telephone lines*	44.14
	GDP per capita (Int \$)	19 034	World Bank category	1	Internet users*	29.34
	Total health expenditure (% of GDP)	6.4	ICT Diffusion Index	...	Mobile phone subscribers*	58.68

Content – access to information and knowledge



Since 2002, health information for the general public in electronic format has been provided in the Bahamas and will be reviewed and continued over the next two years. All other listed actions will be started by 2008. Training in human resources is currently taking place and there are plans to develop a virtual library.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health professionals have been provided since 1980 and are rated as moderately effective. ICT skills courses as a part of university curricula and health sciences courses through eLearning for health professionals will be provided by 2008.

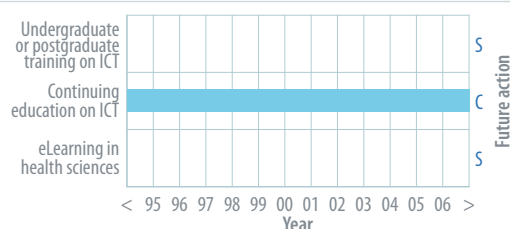


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

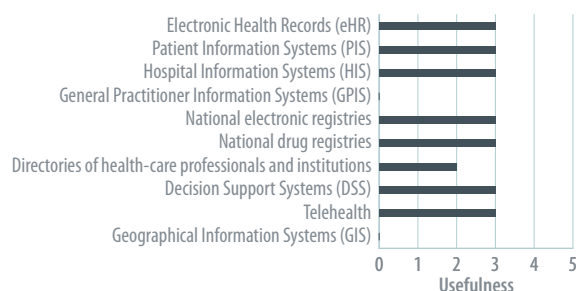


Figure 6. Preferred generic eHealth tools to be provided by WHO

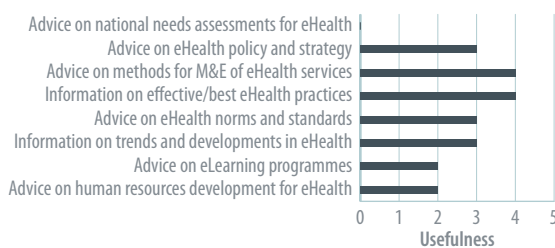


Figure 7. Preferred eHealth services to be provided by WHO

Advice on methods for monitoring and evaluation (M&E) of eHealth services, and Information on effective/best eHealth practices are considered very useful by the Bahamas. All other listed eHealth tools and eHealth services are considered slightly to moderately useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Belize

Enabling environment – policies and strategies to support the information society

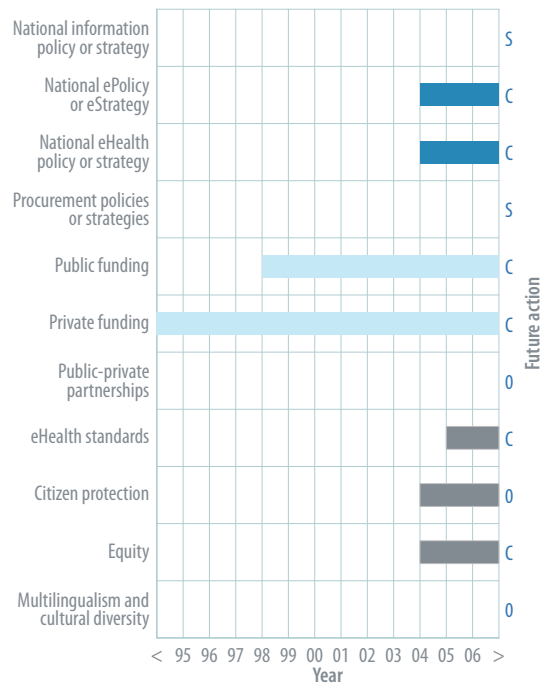


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Belize reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. National mechanisms such as an eStrategy and an eHealth policy have been put in place to promote the use of ICT and are rated as very effective. Implementation of procurement policies or strategies to guide software, hardware and content acquisition in the health sector is planned by 2008. Public and private funding for ICT support of programmes addressing national health priorities has been slightly effective and will continue over the next few years. Protection and inclusiveness policies for citizen protection and equitable access to eHealth were established in 2004. The computerization of mortality statistics and various modules of public health programmes has been a very effective tool in this field. However, human resource development and capacity building pose significant challenges.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Belize through a national plan for the development of ICT in health. This plan, which sets targets for health sector connectivity, has been in existence since 2004. This action will continue over the next few years. No decision has so far been made regarding the implementation of a national policy to reduce the costs of ICT infrastructure. The development of an Intranet for the Ministry of Health is rated as the most effective action thus far in this area.

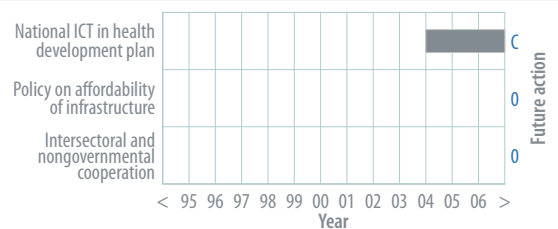


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

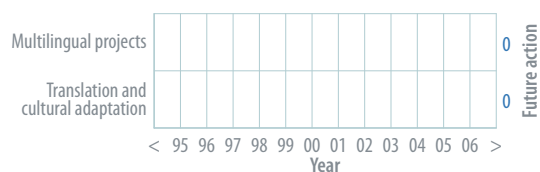
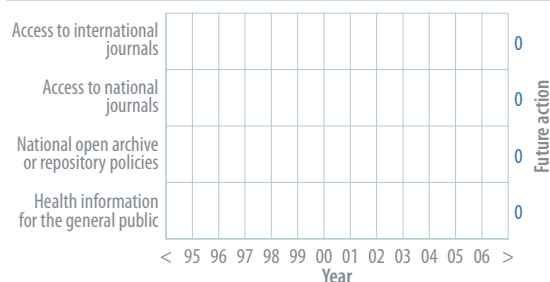


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Belize reports that none of the listed actions to promote the development of electronic multicultural health content have been implemented.

Country	Population (000s)	259	OECD country	No	Main telephone lines*	12.92
Indicators	GDP per capita (Int \$)	6 866	World Bank category	2	Internet users*	13.41
	Total health expenditure (% of GDP)	4.5	ICT Diffusion Index	0.2994	Mobile phone subscribers*	35.12

Content – access to information and knowledge



To date, none of the specified actions to promote online access to health content have been implemented.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Currently, none of the listed actions to build ICT capacity in the health sector have been implemented.

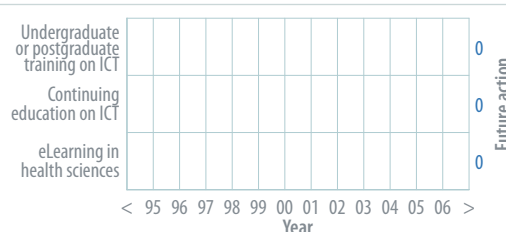


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

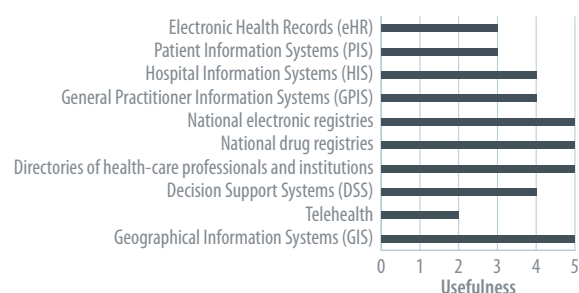


Figure 6. Preferred generic eHealth tools to be provided by WHO

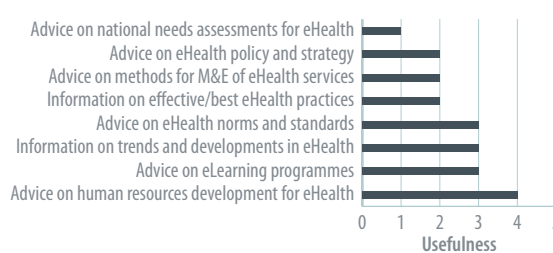


Figure 7. Preferred eHealth services to be provided by WHO

National electronic registries, national drug registries, Geographical Information Systems (GIS), directories of health-care professionals and institutions are rated as extremely useful. All other listed eHealth tools are rated from slightly to very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on human resources development for eHealth is considered a very useful eHealth service.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Brazil

Enabling environment – policies and strategies to support the information society

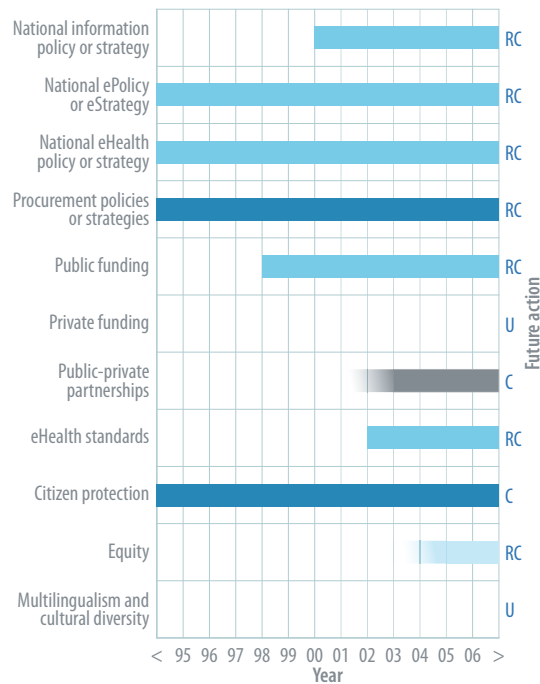


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Brazil reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to very effective. They will be reviewed and continued over the next two years. Noteworthy initiatives in this field include the Health Sector Fund, established by the Ministry of Science and Technology, and a project launched in 2005 to provide complementary health information (TISS). A collaboration between the government and the private sector, TISS creates structures for the exchange of information between various health sectors in Brazil. Among the most effective actions to build an enabling environment for the use of ICT in the health sector, includes the formulation of the national health information and informatics policy, which was drawn up by the Ministry of Health following the 12th National Conference on Health. Institutionalizing the health information policy is the main challenge Brazil faces in this area. Other successes include: facilitating public access via the Internet to health information systems; the establishment of an Intergovernmental Agency for Health information (RIPSA) (involving academia, the government and international organizations). Social exclusion from computer technology, computer illiteracy, the administrative structures; institutional instability; lack of adequately trained staff; and scarce public and private funding opportunities pause significant challenges.

Infrastructure – access to information and communication technologies

Brazil supports ICT infrastructure development for the health sector through intersectoral and nongovernmental cooperation. A national plan for the development of ICT in health, which sets targets for health sector connectivity, will be implemented over the next few years as will a national policy to reduce the costs of ICT infrastructure. One of the most effective actions thus far in building ICT infrastructure for the health sector has been the use of freeware for health applications that lowers costs and offers wider access to health information systems. Among the most significant challenges in this field are high costs (alterations to premises, connectivity, equipment, training and communication); the country's size; and regional diversity (making adaptation of content difficult).

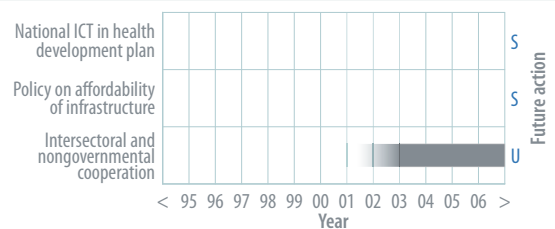


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

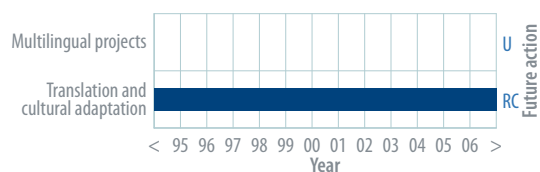


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Since 1985, the development of electronic multicultural health content has been promoted in Brazil through the support of translation and cultural adaptation of existing high-quality content (created either locally or abroad). The most effective action in this area has been the Virtual Health Library, which encourages a multicultural approach to health through an electronic medium, thanks to cooperation between health reference centres throughout Latin America and the Caribbean.

Country indicators	Population (000s)	181 408	OECD country	No	Main telephone lines*	23.46
	GDP per capita (Int \$)	7 843	World Bank category	3	Internet users*	12.18
	Total health expenditure (% of GDP)	7.6	ICT Diffusion Index	0.3256	Mobile phone subscribers*	36.32

Content – access to information and knowledge

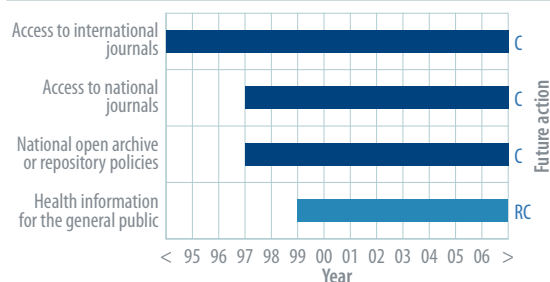


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided to the general public and health-care professionals through national and international electronic journals, and a national open archive for scientific research. All of these actions are rated as extremely effective and will continue over the next few years. The most effective actions in this field are the Virtual Health Library project, which promotes the inter-institutional partnerships for the production of health information; Scielo, an electronic journals portal for comprehensive and unrestricted scientific content; Capes portal, which makes international journals available free of charge to all Brazil's teaching institutions; and the health portal of the Ministry of Health. The most significant challenges to date are the lack of high-quality connectivity; shortage of computers in universities and research institutes; the high cost of subscriptions to journals; and a resistance to the computer culture and low computer literacy.

Capacity – human resources knowledge and skills

ICT capacity in Brazil has been built through the use of undergraduate/postgraduate training in ICT, continuing education in ICT, and eLearning in health sciences. These are rated from slightly to moderately effective and will be reviewed and continued over the next two years. The current reform of training curricula of health professionals to include ICT for health components has been very effective in this field. Various experiments with distance learning in the health sphere, at intermediate and higher levels, have also led to the successful expansion of ICT. However, the current infrastructure, a shortage of human resources to provide training in ICT for health and the lack of distance learning and ICT methodologies are all contributing factors to the challenge in building ICT capacity in the health sector.

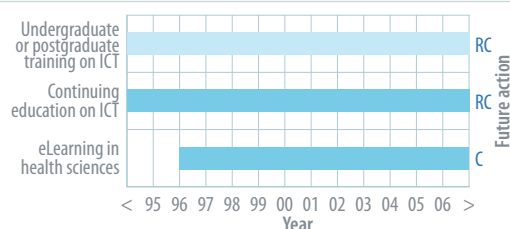


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

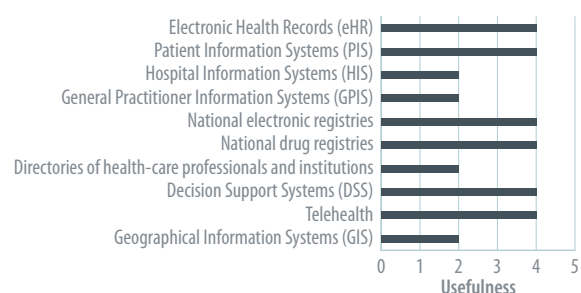


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Brazil highlights its need for models for presenting health information. Advice on human resources development for eHealth is considered an extremely useful eHealth service. All remaining listed eHealth services are rated from moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Canada

Enabling environment – policies and strategies to support the information society

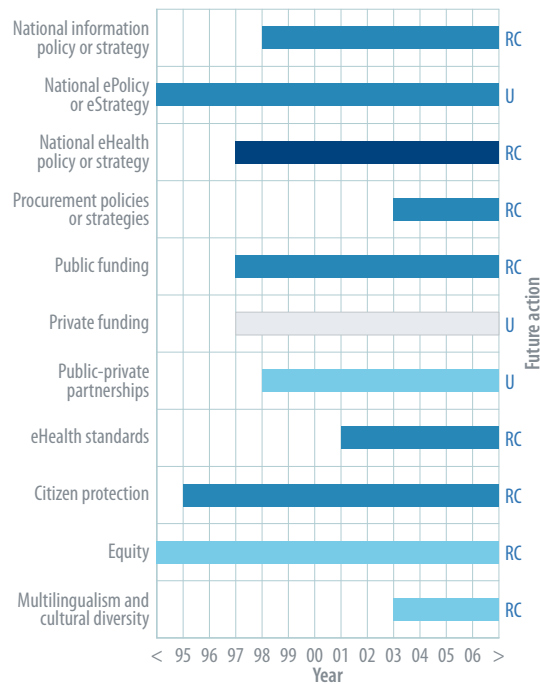


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Canada reports having taken all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector. Work began in 1997 on a national eHealth policy, and has been extremely effective. Canada mentions the following among its most effective actions: Health Canada taking Industry Canada's example to establish a national Advisory Council on Health Infostructure; followed by the establishment of the First Nations Health Information System, National Health Surveillance System and the Canadian Health Network; then the Office of Health and the Information Highway as a focal point for issues related to the use of ICT in Canada's health sector. The creation of Canada Health Infoway in 2001, along with a significant government investment, both expanded the use of telehealth and built the foundation for Canada's electronic health record system. The Pan-Canadian Health Information Privacy and Confidentiality Framework, endorsed in 2005, recommended core provisions for the collection, use and disclosure of personal health information. The most significant challenges Canada overcame were: engaging a good representation of the multiple players and diverse stakeholders in health care, in early discussions about eHealth, despite their numbers and geographical distribution; determining and organizing useful health information for citizens in the early days of Internet usage (1994–98); and developing, over time, the policy case for ICT to transform health care, while building federal/provincial/territorial collaboration, without a full 'business case' for ICT in health care.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Canada through a Technology Roadmap for the development of ICT in health, a policy on affordability of infrastructure, and intersectoral and nongovernmental cooperation. These have all been extremely effective and will be reviewed and continued over the next few years. Among the most effective actions thus far in building ICT infrastructure for the health sector are: Canada Health Infoway and its dedicated funding; use of a Canada-wide blueprint, architecture, and standards; a "strategic investor" model to align jurisdictional priorities and leverage solutions and best practices; common ICT investment, pricing and procurement practices; and shared funding with each jurisdiction. Also key are results and benefits measurement, as part of a rigorous approach to ensure accountability. The most significant challenge thus far is the relatively low use of ICT by clinicians (especially physicians) compared to other OECD countries. This is being addressed by various measures including actively engaging clinicians in the development of an "End User Strategy" to increase acceptance for electronic health records in their practices.

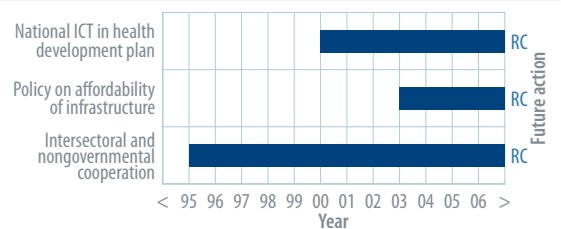


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

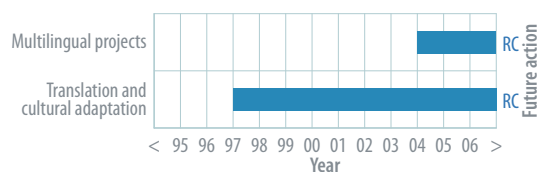


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Canada is a bilingual country so all initiatives with federal government involvement (including all cited here) must produce their content in both English and French. Several initiatives cited also created health content and services in Aboriginal languages. Provinces and territories must be mindful of language rights in health care delivery. Recently, more information and telehealth projects employing some of the many other languages spoken in Canada's very diverse population are being seen. Most of these originate at the provincial/territorial and community levels.

Country indicators	Population (000s)	31 660	OECD country	Yes	Main telephone lines*	64.27
	GDP per capita (Int \$)	30 324	World Bank category	1	Internet users*	62.36
	Total health expenditure (% of GDP)	9.9	ICT Diffusion Index	0.6216	Mobile phone subscribers*	46.72

Content – access to information and knowledge

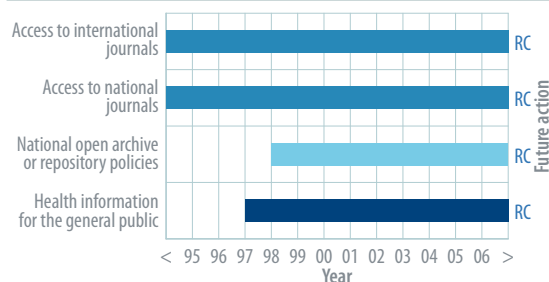


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content is provided through national and international electronic journals, a national open archive and electronic health information for the general public. These actions have been moderately to extremely effective and will be reviewed and continued over the next two years. For approximately 10 years, Canada has successfully worked with its citizens to identify and post electronic health information. Government support at all levels, as well as partnerships with community health groups, health associations and others have helped ensure a range of electronic health information is widely available and not commercially motivated. This factor plus considerable bilingual content has ensured effective outcomes for Canada of both high usage and reliance by citizens on a range of both

federal and provincial/territorial government-sponsored Internet sites for reliable health information. The Canadian Women's Health Network (CWHN) facilitates national networking of women's health organizations and communicates the research findings of the Centres of Excellence for Women's Health and other initiatives via a monthly e-bulletin on women's health issues. The most significant challenges to date in this field include finding a way to 'harmonize' the relevant information now available through numerous portals.

Capacity – human resources knowledge and skills

ICT capacity in Canada has been built through the use of undergraduate or postgraduate training in ICT, continuing education in ICT, and ICT and eLearning in health sciences. The federal government has successfully funded numerous collaborative initiatives to expand the adoption of ICT by provinces and territories. In particular, telehealth has facilitated better access to health-care practitioners regardless of their geographic location. The growing use of this technology (for diagnosis, treatment as well as education) provides Canadians with concrete examples of the benefits that can accrue from the use of ICT in the delivery of health care. Thanks to widespread implementation of eHealth tools such as telerriage and 24/7 telephone information lines, Canadians are beginning to understand the potential of eHealth to enhance the efficiency and effectiveness of the health care system. However, while citizens are supportive of electronic health records provided their personal health information is protected, considerable investment and change management work will still be required to successfully implement these systems on a larger scale.

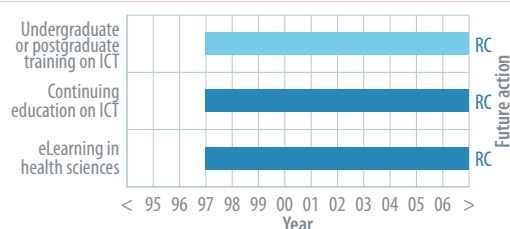


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

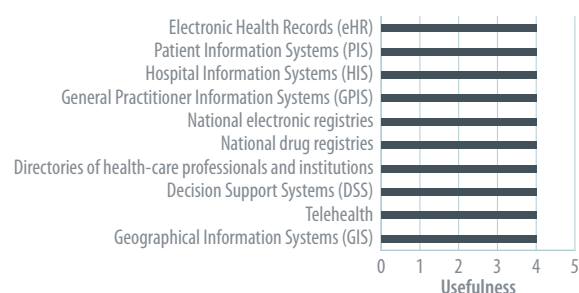


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools and services are considered very useful. Canada reports that it has been increasing provision of eHealth for nearly ten years. The development of Canada's eHealth tools and services has therefore been an incremental process that has featured collaborative federal activity with the provinces and territories as well as many other stakeholders in eHealth.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Chile

Enabling environment – policies and strategies to support the information society

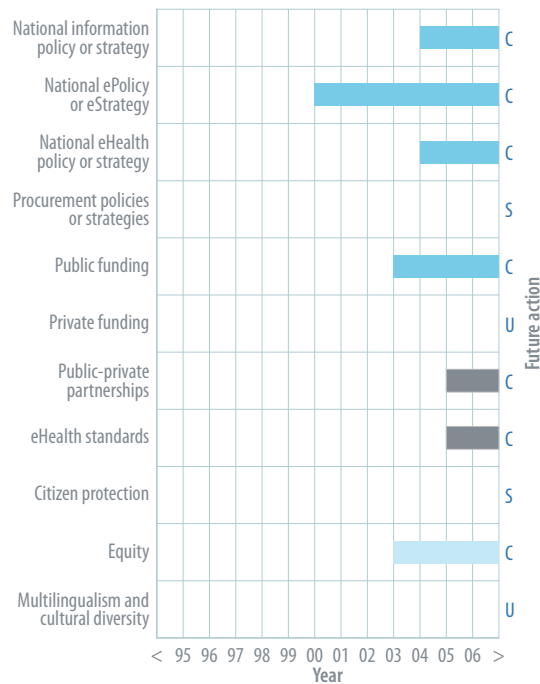


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Chile reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to moderately effective. National mechanisms such as an information policy, an eStrategy, and an eHealth policy have been put in place to promote the use of ICT. Procurement policies to guide software, hardware and content acquisition in the health sector are likely to be implemented by 2008. Public funding for ICT support of programmes addressing national health priorities has been provided since 2003. This action has been rated as moderately effective and will continue over the next two years. A communications network connecting 800 primary and secondary health facilities is rated as the most effective programme in this field. Called the 'Computerization Plan', this programme was implemented with the support of the Ministry of Health to strengthen the digital sector in Chile. Lack of ICT familiarity among health personnel is a significant challenge and Chile has adopted methods to address this problem through the development of ICT training programmes.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Chile through a national plan for the development of ICT in health and a policy on affordability of infrastructure. The national plan for the development of ICT in health, which sets targets for health sector connectivity, has been implemented since 2005 and is reported to be very effective. Since that year the focus on purchasing equipment has shifted to making computer services more widely available to the public. The development of a telecommunications network has greatly improved access and reduced costs. The most significant challenge in building ICT infrastructure for the health sector is supplying modern equipment and strengthening the technical infrastructure.

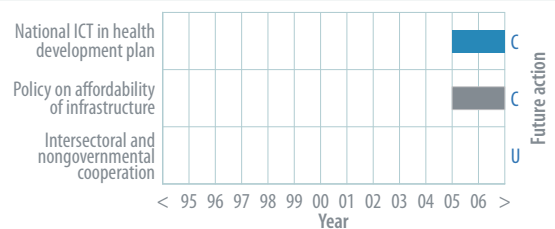


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

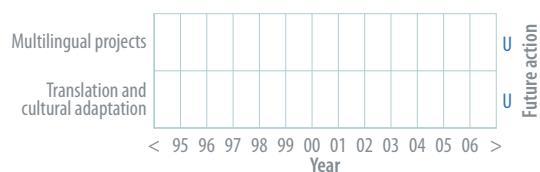
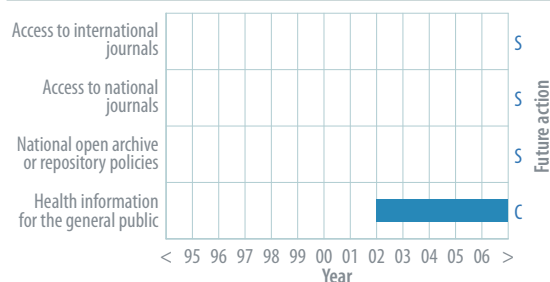


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken in the near future.

Country indicators	Population (000s)	15 951	OECD country	No	Main telephone lines*	21.53
	GDP per capita (Int \$)	11 539	World Bank category	2	Internet users*	27.9
	Total health expenditure (% of GDP)	6.1	ICT Diffusion Index	0.3787	Mobile phone subscribers*	62.08

Content – access to information and knowledge



Chile provides online access to health content to the general public. This has been very effective and will continue. A policy for a digital national open archive and access to national and international electronic journals will be provided over the next few years – work on a health web portal has begun.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity in Chile has been built through the use of eLearning in health sciences. This initiative was introduced in 2003 and is rated as moderately effective. This initiative will be reviewed and continued over the next few years.

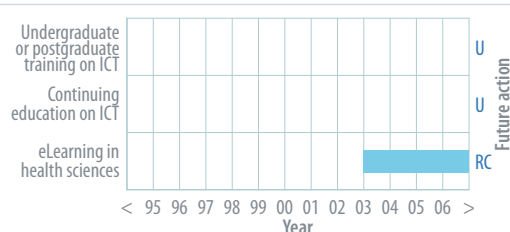


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

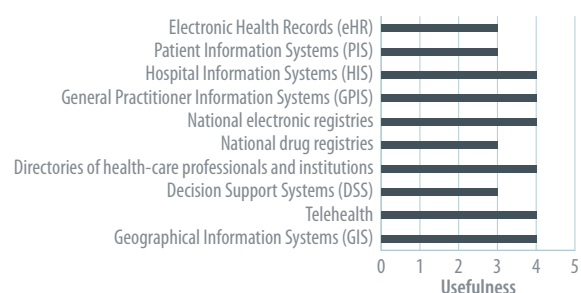


Figure 6. Preferred generic eHealth tools to be provided by WHO

Hospital Information Systems (HIS), General Practitioner Information Systems (GPIS), national electronic registries, Geographical Information Systems (GIS), telehealth, and directories of health-care professionals and institutions are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. All other listed eHealth tools are rated as moderately useful. Chile highlights the need for systems to monitor and report health determinants. Advice on the introduction of standards for health information exchange is also required.



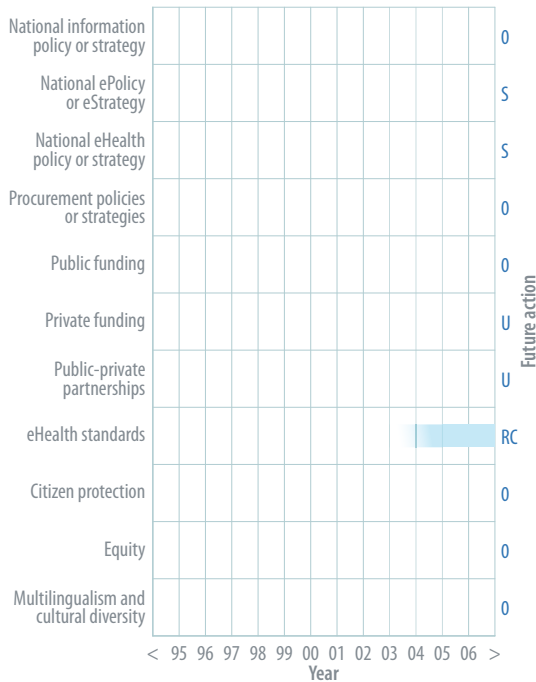
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Costa Rica

Enabling environment – policies and strategies to support the information society



Costa Rica reports that it has adopted norms and standards for eHealth systems, services and applications. This action has been slightly effective and will be reviewed and continued over the next two years. A national ePolicy and a national eHealth policy will be implemented by 2008 to promote the use of information and communication technologies (ICT) across all sectors. Access to information via the Internet and the development of the Virtual Health Library are rated as the most effective actions in building an enabling environment for the use of ICT in the health sector. The most significant challenge to date in this field has been the limited resources available to ensure access to new technologies and the hiring of new staff.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a policy on affordability of infrastructure. This national policy was implemented in 1995 to reduce the costs of ICT infrastructure. The introduction in CCSS hospitals of teleconference facilities, the draft Patient Safety Project and the eHealth Project, and the creation of Health Areas and Basic Comprehensive Care Teams are rated as the most effective actions thus far in building ICT infrastructure for the health sector. The most significant challenge to date in this field is the lack of resources and the lack of institutionalizing the using of ICT either for education or diagnosis (e.g. equipment is available but is not necessarily used to support eHealth).

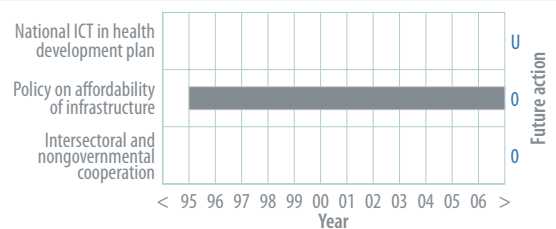


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

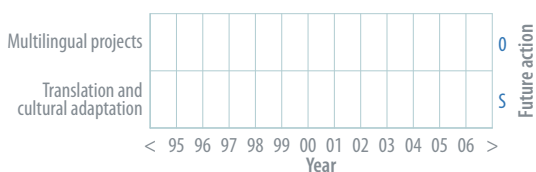


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

At this stage, none of the specified actions to promote the development of electronic multicultural health content have been implemented but translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad) are expected to commence by 2008. The most effective action taken to provide electronic multicultural health content is the electronic links to health-related web sites in other countries. The lack of financial and human resources, equipment and high costs associated with provision of this content poses significant challenges in this field.

Country indicators	Population (000s)	4 176	OECD country	No	Main telephone lines*	31.62
	GDP per capita (Int \$)	8 471	World Bank category	2	Internet users*	23.54
	Total health expenditure (% of GDP)	7.3	ICT Diffusion Index	0.356	Mobile phone subscribers*	21.73

Content – access to information and knowledge

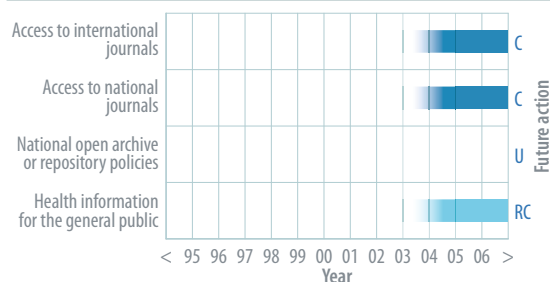


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have access to online health content through national and international electronic journals. This has been very effective and will continue. Electronic health information has been made available for the general public as well. Costa Rica highlights the development of the CCSS BINASS virtual library and of the University of Costa Rica health sciences library. Among the most effective actions taken to promote access to electronic health content has been development of the Cielo Costa Rica project and the production of electronic versions of national reviews. These initiatives have been successful because users are able to access full text at any time, without needing to consult information units. Further successes include the development of web sites of health-sector institutions, such as CCSS,

AyA, the Ministry of Health, the Institute of Statistics and Censuses, the Central American Centre for Population, the Costa Rican Cancer Institute and the Social Security Virtual Health Library. Despite these achievements, many health workers still lack access to the Internet. This combined with the lack of high-speed communications media and the high cost of equipment pose the greatest challenges in this field. The Costa Rican Electricity Institute has been charged with initiating projects to improve communications facilities, which is part of the strategy to overcome these challenges.

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate or postgraduate training in ICT and eLearning in health sciences. These programmes will continue over the next two years. The provision of ICT skills programmes in the ongoing training of health-care professionals are likely to commence by 2008. The most effective actions reported are the training of medical, technical and specialized staff in ICT; through agreements with national or international universities ICT has been institutionalized as part of the health culture. A significant challenge in building ICT capacity in the health sector has been the high cost of training and hiring staff through private firms.

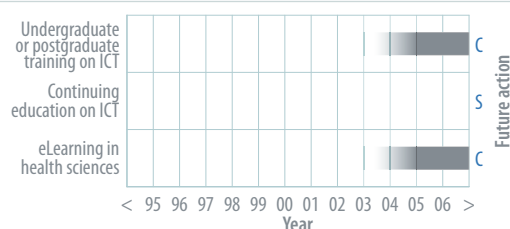


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

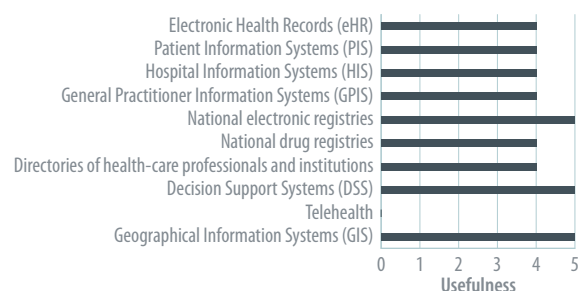


Figure 6. Preferred generic eHealth tools to be provided by WHO

National electronic registries, Decision Support Systems (DSS), and Geographical Information Systems (GIS) are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Costa Rica. All other listed eHealth tools are rated as very useful. Advice on eLearning programmes, and advice on human resources development for eHealth are considered extremely useful eHealth services.

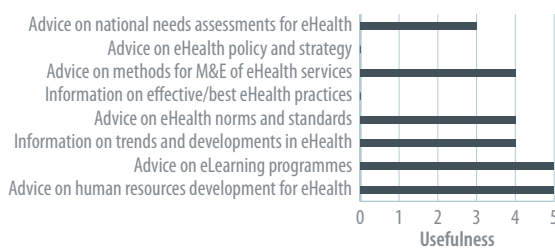


Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Dominican Republic

Enabling environment – policies and strategies to support the information society

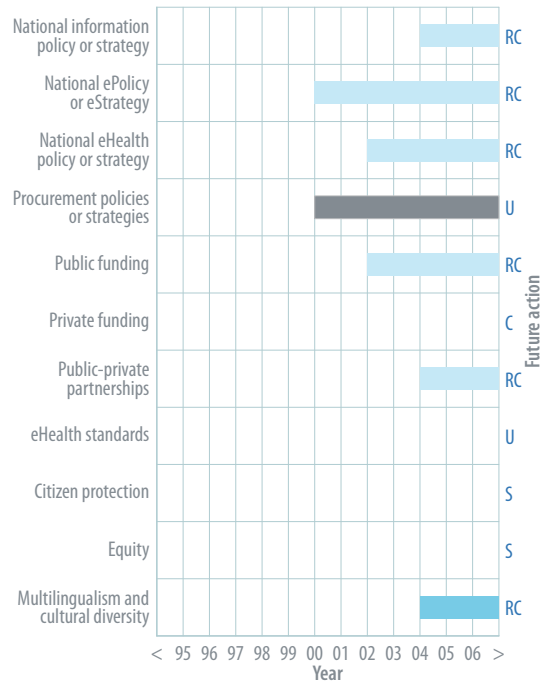


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Dominican Republic reports that over half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been started between 2000 and 2004, and are rated from slightly to moderately effective. These actions will be reviewed and are likely to be continued over the next two years. The Dominican Republic highlights projects for the development of an epidemiological information management and surveillance system as well as the provision of a technology platform for various hospitals as significant advances. These initiatives are part of the Provincial Health Systems Programme, funded by the World Bank and created as part of the health-sector reform during 2001–2004. It is reported that the country's health sector suffers from the absence of policies and strategies on the use of ICT: it is recognized that programmes, actions and efforts will need to share a common strategy and vision to increase their chances of success. Another significant challenge in this field is the institutional framework for hospital management which requires strengthening. The Dominican Republic indicates that resources and funds have been made available to develop initiatives, especially for technical infrastructure and applications, but they have not been used fully leaving projects incomplete and leading to some feeling a review of processes is required. It cites the example of the epidemiological information management and surveillance system, an initiative developed through the Executive Committee for Health Sector Reform (CERSS). Under this project, some US\$ two million were

invested in the health sector to develop an information system; including hardware purchases and developing applications for online clinical histories. To date, only parts of the programme are in use.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health, which sets targets for health sector connectivity. The most effective actions in this field have been those carried out by the Dominican Telecommunications Institute, INDOTEL, through the Telecommunications Development Fund. The objective of these actions was to develop a pilot project to explore how ICT could make a significant contribution to saving lives, by making available rapid, timely and appropriate patient access to the level of health care required. To this end, the initiative called for radio links to primary health care facilities in the country's northern region, and the installation of interactive videoconference facilities using ISDN lines in five hospitals (Santiago, San Francisco de Macoris, Puerto Plata, La Vega and Mao) as well as facilities offering wideband Internet access in 22 hospitals in the same region. Significant challenges in this field have been the unreliable supply of electricity, which has resulted in regularly damaged equipment; and there are no funds to pay for their repair in the Ministry of Health's budget. Getting physicians to use tools which they are unfamiliar with such as videoconferencing and telemedicine is also a problem and training is required.

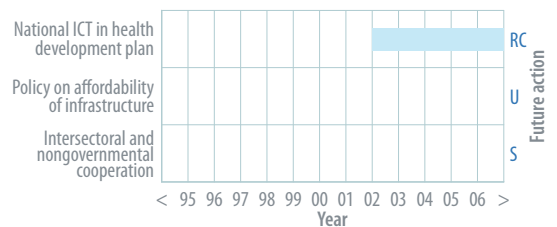


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

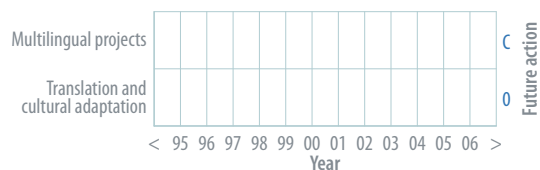


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

At this stage, none of the specified actions to promote the development of electronic multicultural health content have been implemented. A significant challenge in this field is for health professionals to make use of the large volume of medical information available in other languages.

Country indicators	Population (000s)	8 641	OECD country	No	Main telephone lines*	10.65
	GDP per capita (Int \$)	4 796	World Bank category	3	Internet users*	9.1
	Total health expenditure (% of GDP)	7	ICT Diffusion Index	0.2842	Mobile phone subscribers*	28.82

Content – access to information and knowledge

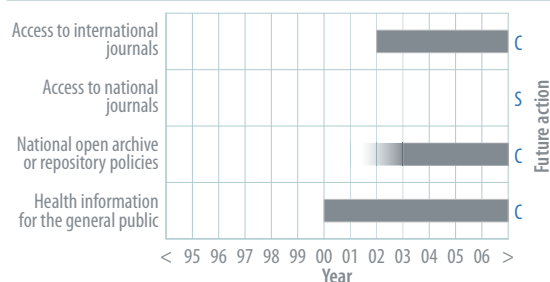


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have access to online health content through international electronic journals in the Dominican Republic. The country has also created a national open archive for scientific research, and provided the general public with electronic health information. Highlighted in this field is the signing of an agreement in 2002 by 16 institutions for the development of the virtual health library (BVS) and the Virtual Health and Environmental Library of the Dominican Republic (BVSA). In 2005, the agreement was renewed and joined by a further three institutions. The institutions represent the government sector, universities, nongovernmental organizations (NGOs), professional associations and international organizations. Another initiative in which the country is involved and whose purpose is to facilitate electronic

access to international journals is Health InterNetwork Access to Research Initiative (HINARI). As of 2005, 14 institutions, including universities, hospitals and research institutes were participating in this WHO programme. The main challenge has been the difficulty of ensuring regular collection of information in electronic format because of the absence of an appropriate national policy. Nevertheless, BVS and BVSA are tools that may be used to improve this situation.

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of health sciences courses offered through eLearning for health professionals in training and practice. The National Institute of Government Administration has provided courses and academic activities on HIV/AIDS, social security, health economics and other subjects. In addition, the Dominican Learning for Development Network and the Global Development Learning Network (GDLN) have provided virtual courses on nutrition, cancer, gerontology and geriatrics for the country's health workers, together with courses for final-year medical school students at a number of universities: examples are the discussions on communicable diseases (dengue fever, HIV/AIDS and tuberculosis) organized between the Ibero-American University (UNIBE) and Santiago Technical University (UTESA), respectively located in Santo Domingo and Santiago.

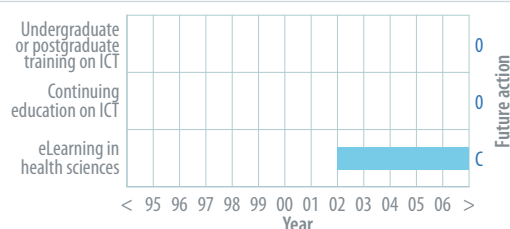


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

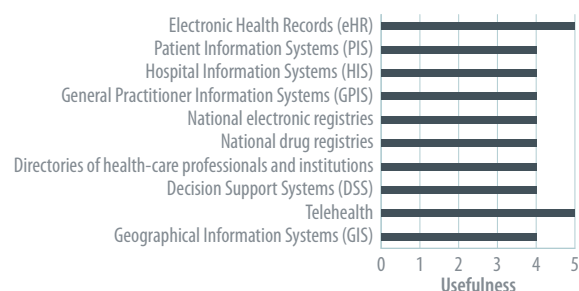


Figure 6. Preferred generic eHealth tools to be provided by WHO

Electronic Health Records (eHR), and telehealth are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation by the Dominican Republic. Advice on human resources development for eHealth is considered as an extremely useful eHealth service.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

El Salvador

Enabling environment – policies and strategies to support the information society

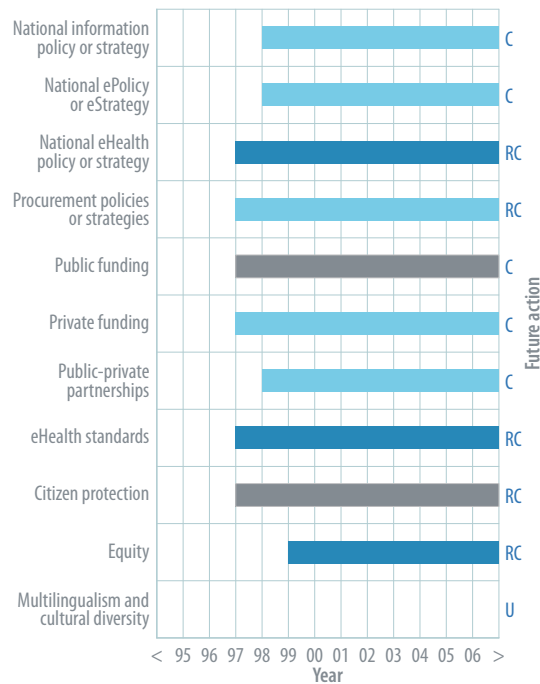


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

El Salvador reports that all but one of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They are rated from moderately to very effective. All initiated between 1997 and 1999, they will be reviewed and/or continued over the next two years. The development of institutional-level information systems is rated as the most effective action in building an enabling environment for the use of ICT in the health sector. This is due to the existence of an institutional policy that directs efforts to collect and communicate information. Efforts to train senior and middle-ranking staff on ICT, along with obtaining the necessary tools to set up the system have also proven to be very effective. The most significant challenge to date in this field has been the lack of funds for ICT. This situation has been addressed by negotiating support from donor organizations and institutions, and even from technical cooperation. However, the requirements necessary to introduce the system nationwide are vast, and a similar level of investment is needed to ensure its sustainability. Due to this, access to information systems is currently limited to a small group.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was implemented in 1995. Intersectoral and nongovernmental cooperation commenced in 1992. Since 1990, El Salvador has developed and refined software to modernize data gathering and modelling. Examples are PLAG-SALUD (epidemiological surveillance of instances of pesticide poisoning) and SISNAVE (national epidemiological surveillance system). Activities with nongovernmental institutions and donors are rated as the most effective action in this area thus facilitating access to equipment, training of staff and more rapid exchange of information. The most significant challenge is reported as the need to adopt a national policy that integrates all sectors. Institutional coordination in terms of information sharing also remains difficult. In 2005, the Government announced the 'e-país' programme, an initiative designed to improve access to communication via the Internet. This programme gives precedence to information systems that provide a basis for the development of strategies for action on topics of national interest. In 1998, 'Connecting Up to the Future' was implemented. This initiative has generated public establishments that offer low-cost advice, services and training on computer communication in addition to eLearning. The 'Infocentros', are located in the capital as well as in the provinces.

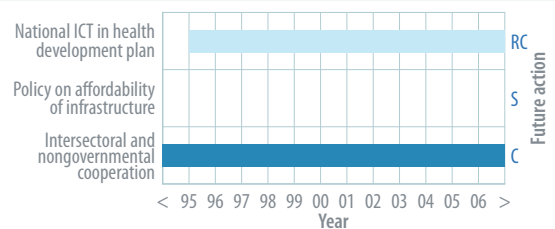


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

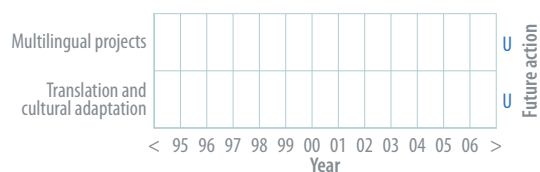


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	6 643	OECD country	No	Main telephone lines*	13.42
	GDP per capita (Int \$)	4 655	World Bank category	3	Internet users*	8.88
	Total health expenditure (% of GDP)	8.1	ICT Diffusion Index	0.1604	Mobile phone subscribers*	27.71

Content – access to information and knowledge

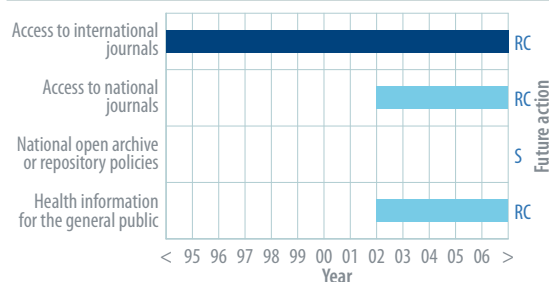


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national and international electronic journals. Electronic health information for the general public is also offered. El Salvador is developing and improving information systems to facilitate and encourage usage of online health information. This is essentially being done on a sector-by-sector basis, an approach that has been effective by elevating the profile of health, which in turn has led to the availability of increased financial resources. However, some sectors in El Salvador are somewhat reluctant to share information because they do not have confidence in the system's ability to analyse data to their requirements. Further, few sectors have access to or the capacity required by this type of system.

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of continuing education in ICT and eLearning in health sciences. They are rated from moderately to very effective and will be reviewed and continued over the next two years. One of the most effective actions reported is the procurement and development of computer programs, computer-science resources and information systems intended for staff working in the information field. This has improved and facilitated work in this sphere, and encouraged staff to innovate. A significant challenge in building ICT capacity in the health sector has been the lack of funds. An attempt at a solution has involved negotiations with donor organizations and institutions. In addition, projects have been developed in collaboration with the World Bank that provide training in this field.

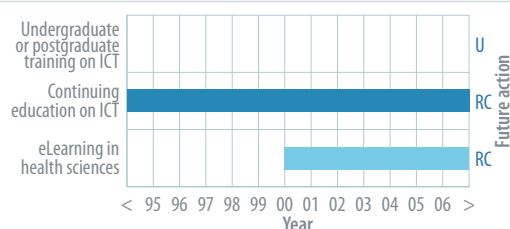


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

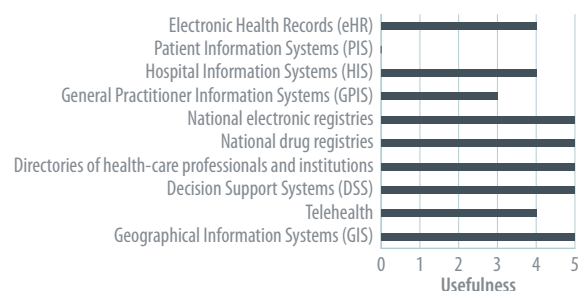


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

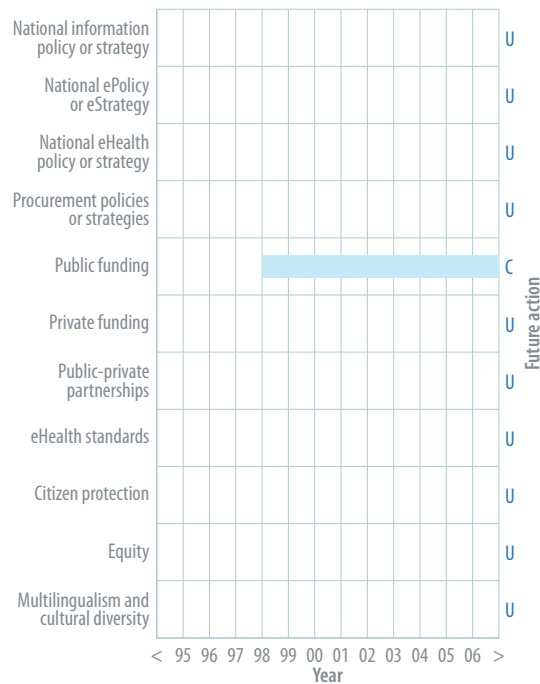
National electronic registries, national drug registries, Geographical Information Systems (GIS), Decision Support Systems (DSS), and directories of health-care professionals and institutions are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to El Salvador. Advice on eLearning programmes and advice on human resources development for eHealth are considered extremely useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Honduras

Enabling environment – policies and strategies to support the information society



Honduras reports that one of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector has been taken: public funding for ICT support of programmes addressing national health priorities has been provided since 1998. This action has been rated as slightly effective and will continue over the next two years. The most significant challenge to date in building an enabling environment for the use of ICT in the health sector has been the need for a guiding body for the ICT sector that can formulate national policies and then facilitate and coordinate national eHealth initiatives accordingly.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

To date, none of the specified actions to support ICT infrastructure development have been implemented and a decision remains to be made as to which actions will be taken over the next few years.

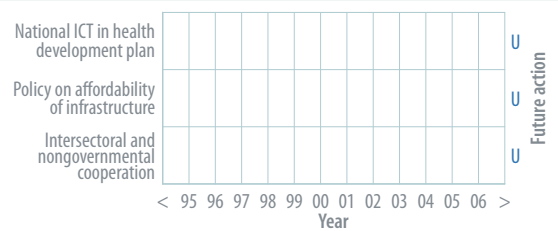
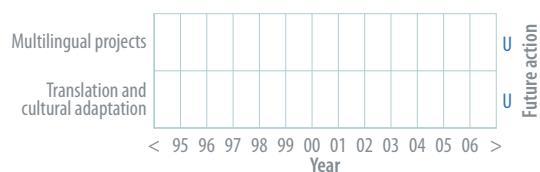


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



At this stage, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	6 893	OECD country	No	Main telephone lines*	5.57
	GDP per capita (Int \$)	2 588	World Bank category	3	Internet users*	3.18
	Total health expenditure (% of GDP)	7.1	ICT Diffusion Index	0.2234	Mobile phone subscribers*	10.1

Content – access to information and knowledge

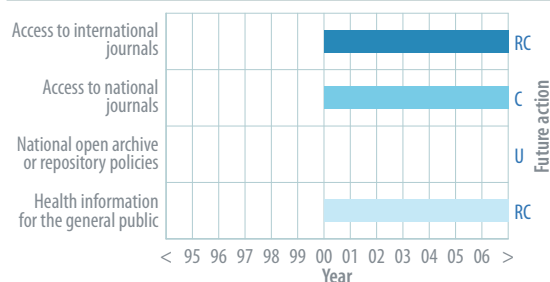


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national and international electronic journals and electronic health information for the general public. Access to electronic journals was introduced in 2000. These services have been moderately to very effective. Creating and providing health information for the general public in electronic format commenced also in 2000 and is rated as slightly effective. Honduras highlights the creation of the Virtual Health Library of Honduras as its most effective action taken to promote access to electronic health content. The most significant challenges to date in this field have been the lack of Internet connectivity and the scarcity of professionals in the area of information management.

Capacity – human resources knowledge and skills

ICT capacity has been built through eLearning in health sciences with courses for health professionals in training and practice having been offered since 2004. These are reported to be moderately effective. A significant challenge in building ICT capacity in the health sector has been the low level of ICT use by health professionals. To remedy this, basic courses in ICT are now given to all teaching and health staff.

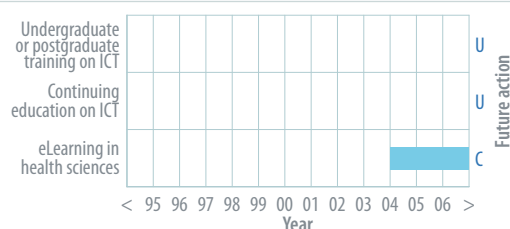


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

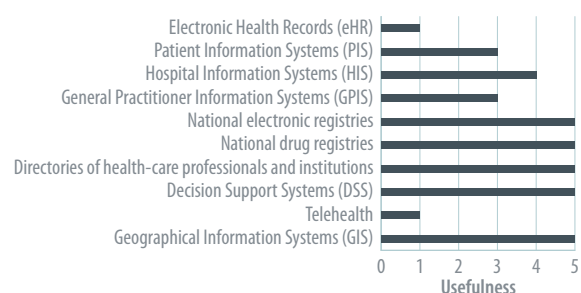


Figure 6. Preferred generic eHealth tools to be provided by WHO

National electronic registries, national drug registries, directories of health-care professionals and institutions, Decision Support Systems (DSS) and Geographical Information Systems (GIS) are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Information on trends and developments in eHealth is considered an extremely useful eHealth service.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Mexico

Enabling environment – policies and strategies to support the information society

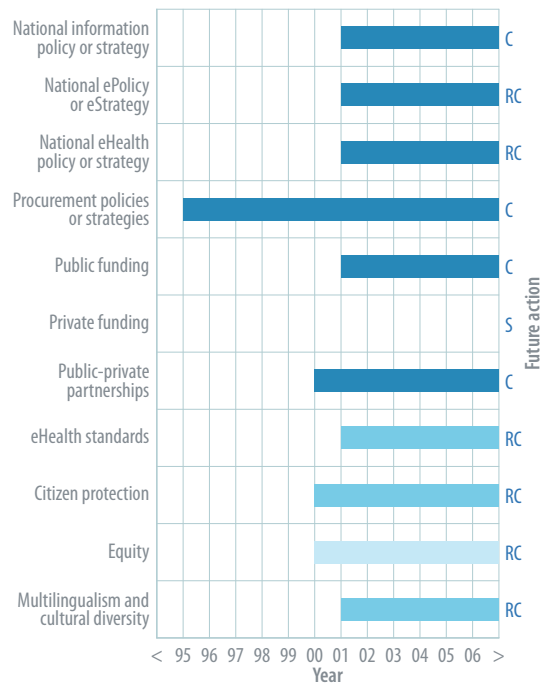


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Mexico reports that the majority of the listed actions to promote an enabling environment for ICT in the health sector have been taken, most of them being rated as very effective. These actions are predicted to continue. The provision of private funding for ICT support to programmes addressing national health priorities will start by 2008. Among other important initiatives the following are mentioned: the establishment in 1996 of the National Telehealth Programme by the State Employee's Social Security and Welfare Institute (ISSSTE) linking 18 secondary- and tertiary-level medical facilities in Mexico's interior; the development in 2004 by ISSSTE and its strategic partners of a remote medical diagnosis programme to provide telehealth services in rural clinics; and the eMexico programme (2000) providing Internet services via satellite to health centres, schools and libraries in rural communities. Involving groups from various sectors in decision-making processes has been a most effective action and achieved through the cooperation of public and private sectors, as has the development and implementation of eGovernment.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Mexico through a national plan for the development of ICT in health and a policy on affordability of infrastructure. Both initiatives were introduced in 2002 and are rated as moderately and slightly effective, respectively. Intersectoral and nongovernmental cooperation commenced in 2001 and is considered moderately effective. These actions are likely to continue over the next two years. The ISSSTE initiative to implement a nationwide 'medical appointment by phone and Internet' system for first-level general consultations in external medicine is highlighted as a success. The upgrading of ICT in order to improve health services for the population and to marginalized and vulnerable groups in particular is described as the most important action. The lack of a specific budget line for the development of ICT infrastructure and the diminution of funds in relation to a growing population are reported as significant challenges; new programmes integrating various sectors have been established to address these issues.

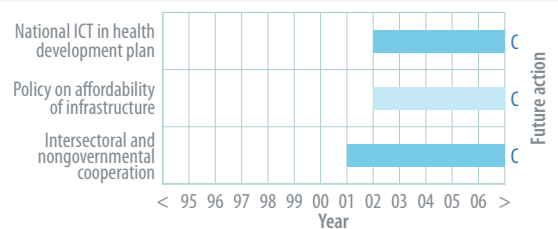


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

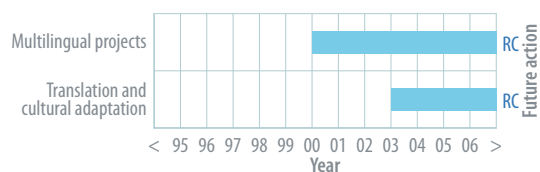


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects to promote the development and use of new electronic health content in multiple languages were introduced in 2000 and translation and cultural adaptation of existing high-quality content (created either locally or abroad), in 2003. These projects are considered moderately effective and will be reviewed and continued. The National Indigenous People's Council has played a leading role in the field of providing electronic multicultural health content. However, most of the people speaking indigenous languages have no access to electronic media at present.

Country indicators	Population (000s)	103 718	OECD country	Yes	Main telephone lines*	17.22
	GDP per capita (Int \$)	9 445	World Bank category	2	Internet users*	13.38
	Total health expenditure (% of GDP)	6.2	ICT Diffusion Index	0.2969	Mobile phone subscribers*	36.64

Content – access to information and knowledge

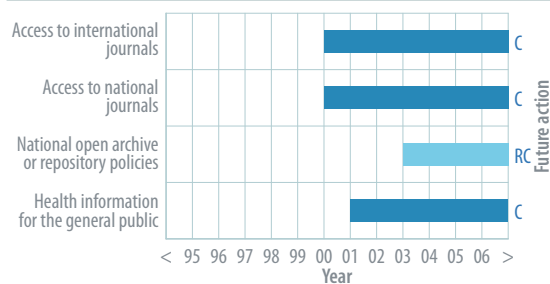


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 2000, and this action is reported as very effective. A policy for a digital national open archive for scientific research (published within the country) was introduced in 2003 and is considered moderately effective. Since 2001, Mexico has provided health information for the general public in electronic format and with great success. All of these services are expected to continue. Mexico's eHealth portal, developed in 2003, was the first portal for the general public to be developed by the health sector. Since its launch various institutions have joined in the effort by providing their own pages with health content. The development of high-quality content is mentioned as a challenge as is the lack of sufficient online access. Issues of access are being addressed by promoting shared access, e.g. via Internet kiosks.

Capacity – human resources knowledge and skills

All of the listed educational programmes for building ICT capacity in the health sector are being offered and are likely to continue. The development of educational tools to provide training for health professionals in ICT is highlighted as an important action. Budgetary constraints pose a significant challenge.

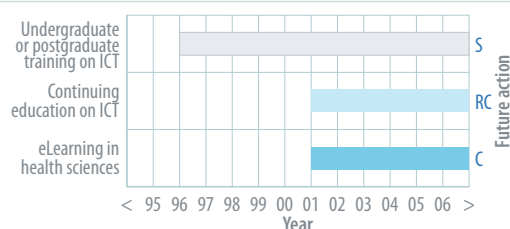


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

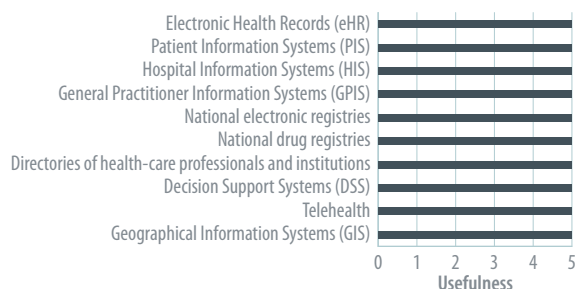


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Mexico. All of the specified eHealth services are considered from very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Panama

Enabling environment – policies and strategies to support the information society

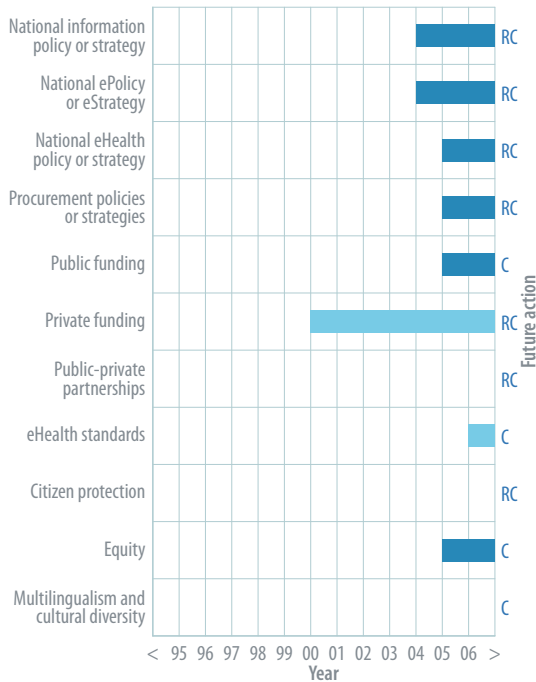


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Panama reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken, and rates them from moderately to very effective. These actions are likely to continue over the next two years. Public-private partnerships to foster the use of ICT within the health sector, and regulations to protect the privacy and security of individual patient data where eHealth is used are likely to be implemented over the next two years. Since 2001 Panama has collaborated with eHealth entities such as ATA, ATALACC and participated with national institutions in international networks such as MED device (established jointly by the Pan American Health Organization/World Health Organization, PAHO/WHO). The most effective actions in building an enabling environment for the use of ICT in the health sector have been: the establishment of a guiding plan for ICT, a national agenda for telemedicine and telehealth, and a rural telemedicine project in the indigenous area of Camarca Ngöbe büglé. The most significant challenge to date in this field has been a general resistance to change, shortage of economic resources and the lack of up-to-date equipment.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health, a policy on affordability of infrastructure, and intersectoral and nongovernmental cooperation. The aforementioned national plan, which sets targets for health sector connectivity, was implemented in 2005 and is reported to be very effective. That same year a national policy to reduce the costs of ICT infrastructure for the health sector was also successfully implemented. The organization and development of a data centre is reported as the most effective action thus far in building ICT infrastructure for the health sector. The most significant challenge to date in this field is the lack of economic resources. To remedy this, Panama is seeking support through international organizations and conducting negotiations with ICT suppliers.

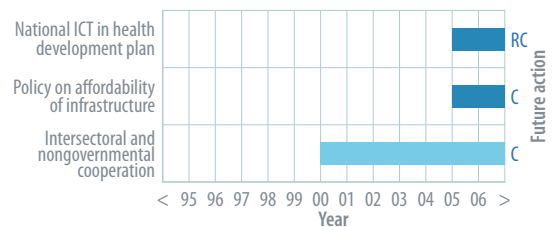


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

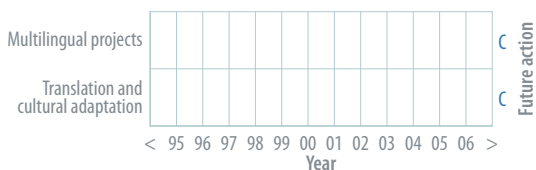
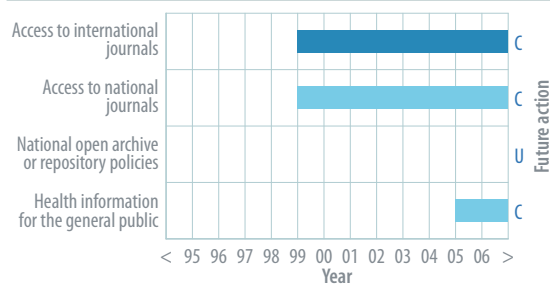


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	3 119	OECD country	No	Main telephone lines*	11.85
	GDP per capita (Int \$)	7 255	World Bank category	2	Internet users*	9.46
	Total health expenditure (% of GDP)	7.6	ICT Diffusion Index	0.2235	Mobile phone subscribers*	26.98

Content – access to information and knowledge



Health professionals have had access to online health content through international and national electronic journals since 1999, and this initiative is rated as moderately to very effective. The general public also has access to electronic health information. This initiative commenced in 2005 and is rated as moderately effective. Panama highlights the strengthening of the Ministry of Health's web site as its most effective action taken to promote access to electronic health content. Lack of human resources training is reported as the most significant challenge in this field.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate or postgraduate training in ICT. ICT skills courses as a part of university curricula for health sciences students have been offered since 2004 and are rated as slightly effective. ICT skills programmes in the ongoing training of health-care professionals, and health sciences courses through eLearning for health professionals in training and practice will be introduced over the next few years. The lack of specific initiatives to increase ICT capacity in the health sector has been a significant challenge.

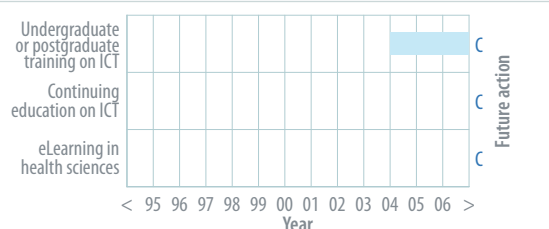


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

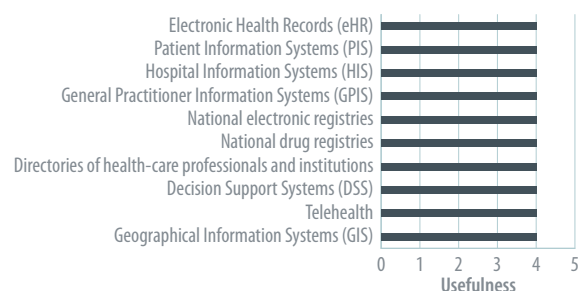


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

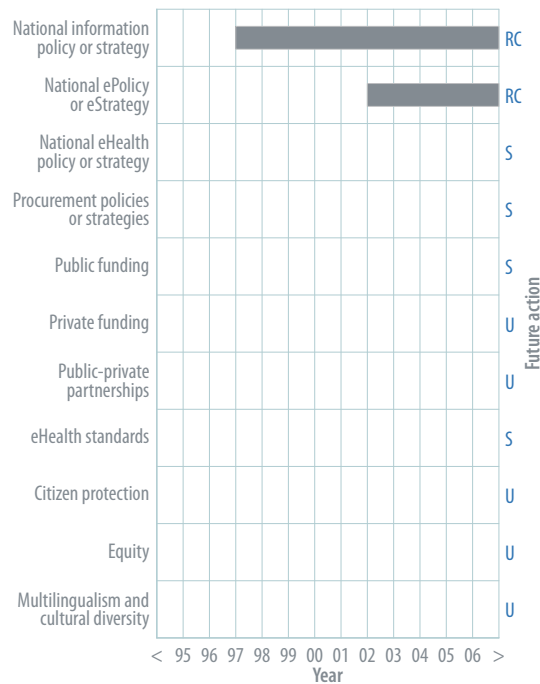
All listed eHealth tools are rated as very useful if WHO could offer these as generic prototypes for adaptation to Panama. Advice on methods for monitoring and evaluation of eHealth services, advice on human resources development for eHealth, advice on eHealth norms and standards, information on trends and developments in eHealth, advice on eLearning programmes, and information on effective/best eHealth practices are considered as extremely useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Paraguay

Enabling environment – policies and strategies to support the information society



Paraguay reports that a national information policy was implemented in 1997 and a national ePolicy in 2002. These actions are likely to be reviewed and continued. Policies for eHealth, procurement, provision of public funding, and norms and standards for eHealth systems are expected to be implemented by 2008. To date, no decision has been made as to which of the remaining listed actions will be taken. Other initiatives are highlighted as being important such as the creation of web portals, encouraging private and public institutions for contracting and purchasing and developing information within the area of eHealth. The most effective action is described to be the Presidential Council, responsible for modernizing the public administration, which formed an inter-institutional working group for the development of information and communication technologies (ICT). Resistance to and fear of change are reported as significant challenges.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, and a national policy to reduce the costs of ICT infrastructure for the health sector are initiatives likely to be introduced over the next two years. Intersectoral and nongovernmental cooperation commenced in 1990 and is considered slightly effective. This initiative will be reviewed and continued. The most important initiative, so far, in building ICT infrastructure for the health sector is the provision of access to Internet by the Ministry of Public Health and Social Welfare (MSPyBS) and the Social Security Institute (IPS). Funding and skills development are reported as significant challenges.

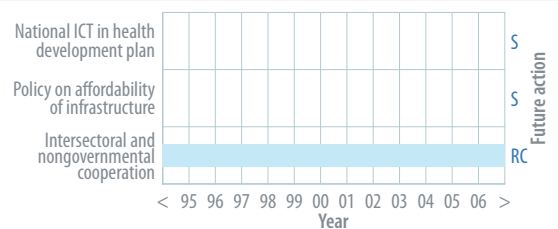
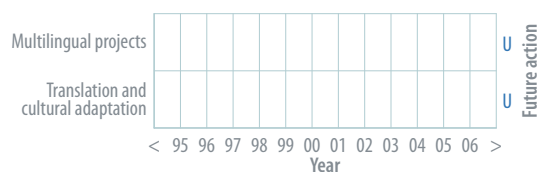


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	5 878	OECD country	No	Main telephone lines*	4.73 [03]
	GDP per capita (Int \$)	4 148	World Bank category	3	Internet users*	2.49
	Total health expenditure (% of GDP)	7.3	ICT Diffusion Index	0.2755	Mobile phone subscribers*	29.38

Content – access to information and knowledge

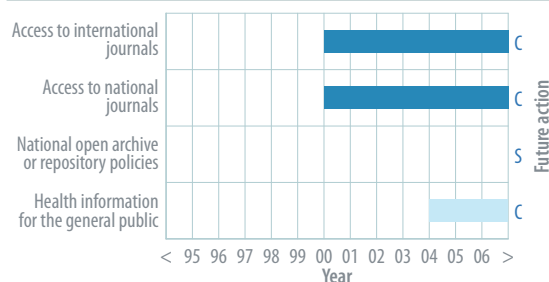


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 2000, and this initiative has been very effective. In 2004 Paraguay began creating and providing health information for the general public in electronic format. These services are expected to continue. A policy for a digital national open archive for scientific research is likely to be introduced by 2008. The creation of a national Library of Medicine (in 2000) is highlighted as another important initiative in this area that will continue. The most effective action is described to be the possibility of accessing various databases through the Virtual Health Libraries. Cost for equipment and Internet services, low server speed and lack of training are reported to pose significant challenges in the field of extending access.

Capacity – human resources knowledge and skills

Health sciences courses through eLearning for health professionals will be introduced in the next two years. At this stage, no decision has been made as to which of the remaining listed educational programmes will be introduced by 2008. Paraguay highlights a pilot training programme in the area of sexual and reproductive health, begun in 2004, which will be reviewed and continued. High costs and lack of skills are reported as significant challenges in building ICT capacity in the health sector.

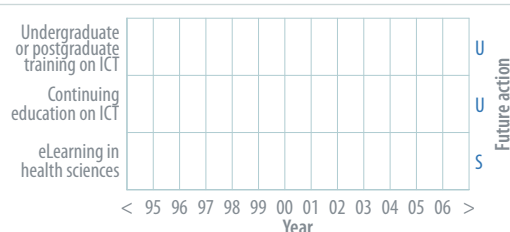


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

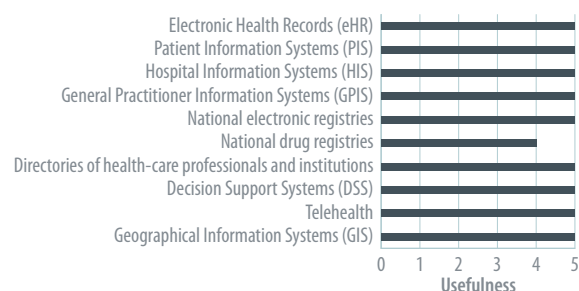


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Paraguay. Teleresearch is mentioned as an additional tool that would be extremely useful. All of the specified eHealth services are also considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Peru

Enabling environment – policies and strategies to support the information society

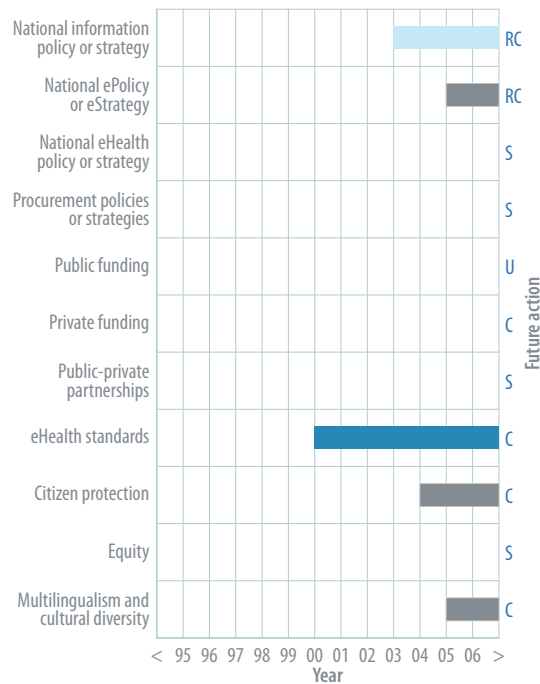


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Peru reports that almost half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and predicts they will continue over the next two years. A national information policy to promote an information society was implemented in 2003 and has so far been slightly effective. This, together with the national ePolicy introduced in 2005, is likely to be reviewed and continued. Norms and standards for eHealth systems, services or applications were adopted in 2000, and are rated as very effective. To date, no decision has been made as to whether public funding for ICT support to programmes addressing national health priorities will be provided by 2008. The rest of the listed actions are likely to be introduced in the next two years. Peru notes the work of the Peruvian Social Security Institute, EsSalud, for instance having developed a strategic plan (2004–2007), and having adopted procurement policies and eHealth norms and standards. The Virtual Health Library (created in 2003) is highlighted; a multi-institutional effort providing public access to health information as another important initiative that will continue. The Development Plan for the Information Society which institutionalizes the process of ICT consolidation is described as a most effective action in Peru. Significant challenges are reported to be the slow acknowledgement and adoption of ICT by health sector staff, a lack of funding, and vulnerability of ICT policies to shifting political priorities.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, is likely to be introduced by 2008. At this stage, no decision has been made as to whether a national policy to reduce the costs of ICT infrastructure for the health sector will be implemented. Intersectoral and nongovernmental cooperation commenced in 2004 and will continue over the next two years. The most significant barrier in building ICT infrastructure for the health sector, so far, has been the lack of a development plan.

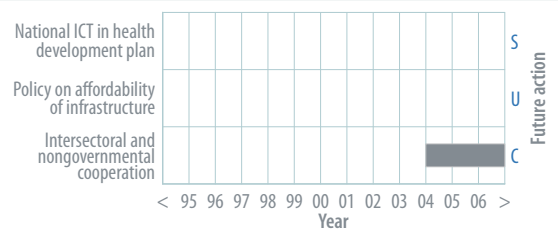


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

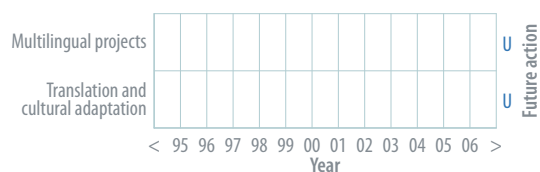


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken. Multiple isolated local efforts are under way but these are not systematized. Limited access to electronic media is reported as a challenge in providing electronic multicultural health content.

Country indicators	Population (000s)	27 162	OECD country	No	Main telephone lines*	7.39
	GDP per capita (Int \$)	5 309	World Bank category	3	Internet users*	11.61
	Total health expenditure (% of GDP)	4.4	ICT Diffusion Index	0.271	Mobile phone subscribers*	14.75

Content – access to information and knowledge

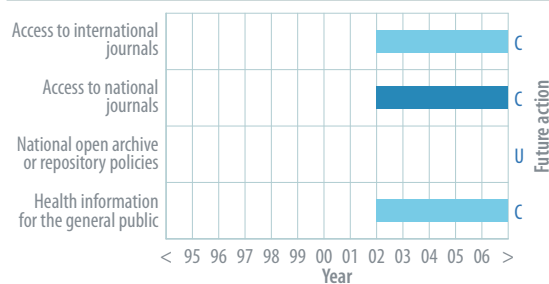


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 2002. The former is rated as moderately effective, and the latter as very effective. Peru has also been creating and providing health information for the general public in electronic format successfully since 2002. These services are expected to continue. The most important initiative to promote access to electronic health content is described as being the introduction of the “Governmental Transparency” law (no. 27806/2002). However, there is a need to improve the diffusion of technical information such as the publication of indicators for the fulfilment of health goals within the system. A significant challenge to access of information is related to infrastructure – data show that only 7% of households have access to computers and in 2005 only 1% of households had access to the Internet.

Capacity – human resources knowledge and skills

Peru has been offering ICT skills courses as a part of university curricula for health sciences students since 2002 and this programme is likely to continue. To date, there has been no decision made as to which of the remaining actions for building ICT capacity in the health sector will be taken over the next two years. Some private universities are reported to have incorporated ICT courses in the basic training of health sciences. Peru indicates that ICT training in the health sector is not seen as a high priority issue at this time.

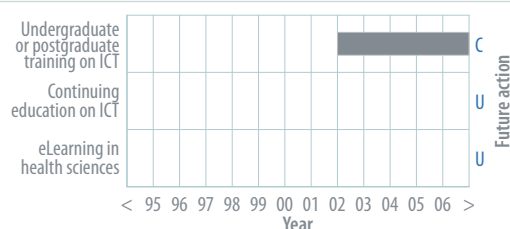


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

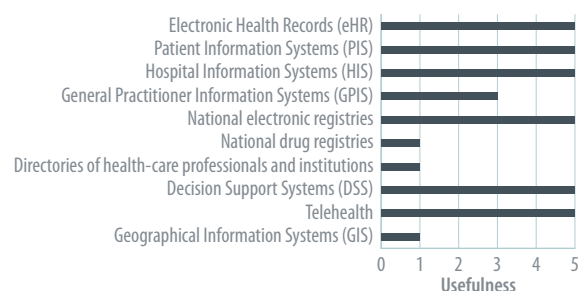


Figure 6. Preferred generic eHealth tools to be provided by WHO

Half of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Methodological guides for the strategic planning of ICT for health institutions and epidemiological surveillance systems of noncommunicable diseases are mentioned as additional tools that would be extremely useful. Of the listed eHealth services the majority are considered from very to extremely useful.

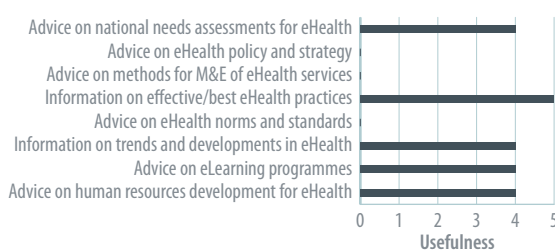


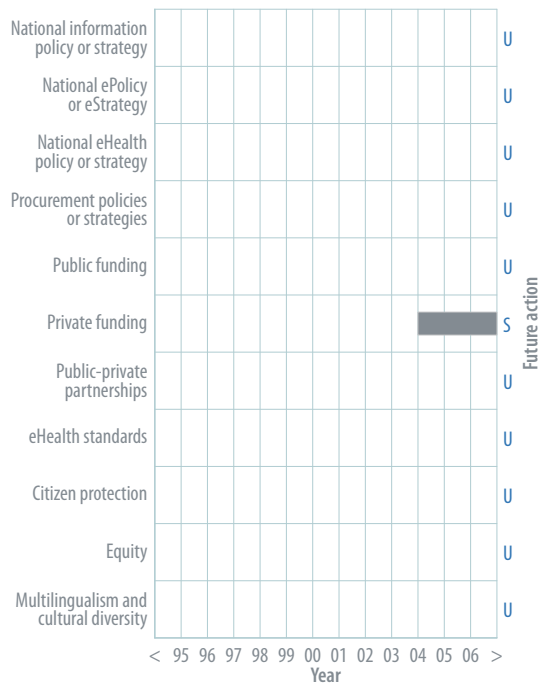
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Suriname

Enabling environment – policies and strategies to support the information society



Suriname reports that private funding for information and communication technologies (ICT) support to programmes addressing national health priorities has been provided since 2004 and is likely to continue over the next two years. A decision remains to be made as to which of the remaining listed actions to promote an enabling environment for ICT in the health sector will be introduced by 2008. In 2000 the first initiative was taken by the Ministry of Health in collaboration with the Pan American Health Organization (PAHO), to set up a National Health Interview Survey (NHIS) for the country. This collaboration included the creation of a core health data set; identification of institutions (e.g. hospitals and clinics) responsible for data collection and reporting; and the reporting of health-related data to the NHIS Unit of the Ministry of Health (in hard and soft copies in the absence of an electronic reporting network).

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

To date, none of the specified actions to support ICT infrastructure development have been implemented and a decision remains to be made as to which actions will be introduced in the next two years.

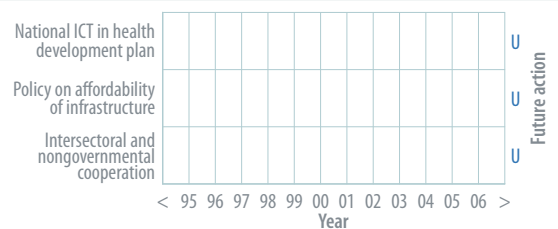
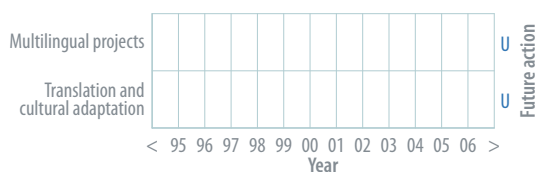


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

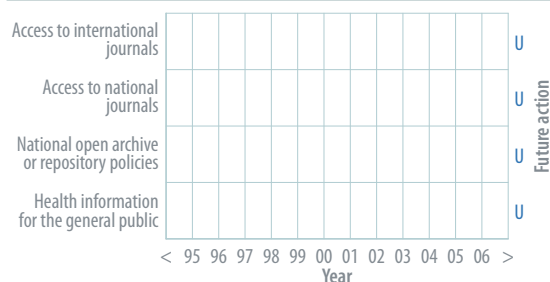


Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and no decision has been made as to which actions will be taken by 2008.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	444	OECD country	No	Main telephone lines*	18.52
	GDP per capita (Int \$)	3 907	World Bank category	3	Internet users*	6.83
	Total health expenditure (% of GDP)	7.9	ICT Diffusion Index	0.3864	Mobile phone subscribers*	48.48

Content – access to information and knowledge



At this stage, none of the listed actions to promote access to electronic health content have been implemented and no decision has been made as to which initiatives will be introduced in the coming two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Suriname has offered ICT skills courses as a part of university curricula for health sciences students (undergraduate or postgraduate) since 1983 and will continue to do so. No decision has been made as to which of the remaining listed educational programmes will be introduced in the next two years.

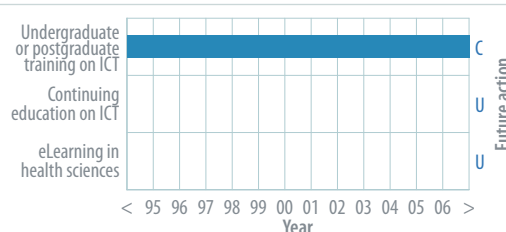


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

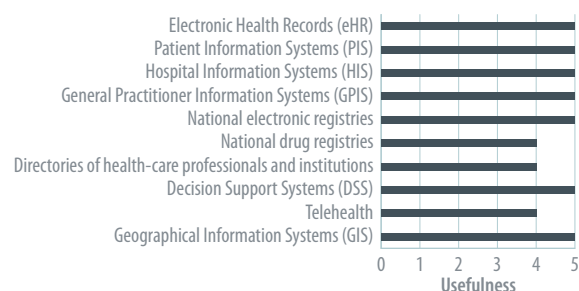


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation by Suriname. A financial information system and a health-personnel information system are mentioned as additional tools that would be extremely useful. The specified eHealth services are considered very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Venezuela (Bolivarian Republic of)

Enabling environment – policies and strategies to support the information society

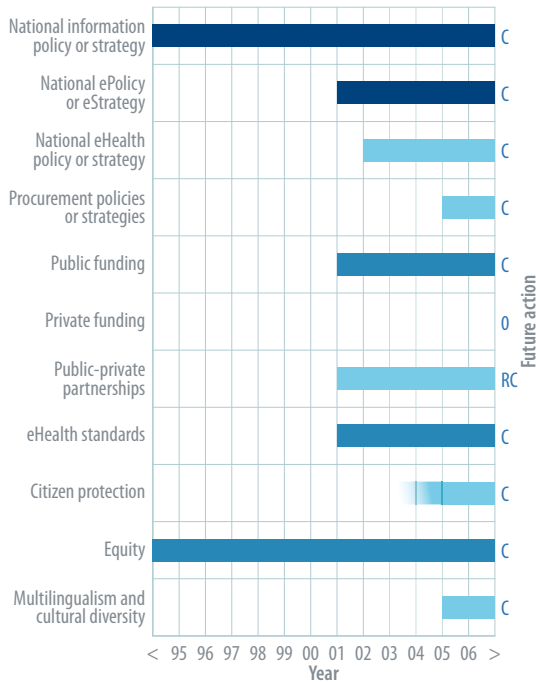


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Bolivarian Republic of Venezuela reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are predicted to continue over the next two years. A national information policy to promote an information society was implemented in 1978 and has been extremely effective. The national ePolicy, introduced in 2001, has also been rated extremely effective. The rest of the implemented actions are considered from moderately to very effective. The most important initiative is described as being the design and development of the country's Virtual Health Library (VHL) with the participation of national universities and institutions specialized in health and information. As a technological partner, the National Information Technology Centre has been responsible for connecting the education and research sectors at the national level. Inadequate infrastructure in the health sector, especially in hospitals, is reported as a significant challenge.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2001. A national policy to reduce the costs of ICT infrastructure for the health sector has also been introduced. Both are rated as moderately effective. Intersectoral and nongovernmental cooperation commenced in 1999 and is considered very effective. These actions are likely to continue over the next two years. The refurbishment of hospitals, which in some cases includes computer equipment, is highlighted as an important action. Funding poses a significant challenge in building ICT infrastructure for the health sector.

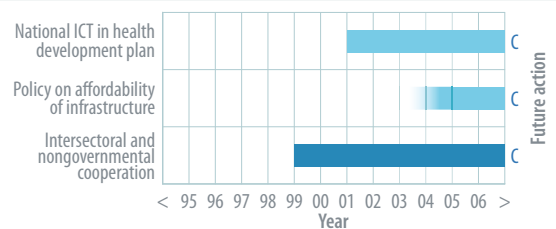


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

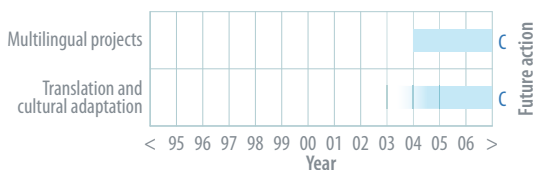


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects have been implemented since 2004 to promote the development and use of new electronic health content in multiple languages. The translation and cultural adaptation of existing high-quality content (created either locally or abroad) has also been introduced. Both initiatives are rated as slightly effective and will continue. The Bolivarian Republic of Venezuela highlights that translation of health content into indigenous languages is being conducted, but that provision of these materials through online access is limited due to a lack of infrastructure in remote regions of the country.

Country indicators	Population (000s)	25 816	OECD country	No	Main telephone lines*	12.78
	GDP per capita (Int \$)	5 127	World Bank category	2	Internet users*	8.84
	Total health expenditure (% of GDP)	4.5	ICT Diffusion Index	0.3053	Mobile phone subscribers*	32.17

Content – access to information and knowledge

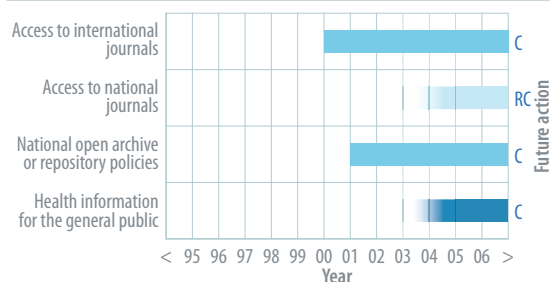


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international electronic journals since 2000, which has been moderately effective and will continue. Access to national electronic journals has also been introduced and is rated as slightly effective and is likely to be reviewed and continued. A policy for a digital national open archive for national scientific research was implemented in 2001 and will continue. Online health information for the general public is being created and provided. This is rated as very effective and will continue. The development and the sustainability of networks like the VHL and the Scientific Electronic Library Online (SciELO), which enable equitable and free access to health information, are described as the most important initiatives in this field. The major challenges in promoting access to

electronic health content (and the Health InterNetwork Access to Research Initiative [HINARI]) are reported to be the limited budget for these kinds of services at the national universities, the lack of consortia for acquiring eJournals at discounted prices, and the low per capita income.

Capacity – human resources knowledge and skills

The Bolivarian Republic of Venezuela offers ICT skills courses as a part of university curricula for health sciences students as well as ICT skills programmes in the ongoing training of health-care professionals. These educational programmes are rated as moderately effective. Health sciences courses through eLearning for health professionals (in training and practice) have been offered since 2005 and are rated as very effective. All of these educational programmes are expected to continue over the next two years. The most important initiatives mentioned include the use of distance learning diploma-courses offered by the Instituto de Altos Estudios en Salud Publica (IAESP) [Public Health Higher Learning Institute] and some private universities such as the University of Yacambu. In the case of IAESP, the distance courses are only offered under the national public health system. The high costs for courses at the private universities also pose a significant barrier.

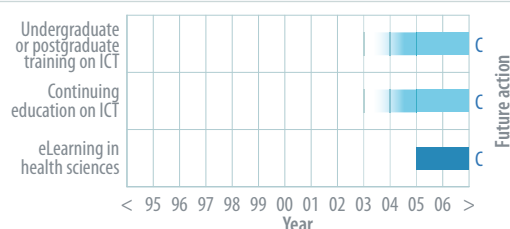


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

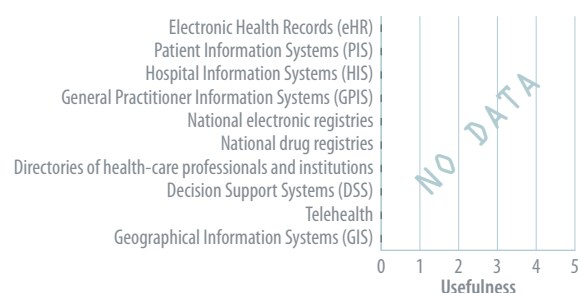


Figure 6. Preferred generic eHealth tools to be provided by WHO

This section of the survey was not completed.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants



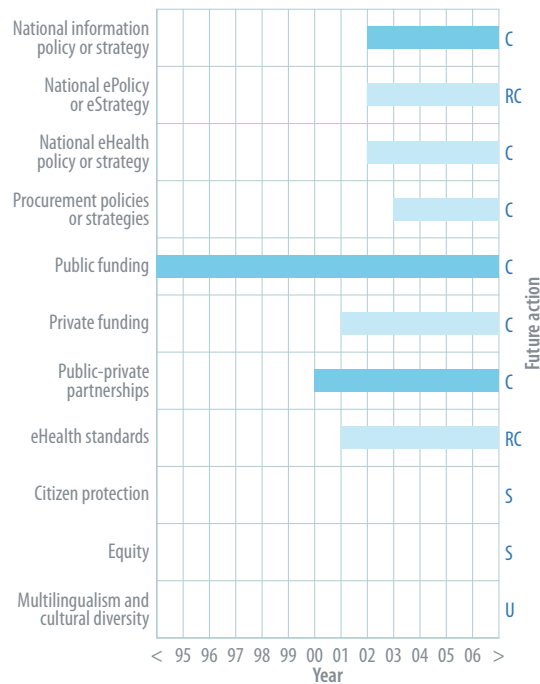
WHO SOUTH-EAST ASIA REGION



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Bangladesh

Enabling environment – policies and strategies to support the information society



Bangladesh reports that all but three of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and rates them as being slightly to moderately effective. They will continue over the next two years. By 2008 Bangladesh will provide equitable access to eHealth and enact standards, regulations or legislation to protect the privacy and security of individual patient data where eHealth is used. The formulation and implementation of an ICT policy (initiated in 2002) has been integral in building an enabling environment for the use of ICT in the health sector. The most significant challenge has been the development of a successful eHealth strategy and an action plan to implement it.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Bangladesh has taken all actions listed to support ICT infrastructure development for the health sector. They will be reviewed and continued over the next two years. Two actions have been the most effective to date: promoting locally developed software in all public and private sector procurement (via preferential pricing), and a customs duty/tax reduction on computer hardware and software. The inadequate ICT infrastructure has been the most significant challenge in building infrastructure for the health sector.

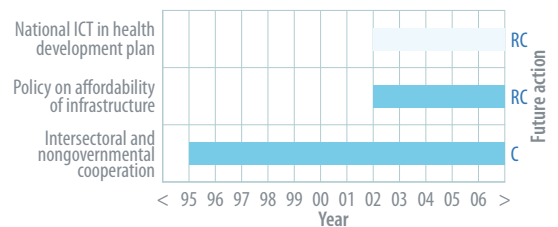
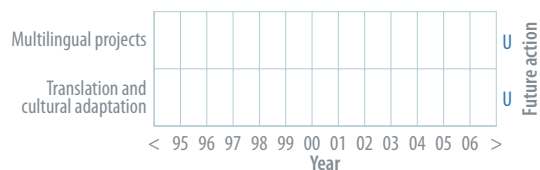


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	136 615	OECD country	No	Main telephone lines*	0.61
	GDP per capita (Int \$)	1 987	World Bank category	4	Internet users*	0.22
	Total health expenditure (% of GDP)	3.4	ICT Diffusion Index	0.1711	Mobile phone subscribers*	2.03

Content – access to information and knowledge

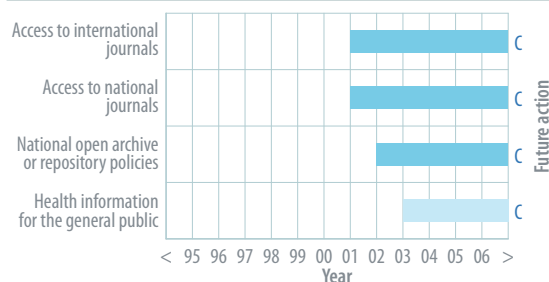


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

All actions listed to promote online access to health content have been taken and are rated from being slightly to moderately effective. They will continue over the next two years. The most effective action has been the individual development of electronic health content by the private tertiary-level hospitals (e.g. Apollo Hospital, Comfort Nursing Home, Continental Hospital, Samorita Hospital Ltd., Monwara Hospital Ltd.). The development of a national eHealth portal has proven to be a significant challenge in promoting access to electronic health content. Bangladesh reports that its ICT policy recommends the use of ICT in health care. To benefit from such eHealth innovations as electronic medical records, telemedicine, and online medical and health education, a national eHealth portal needs to be developed. There is, however, no

consensus among users and policy-makers on how to proceed. Recently, a few companies have taken the initiative to develop eHealth content (e.g. Telemedicine Reference Center Ltd. co-sponsored an initiative on eHealth & Learning with the Sustainable Development Networking Programme (SDNP).

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health professionals have been provided since 2000 and are rated as slightly effective. ICT skills courses as part of the university curricula (undergraduate or postgraduate) for health sciences students and health sciences courses through eLearning for health professionals in training and practice will be provided by 2008. One of the most effective actions reported is a pilot project called eHealth & Learning (eHL), started in January 2003 by the SDNP, which is funded by the European Union in its Asia ICT programme. Bangladesh notes that video conferencing is quite difficult due to broadband limitations. To correct this, the government has approved the use of an undersea cable to service the country. This will make transferring data faster and so video conferencing will be possible in the near future.

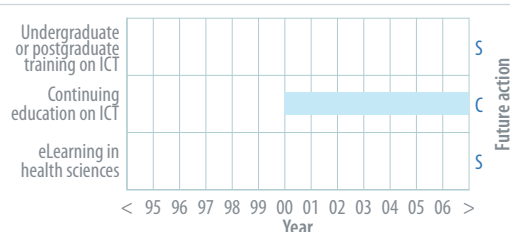


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

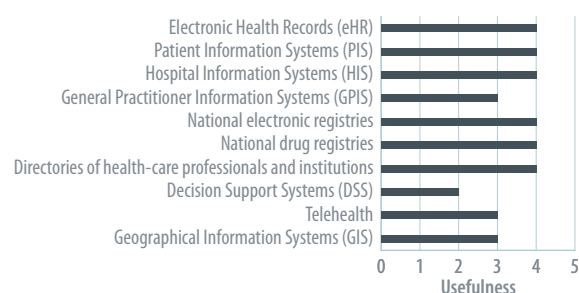


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

Electronic Health Records (eHR), Patient Information Systems (PIS), Hospital Information Systems (HIS), national electronic registries, national drug registries, and directories of health-care professionals and institutions are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Highlighted as extremely useful is the development of a national eHealth portal. Advice on national needs assessments for eHealth, advice on eHealth policy and strategy, and advice on methods for monitoring and evaluation (M&E) of eHealth services are also considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Bhutan

Enabling environment – policies and strategies to support the information society

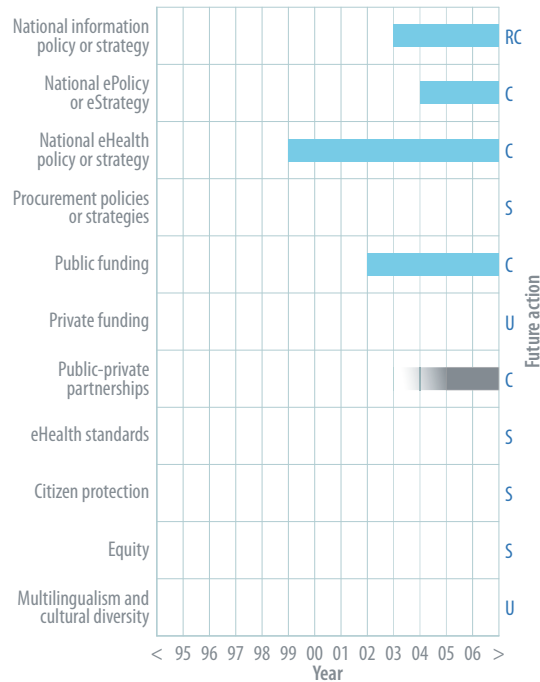


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Bhutan reports that almost half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. These actions will continue over the next two years. The introduction of an e-mail-based consultancy service for the health sector has been the most effective action to date in building an enabling environment for the use of ICT. Telemedicine was introduced for faster and efficient referral of seriously ill patients to the Bhutan National Referral Hospital. This service, available in five out of 29 hospitals, now also facilitates consultation between medical specialists. The most significant challenges have been the lack of resources for ICT infrastructure, ICT literacy and a lack of qualified IT professionals.

Infrastructure – access to information and communication technologies

Bhutan indicates that it works effectively with nongovernmental partners and others to promote infrastructure development, and will continue to do so. The government plans to implement a policy on affordability of infrastructure and a national plan for the development of ICT in health by 2008, which will set targets for health sector connectivity. The most effective action taken has been fundraising from donor and other international agencies with the aim of improving ICT infrastructure development and ultimately establishing a telemedicine practice. Difficult geographical terrain, communication problems and high labour costs for building infrastructure are reported to be the most significant challenges in the area of infrastructure.

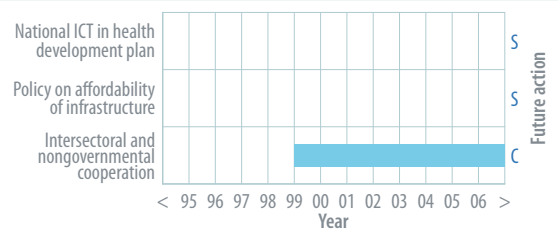


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

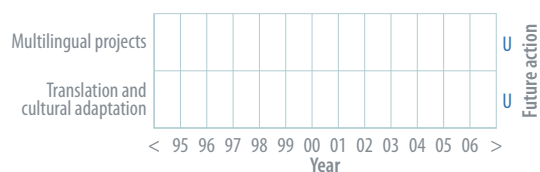


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	2 071	OECD country	No	Main telephone lines*	3.88
	GDP per capita (Int \$)	1 888	World Bank category	4	Internet users*	2.56
	Total health expenditure (% of GDP)	3.1	ICT Diffusion Index	...	Mobile phone subscribers*	2.45

Content – access to information and knowledge

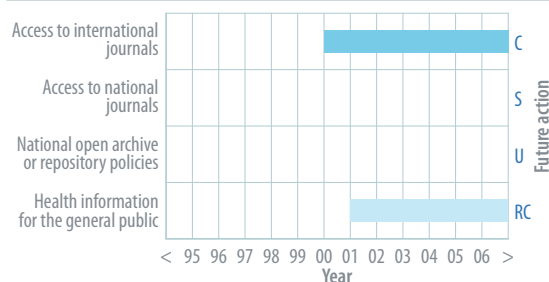


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals was introduced in 2000. This service has been moderately effective and will be continued. Creating health information and providing it electronically for the general public started in 2001 and is rated as being slightly effective. Bhutan created a successful programme that utilizes mass media to generate awareness of health-related issues such as HIV/AIDS, and tobacco, alcohol and drug abuse. The most effective action taken has been the provision of Internet access in the capital and various country districts as a cheap, fast and efficient mode to access information. However, limited access to Internet facilities in other districts is posing a significant challenge to promoting access to electronic health content.

Capacity – human resources knowledge and skills

ICT skills courses have been offered as part of university curricula for health sciences students since 2004, with good results. ICT skills programmes in the ongoing training of health professionals have been offered since 2000 and are rated as being very effective. Bhutan highlights the fact that courses on nursing for development and promotion of in-country human resources have been very effective. The most effective action reported in this area is the training of health personnel in the latest ICT skills. The lack of funds and qualified IT professionals in Bhutan are significant challenges to capacity building.

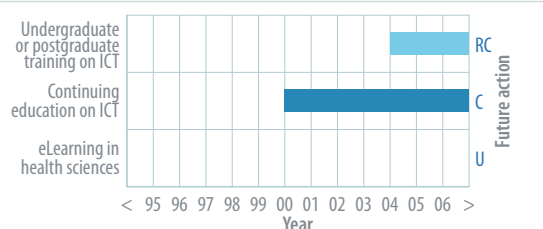


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

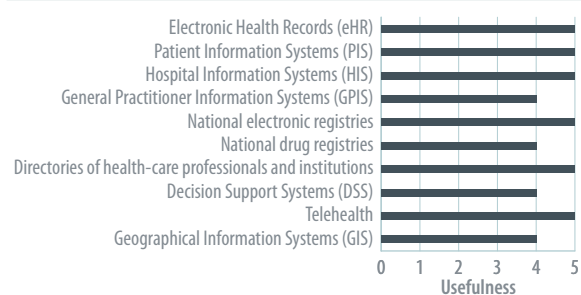


Figure 6. Preferred generic eHealth tools to be provided by WHO

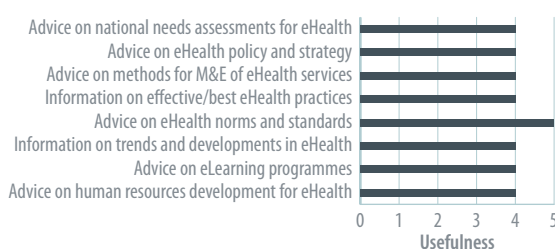


Figure 7. Preferred eHealth services to be provided by WHO

Electronic Health Records (eHR), Patient Information Systems (PIS), Hospital Information Systems (HIS), national electronic registries, telehealth, directories of health-care professionals and institutions, and a global health information system are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on eHealth norms and standards is also considered extremely useful. All other listed eHealth tools and eHealth services are rated very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Democratic People's Republic of Korea

Enabling environment – policies and strategies to support the information society

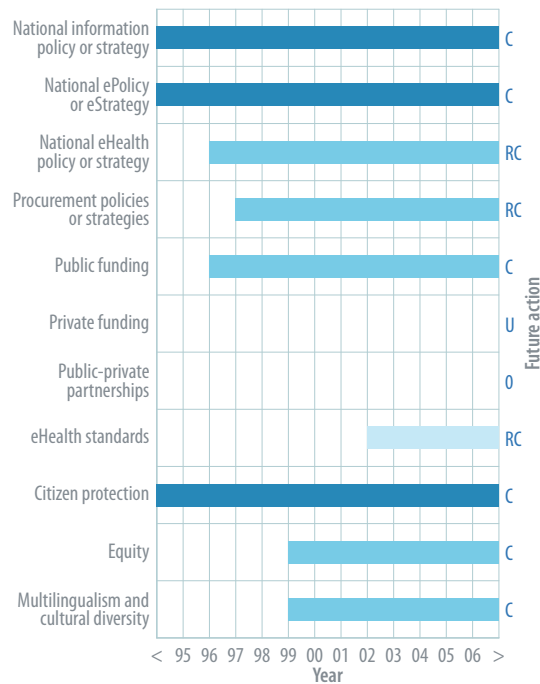


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Democratic People's Republic of Korea reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to moderately effective. They will be reviewed and are likely to be continued over the next two years. It lists the following as its most effective actions in building an enabling environment for the use of ICT in the health sector: training of ICT specialists in the health sector in order to develop the human resource capacity in the IT field and eHealth; the founding of an IT Center in the Ministry of Public Health, which acts as an administrative and technical guiding board on eHealth issues; and establishment of 'IT sections' at all central level hospitals as the main centres for maintaining eHealth systems. The most significant challenges to date in this field have been the lack of human resources equipped with ICT- and health-related knowledge and skills, lack of funding, and low awareness of eHealth issues among health and administrative personnel. Measures taken to combat this include: fostering collaboration between health professionals and ICT experts; strengthened ICT education in the medical college/university curricula and in-service training courses; resource mobilization from external resources (multi-lateral organizations, other donors); and improved education and communication materials on the importance and advantages of eHealth and the Health Information System.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health, a policy on affordability of infrastructure and intersectoral and nongovernmental cooperation. Some of the most effective actions in building ICT infrastructure for the health sector include: establishment of a Wide-Area Network and virtual private Intranet/network in the health sector, which formed the foundation for realizing eHealth nation-wide; establishment of an Intranet for hospitals through a pilot project; the building of a database to manage health personnel, health facilities and health statistical data; standardization of work procedures necessary for eHealth provision in a local context; development of a number of software programs now being used in the health sector; and annual nation-wide exhibitions and seminars on achievements made on the use of ICT in the health sector. The most significant challenges to date in this field are the difficulty in interchangeability between various eHealth systems, software and databases and enhancing the security of the eHealth system. Measures taken to overcome these challenges include: promoting/facilitating standardization of data for eHealth, preparatory work in establishing committees for standardization of eHealth and increased attention to specialized training.

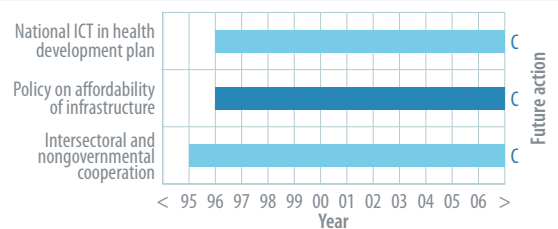


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

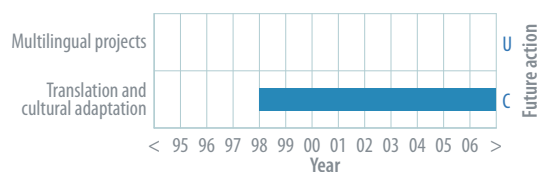


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted through the translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad).

Country indicators	Population (000s)	22 271	OECD country	No	Main telephone lines*	4.10 [03]
	GDP per capita (Int \$)	1 276	World Bank category	4	Internet users*	...
	Total health expenditure (% of GDP)	5.8	ICT Diffusion Index	...	Mobile phone subscribers*	...

Content – access to information and knowledge

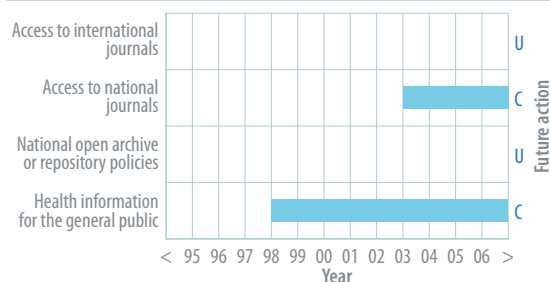


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national electronic journals for health professionals, and the availability of electronic health information for the general public. The Democratic People's Republic of Korea highlights the following as its most effective actions taken to promote access to electronic health content: the creation of an Internet Service Provider (ISP) network and Ministry of Health web site for health information and provision of online access to international electronic journals. This has contributed to the dissemination of health and medical knowledge in the country, and its introduction into health care practice. The most significant challenges in this field are supplying sufficient up-to-date medical science information/data to meet the increased demand, the lack of funds for procuring equipment/hardware,

and for maintaining the electronic information system. Measures taken to address these challenges include: seeking the assistance of international organizations including the World Health Organization (WHO) and utilizing some of the income gained through the development of the ICT industry to procure hardware.

Capacity – human resources knowledge and skills

ICT capacity has been built through the introduction of undergraduate or postgraduate training in ICT, continuing education in ICT, and eLearning in health sciences. These actions are rated from slightly to moderately effective and will continue over the next two years. Among the most effective actions reported are the increased hours allocated for ICT lessons in the medical universities/colleges; improved curricula and quality of teaching and new facilities for practical lessons; and basic IT literacy tests, which are now part of the qualification assessment of in-service health personnel. A lack of information on the application and introduction of ICT in the health sector is a significant challenge in building ICT capacity. However, the state has increased efforts to address this.

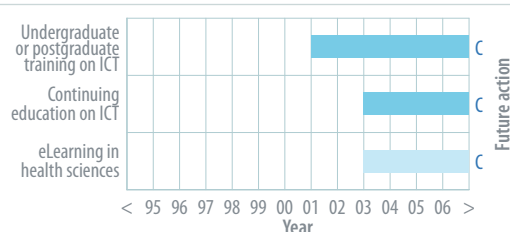


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

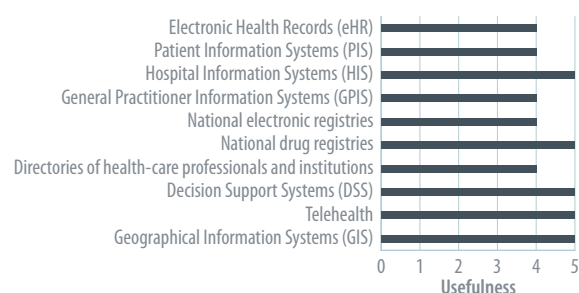


Figure 6. Preferred generic eHealth tools to be provided by WHO

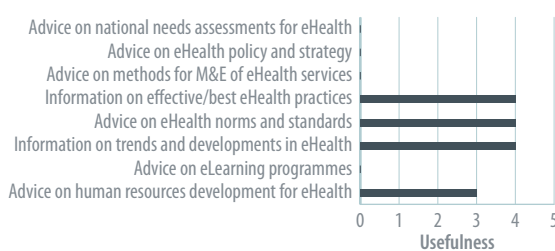


Figure 7. Preferred eHealth services to be provided by WHO

Hospital Information Systems (HIS), national drug registries, Geographical Information Systems (GIS), Decision Support Systems (DSS), telehealth, and an evidence-based medical database are rated as extremely useful if WHO could offer these as generic prototypes for adaptation. Advice on eHealth norms and standards, information on trends and developments in eHealth and information on effective/best eHealth practices are considered very useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

India

Enabling environment – policies and strategies to support the information society

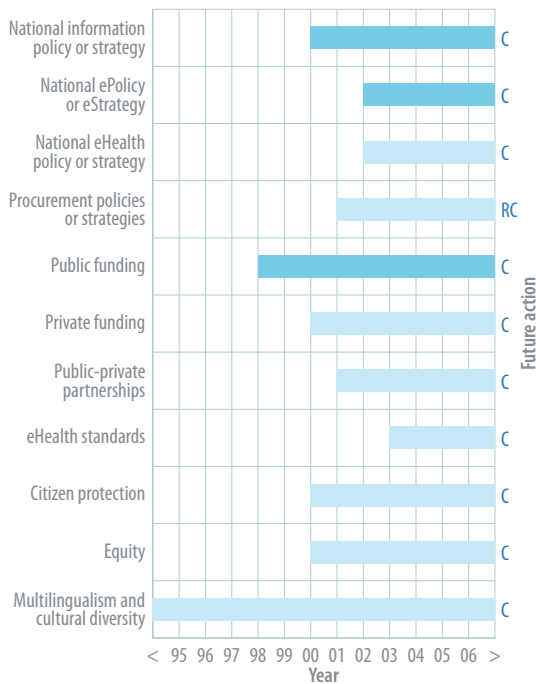


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

India reports that all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to moderately effective. National mechanisms such as an information policy, an eStrategy, and an eHealth policy have been put in place between 2000 and 2002 to promote the use of ICT. Specific health sector mechanisms, such as public-private partnerships, procurement policies, public and private funding and eHealth standards have been successfully introduced since 1998. India lists the following as its most effective actions in building an enabling environment for the use of ICT in the health sector: enactment of the Information Technology Act 2000, providing a legal basis for all digitally related information actions and privacy issues; comprehensive guidelines and recommendations for IT infrastructure in health (2003); and the creation of a task force on the topic of telemedicine (2005). The most significant challenges to date have been the coordination of inter-ministerial and departmental activities, and resource constraints.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in India through a national plan for the development of ICT in health and intersectoral and nongovernmental cooperation. A national policy to reduce the costs of ICT infrastructure for the health sector will be implemented over the next few years. India highlights the launch in 2007 of HealthSat, which is likely to strengthen specific health network communications. Among the most effective actions so far in building ICT infrastructure for the health sector has been the creation of more than one hundred pilot projects in telemedicine with connectivity and funding support from the Indian Space Research Organization. This has led to a significant increase in experience and expertise in the sphere of telemedicine and advanced several policy initiatives, the most important being the IT Infrastructure in Health policy. Further, the Ministry of Finance has mandated that 3% of the budget of all government spending will go to ICT, which has created a culture of ICT usage in government. Provision of Internet access in rural areas (where approximately 65% of the total population dwell) and the great diversity of languages across regions are listed as the most significant challenges in this field.

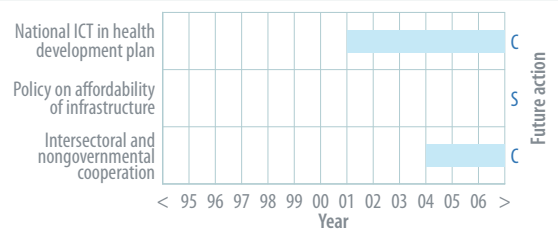


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

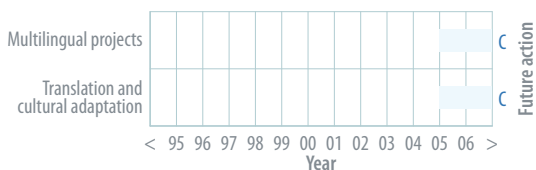


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted through the introduction of multilingual projects and the support of translation and cultural adaptation. The most effective actions taken are: the CDAC (Centre for Development of Advanced Computing) initiative where computers capable of multilingual use are being developed and promoted; and Indian Institute of Technology Kanpur programmes for providing guidelines for prevention and control of major diseases. Limited availability of good health content in local languages and a lack of resources for widespread quality translation have been significant challenges.

Country indicators	Population (000s)	1 070 800	OECD country	No	Main telephone lines*	4.07
	GDP per capita (Int \$)	1 691	World Bank category	4	Internet users*	3.24
	Total health expenditure (% of GDP)	4.8	ICT Diffusion Index	0.2081	Mobile phone subscribers*	4.37

Content – access to information and knowledge

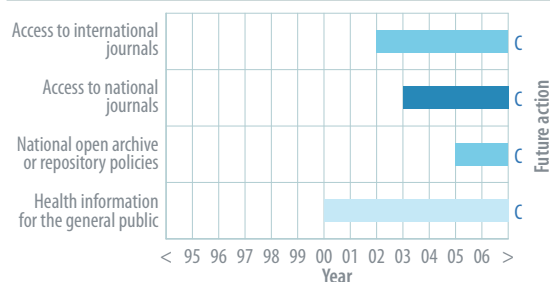


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national and international electronic journals, a national open archive for scientific research, and the availability of electronic health information for the general public. India reports that efforts in providing health information to the citizen are undertaken by disease control programmes, which provide prevention and control-related information. Currently all major associations of health professionals are developing web-based information sources. The most effective actions taken are the following: enhancing access to bibliographic data on international medical research and facilitating the provision of full text by the Indian Medlars Centre; the establishment of the National Health Information Collaboration, a web portal managed by the bio-informatics centre of the Indian

Council of Medical Research; and the network of medical college libraries through the Ministry of Health. The most significant challenge in this field is the lack of resources in providing online access to international medical journals. Building consortia for the purpose of procurement have been initiated in different states, but with mixed outcomes. The Ministry of Health has recently started consultations to examine the feasibility of creating a national consortium for the purchase of digital information products at favourable prices for the country.

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of continuing education in ICT and through eLearning in health sciences. One of the most effective actions reported is the establishment of telemedicine nodes in hospitals with connectivity from the Indian Space Research Organisation. This generated significant awareness among health professionals and other stakeholders regarding the potential of ICT in enhancing health care. India reports its historic public health focus on combating the burden of disease overshadows attention being paid to strategic thinking in the effective deployment of ICT for health. The Ministry of Communication and Information Technology took the lead in promoting action on standards and guidelines for ICT initiatives, and ICT issues are also high on the Ministry of Health's agenda.

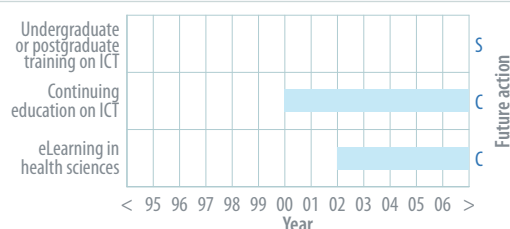


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

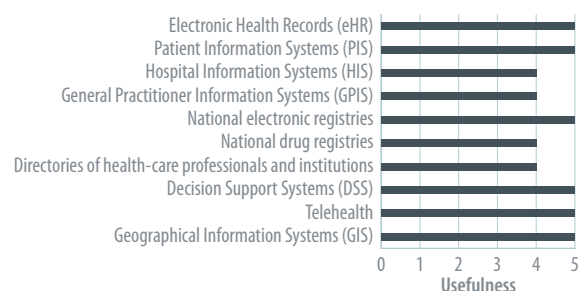


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

India rates the majority of listed eHealth tools as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. It adds to the list of extremely useful tools the following: eLearning modules (content), virtual classrooms and digital libraries. India recommends that eHealth programmes that failed in developed countries should be shared, as failure of ICT initiatives is generally attributed to various factors related to economic development.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Maldives

Enabling environment – policies and strategies to support the information society

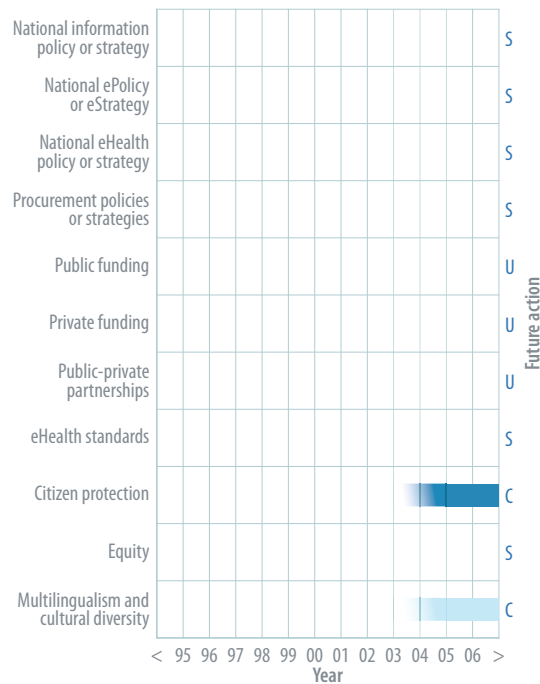


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Maldives reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector are expected to commence by 2008. Regulations to protect the privacy and security of individual patient data where eHealth is used are considered very effective, and are likely to continue over the next two years. The recognition of cultural diversity through the provision of information in local languages has been slightly effective and may continue. To date, a decision remains to be made as to which of the remaining listed actions will be introduced by 2008. Although the Maldives highlights the introduction of telemedicine in four regional hospitals in addition to the Indira Gandhi Memorial Hospital in Malé as a significant measure, it notes that access to and use of the project has been limited so far. The most significant challenge is physical access. Patients needing specialized care must be referred to one of the central, regional or atoll hospitals that provide specialized medical services; the referral system is complicated and costly due to the geography of the country and the limited public sea-transport system.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was introduced in 2003 and is reported to be slightly effective. The implementation in 2003 of a national policy to reduce the costs of ICT infrastructure for the health sector is rated as moderately effective. Both actions are likely to be reviewed and continued over the next two years. Intersectoral and nongovernmental cooperation is likely to continue as well. The establishment of telecommunications companies to develop and improve networks and accessibility to all the regions and to most of the islands with public hospitals is reported as another important action in this field. Among the most effective actions in building ICT infrastructure for the health sector is the installation of telephone lines, fax machines and mobile telephone networks for the sharing of data and information between hospitals, the Department of Public Health and the Ministry of Health. The most significant challenge in this area is the reported need to build capacity of staff across the health system.

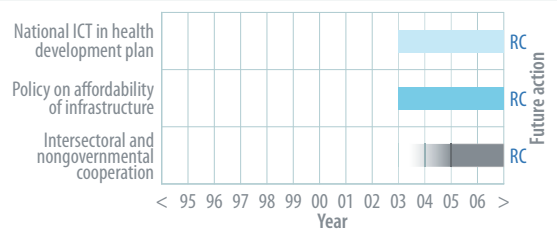


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

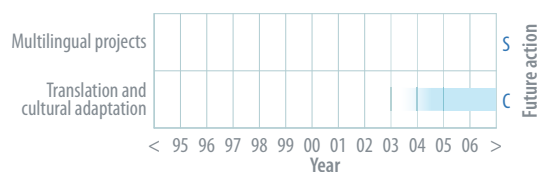


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The Maldives plans to introduce special projects to promote the development and use of new electronic health content in multiple languages by 2008. The translation and cultural adaptation of existing high-quality content (created either locally or abroad) is rated as slightly effective and likely to continue.

Country indicators	Population (000s)	313	OECD country	No	Main telephone lines*	9.6
	GDP per capita (Int \$)	5 894	World Bank category	3	Internet users*	5.79
	Total health expenditure (% of GDP)	6.2	ICT Diffusion Index	0.3565	Mobile phone subscribers*	34.53

Content – access to information and knowledge

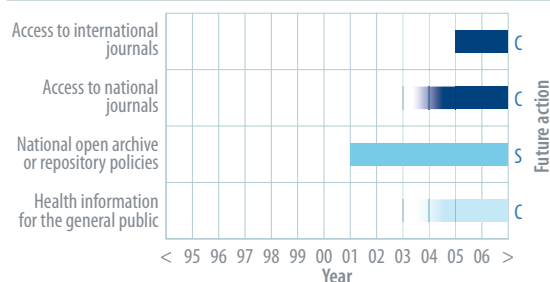


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have access to online health content through international and national electronic journals in the Maldives. These services are rated as extremely effective and are predicted to continue over the next two years. The Health InterNetwork Access to Research Initiative (HINARI), introduced in 2005, is mentioned as an extremely effective advance in this area. A policy for a digital national open archive for scientific research, published within the Maldives, was implemented in 2001. This is reported to be a moderately effective action likely to continue. Creating and providing health information for the general public in electronic format is described as a slightly effective service that is expected to be reviewed and continued. The Maldives highlights the need to strengthen the network of the National Library, and the

libraries of the Ministry of Health and the Faculty of Health Sciences. Raising awareness among health professionals of the potential of these resources is reported as a significant challenge.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 2002 and are rated as moderately effective. ICT skills programmes in the ongoing training of health-care professionals were introduced in 2003 and are rated as slightly effective. The Maldives also offers health sciences courses through eLearning for health professionals in training and practice. All these actions are planned to continue over the next two years. Insufficient Internet connectivity and the high costs related to it are described as significant challenges to build ICT capacity in the health sector.

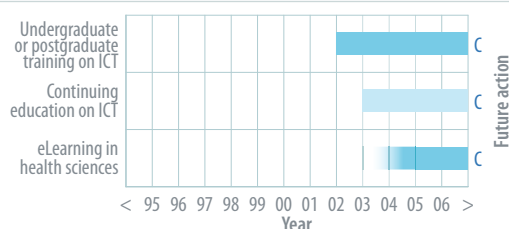


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

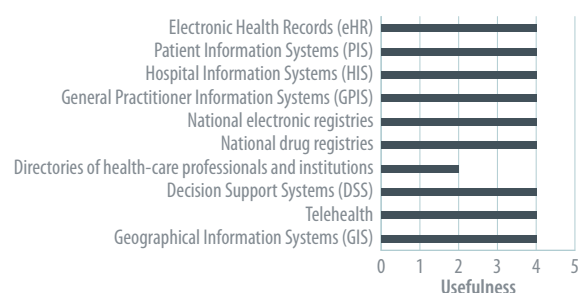


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation to the Maldives. The majority of the specified eHealth services are also considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Myanmar

Enabling environment – policies and strategies to support the information society

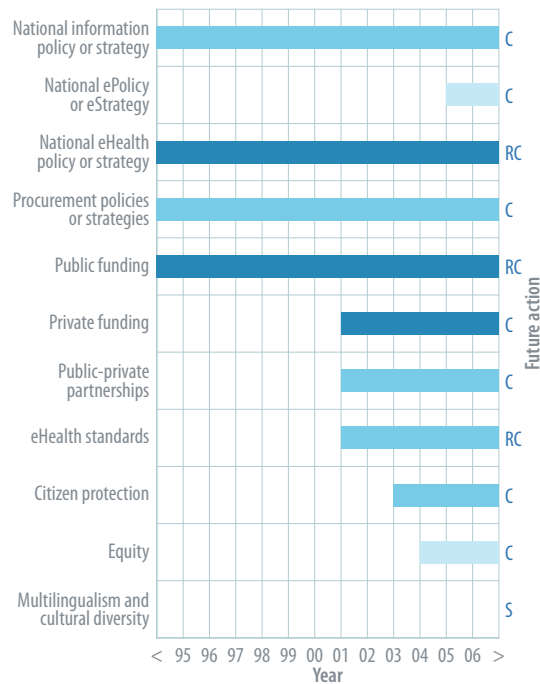


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Myanmar reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. The country predicts they will continue over the next two years. To recognize cultural diversity the provision of information in local languages is expected to begin by 2008. Myanmar highlights the establishment of an eHealth data centre in 2003 as a moderately effective action, which will continue over the next two years. Telemedicine education and teleconferencing are mentioned as other very effective actions initiated in 2003. The national eHealth plan, which includes development of infrastructure and human resources and the establishment of eLibraries, is mentioned among the most effective actions taken in building an enabling environment for the use of ICT in the health sector. Rapidly changing technology, insufficient funding, limited access to the Internet and insufficient bandwidth are listed as the most significant challenges in this field. Inter-ministerial collaboration is seen as an option for dealing with these challenges.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2005; its effectiveness is still unknown. This action is expected to continue. Myanmar indicates that intersectoral and nongovernmental cooperation to promote infrastructure development commenced in 2001. This is rated as very effective and likely to continue. Currently there are no plans to implement a national policy to reduce the costs of ICT infrastructure for the health sector. Myanmar highlights the establishment of cyber cafes and public access centres as other important actions in this field, which will continue in the next few years. Developing a countrywide network for eHealth is described as the most effective action thus far in building ICT infrastructure for the health sector. The most significant challenge is reported to be the development of teleconsultation at district hospitals and planning for technical and financial support is seen as a solution.

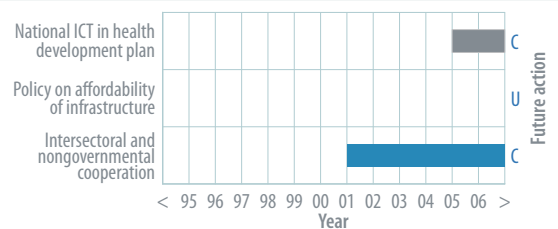


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

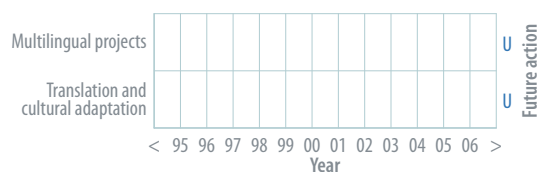


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken in the next two years.

Country indicators	Population (000s)	49 463	OECD country	No	Main telephone lines*	0.79
	GDP per capita (Int \$)	1 838	World Bank category	4	Internet users*	0.12
	Total health expenditure (% of GDP)	2.8	ICT Diffusion Index	..	Mobile phone subscribers*	0.17

Content – access to information and knowledge

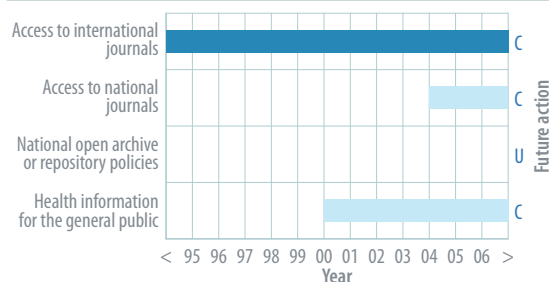


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1990 and 2004, respectively. The former is rated as very effective and the latter as slightly effective. Creating and providing health information for the general public in electronic format commenced in 2000 and is rated as slightly effective. These services are likely to continue over the next two years. Another action highlighted by Myanmar is the development of an eLibrary management system in medical universities. The planning and implementation of online access to medical information is described as the most effective action in this field. The most significant challenge is the provision of required infrastructure and maintenance for the facilities. Myanmar addresses this by building and strengthening staff capacity.

Capacity – human resources knowledge and skills

Myanmar reports that all of the listed actions to build ICT capacity in the health sector were introduced between 2001 and 2003. They are rated as moderately effective and are predicted to continue over the next two years. Providing ICT management and training in eHealth to staff at every level is described as the most effective action in this area. The most significant challenge is described to be the upgrading and expansion of ICT facilities at various levels of the health system. Myanmar reports that more resources will have to be mobilized to solve it.

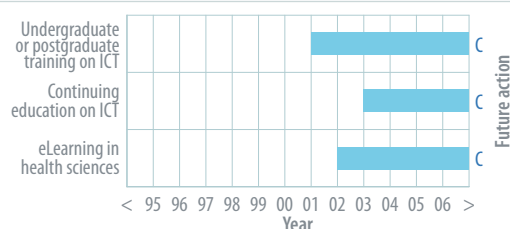


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

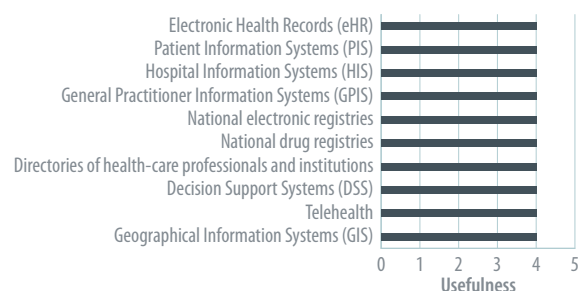


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation to Myanmar. Disease surveillance is reported as an additional eHealth tool that would be very useful. All of the specified eHealth services are considered very useful. Medical/health informatics training is mentioned as an additional service that would be very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Nepal

Enabling environment – policies and strategies to support the information society

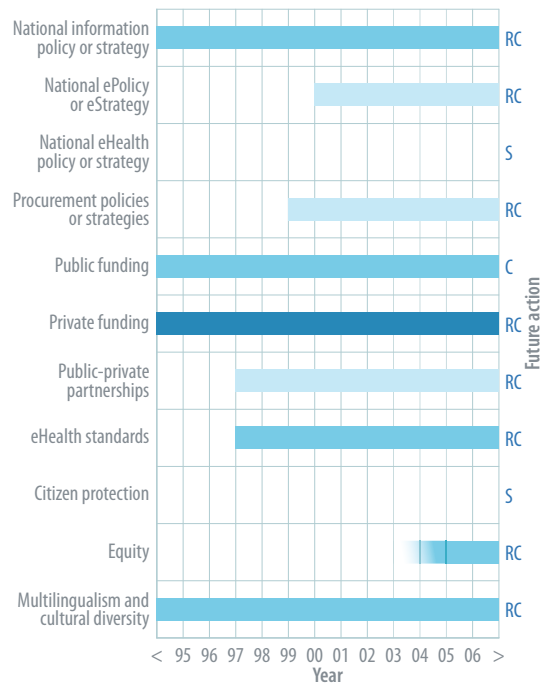


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Nepal reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are likely to continue. They have been rated from slightly to very effective. Implementation of a national eHealth policy and regulations to protect the privacy and security of individual patient data where eHealth is used will begin by 2008. In 2005 Nepal decentralized local health services and created the Human Resource Development System (eHURDIS), which is a national database of health professionals. The most important initiatives in building an enabling environment for the use of ICT in the health sector include the Health Management Information System (HMIS) at the Department of Health Services, the Financial Management Information System and the Logistic Information System. Another important project is the initiation of HealthNet Nepal and the provision of locally-generated health information, introduced in 1994. The need for an appropriate policy, limited infrastructure and the lack of ICT skills are mentioned as the most significant challenges. A National Information Technology Commission has been formed to look after all the policy issues related to the information technology. Nepal is addressing these issues by expanding the infrastructure to the district level, training of health professionals in ICT and enhancing quality control of medical education.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, and intersectoral and nongovernmental cooperation to promote infrastructure development will be introduced by 2008. A Local Area Network (LAN) and Wide Area Network (WAN) were introduced in 2004 at the Ministry of Health and Population and the Department of Health Services, and are described as important initiatives in building ICT infrastructure for the health sector. Nepal emphasizes that any efforts to improve ICT in the country should be done within the framework of the existing network rather than building a new system.

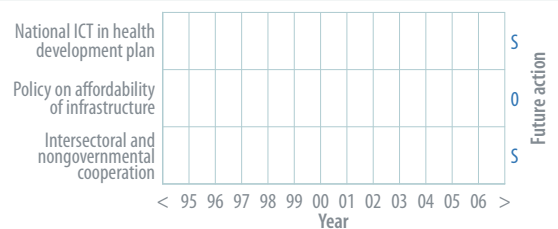


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

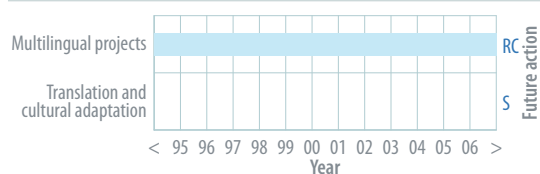


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

In 1994 Nepal introduced special projects to promote the development and use of new electronic health content in multiple languages. This action, rated as slightly effective; will be reviewed and continued. Radio and television are, due to their accessibility, described as the most effective electronic media for disseminating multicultural health content with over one third of the population owning a television.

Country indicators	Population (000s)	26 053	OECD country	No	Main telephone lines*	1.69
	GDP per capita (Int \$)	1 219	World Bank category	4	Internet users*	0.48
	Total health expenditure (% of GDP)	5.3	ICT Diffusion Index	0.1794	Mobile phone subscribers*	0.47

Content – access to information and knowledge

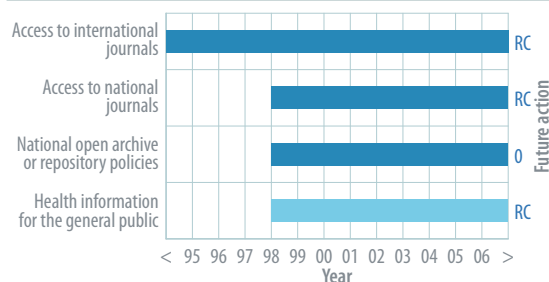


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

The provision of access to international electronic journals began in 1994, and to national electronic journals in 1998. A policy for a digital national open archive for scientific research published within the country was introduced in 1998. The same year Nepal initiated the creation and provision of health information for the general public in electronic format. The majority of the services in this field are rated as very effective. In 2005, the Central Bureau of Statistics opened a national digital archive of census results for the general public. This is considered a very successful initiative and will be reviewed and continued. HealthNet Nepal, a nongovernmental organization that collects and provides access to international and locally generated eHealth information is highlighted as the most effective action together

with the establishment of the Ministry of Health website, <http://www.moh.gov.np>. The lack of computers and computer illiteracy are reported as significant challenges in the field of extending access to the community.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students will be introduced by 2008. ICT skills programmes in the ongoing training of health-care professionals and health sciences courses through eLearning in training and practice have been offered since 2000. These educational programmes are rated from moderately to very effective and will be reviewed and continued over the next two years. An institutional policy was implemented in 2005 to include eEducation in the training of undergraduate and postgraduate students. Another initiative is the training provided by HealthNet Nepal in basic ICT for literature and digital library research, and for statistical applications.

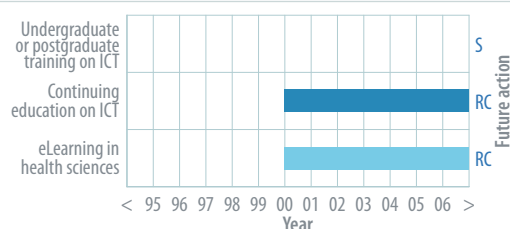


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

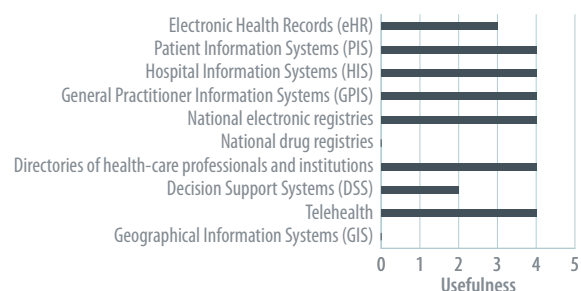


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

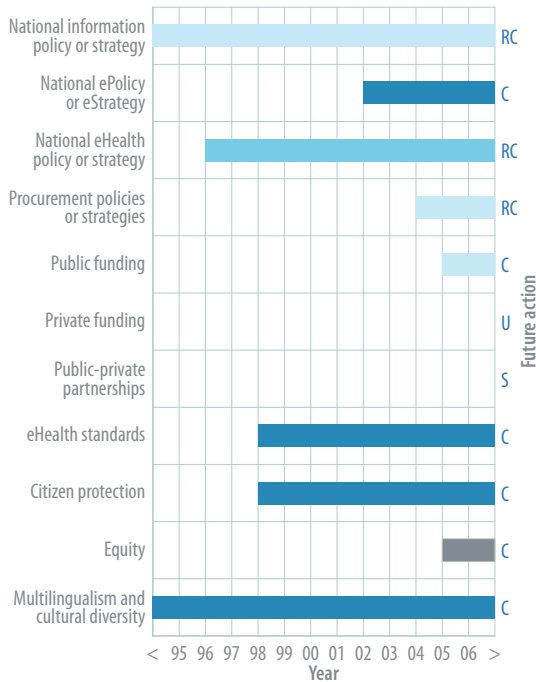
The majority of the listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. All of the specified eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Sri Lanka

Enabling environment – policies and strategies to support the information society



Sri Lanka reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken, and will continue over the next two years. Of the implemented actions more than half rated moderately to very effective. It remains to be decided as to whether the securing of private funding for ICT will be introduced. The implementation of public-private partnerships to foster the use of ICT for health is expected to start by 2008. Another important action, taken in 2005, was to provide necessary infrastructure and affordable access throughout the country, including eCitizen services. The e-Sri Lanka initiative is described as the most effective action in building an enabling environment for the use of ICT in the health sector. The most significant challenge is reported to be the change from paper-based to e-based systems.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was implemented in 1999. This is rated as a moderately effective action and will be reviewed and continued over the next two years. The implementation since 2004 of a national policy to reduce the costs of ICT infrastructure for the health sector has been very effective and is planned to continue over the next two years. Sri Lanka indicates that it works productively with other sectors and nongovernmental partners to promote infrastructure development and will continue to do so. Grants from the World Health Organization, the World Bank and other donor agencies are described as most effective in the building of ICT infrastructure for the health sector. The absence of an ICT wide area network (WAN) for the public's use poses a significant challenge in the provision of access.

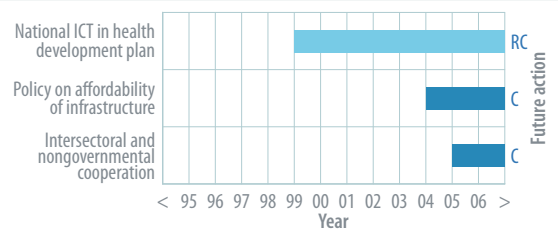


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

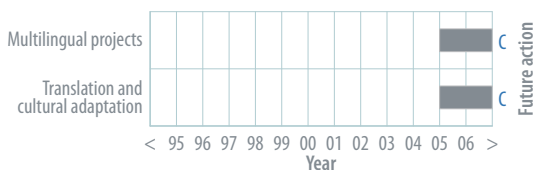
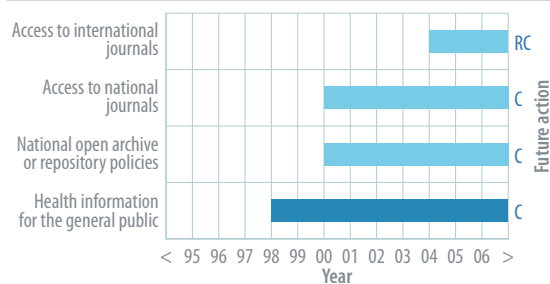


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects to promote the development and use of new electronic health content in multiple languages and the support of the translation and cultural adaptation of existing high-quality content which has been created either locally or abroad were introduced in 2005 and will continue. The use of ICT by indigenous systems of medicine such as Ayurveda is highlighted by Sri Lanka as another important initiative in this field. The most effective project to provide electronic multicultural health content is reported to be the development of a software programme to be used in English and two local languages.

Country indicators	Population (000s)	20 394	OECD country	No	Main telephone lines*	5.1
	GDP per capita (Int \$)	3 516	World Bank category	3	Internet users*	1.44
	Total health expenditure (% of GDP)	3.5	ICT Diffusion Index	0.2545	Mobile phone subscribers*	11.37

Content – access to information and knowledge



Access to international and national electronic journals was introduced in 2004 and 2000, respectively, and a digital national open archive for scientific research, including health research, was launched in 2000. These services are rated as moderately effective. Creating and providing health information for the general public in an electronic format commenced in 1998 and is rated as very effective. All of these activities will continue. Translation of information to local languages and its conversion to electronic format are reported to be the most significant challenges in the field of extending access to the community.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as part of university curricula for health sciences students have been offered since 2004 and will likely be reviewed and continued. ICT skills programmes in the ongoing training of health professionals began in 1997. Since 2000, health professionals have had access to health sciences courses through eLearning. Both these educational programmes are considered moderately effective and will continue. Sri Lanka highlights the introduction of training programmes at the National Institute of Health Sciences in electronic hospital record keeping; International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10); and ICT. Training in basic computer skills, subsequent training and exercise modules for distance learning are described as the most effective approaches in building ICT capacity in the health sector. Motivating health professionals to develop their ICT skills is reported as the most significant challenge in this area.

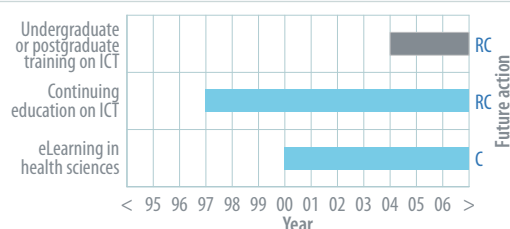


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

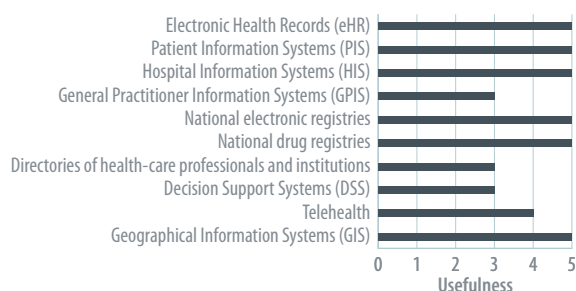


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

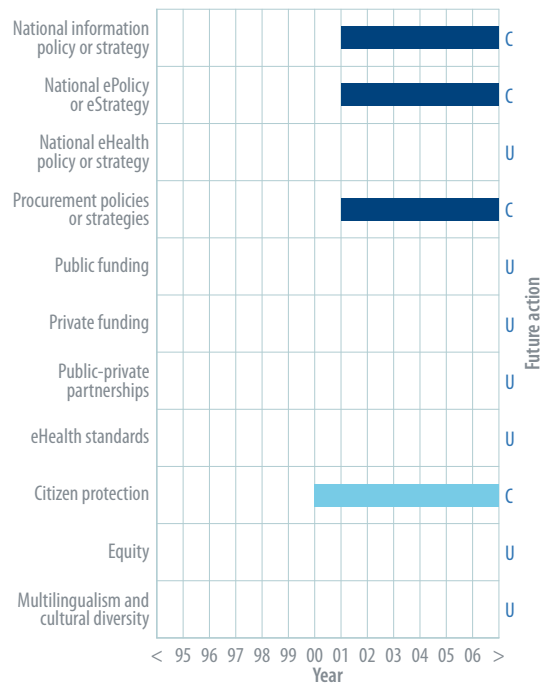
Sri Lanka rates the majority of the listed eHealth tools as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Provision of open source products is mentioned as an additional tool that would be extremely useful. All of the specified eHealth services are rated as moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Thailand

Enabling environment – policies and strategies to support the information society



Thailand reports that both a national information policy and a national ePolicy were adopted in 2001. Procurement policies to guide software, hardware and content acquisition in the health sector were introduced the same year. These actions are considered extremely effective and will continue over the next two years. In 2000 regulations to protect the privacy and security of individual patient data where eHealth is used were implemented. Rated as moderately effective, so far, they are expected to continue. Currently, no decision has been made as to which of the remaining listed actions will be taken by 2008. Thailand highlights the use of information and communication technologies (ICT) to develop the Health Service System (eHealth Service). eProcurement is listed as another important initiative in building an enabling environment for the use of ICT in the health sector. Medical eConsultation and medical eLearning are current pilot projects highlighted in the area of eHealth. However, inadequate funding and support in terms of policy pose a significant challenge.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

To date, none of the specified actions to support ICT infrastructure development have been implemented and no decision has been made as to which initiatives will be introduced in the next two years.

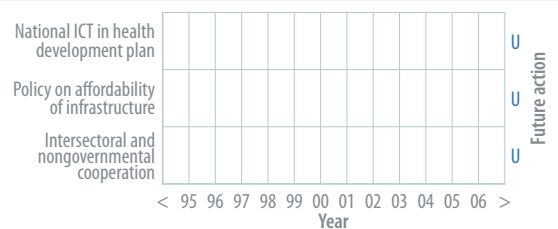
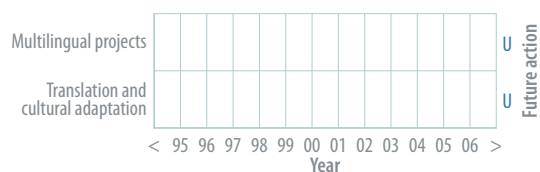


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

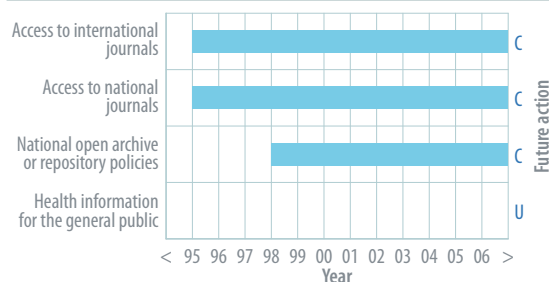


At this stage, none of the specified actions to promote the development of electronic multicultural health content have been implemented and decision remains to be made as to which actions will be taken by 2008.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	63 145	OECD country	No	Main telephone lines*	10.97
	GDP per capita (Int \$)	7 776	World Bank category	3	Internet users*	11.25
	Total health expenditure (% of GDP)	3.3	ICT Diffusion Index	0.3049	Mobile phone subscribers*	44.18

Content – access to information and knowledge



Health professionals have had access to online health content through international and national electronic journals since 1995. A policy for a digital national open archive for scientific research (published in Thailand) was implemented in 1998. All these services are considered moderately effective and likely to continue. A decision remains to be made as to whether online health information for the general public will be created and provided by 2008.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses have been offered as part of university curricula for health sciences students since 1992, with great success. The same year, ICT skills programmes were introduced in the ongoing training of health-care professionals, which has been rated as moderately effective. These educational programmes are expected to continue over the next two years. There are no plans, as yet, to provide health sciences courses through eLearning for health professionals (in training and practice) in the coming two years.

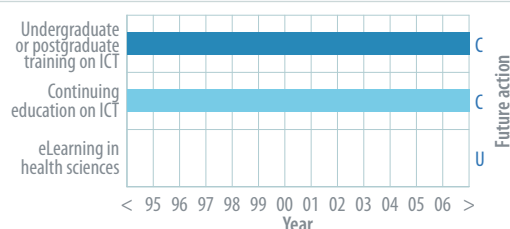


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

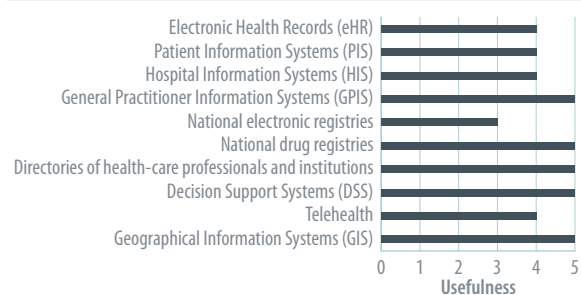


Figure 6. Preferred generic eHealth tools to be provided by WHO

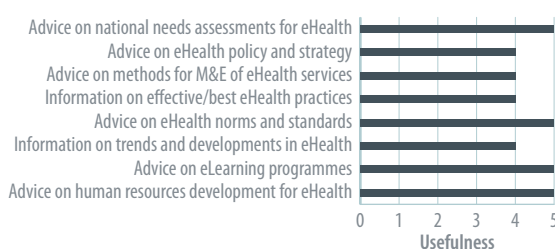
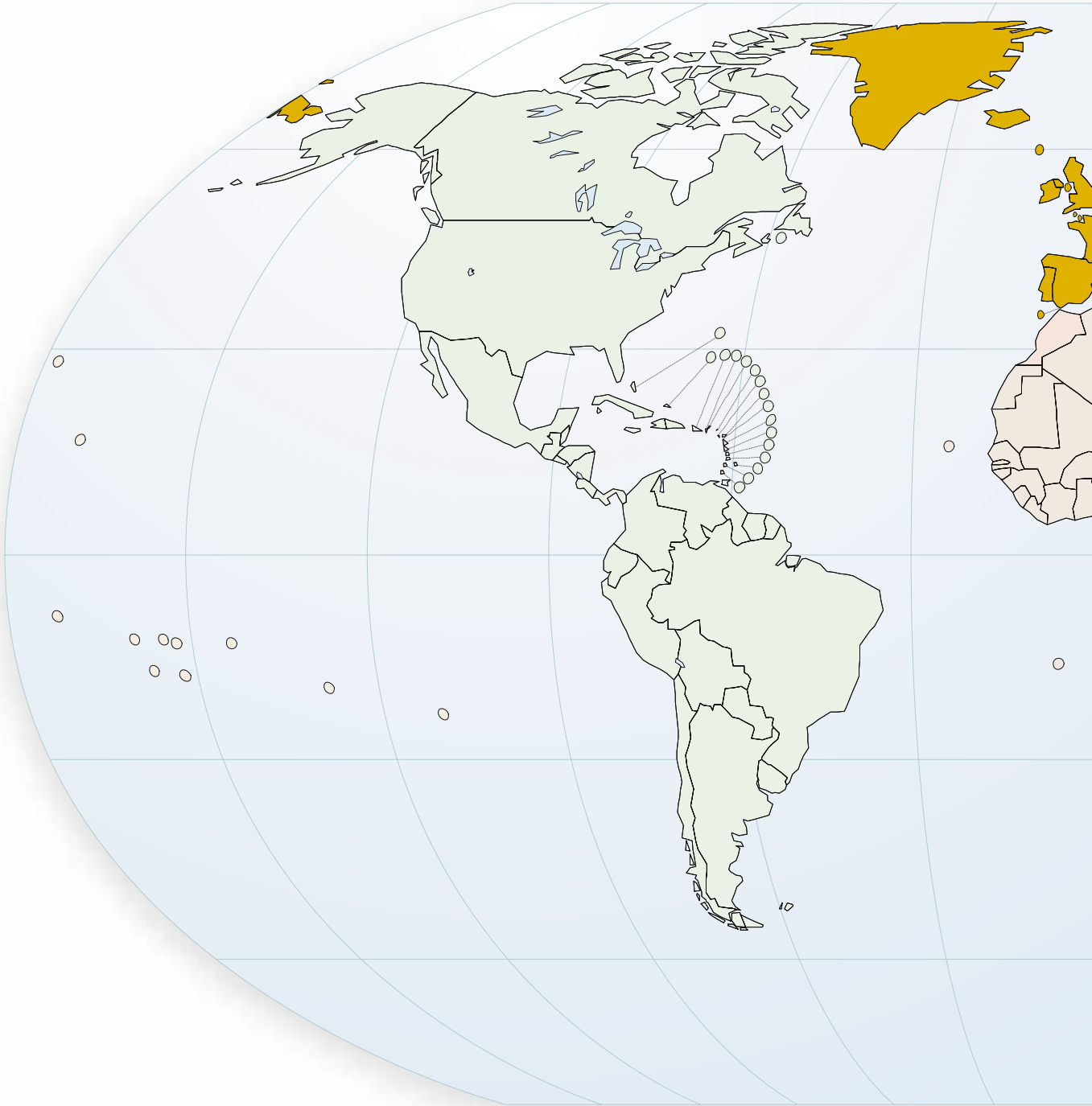


Figure 7. Preferred eHealth services to be provided by WHO

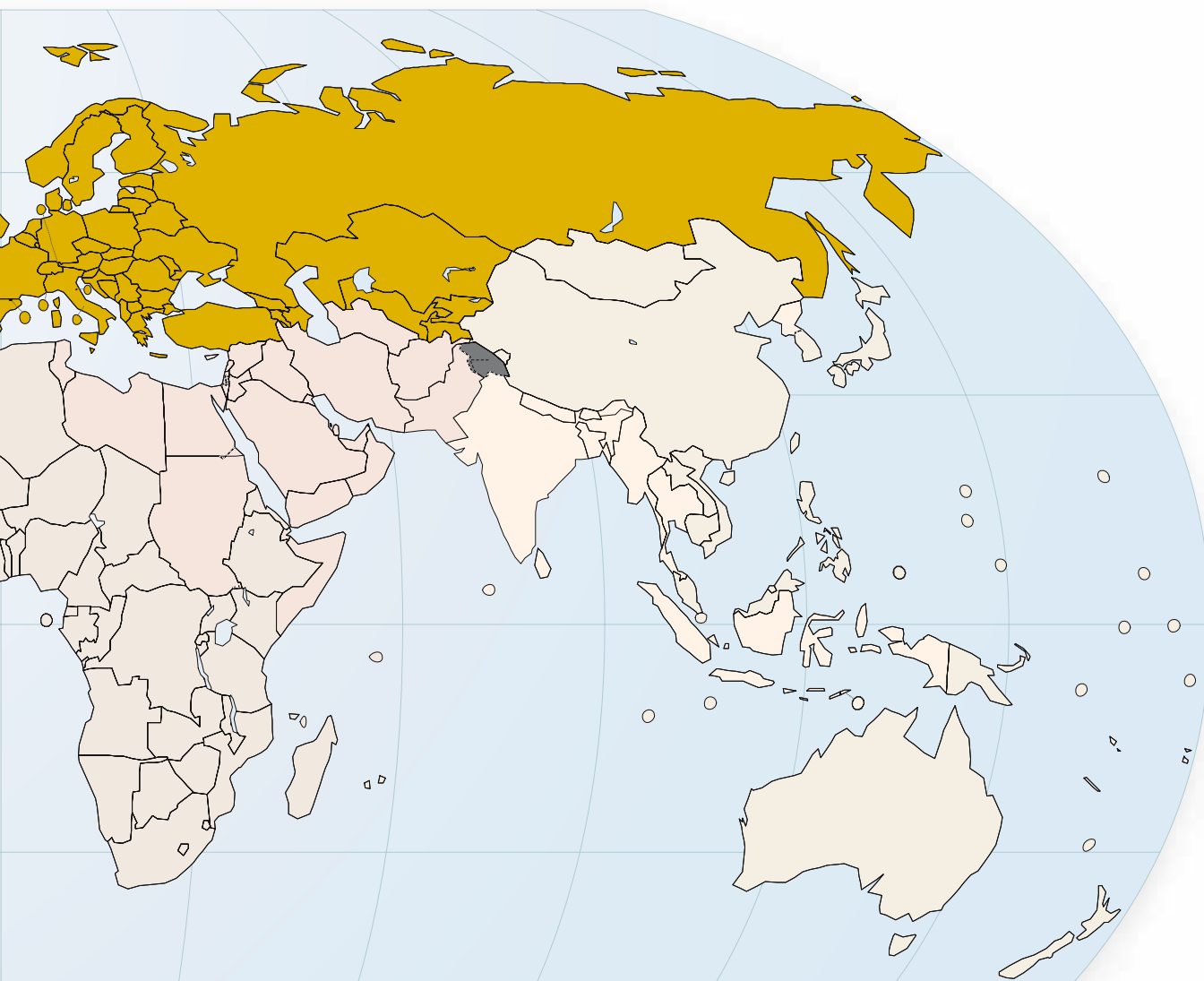
The majority of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Thailand. The specified eHealth services are considered very to moderately useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants



WHO EUROPEAN REGION



Albania 218	Finland 238	Luxembourg 254	Spain
Andorra	France** 240	Malta	Sweden
Armenia 220	Georgia	Monaco	Switzerland 264
Austria 222	Germany 242	Netherlands	Tajikistan
Azerbaijan	Greece	Norway 256	The former Yugoslav Republic of Macedonia
Belarus 224	Hungary 244	Poland 258	Turkey 266
Belgium 226	Iceland 246	Portugal	Turkmenistan
Bosnia and Herzegovina	Ireland	Republic of Moldova	Ukraine
Bulgaria	Israel 248	Romania	United Kingdom of Great Britain and Northern Ireland 268
Croatia 228	Italy	Russian Federation 260	Uzbekistan
Cyprus 230	Kazakhstan	San Marino	
Czech Republic 232	Kyrgyzstan	Serbia	
Denmark 234	Latvia 250	Slovakia 262	
Estonia 236	Lithuania 252	Slovenia	

Albania

Enabling environment – policies and strategies to support the information society

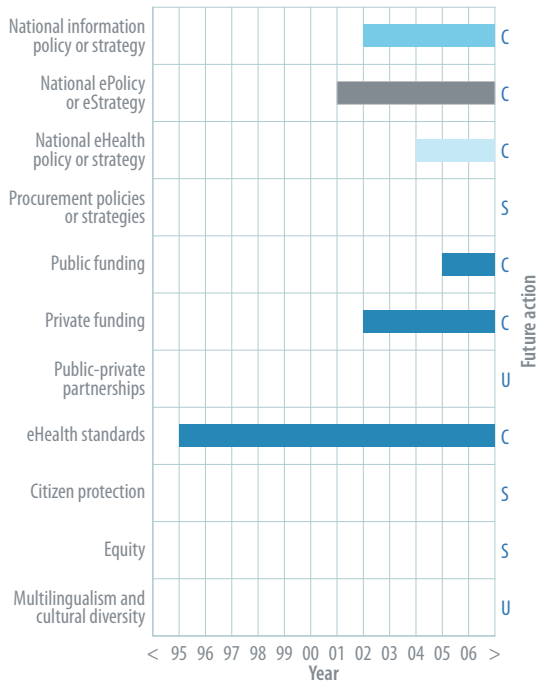


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Albania reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. The country predicts these actions will be reviewed and continued over the next few years. National mechanisms such as an information policy, an eStrategy, and an eHealth policy have been established between 2001 and 2004 to promote the use of ICT. In the next few years, Albania intends to implement procurement policies or strategies to guide software, hardware and content acquisition in the health sector. Private and public funding for ICT support of programmes addressing national health priorities has been provided since 2002 and 2005, respectively, and has been very effective. Albania highlights the support of the Ministry of Health towards ICT development as well as the initiatives it provides on financial and professional incentives, training and support of technical staff as important factors in the development of an enabling environment.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Albania through a national plan for the development of ICT in health, and intersectoral and nongovernmental cooperation. The former, which sets targets for health sector connectivity, was implemented in 1999 and is reported to be moderately effective. The latter has been very effective and the partnerships will continue. The development of a reporting system for morbidity statistics in primary health care in two districts of Albania is rated as the most effective action taken so far in building ICT infrastructure for the health sector.

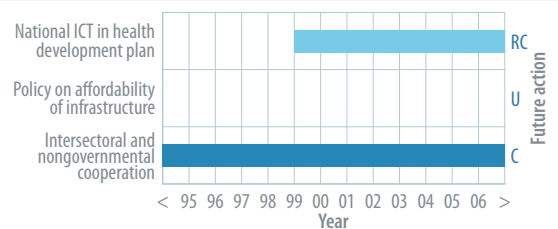


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

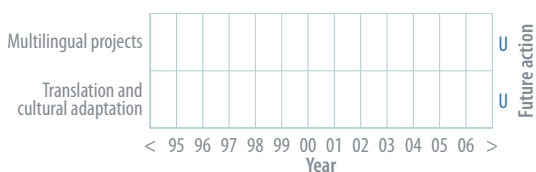
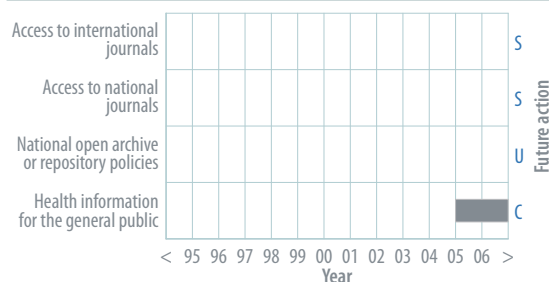


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	3 094	OECD country	No	Main telephone lines*	8.30 [03]
	GDP per capita (Int \$)	5 626	World Bank category	3	Internet users*	2.35
	Total health expenditure (% of GDP)	6.5	ICT Diffusion Index	0.1966	Mobile phone subscribers*	35.8

Content – access to information and knowledge



Online access to health content has been provided in Albania since 2005 through electronic health information for the general public. An effectiveness rating of this action is not yet available. Access to national and international electronic journals will be introduced by 2008. Albania highlights the completion of its Ministry of Health's web site as the most effective action taken to promote access to electronic health content.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity in Albania has been built through the use of undergraduate and postgraduate training in ICT. ICT skills courses as part of university curricula for health sciences students have been offered since 1996 and they are rated as very effective. ICT skills programmes in the ongoing training of health-care professionals will be provided by 2008, as will health sciences courses through eLearning for health professionals in training and practice.

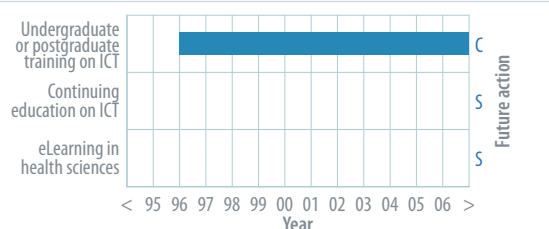


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

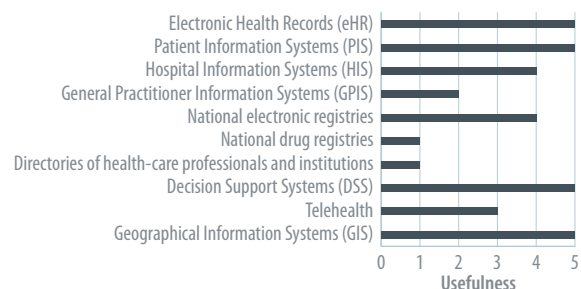


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

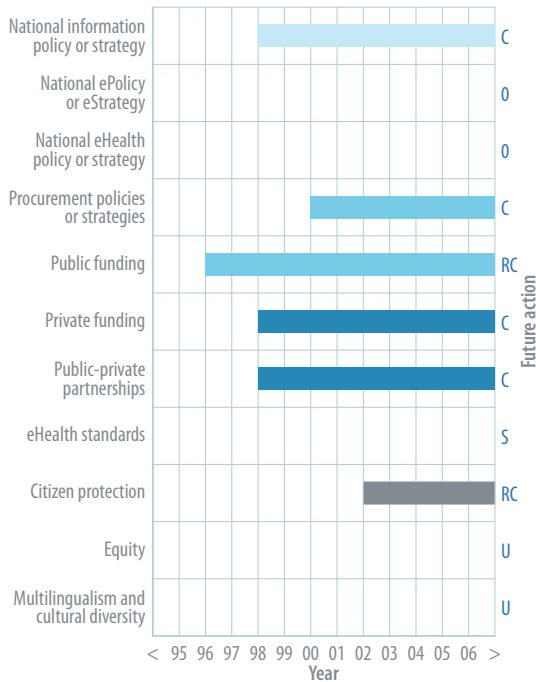
Electronic Health Records (eHR), Patient Information Systems (PIS), Geographical Information Systems (GIS) and Decision Support Systems (DSS) are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation by Albania. Advice on eHealth norms and standards is considered an extremely useful eHealth service.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Armenia

Enabling environment – policies and strategies to support the information society



Armenia reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They will be reviewed and continued over the next two years. The government plans to adopt norms and standards for eHealth systems, services or applications by 2008. Public funding for ICT support to programmes addressing national health priorities has been provided since 1998. That same year public-private partnerships to foster the use of ICT within the health sector were formed. Both these actions have been rated as very effective. The most significant challenges in developing an enabling environment for the use of ICT in the health sector have been the lack of an integrated policy on eHealth, and inadequate levels of managerial, material and technical services.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

Since 2002, Armenia has been working effectively with other sectors and nongovernmental partners to promote infrastructure development and will continue to do so. It has also implemented a national plan for the development of ICT in health, which has successfully set targets for health sector connectivity. The absence of policies is the most significant challenge in building infrastructure for the health sector.

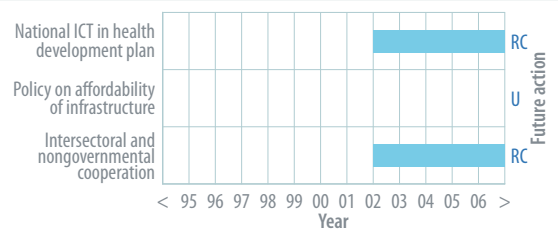
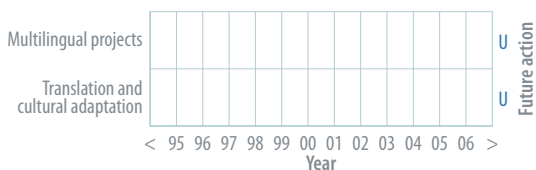


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	3 037	OECD country	No	Main telephone lines*	19,09
	GDP per capita (Int \$)	5 049	World Bank category	3	Internet users*	4,91
	Total health expenditure (% of GDP)	6	ICT Diffusion Index	0.2813	Mobile phone subscribers*	6.66

Content – access to information and knowledge

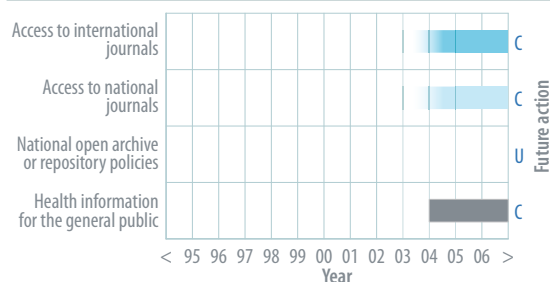


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to national and international electronic journals was introduced over the past few years and is rated to be slightly to moderately effective. Since 2004 health information for the general public has been available in electronic format. Highlighted as very effective is the training provided on medical information and statistics. The development of web sites on medical informatics is noted as being one of the most effective actions taken to promote access to electronic health content for health professionals. The most significant challenge in this field is the stability of Internet links due to the high costs associated with their provision and maintenance.

Capacity – human resources knowledge and skills

Armenia has been offering training in ICT as well as eLearning programmes in health sciences over the past few years. These programmes are rated as moderately effective and will continue over the next two years. Training courses are also offered to ICT specialists in preparation for projects funded by donors, including preparing a methodology for medical statistics and training in collection, processing and presentation of electronic information. Some of the most effective actions reported include: the examination and approval of reporting media; introduction of the International Classification of Diseases and Related Health Problems (ICD) 10th edition; introduction of new reporting forms; and development of special teaching modules. The poor coordination of activities in this area is reported to have been a significant challenge.

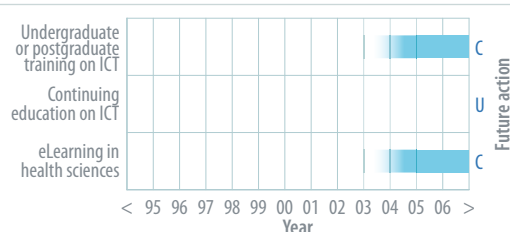


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

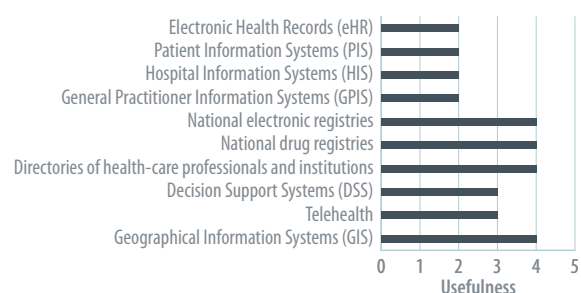


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

National electronic registries, National drug registries, Directories of health-care professionals and institutions, and Geographical Information Systems (GIS) are rated as very useful if the World Health Organization (WHO) could offer these as generic prototypes for adaptation. Advice on human resources development for eHealth is considered an extremely useful eHealth service by Armenia while the majority of the remaining listed services are rated as very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Austria

Enabling environment – policies and strategies to support the information society

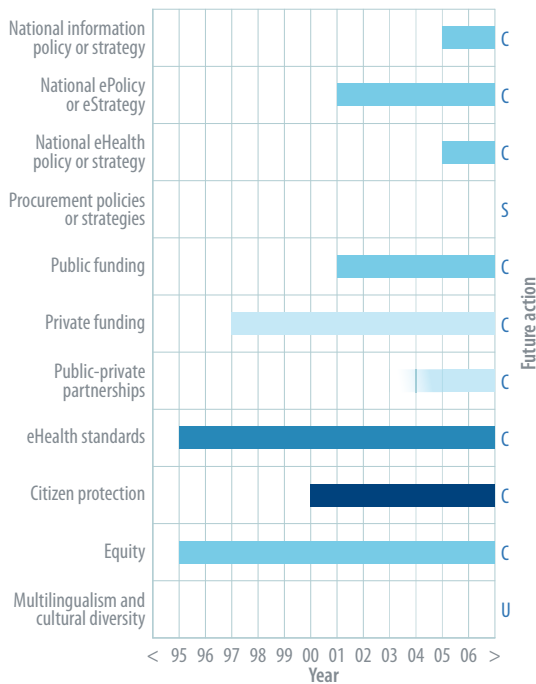


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Austria reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to moderately effective. They will be continued over the next two years. The implementation of procurement policies or strategies to guide software, hardware and content acquisition in the health sector will be started by 2008. Regulations to protect the privacy and security of individual patient data where eHealth is used (introduced in 2000) have been extremely effective. The most effective actions in this area have been the creation of guidelines for communication between health-care providers (MAGDA-LENA) in 1997 and the introduction of the eCard programme in 2005. The implementation of standards for content, including terminology and technical standards, presents the most significant challenge in this area.

Infrastructure – access to information and communication technologies

Austria indicates that it works effectively with nongovernmental partners to promote infrastructure development, and will continue to do so. It also plans to implement a national ICT in health development plan by 2008, which will set targets for health sector connectivity. Pilot projects for communications between hospitals and other health-care providers have been successfully undertaken. The most significant challenge in building health sector infrastructure is the lack of integration across this sector.

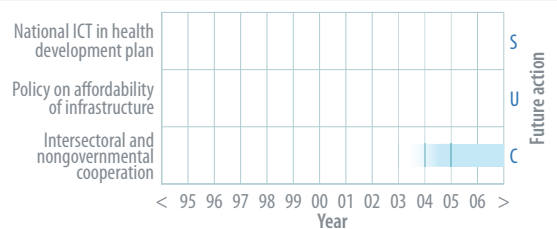


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

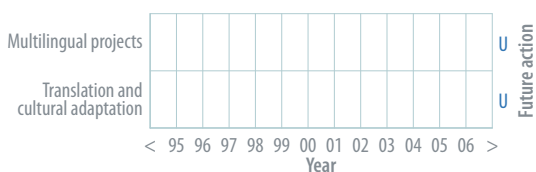
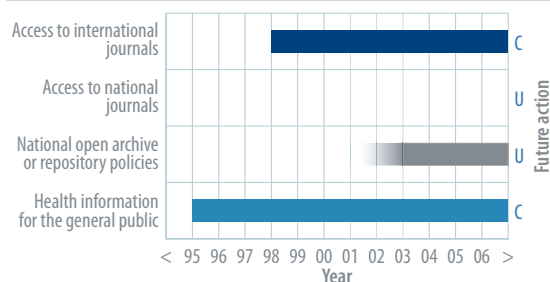


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	8 121	OECD country	Yes	Main telephone lines*	46.2
	GDP per capita (Int \$)	30 601	World Bank category	1	Internet users*	47.52
	Total health expenditure (% of GDP)	7.5	ICT Diffusion Index	0.5699	Mobile phone subscribers*	97.36

Content – access to information and knowledge



Access to international electronic journals was introduced in 1998. This service has been extremely effective and will be continued. Creating health information and providing it electronically for the general public started in 1995 and is rated as very effective. Austria highlights a health information system for citizens (established in 1995) as its most effective action taken to promote access to electronic health content. Finding sponsors for the development of patient-related health knowledge and quality assurance of health-related Internet pages are reported as the most significant challenges.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

All actions listed to build ICT capacity in the health sector began in 2003. They are rated as slightly to moderately effective and will continue over the next two years. The introduction of ICT (electronic journals – PubMed, virtual universities) within the medical curricula is one of the most effective actions reported. A significant challenge has been the hesitation of medical doctors to use ICT.

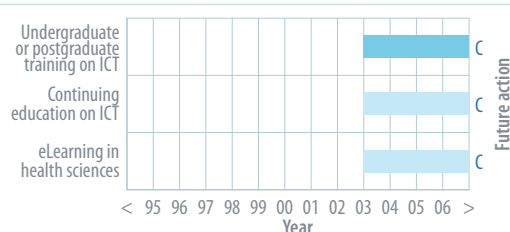


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

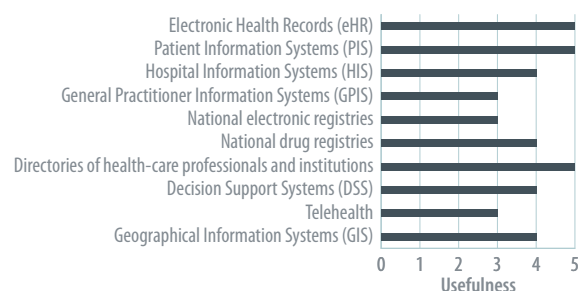


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

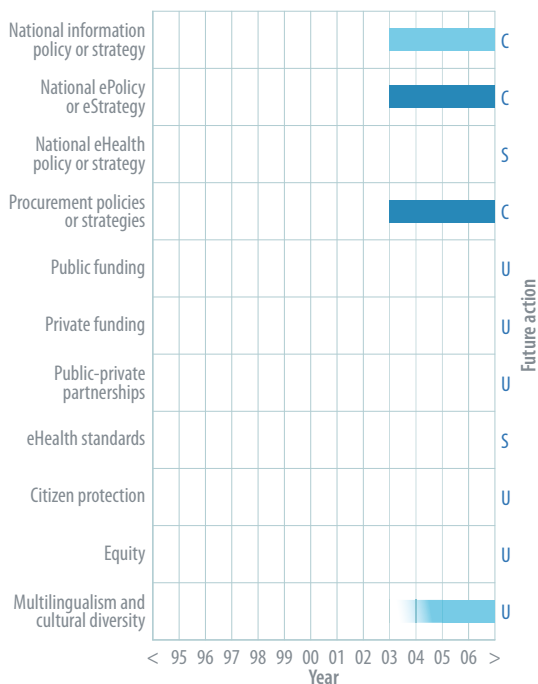
Electronic Health Records (eHR), Patient Information Systems (PIS) and directories of health-care professionals and institutions are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. All other listed eHealth tools are considered moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Belarus

Enabling environment – policies and strategies to support the information society



Belarus reports that slightly fewer than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken, and they are rated from moderately to very effective. National mechanisms such as an information policy and an eStrategy were established in 2003 to promote the use of ICT. That same year, procurement policies or strategies to guide software, hardware and content acquisition were successfully implemented. A national eHealth policy, which will set out a vision and objectives to promote the use of ICT in the health sector, should be developed by 2008. Norms and standards for eHealth systems, services or applications will also be adopted by 2008.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

To date, none of the specified actions to support ICT infrastructure development have been implemented and a decision remains to be made as to which actions will be taken in the next two years.

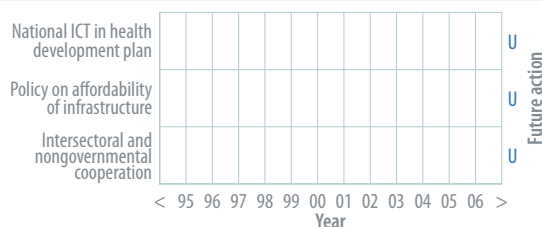
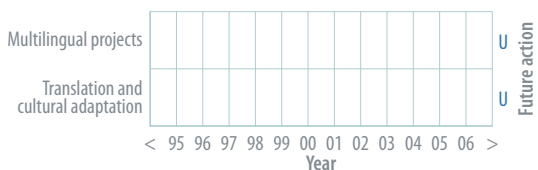


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

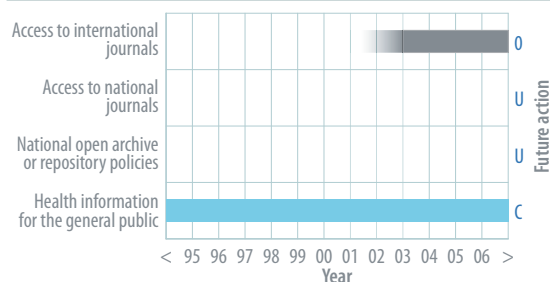


Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	9 866	OECD country	No	Main telephone lines*	32.24
	GDP per capita (Int \$)	10 359	World Bank category	3	Internet users*	24.98
	Total health expenditure (% of GDP)	6.4	ICT Diffusion Index	0.3329	Mobile phone subscribers*	22.73

Content – access to information and knowledge



Online access to health content has been provided in Belarus through international electronic journals for health professionals and through electronic health information for the general public. The latter commenced in 1994 and is rated as moderately effective. This will continue over the next two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity in Belarus has been built through the use of undergraduate or postgraduate training in ICT, and continuing education in ICT. ICT skills courses as a part of university curricula for health sciences students have been offered since 2000 and this action is rated as moderately effective. That same year, ICT skills programmes in the ongoing training of health-care professionals commenced, and this has also been moderately effective.

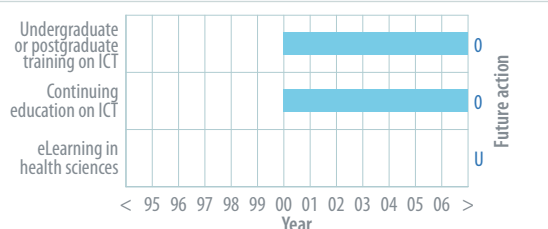


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

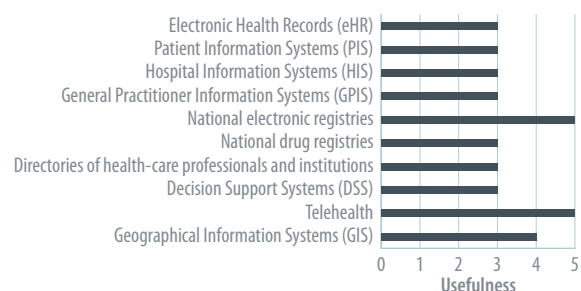


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

National electronic registries, and telehealth are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Belarus. The majority of the listed eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Belgium

Enabling environment – policies and strategies to support the information society

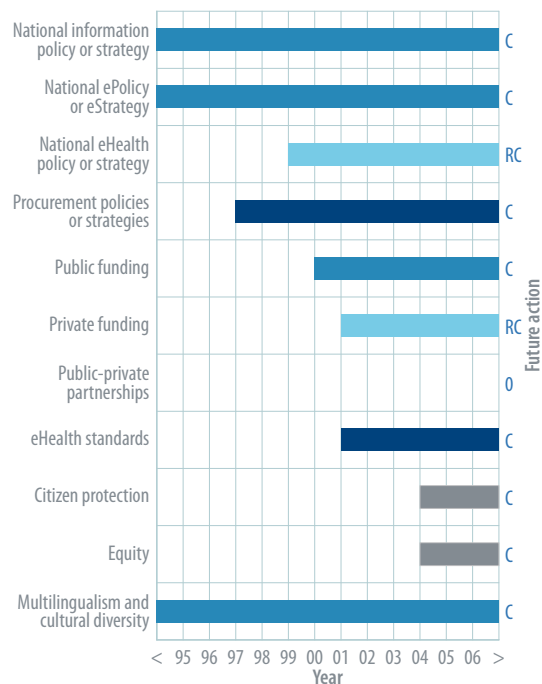


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Belgium reports that all but one of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from moderately to extremely effective. They will be reviewed and continued over the next two years. An information policy, an eStrategy, and an eHealth policy were implemented during the late 1980s and early 1990s to promote the use of ICT. Specific health sector mechanisms, such as public and private funding and eHealth standards have been successfully introduced in Belgium over the past 10 years. The implementation of procurement policies to guide software, hardware and content acquisition in the health sector has been extremely effective. Equally effective has been the adoption of norms and standards for eHealth systems, services and applications. The promotion of multilingualism and cultural diversity was established in 1988. The creation of a health information system and health legislation that mandates the specific use of ICT has been reported as the most effective action in building an enabling environment for the use of ICT in the health sector.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Belgium through a national plan for the development of ICT in health, a policy on affordability of infrastructure, and through intersectoral and nongovernmental cooperation. This plan, which sets targets for health sector connectivity, was implemented in 2003 and is reported to be moderately effective. Intersectoral cooperation to promote infrastructure development commenced in 2002 and has so far been slightly effective. All initiatives will continue over the next few years.

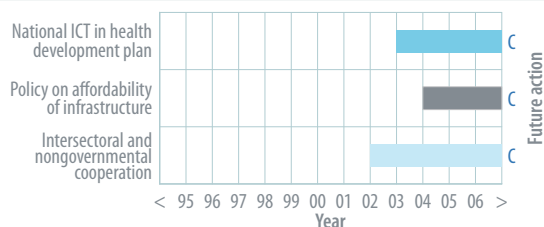


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

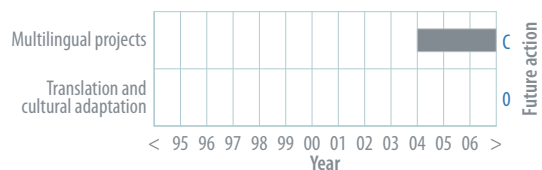
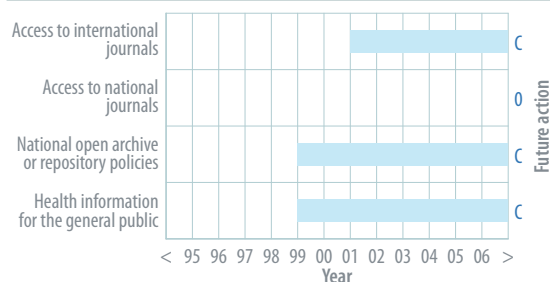


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted through the introduction of multilingual projects since 2004. The programme's effectiveness is so far unknown but these projects will continue over the next two years.

Country indicators	Population (000s)	10 376	OECD country	Yes	Main telephone lines*	46.44
	GDP per capita (Int \$)	30 072	World Bank category	1	Internet users*	40.62
	Total health expenditure (% of GDP)	9.4	ICT Diffusion Index	0.5389	Mobile phone subscribers*	88.32

Content – access to information and knowledge



Online access to health content for the general public and health-care professionals has been provided through the provision of international electronic journals and a digital national open archive for scientific research. These are both reported to have been slightly effective and will continue over the next few years. Belgium highlights the establishment of the Federal Health Care Center as its most effective action taken to promote access to electronic health content.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate and postgraduate training, continuing education in ICT, and through eLearning in health sciences. ICT skills courses as part of university curricula for health sciences students have been offered since 1986 and is rated as moderately effective. ICT skills programmes in the ongoing training of health-care professionals and health sciences courses through eLearning for health professionals in training and practice have been offered since 2003. These educational programmes will continue over the next few years.

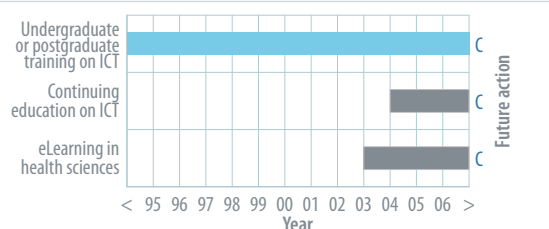


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

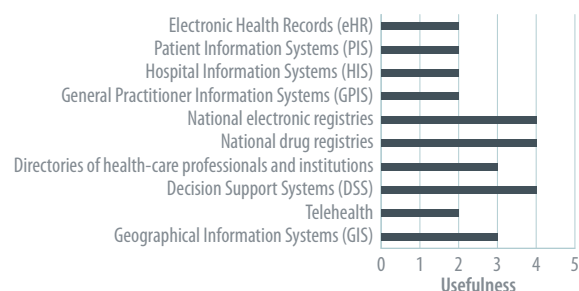


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

National electronic registries, national drug registries, and Decision Support Systems (DSS) are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Information on trends and developments in eHealth, advice on eLearning programmes, and advice on human resources development for eHealth are considered very useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Croatia

Enabling environment – policies and strategies to support the information society

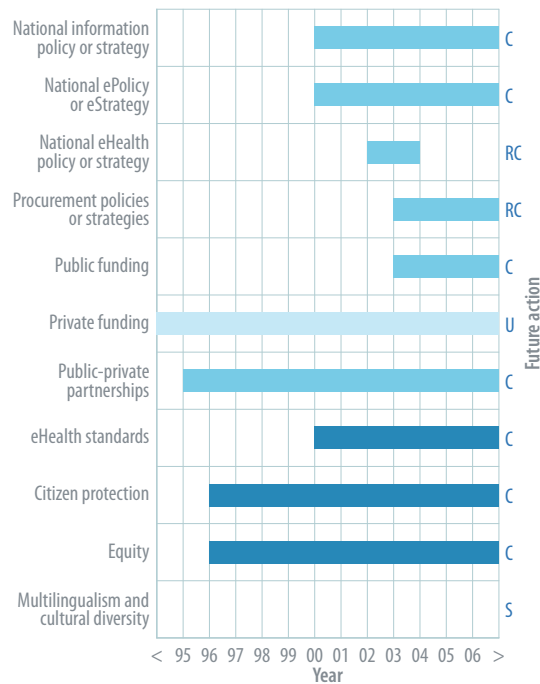


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Croatia reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to very effective. They are likely to be reviewed and continued over the next two years. The availability of information in local languages which recognize cultural diversity will start by 2008. Croatia highlights the successful introduction of telemedicine, virtual polyclinics, video conferencing, telepathology, teleradiology, teleneurosurgery, telecardiology, and tele-education services (all begun in 1995). A very effective action has been a pilot project of the Primary Care Information System (conducted between 2001 and 2003). It aimed to develop and deploy a health information system, based on the latest technologies, which would improve the quality of primary health care through the provision of timely and accurate information. Sixty physicians and nurses were equipped with computers connected via a central server to the main national health insurer, the state treasury and the public health institute. This ensured rapid retrieval of documents, eliminated the need for manual input of data and helped predict system interventions. The project also introduced electronic smart cards for physicians and nurses, so that at each medical check-up the information system verified the status and rights of the patient as well as the physician or nurse. Based on the experiences from this pilot project, a plan has been developed for a comprehensive health information system at the national level that will connect primary health care facilities, hospitals, laboratories, dental clinics, health insurance companies, the state treasury, the public health institute and electronic health record databases. However, the lack of financial resources and a situation of insufficient intersectoral cooperation poses significant challenges.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Croatia through a national ICT in health development plan, a policy on affordability of infrastructure, and intersectoral and nongovernmental cooperation. These approaches have been rated from slightly to very effective and will be continued over the next few years. Croatia highlights the very successful establishment in 1997 of the Committee for Telemedicine through the Croatian Medical Academy. The creation of a telemedicine network for health services provision for the population and the provision of software for primary care units have been rated as the most effective initiatives in building ICT infrastructure for the health sector. However, the difficulty in establishing integrated information networks across various levels of the health sector and health insurance costs pose significant challenges in infrastructure development.

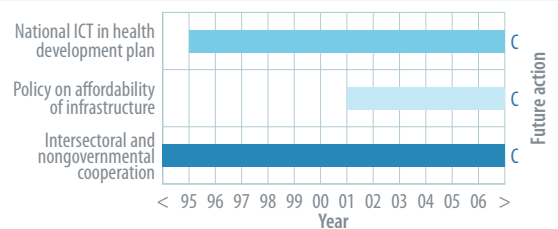


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

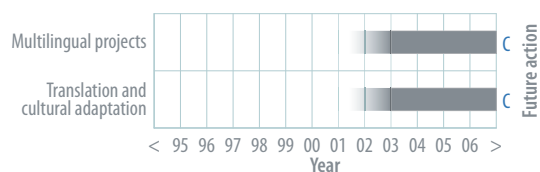


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in Croatia through the introduction of multilingual projects and the support of translation and cultural adaptation. Special projects have also been introduced to promote the development and use of new electronic health content in multiple languages. The translation and cultural adaptation of existing high-quality content (created either locally or abroad) has been supported for the last few years and will be continued.

Country indicators	Population (000s)	4 522	OECD country	No	Main telephone lines*	42.74
	GDP per capita (Int \$)	10 804	World Bank category	2	Internet users*	29.51
	Total health expenditure (% of GDP)	7.8	ICT Diffusion Index	0.424	Mobile phone subscribers*	58.37

Content – access to information and knowledge

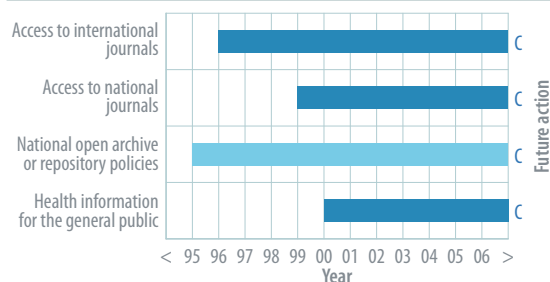


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content for the general public and health-care professionals has been provided through national and international electronic journals and a national open archive. These initiatives all commenced around the mid- to late-1990s and have been very effective. They will continue over the next few years. Among the most effective initiatives taken to promote access to electronic health content are the tourist health information portals, an eJournal for public health, and eDZ (a portal for health professionals). Funding and human resources are reported as the most significant challenges in the field of providing online access to health content.

Capacity – human resources knowledge and skills

Capacity in Croatia has been built through the use of undergraduate or postgraduate training in ICT, continuing education in ICT, and through eLearning in health sciences. These are rated from moderately to very effective and will continue over the next few years. Among the most effective actions reported are the postgraduate education programme in Health Information Systems, continuing education in primary health care, and a programme established in cooperation with the Croatian Chamber of Physicians in ICT for health. The difficulty in having medical informatics recognized as a medical profession is posing a significant challenge in this field.

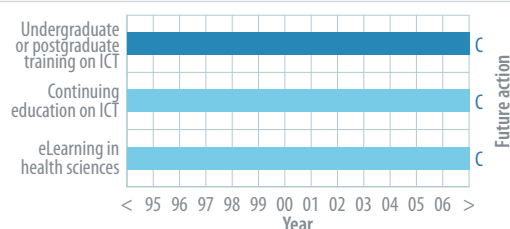


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

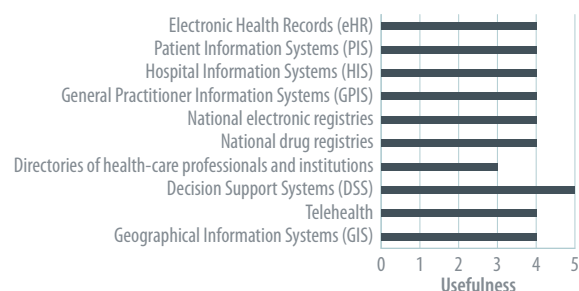


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

Decision Support Systems (DSS) is rated as extremely useful if the World Health Organization could offer it as a generic prototype for adaptation. All other listed eHealth tools are rated from moderately to very useful. Information on effective/best eHealth practices and advice on human resources development for eHealth are considered as very useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Cyprus

Enabling environment – policies and strategies to support the information society

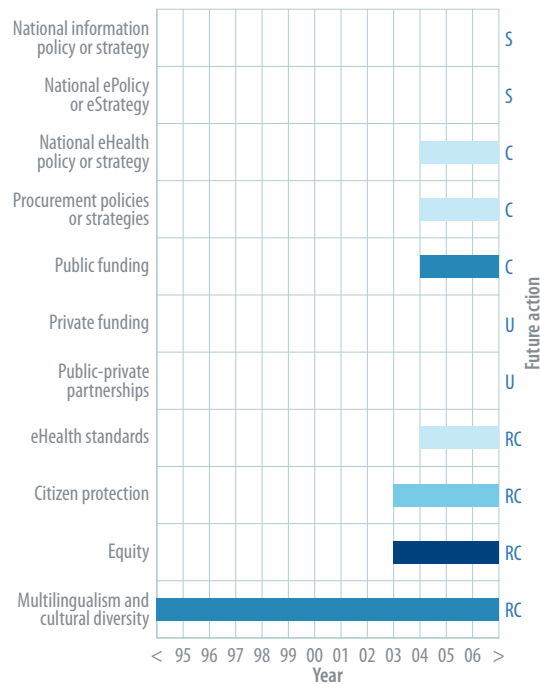


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Cyprus reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They are likely to be reviewed and continued over the next two years. Policies to promote inclusiveness and equitable access to eHealth, introduced in 2003, have been extremely effective and will be reviewed and continued. Cyprus provides public funding for ICT support to programmes addressing national health priorities and promotes the availability of information in local languages and the recognition of cultural diversity. These actions are considered very effective and likely to continue. One of the most effective actions in building an enabling environment for the use of ICT in the health sector was the publication in 2004 of a document that describes the requirements for a Web-enabled hospital information system. Currently under evaluation, Cyprus plans to implement the project in 2006 for the New Nicosia General Hospital and the New Famagusta General Hospital. If successful, it will be extended to the remaining hospitals on the island. Additional effective actions noted include: the Government Data Network (GDN), which links all government systems together; the Government Internet Note (GIN), which provides an interface between government information systems and the Internet; and an e-Government portal, which will offer e-services to the public (e.g. through public kiosks and mobile devices), expected to be completed in 2007.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health and intersectoral and nongovernmental cooperation. These actions started between 2000 and 2003, are rated as moderately effective, and will be reviewed and continued over the next few years. A national policy to reduce the costs of ICT infrastructure for the health sector will be implemented over the next two years.

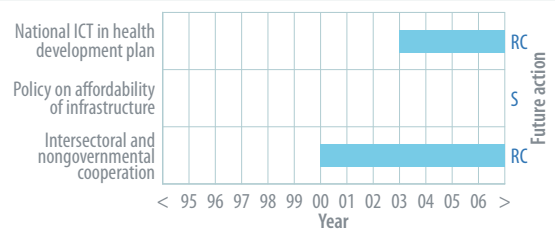


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

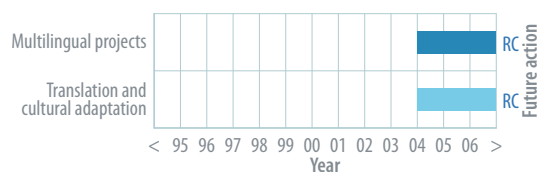
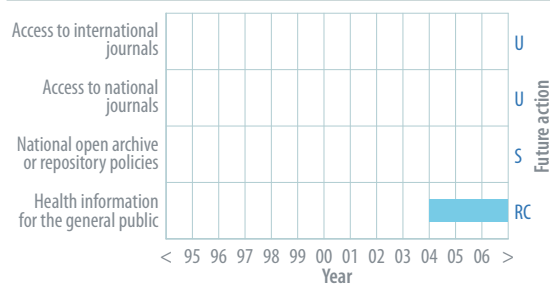


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Over the last two years special projects have been introduced to promote the development and use of new electronic health content in multiple languages with great success. Translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad) has also been supported in Cyprus during this period. Both actions will be reviewed and continued over the next few years.

Country indicators	Population (000s)	816	OECD country	No	Main telephone lines*	51.84
	GDP per capita (Int \$)	17 735	World Bank category	1	Internet users*	36.93
	Total health expenditure (% of GDP)	6.4	ICT Diffusion Index	0.525	Mobile phone subscribers*	79.37

Content – access to information and knowledge



Electronic health information for the general public has been provided since 2004, and this action, rated as moderately effective, will be reviewed and continued over the next few years. There are plans to implement a policy for a digital national open archive for scientific research (published within the country) by 2008. Cyprus highlights the development of the web site of the Ministry of Health as its most effective action taken to promote access to electronic health content as it has significantly increased the availability of health information to the general public.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of continuing education in ICT. Initiated in 2003, the provision of ICT skills programmes in the ongoing training of health-care professionals has been moderately effective and will be reviewed and continued over the next two years. No decision has yet been made with respect to offering ICT skills courses as a part of university curricula for health sciences students or health sciences courses through eLearning for health professionals in training and practice.

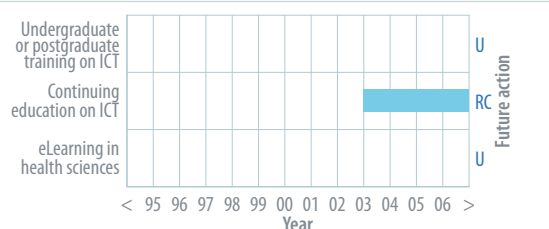


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

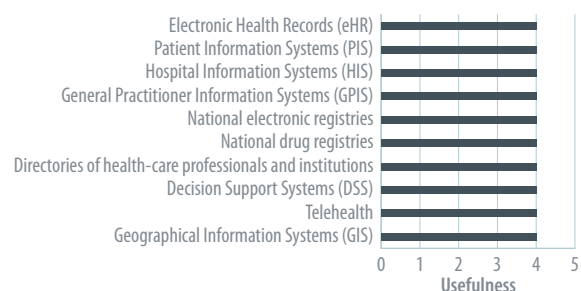


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. All listed eHealth services are also considered very useful by Cyprus.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Czech Republic

Enabling environment – policies and strategies to support the information society

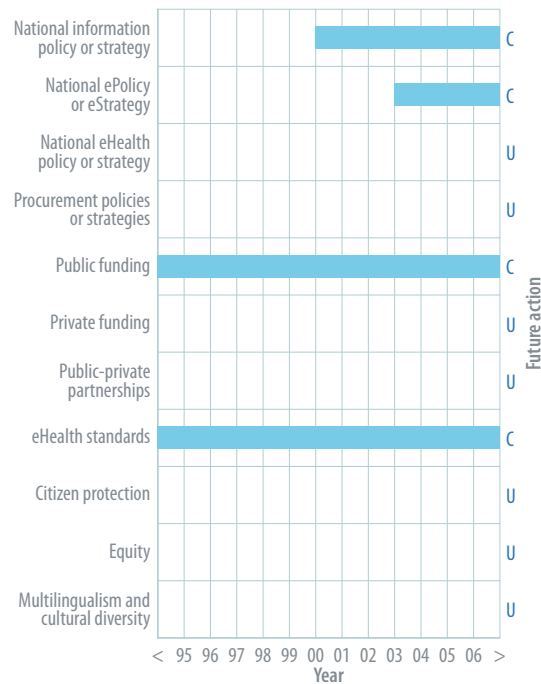


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Czech Republic reports that slightly fewer than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. National mechanisms such as an information policy (2000) and an eStrategy (2003) have been put in place to promote the use of ICT. Public funding for ICT support of programmes addressing national health priorities has been provided since 1990, and norms and standards for eHealth systems and services have been adopted since 1994. All have so far been moderately successful and will continue over the next few years. The Czech Republic highlights in this field the project Netc@rds, initiated by eTEN/EC for a common interoperable platform to enable access to health care services via cellular networks in all EC member countries. The most effective initiatives in building an enabling environment for the use of ICT in the health sector include: MeDiMed, the first and only integrated regional system in the area of health telematics in the Czech Republic; an ongoing pilot project in the city of Litoměřice on electronic patient and health-care provider identification called the Phare Mácha project; a national data standard for healthcare data communication (used by laboratories to send their data to clinics); a national health and public health register; two health insurance portals; a portal of the Institute of Health Information and Statistics; and a national information system maintaining records of patient medication. The most significant challenge in this field has been the lack of a coordinated approach to ICT as the significant players in

health care (state/local administrations, health-care providers, insurance companies) purportedly have other priorities. As eHealth is still being established in the Czech Republic, individual hospital or department applications prevail over coordinated efforts.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in the Czech Republic through intersectoral and nongovernmental cooperation. This was facilitated by the work of MEDTEL, a nongovernmental organization for eHealth promotion set up in 2003 by a group of individuals, mostly coming from IT companies and health care facilities. A decision remains to be made as to what action will be taken on a national plan for the development of ICT in health and on the implementation of a national policy to reduce the costs of ICT infrastructure.

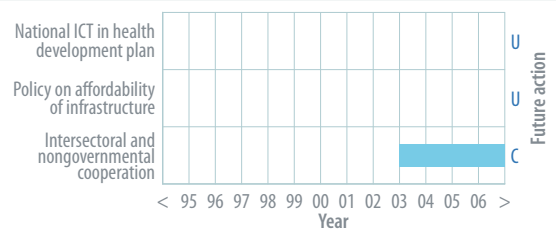


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

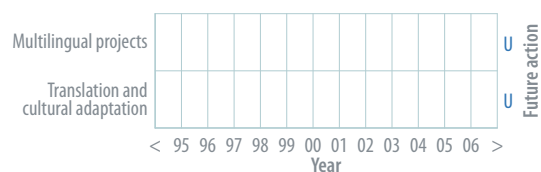


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

At this stage, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	10 202	OECD country	Yes	Main telephone lines*	33.58
	GDP per capita (Int \$)	17 325	World Bank category	2	Internet users*	49.97
	Total health expenditure (% of GDP)	7.5	ICT Diffusion Index	0.4524	Mobile phone subscribers*	105.64

Content – access to information and knowledge

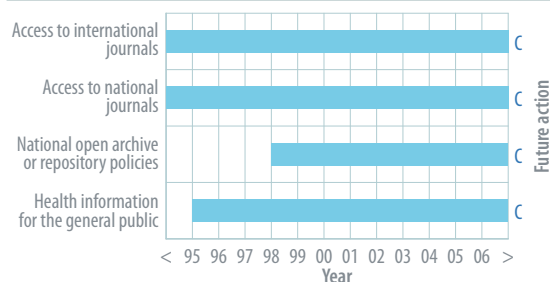


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided in the Czech Republic through national and international electronic journals, a digital national open archive, and the availability of electronic health information for the general public. These actions were all implemented during the 1990s and are rated as being moderately effective. Highlighted as very effective in this field are: RANKMED – health web pages assessment and evaluation; CITMED – automatic assessment of health web pages citation level; and EUMED – a register of relevant European Union (EU) background materials in the field of medical informatics. Providing online access to journals in biomedicine and social sciences for the medical and research communities has been one of the most effective actions taken to promote access to electronic health content. The lack of a coordinated approach to ICT is a significant challenge in this field.

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate and postgraduate training in ICT, continuing education in ICT and eLearning in health sciences.

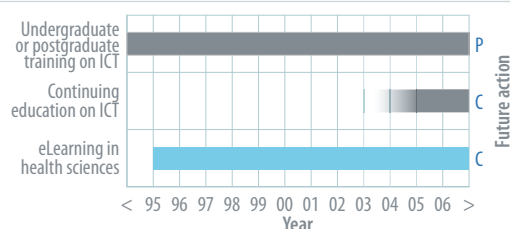


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

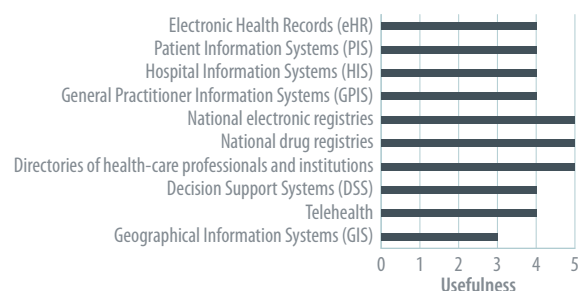


Figure 6. Preferred generic eHealth tools to be provided by WHO

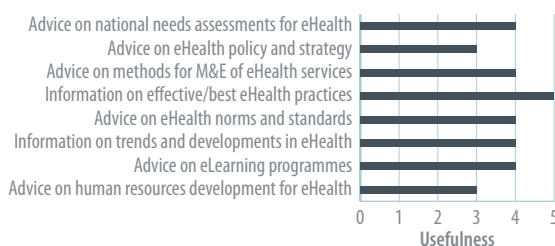


Figure 7. Preferred eHealth services to be provided by WHO

National drug registries, directories of health-care professionals and institutions, and national electronic registries are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Information on trends and developments in eHealth is considered an extremely useful eHealth service. All other listed eHealth tools and eHealth services are rated from moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Denmark

Enabling environment – policies and strategies to support the information society

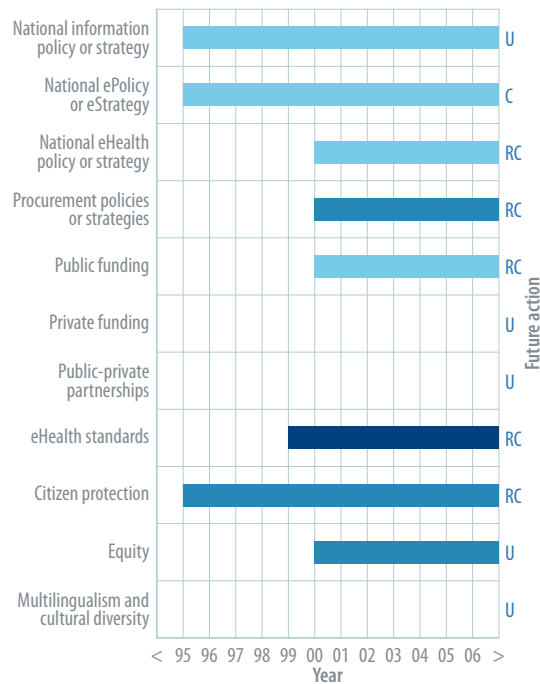


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Denmark reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from moderately to extremely effective. They will be reviewed and continued over the next two years. An information policy and an eStrategy were implemented in 1995 and an eHealth policy was introduced in 2000 to promote the use of ICT. Procurement policies to guide software, hardware and content acquisition in the health sector were implemented in 2000 and have been very effective in promoting an enabling environment for ICT. That same year public funding for ICT support of programmes addressing national health priorities became available. Norms and standards for eHealth systems, services and applications, implemented in 1999, have been extremely effective and will be reviewed and continued over the next two years. Also proven very effective have been regulations (enacted in 1995) to protect the privacy and security of individual patient data where eHealth is used. Additionally, various policies have successfully been implemented in Denmark to promote inclusiveness and equitable access to eHealth. The establishment of MEDCOM, a steering committee for IT-messages in health care, is rated as the most effective initiative.

Infrastructure – access to information and communication technologies

Currently, none of the specified actions to support ICT infrastructure development have yet been implemented in Denmark. However, a national plan for the development of ICT in health, which sets targets for health sector connectivity, will be implemented before 2008. A decision remains to be made as to which actions will be taken in the near future for a national policy to reduce the costs of ICT infrastructure in the health sector, and intersectoral and nongovernmental cooperation to promote infrastructure development.

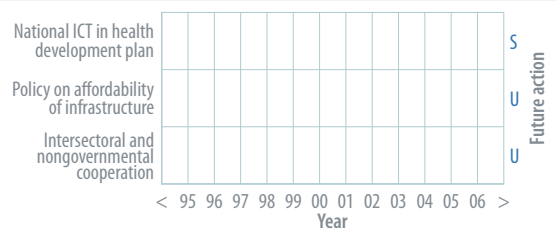


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

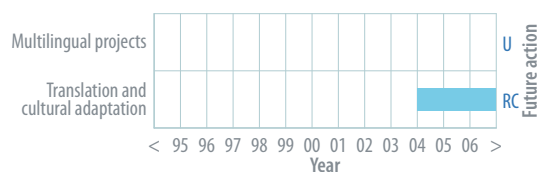


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in Denmark through the support of translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad). This commenced in 2004 and has so far been moderately effective. This action will be reviewed and continued over the next two years.

Country indicators	Population (000s)	5 391	OECD country	Yes	Main telephone lines*	64.46
	GDP per capita (Int \$)	30 731	World Bank category	1	Internet users*	60.41
	Total health expenditure (% of GDP)	9	ICT Diffusion Index	0.72	Mobile phone subscribers*	95.51

Content – access to information and knowledge

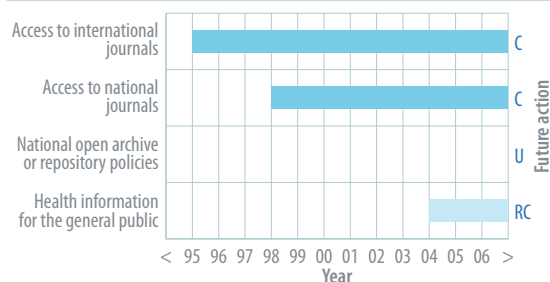


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national and international electronic journals and the availability of electronic health information for the general public. Access to international and national electronic journals was introduced in 1995 and 1998, respectively. These services have been moderately effective and will continue. The creation and provision of health information for the general public in electronic format commenced in 2004 and has so far been slightly effective. This will be reviewed and continued over the next few years. Denmark highlights its nationwide web-based health portal as its most effective initiative in promoting access to electronic health content.

Capacity – human resources knowledge and skills

ICT capacity in Denmark has been built through the use of undergraduate and postgraduate training in ICT, continuing education in ICT and through eLearning in health sciences. ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals have been offered since 2000 and are rated as slightly effective. Health sciences courses through eLearning for health professionals in training and practice have been offered since 2001 and this is reported to be moderately effective. All actions will be reviewed and continued over the next few years.

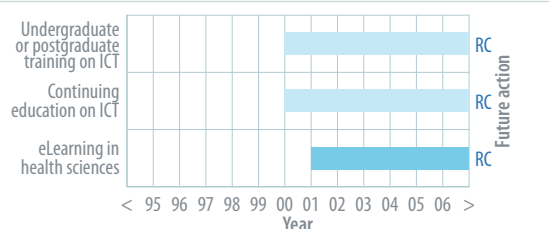


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

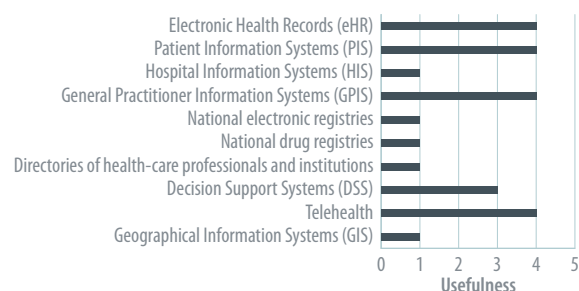


Figure 6. Preferred generic eHealth tools to be provided by WHO

Electronic Health Records (eHR), Patient Information Systems (PIS), General Practitioner Information Systems (GPIS) and telehealth are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Information on effective/best eHealth practices is considered an extremely useful eHealth service. All remaining listed eHealth services are rated from slightly to very useful.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Estonia

Enabling environment – policies and strategies to support the information society

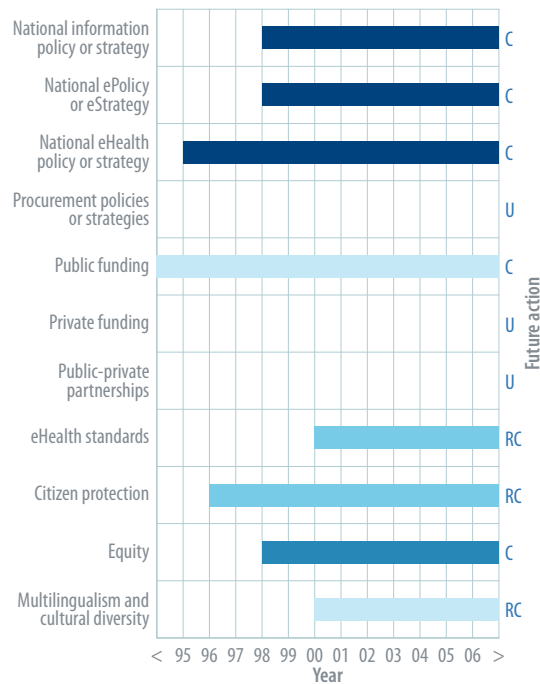


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Estonia reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. National mechanisms such as an information policy, an eStrategy, and an eHealth policy have been in place since the mid-to-late 1990s and have been extremely effective in promoting the use of ICT. Policies promote inclusiveness and equitable access to eHealth, introduced in 1998, have been very effective. Rated as the most effective actions in building an enabling environment for the use of ICT in the health sector are initiatives for an (electronic) personal ID, a digital signature, a secure data exchange system (X-road), a national Internet service provider for the public sector (E-net), and health sector-related landmarks supporting development (e.g. the World Bank loan supporting the IT system for the Health Insurance Fund [1995] and the Information Protection Act [1996]). The most significant challenges reported to date in this field have been the implementation of eHealth standards by the eHealth Foundation (2005), and the development of eHealth legislation to implement eHealth services.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Estonia through a national plan for the development of ICT in health, a policy on affordability of infrastructure and intersectoral and nongovernmental cooperation. The national plan, which sets targets for health sector connectivity, was implemented in 2000 and is reported to be very effective. That same year, a policy to reduce the costs of ICT infrastructure for the health sector was implemented and is reported to be moderately effective. All actions in this field will continue over the next few years. The most effective action thus far in building ICT infrastructure for the health sector has been the provision of low-cost access to Internet for the health sector (E-net). Estonia is aiming for 100% Internet coverage by 2008.

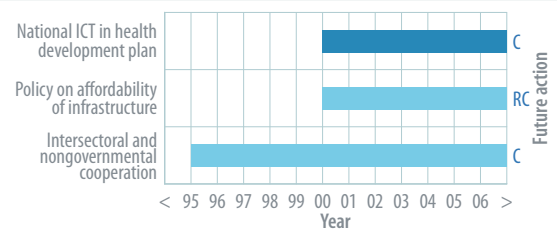


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

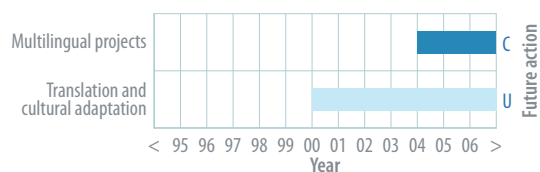
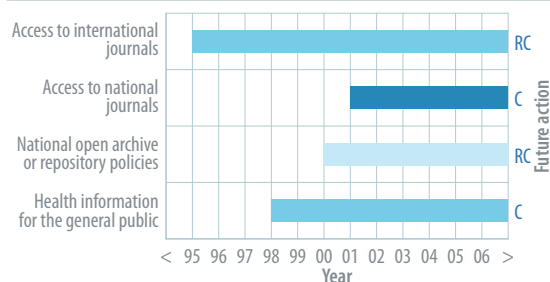


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted through the introduction of multilingual projects and through the support of translation and cultural adaptation. Special projects have been introduced since 2004 to promote the development and use of new electronic health content in multiple languages. This has been very effective and will continue over the next two years. The translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad) has been slightly effective and a decision remains to be made as to what further action will be taken in this field over the next few years.

Country indicators	Population (000s)	1 341	OECD country	No	Main telephone lines*	33.95
	GDP per capita (Int \$)	12 753	World Bank category	2	Internet users*	51.22
	Total health expenditure (% of GDP)	5.3	ICT Diffusion Index	0.4867	Mobile phone subscribers*	96

Content – access to information and knowledge



Online access to health content has been provided through national and international electronic journals (for health professionals), a national open archive for scientific research, and electronic health information for the general public. Access to electronic journals was introduced in 1995 and 2001, respectively, and these services have been moderately to very effective. In 2000, a policy for the digital national open archive (materials published in Estonia) was implemented. Health information for the general public was introduced in 1998 and is rated as moderately effective.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate or postgraduate training in ICT, continuing education in ICT, and through eLearning in health sciences. ICT skills courses as part of university curricula for health sciences students have been offered since 1995 and this action is rated as extremely effective. That same year ICT skills programmes in the ongoing training of health-care professionals started, and this action is reported to be very effective. Health sciences courses through eLearning for health professionals in training and practice have only been offered since 2005. Estonia reports that students (primary and secondary schools, and universities) have been trained in the use of computers and Internet since the early 1990s and this has proven to be a very effective approach in starting to build ICT capacity from an early age.

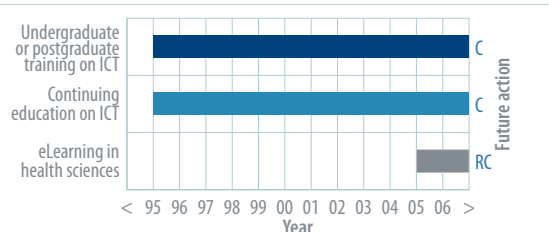


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

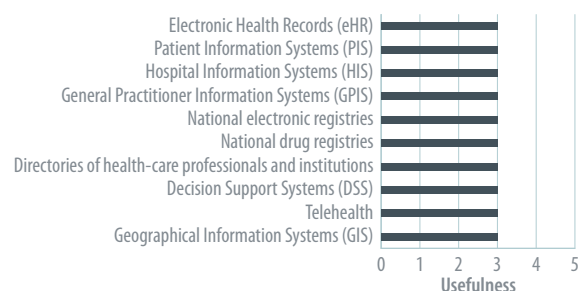


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools are rated as moderately useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on methods for monitoring and evaluation (M&E) of eHealth services, advice on eHealth norms and standards, information on effective/best eHealth practices, and advice on eLearning programmes are considered moderately useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Finland

Enabling environment – policies and strategies to support the information society

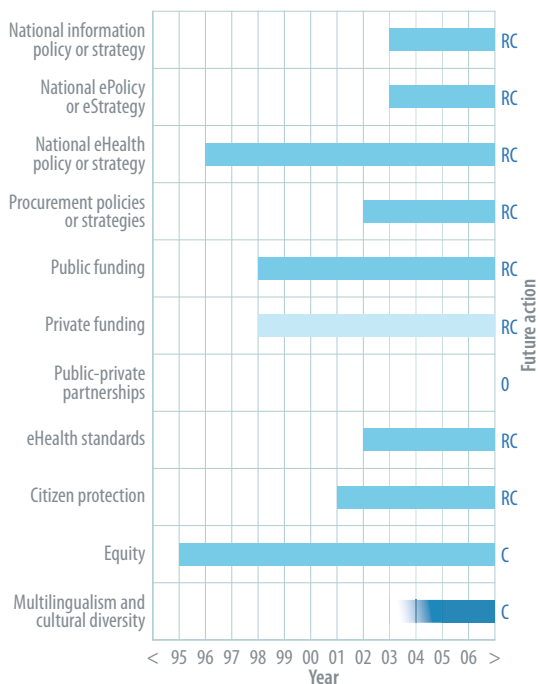


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Finland reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector were implemented between 1995 and 2004. They will be reviewed and continued over the next two years. The promotion of availability of information in local languages and the recognition of cultural diversity has been very effective and will continue. Private funding for ICT support has been secured since 1998 through the research and development programmes of the National Technology Agency (TEKES). The promotion of information in local languages and the recognition of cultural diversity has been very effective in Finland and will continue. The most effective initiative started in this field is the introduction of an evidence-based decision support system called Duodecim. Now in country-wide use, this system provides incentive to health-care professionals to use ICT in their daily work. Finland reports that it is a challenge to implement norms, standards and interoperability of ICT as health-care providers are decentralized.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Finland through intersectoral and nongovernmental cooperation. This cooperation has been only slightly effective since 2003 and will be reviewed and continued over the next few years. A national plan for the development of ICT in health, which sets targets for health sector connectivity, will be implemented within the next two years. Similarly, a national policy to reduce the costs of ICT infrastructure for the health sector will also be implemented. Finland highlights the importance of other initiatives in this field such as national services for ICT in health care, and Code Server.

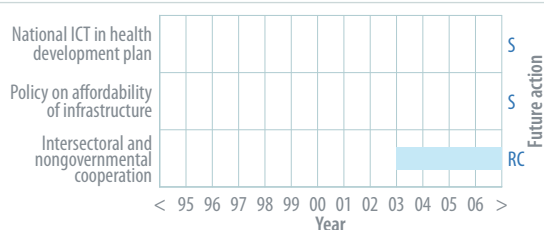


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

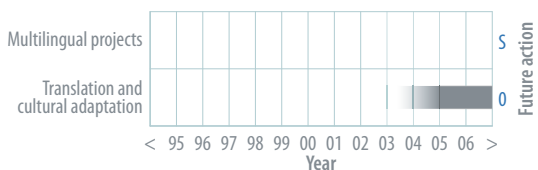


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in Finland through the support of translation and cultural adaptation of existing high-quality content (created either locally or abroad). Special projects are planned to begin over the next few years to promote the development and use of new electronic health content in multiple languages.

Country indicators	Population (000s)	5 220	OECD country	Yes	Main telephone lines*	45.4
	GDP per capita (Int \$)	28 401	World Bank category	1	Internet users*	63
	Total health expenditure (% of GDP)	7.4	ICT Diffusion Index	0.6908	Mobile phone subscribers*	95.63

Content – access to information and knowledge

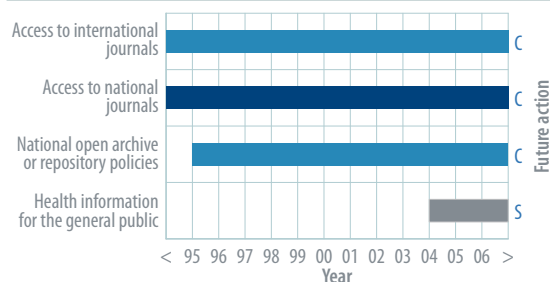


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content (for health-care professionals and the public) has been provided through various national and international electronic journals and a digital national open archive. Access to Medline was introduced in 1994 and has been very effective for the medical and research communities. The Finnish national open archive, Helka (introduced in 1995), has been very successful in providing national scientific and health research information. The most effective accomplishment in this field has been the provision of access for all health-care professionals to information databases such as Medline and the national medical database kept by the medical association of Duodecim with other partners. The most significant challenge in this field is that not all access is free of cost.

Capacity – human resources knowledge and skills

ICT capacity in Finland has been built through undergraduate and postgraduate training in ICT, continuing education in ICT, and eLearning in health sciences. These actions are rated from moderately to very effective and will continue over the next few years. ICT skills courses as a part of university curricula for health sciences students have been offered since the late 1980s and are rated as very effective. Since the 1990s ICT skills programmes in the ongoing training of health-care professionals have been introduced and have so far been moderately effective. The shortage of health-care professionals is a significant challenge in this field.

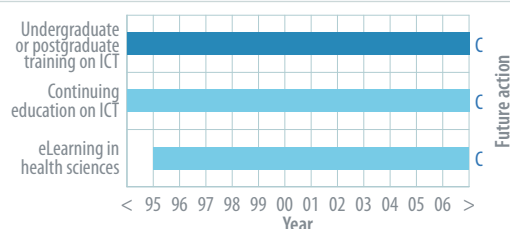


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

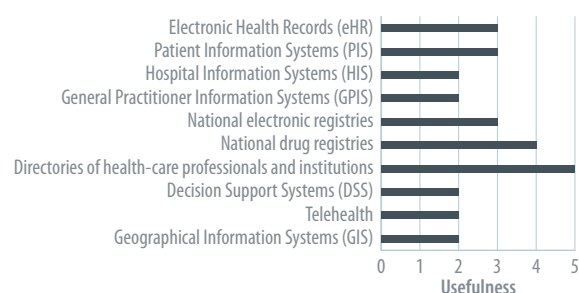


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

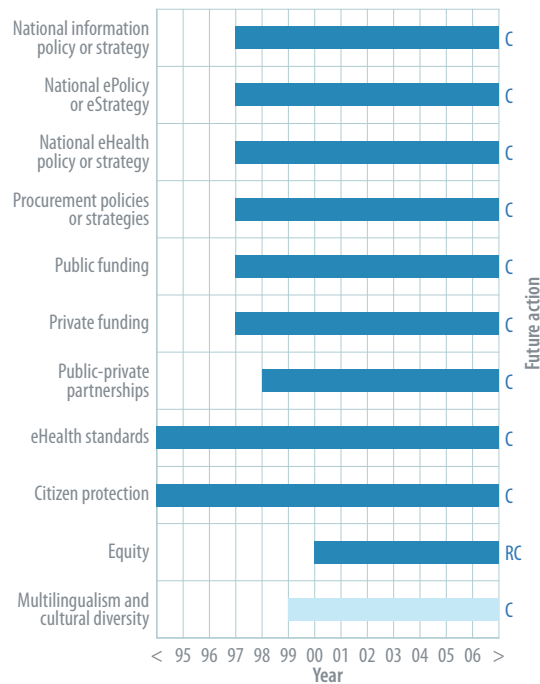
Directories of health-care professionals and institutions, and national drug registries are respectively rated as extremely and very useful. All other listed eHealth tools are rated from slightly to moderately useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on methods for monitoring and evaluation of eHealth services, and information on effective/best eHealth practices are considered as very useful. All remaining listed eHealth services are rated slightly to moderately useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

France

Enabling environment – policies and strategies to support the information society



France reports that all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and the majority are rated very effective. The only action rated as slightly effective is the promotion of availability of information in local languages and the recognition of cultural diversity (begun in 1999). National mechanisms such as an information policy, an eStrategy, and an eHealth policy were established in 1997, and have been successful. France highlights the introduction of an electronic personal medical file (in 2004) as an important national eHealth initiative. However, it recognizes it is too early to determine the effectiveness of this action at this stage. The introduction of the Vitale medical insurance card and Carte Professionnel de Santé (CPS), a health professional's card, are seen as effective actions in the use of ICT in the health domain. The most significant challenge to date has been the the lack of uniform equipment available to health-care professionals.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health, a policy on affordability of infrastructure and through intersectoral and nongovernmental cooperation. These initiatives started in 2000 and have so far been very effective. In this context the introduction of the Vitale medical insurance card and the CPS are also rated as the most effective actions. However, the high cost of financing these projects pose a significant challenge in the development of ICT infrastructure in France.

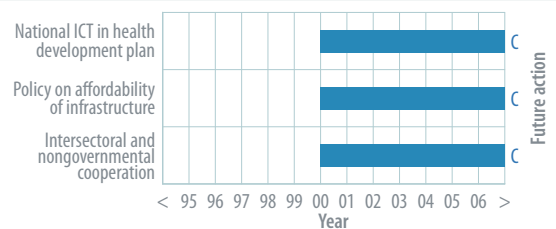
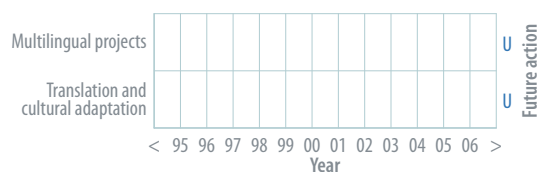


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	59 768	OECD country	Yes	Main telephone lines*	56.04
	GDP per capita (Int \$)	28 632	World Bank category	1	Internet users*	41.37
	Total health expenditure (% of GDP)	10.1	ICT Diffusion Index	0.5453	Mobile phone subscribers*	73.72

Content – access to information and knowledge

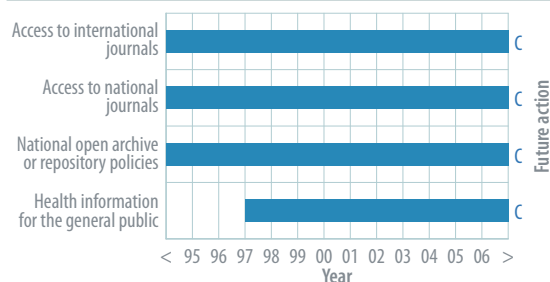


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national and international electronic journals, a national open archive for scientific research and electronic health information for the general public. These were all introduced between 1993 and 1997 and have so far been very effective in promoting online access to health content. France highlights in this field the establishment in 1998 of the Agency Web Portal (<http://www.sante.fr>), which has been very effective and will continue. Setting up Internet web sites and portals for the general public or for a more targeted audience, have been the most effective actions taken to promote access to electronic health content. Provision of sites with content exclusively for the health-care professional is reported as a significant challenge in this field.

Capacity – human resources knowledge and skills

ICT capacity in France has been successfully built through the use of undergraduate and postgraduate training in ICT, and continuing education in ICT. These actions are rated as very effective and will continue over the next two years. Health sciences courses through eLearning for health professionals in training and practice will be introduced by 2008.

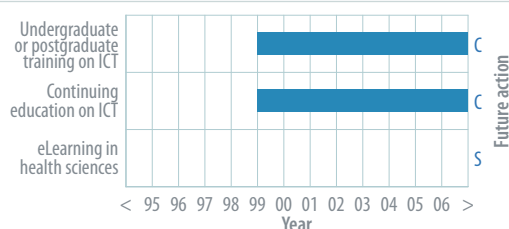


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

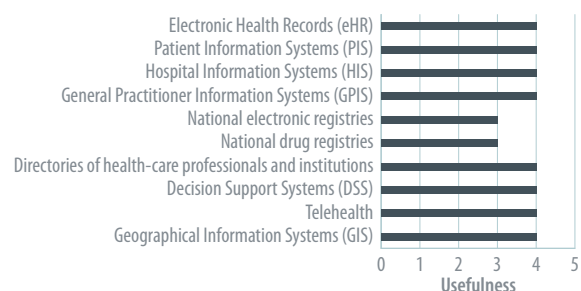


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

Electronic Health Records (eHR), Patient Information Systems (PIS), Hospital Information Systems (HIS), General Practitioner Information Systems (GPIS), Geographical Information Systems (GIS), Decision Support Systems (DSS), telehealth, and directories of health-care professionals and institutions are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on human resources development for eHealth, advice on eHealth norms and standards, information on trends and developments in eHealth, advice on eLearning programmes, and information on effective/best eHealth practices are considered as very useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Germany

Enabling environment – policies and strategies to support the information society

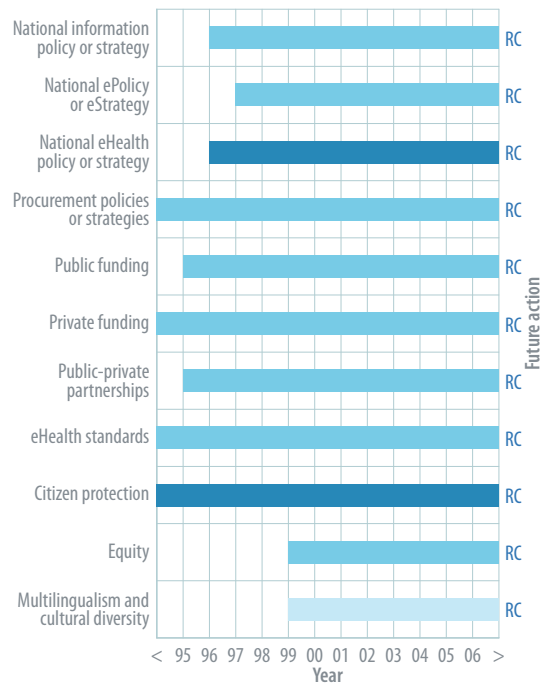


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Germany reports that all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to very effective. They will be reviewed and are likely to be continued over the next two years. National mechanisms such as an information policy, an eStrategy, and an eHealth policy have been put in place to promote the use of ICT since the mid 1990s. Specific health sector mechanisms such as public-private partnerships, procurement policies, public and private funding and eHealth standards have been successfully introduced. Protection and inclusiveness policies for citizen protection, equitable access to eHealth, multilingualism and cultural diversity have also been in place since the 1990s. Germany mentions the establishment in 2003 of the Aktionsforum Gesundheitsinformationssystem, which provides high-quality of health information to health professionals. The federal legislation on the eHealth card (SHI Modernization Act, enforced in 2004) is rated as the most effective action in building an enabling environment for the use of ICT in the health sector. The most significant challenge to date in this field has been standardizing practices and creating interoperability between eHealth systems nationwide.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health, and through intersectoral and nongovernmental cooperation. A national plan, which sets targets for health sector connectivity, was implemented in 1997 and is reported to be very effective. That same year Germany started successfully working with intersectoral and nongovernmental partners to promote infrastructure development and will continue to do so. Federal legislation on the eHealth card is rated as the most effective action in this field. The most significant challenge is financing the eHealth infrastructure since the cost-benefit ratio appears to be less favourable, or at least unclear, for health care providers than for sickness funds/private health insurers. Data protection and security of patients and health professionals are other challenges.

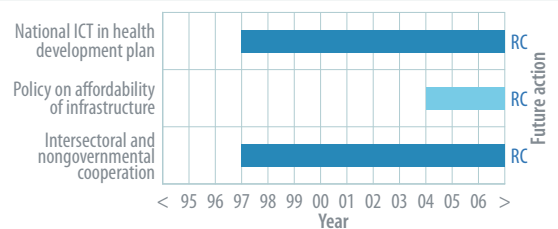


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

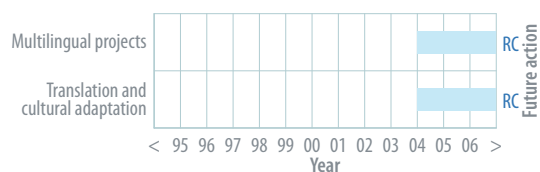


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted through the introduction of multilingual projects and support of translation and cultural adaptation. Special projects have been introduced in Germany since 2004 to promote the development and use of new electronic health content in multiple languages. From 2004, the translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad) has also been supported. These initiatives have been only slightly effective, however, and will be reviewed and continued over the next two years. The conceptualization of culturally adapted health content has been a significant challenge in this field.

Country indicators	Population (000s)	82 534	OECD country	Yes	Main telephone lines*	66.15
	GDP per capita (Int \$)	27 143	World Bank category	1	Internet users*	42.67
	Total health expenditure (% of GDP)	11.1	ICT Diffusion Index	0.6114	Mobile phone subscribers*	86.42

Content – access to information and knowledge

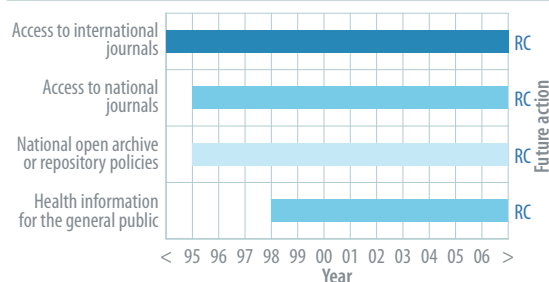


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since the 1990s. During this time, a national open archive for scientific research was also created, and electronic health information was made available to the general public. All these actions are rated from slightly to very effective. Germany highlights the joint evaluation of the evidence base of patient information by patient- and physician-run organizations and other stakeholders as its most effective action taken to promote access to electronic health content. Providing patient information effectively at the point of care which adequately addresses their questions (considering factors such as the stage and severity of their condition, their understanding of their illness, and their general level of education/literacy) is reported as the most significant challenge to date in this field.

Capacity – human resources knowledge and skills

ICT capacity in Germany has been built through the use of undergraduate and postgraduate training in ICT, continuing education in ICT, and through eLearning in health sciences. These actions are rated from slightly to moderately effective and will be reviewed and continued over the next two years. The Physicians' Approbation Ordinance and the revision of the apprenticeship and training of "feldschers" (physicians' assistants in ambulatory physicians' surgeries) are the most effective capacity building actions reported. Significant challenges in building ICT capacity in the health sector have been providing education in new technologies, integrating ICT into learning methods and creating relevant courses for undergraduate and postgraduate students, as well as for continuing professional development.

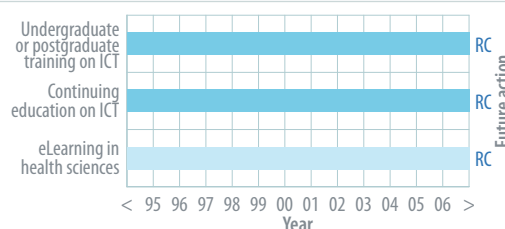


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

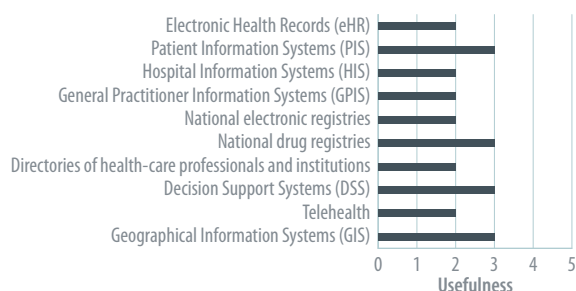


Figure 6. Preferred generic eHealth tools to be provided by WHO

All listed eHealth tools are rated from slightly to moderately useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on eHealth norms and standards, and information on trends and developments in eHealth are considered very useful eHealth services.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Hungary

Enabling environment – policies and strategies to support the information society

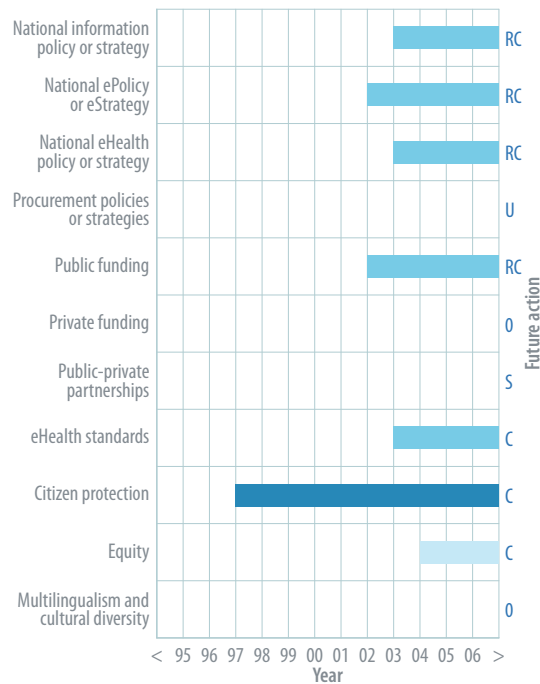


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Hungary reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to very effective. They are likely to be reviewed and continued over the next two years. Hungary highlights a government financed national eHealth Development Program (<http://www.e-egeszseg.hu>), which commenced in 2004 and has so far been moderately effective in raising the profile of eHealth. To date, the most effective action is the development of eHealth Standards as part of the national eHealth Program (accepted by the Hungarian Standards Institute [MSZT]). Additionally, a national health portal with services for citizens (<http://www.dr.info.hu>) and professionals (<http://www.euagazat.hu>) is operational and being expanded. The most significant challenges in this field are reforming the legal environment (i.e. currently privacy legislation forbids the creation of electronic eHealth records), and increasing the cooperation between public administration organizations. To overcome deficiencies in daily health sector ICT project management, the National Institute for Strategic Health Research established the National eHealth Program Management Unit which has the relevant expert capacity but currently lacks official status.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Hungary through a national plan for the development of ICT in health, and through intersectoral and nongovernmental cooperation. The former, which sets targets for health sector connectivity, was implemented in 2003 and is reported to be moderately effective. The latter was implemented in 2003 as well, and will continue. The creation of a national policy to reduce the costs of ICT infrastructure for the health sector will begin within the next two years.

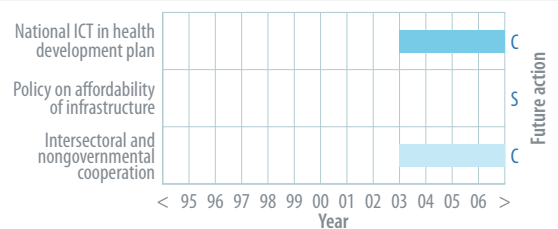


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

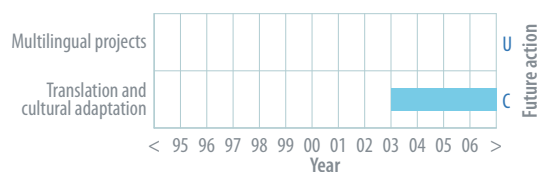


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted through the translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad). As part of the national eHealth Project, the contents of the Clinical Evidence (CE) Database were made available for health-care professionals working in hospitals and clinics, based on an application/training/usage monitoring approach. The concise version of the CE was translated into Hungarian. The most significant challenge in this field is the lack of health professionals speaking foreign languages.

Country indicators	Population (000s)	10 130	OECD country	Yes	Main telephone lines*	35.43
	GDP per capita (Int \$)	15 166	World Bank category	2	Internet users*	26.74
	Total health expenditure (% of GDP)	8.4	ICT Diffusion Index	0.4248	Mobile phone subscribers*	86.43

Content – access to information and knowledge

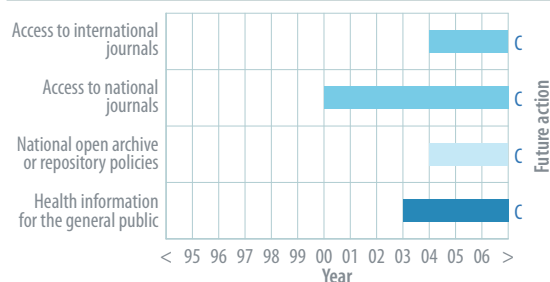


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national and international electronic journals (for health professionals), a national open archive for scientific research, and electronic health information for the general public. The National Institute for Strategic Health Research in Hungary established the Internet-based Hungarian Health Data warehouse, which presents various data on the health care system, according to national and international indicator sets. The most effective initiative taken to promote access to electronic health content is the establishment of a web- and call centre-based health information source for citizens which also offers services for health professionals (<http://www.dr.info.hu>). ‘Dr. Info’ (also known as HealthLine) provides high-quality health information for citizens and health care providers.

HealthLine operates via Internet and telephone, as an integrated health information service provider for local health-care services, such as information on physicians, dentists or pharmacies ; general medical information; drug interactions, disease descriptions, extra health care services; and self-help and support organizations. It does not provide triage or emergency advice. The most challenging task reported in this field is to provide existing health sector-related data, and access to databases at various government agencies and public authorities to information consumers.

Capacity – human resources knowledge and skills

ICT capacity has been built in Hungary since 1996 through the use of undergraduate and postgraduate training in ICT, and continuing education in ICT. It is reported that experimental eLearning applications have been used since 1994 at several different universities and colleges, but they are not part of the approved curricula. Some of the most effective actions reported are starting/accrediting curricula for health-systems administrators at college level and starting/accrediting curricula for health-information system managers at the university level. The most significant challenge in this field is the lack of adequate financial resources in the area of higher education and the lack of commitment for health-related ICT education in medical schools.

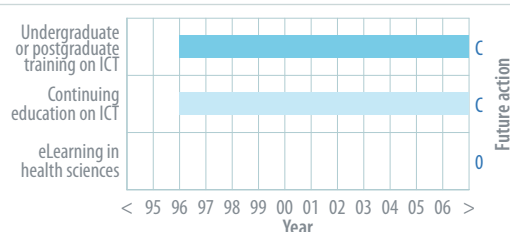


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

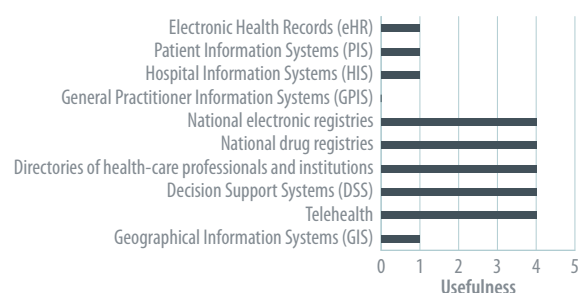


Figure 6. Preferred generic eHealth tools to be provided by WHO

National electronic registries, national drug registries, Decision Support Systems (DSS), telehealth, directories of health-care professionals and institutions, tools to facilitate the interoperability of health information systems, and suggested data models and methodologies are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on methods for monitoring and evaluation of eHealth services, advice on eHealth norms and standards, information on trends and developments in eHealth, information on effective/best eHealth practices are considered very useful eHealth services.

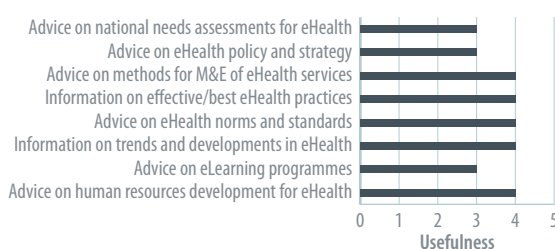


Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Iceland

Enabling environment – policies and strategies to support the information society

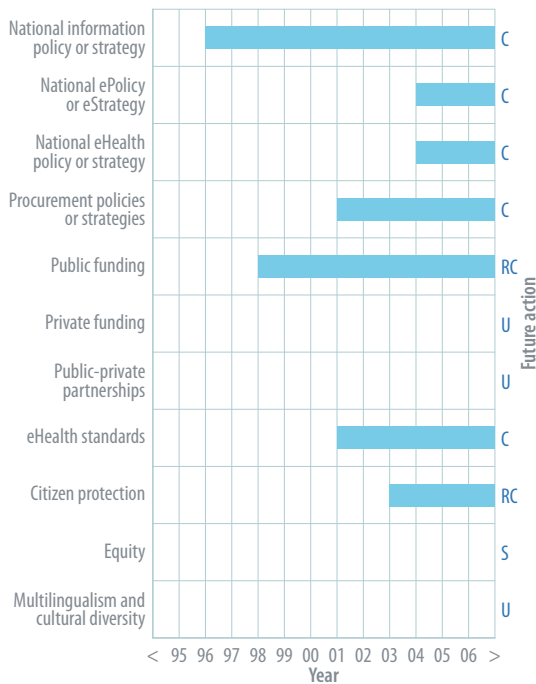


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Iceland reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated moderately effective. They will be reviewed and are likely to be continued over the next few years. National mechanisms such as an information policy, an eStrategy, and an eHealth policy were established between 1996 and 2004 to promote the use of ICT. Specific health sector mechanisms, such as procurement policies, public funding and eHealth standards have been successfully introduced. Policies to promote inclusiveness and equitable access to eHealth (i.e. access irrespective of culture, education, language, geographical location, physical and mental ability, age and gender) will be implemented by 2008. The decision to use the same Electronic Health Records (eHR) system for all health care centres has been the most effective action in building an enabling environment for the use of ICT in the health sector. It enables integration of information and efficient coordination among centres. The establishment of a national 'health net' is reported as the most significant challenge in this field. The Ministry of Health and various stakeholders are collaborating to address this.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Iceland through a national plan for the development of ICT in health, which sets targets for health sector connectivity. The plan was implemented in 2001 and is reported to be slightly effective. A national policy to reduce the costs of ICT infrastructure for the health sector is likely to be implemented over the next few years. The project plan for building a health network, published in 2000, is rated as the most effective action in building ICT infrastructure for the health sector (it has been a base for several successful projects). The most significant challenge to date in this field has been to secure financial support for the establishment of the health network. This has been addressed by sending contributions directly to projects and re-allocating funds within institutions more appropriately.

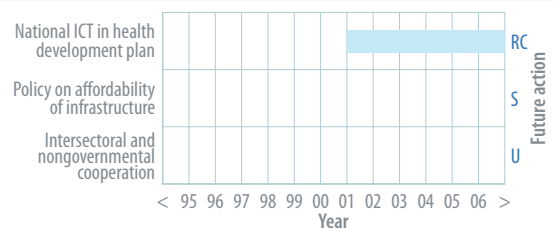


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

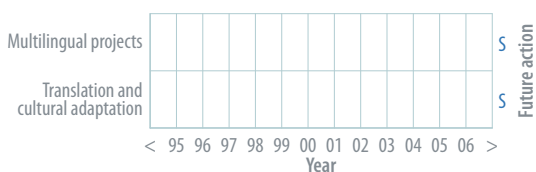


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented in Iceland. However, there are plans to introduce special projects to promote the development and use of new electronic health content in multiple languages over the next few years. Translation and cultural adaptation of existing high-quality content (created either locally or abroad) will also commence by 2008.

Country indicators	Population (000s)	290	OECD country	Yes	Main telephone lines*	65.01
	GDP per capita (Int \$)	29 666	World Bank category	1	Internet users*	77
	Total health expenditure (% of GDP)	10.5	ICT Diffusion Index	0.7547	Mobile phone subscribers*	99

Content – access to information and knowledge

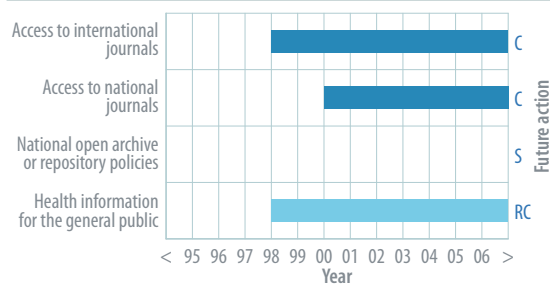


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1998 and 2000, respectively. The general public has recently been provided with electronic health information as well. A policy for a digital national open archive for scientific research (published in the country) will be implemented over the next few years. Iceland highlights the provision of online access to scientific literature both for professionals and the general public (www.hvar.is) as its most effective action taken to promote access to electronic health content.

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate and postgraduate training in ICT, continuing education in ICT, and eLearning in health sciences. These actions are rated from moderately to very effective and will be reviewed and continued over the next few years. ICT skills courses as a part of university curricula for health sciences students have been offered since 2002. At the same time, ICT skills programmes in the ongoing training of health-care professionals were introduced. One year later, health sciences courses through eLearning for health professionals in training and practice were offered as well. The introduction of courses in Health Informatics at undergraduate and graduate university levels is reported as the most effective action in building ICT capacity in the health sector. The establishment of distance learning is, however, posing a significant challenge in this field.

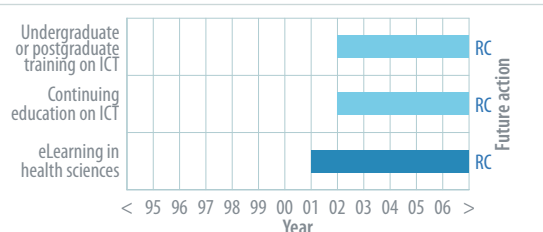


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

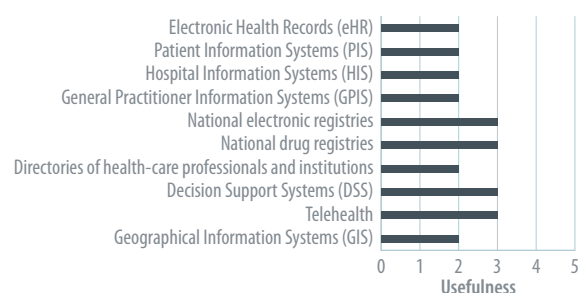


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools are rated from slightly to moderately useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on methods for monitoring and evaluation (M&E) of eHealth services, information on effective/best eHealth practices, advice on eHealth norms and standards, and information on trends and developments in eHealth are considered as very useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Israel

Enabling environment – policies and strategies to support the information society

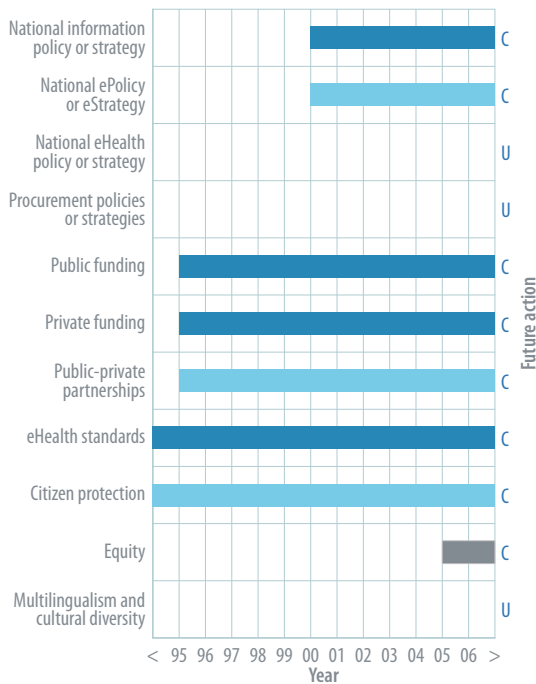


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Israel reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from moderately to very effective. They are likely to continue over the next two years. It highlights the computerized National Health Records (NHR) project that collect relevant patient data and information and makes it available to care providers. The system is designed to create a virtual health record for all Israeli citizens, connecting them to the health-care sector. Additionally, it will incorporate four health maintenance organizations (HMOs), the Israeli defense force, the Ministry of Health, the National Insurance Institute, and all public clinics and hospitals. The most effective action in building an enabling environment for the use of ICT in the health sector has been the initiation of the 'Ofek' project by Israel's largest HMO. Ofek is responsible for the integration of the medical information of all those insured in the HMO (3.7 million people). It is based on a unique software tool, which creates a patient record that can be observed by all care providers at any point of health care delivery. The most significant challenge in this field is the process of creating and maintaining the NHR. It is both a technical and medical informatics challenge, since the goal is to retrieve information from various sources and databases and transmit it to appropriate points of care, in a way that doesn't interfere with the consultation between the patient and the health service provider.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Israel through a national plan for the development of ICT in health and through intersectoral and nongovernmental cooperation. Israel highlights other important contributing factors such as enhanced long-distance communication, data and information security and confidentiality, creation of central data repositories, development of relevant data storages, consolidation of servers and integration of standard eHealth tools. These actions were all introduced around 1995 and have been very effective. The development of the infrastructure components for the computerized NHR project is rated as the most effective action in building ICT infrastructure for the health sector to date.

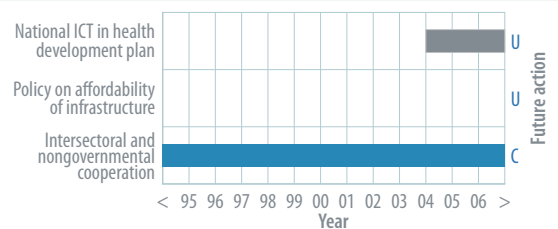


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

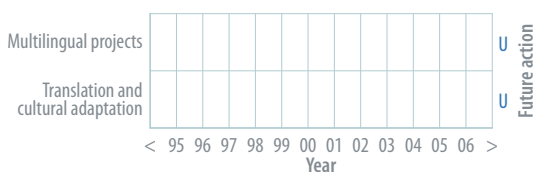


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	6 475	OECD country	No	Main telephone lines*	43.72
	GDP per capita (Int \$)	21 482	World Bank category	1	Internet users*	46.63
	Total health expenditure (% of GDP)	8.9	ICT Diffusion Index	0.5764	Mobile phone subscribers*	105.25

Content – access to information and knowledge

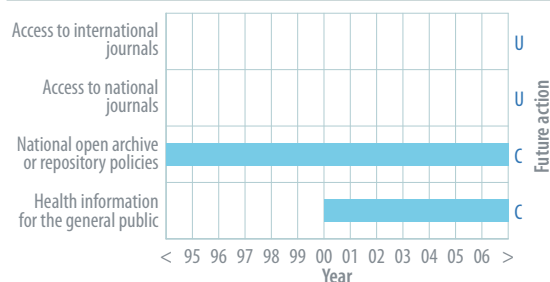


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided in Israel through a digital national open archive for scientific research and the availability of electronic health information for the general public. These have both been moderately effective and will be continued over the next few years. Medical laboratory results have been available electronically since 2000 to patients and physicians, as has information concerning general health issues and that on the topic of health promotion. Patients with chronic diseases receive relevant medical information online from the HMO's digital repositories. NHR and Ofek are noted as the most effective actions taken to promote access to electronic health content.

Capacity – human resources knowledge and skills

ICT capacity in Israel has been built through the use of undergraduate and postgraduate training in ICT. These courses have been offered as part of university curricula for health sciences students since 1985 and are rated as moderately effective. A series of special non-academic courses, designated for different sectors of the Israeli health care system, regarding the principles and use of medical informatics have also been offered since 1985.

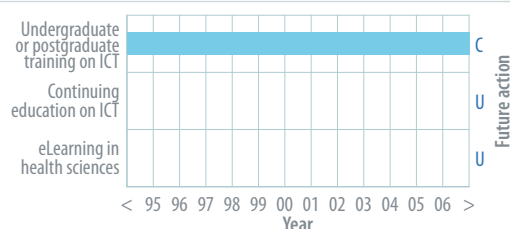


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

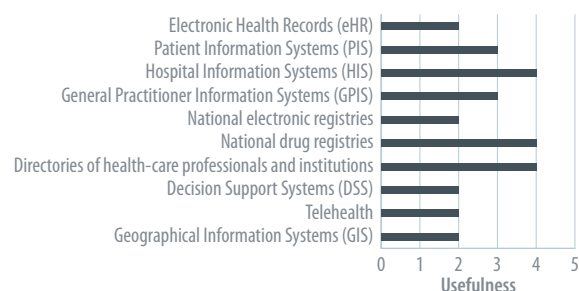


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

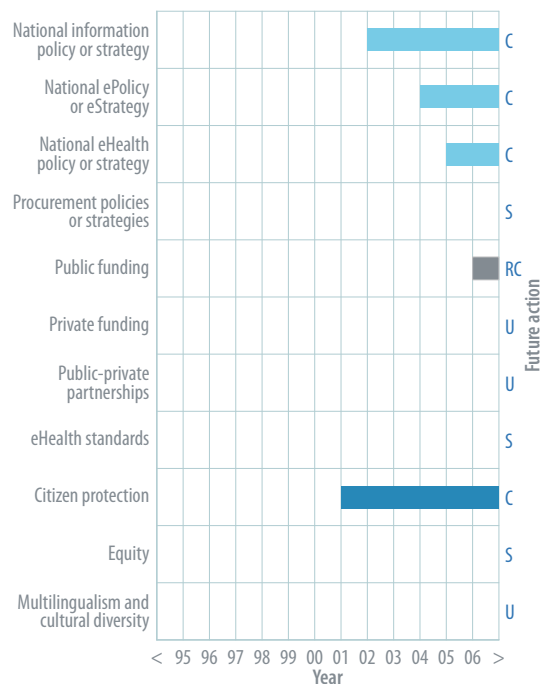
Hospital Information Systems (HIS), national drug registries, and directories of health-care professionals and institutions are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on national needs assessments for eHealth, advice on methods for monitoring and evaluation (M&E) of eHealth services, advice on eHealth norms and standards, and information on effective/best eHealth practices are considered as very useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	0 No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Latvia

Enabling environment – policies and strategies to support the information society



Latvia reports that a national information policy was implemented in 2002, a national ePolicy in 2004 and a national eHealth policy introduced in 2005. These initiatives are rated as moderately effective and will be continued over the next two years. Regulations to protect the privacy and security of individual patient data where eHealth is used were introduced in 2001 and this is considered a very effective action and will continue. Procurement policies, norms and standards for eHealth systems and policies to promote inclusiveness and equitable access to eHealth are likely to be introduced by 2008. The most important initiative in building an enabling environment for the use of information and communication technologies (ICT) in the health sector is reported to be the development of the national strategy 'eHealth in Latvia', which was approved by the Cabinet of Ministers in August 2005. The main challenge has been the development of the strategy for eHealth in Latvia due to difficulties arising from insufficient expertise in this area.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported in Latvia through intersectoral and nongovernmental cooperation. This was introduced in 2006 and has so far been slightly effective. It will be reviewed and continued over the next two years.

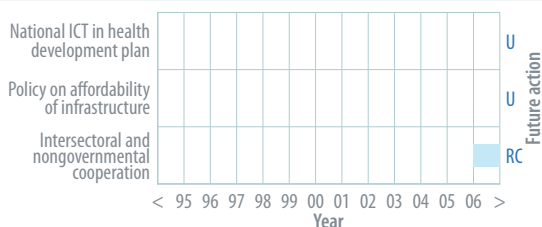
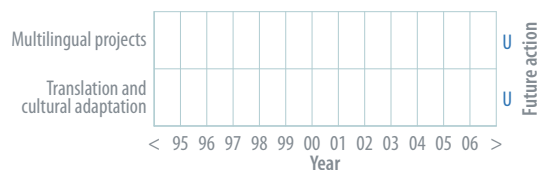


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

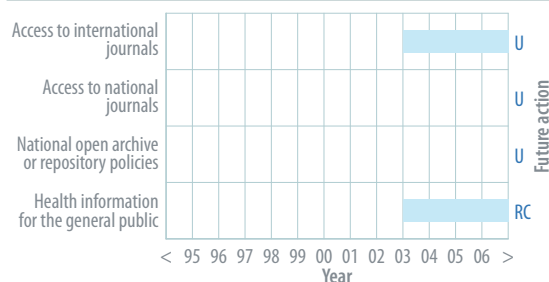


At this stage, none of the specified actions to promote the development of electronic multicultural health content have been taken and a decision remains to be made as to which actions will be introduced.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	2 330	OECD country	No	Main telephone lines*	28.45
	GDP per capita (Int \$)	10 629	World Bank category	2	Internet users*	35.43
	Total health expenditure (% of GDP)	6.4	ICT Diffusion Index	0.3816	Mobile phone subscribers*	67.22

Content – access to information and knowledge



Online access to international journals was introduced in 2003 in Latvia. This service is rated as slightly effective and a decision remains to be made whether it will continue. Health information for the general public was also introduced in 2003 and is likely to be reviewed and continued. The remaining listed actions to promote access to electronic health content have not been implemented and there is currently no decision as to whether they will be introduced over the next two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Latvia has been offering ICT skills courses as a part of university curricula (undergraduate or postgraduate) for health sciences students since 1999. ICT skills programmes in the ongoing training of health professionals, and health sciences courses through eLearning for health professionals in training and practice were introduced in 1995. These educational programmes are rated from moderately to very effective and are expected to be reviewed and continued over the next two years.

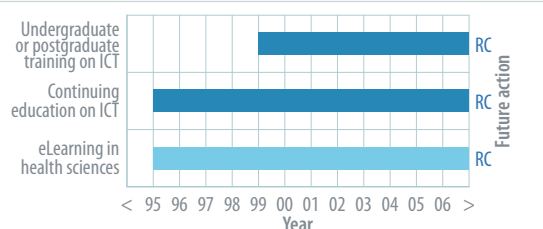


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

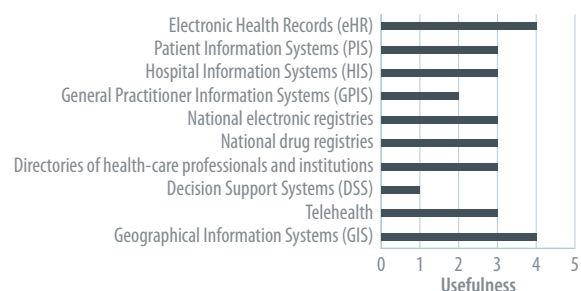


Figure 6. Preferred generic eHealth tools to be provided by WHO

Latvia rates Electronic Health Records (eHR) and Geographical Information Systems (GIS) as very useful eHealth tools if the World Health Organization could offer these as generic prototypes for adaptation. The majority of the specified eHealth services are considered from very to extremely useful.



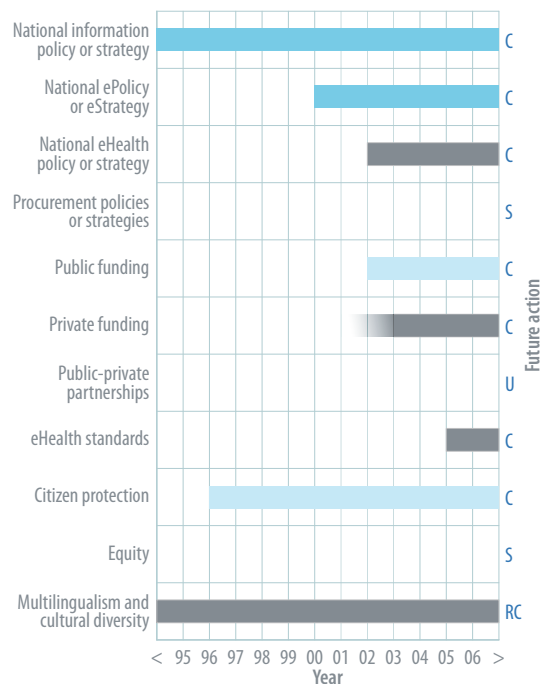
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Lithuania

Enabling environment – policies and strategies to support the information society



Lithuania reports that a majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been introduced and they are likely to continue over the next two years. A national information policy, as well as policies that promote availability of information in local languages and recognize cultural diversity, were implemented in 1991. The implementation of procurement policies to guide software, hardware and content acquisition in the health sector is expected to commence in the next two years, as is the implementation of policies to promote inclusiveness and equitable access to eHealth. To date, no decision has been made to form public-private partnerships to foster the use of ICT within the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was introduced in 2005 and is likely to continue. It is anticipated that a policy on affordability of infrastructure will be implemented by 2008. At this stage, no decision has been made as to whether intersectoral and nongovernmental cooperation will be introduced over the next two years.

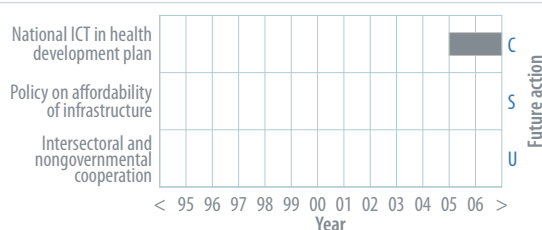
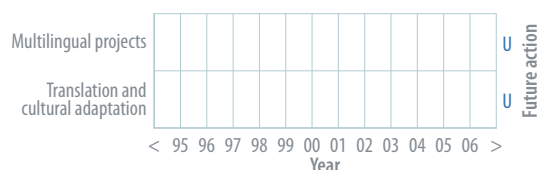


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

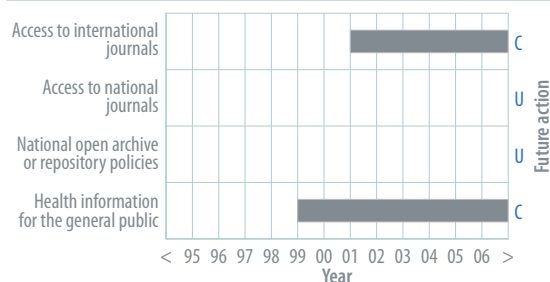


To date, none of the specified actions to promote the development of electronic multicultural health content have been taken and a decision remains to be made as to which actions will be introduced.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	3 455	OECD country	No	Main telephone lines*	23.8
	GDP per capita (Int \$)	11 484	World Bank category	2	Internet users*	28.09
	Total health expenditure (% of GDP)	6.6	ICT Diffusion Index	0.3724	Mobile phone subscribers*	99.29

Content – access to information and knowledge



Online access to international journals for health professionals has been provided since 2001 and to health information for the general public since 1999. Both actions are expected to continue.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses are part of university curricula (undergraduate and postgraduate) for health sciences students and are expected to continue over the next two years, as are health sciences courses through eLearning for health professionals. By 2008, Lithuania expects to provide ICT skills programmes in the ongoing training of health professionals.

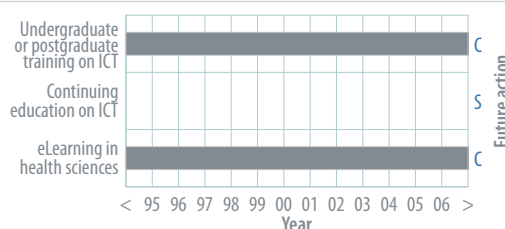


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

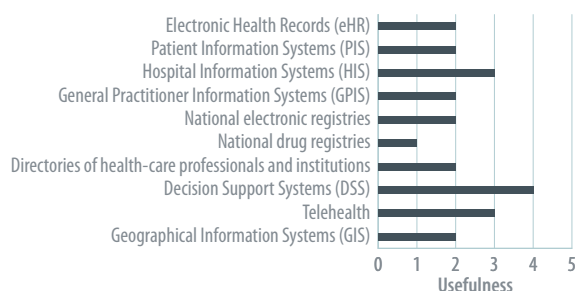


Figure 6. Preferred generic eHealth tools to be provided by WHO

Decision Support Systems (DSS) are rated as very useful eHealth tools if the World Health Organization could offer them as a generic prototypes for adaptation. Advice on eHealth norms and standards is considered an extremely useful eHealth service.

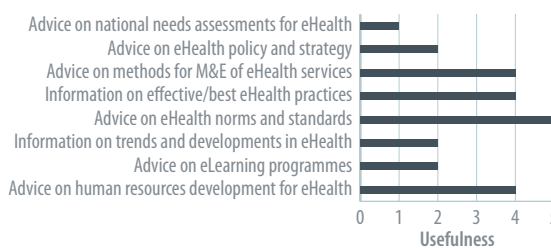


Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Luxembourg

Enabling environment – policies and strategies to support the information society

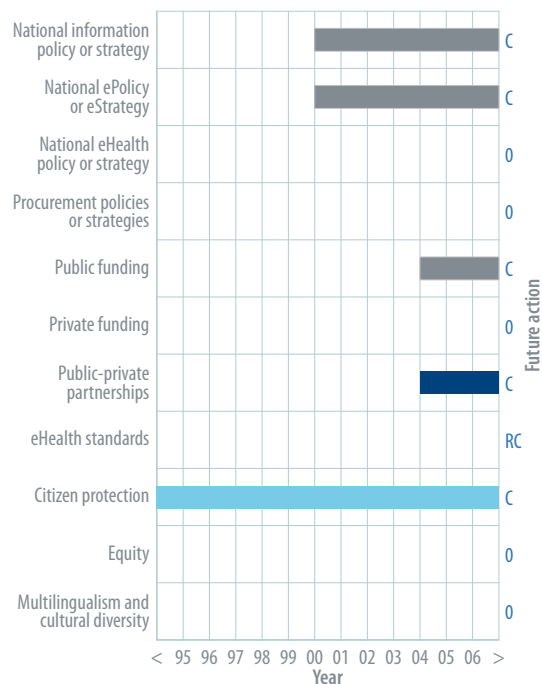


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Luxembourg reports that a national information policy and an ePolicy were re-launched in 2000. Public funding and public-private partnership actions commenced in 2004, the latter quoted as very effective. A policy for citizen protection in the area of eHealth was introduced in 1979 and rated as moderately effective. All of the actions taken in this area are planned to continue. A policy on eHealth standards is expected to be introduced by 2008. The following actions are listed as contributing to building an enabling environment: the creation of an economic interest group to maximize the performance of the country's health network; a feasibility study of the health portal, which brought public and private health partners together and now is entering its second stage after validation by the Ministry of Health; and a politically more favourable climate for information and communication technologies (ICT) in the health sector. Lacking awareness of the opportunities offered by ICT and the absence of a clearly defined eHealth policy are reported as significant challenges.

Infrastructure – access to information and communication technologies

The implementation of a national plan for the development of ICT in health is reported to start by 2008. To date, no decision has been made as to whether a national policy to reduce the costs of ICT infrastructure for the health sector will be introduced over the next two years. Luxembourg adopted a strategy on intersectoral and nongovernmental cooperation in 2005 and reports this action to be very effective and to continue. The HealthNet pilot is described as an effective action to support the ICT infrastructure development for the health sector.

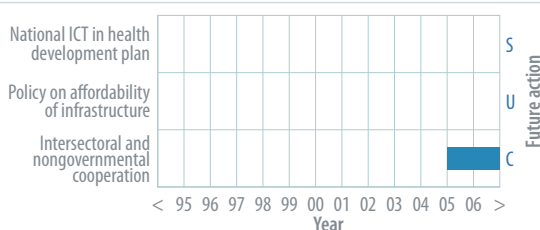


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

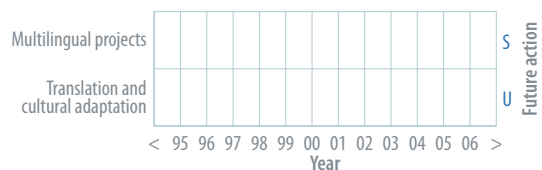


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

At this stage, none of the specified actions in this area have been implemented. However, a policy on multilingual projects, to promote and use new electronic health content in multiple languages, will be launched by 2008.

Country indicators	Population (000s)	448	OECD country	Yes	Main telephone lines*	79.75 [03]
	GDP per capita (Int \$)	54 013	World Bank category	1	Internet users*	59
	Total health expenditure (% of GDP)	6.8	ICT Diffusion Index	0.7236	Mobile phone subscribers*	119.38

Content – access to information and knowledge

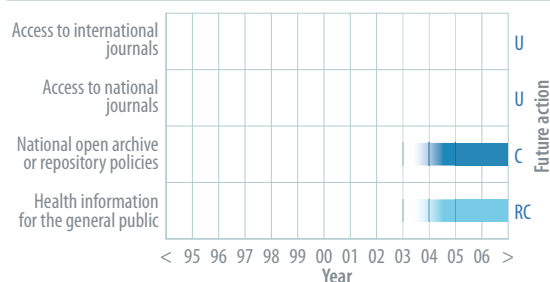


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Of the listed actions, Luxembourg has implemented a policy on a national open archive for scientific research and the provision of health information for the general public. These initiatives are rated as very effective and moderately effective, respectively, and are expected to continue. There is no decision reported on providing online access to international and national journals for its medical communities. However, during the coming years the National Health Portal project will be publishing online public health information for the general public and a database for professional use will be created.

Capacity – human resources knowledge and skills

To date, none of the listed actions have been implemented and it remains to be decided whether they will be started by 2008. Reference is made to ICT training programmes provided by the Henri Tudor Public Research Centre and SITec (training centre of the Henri Tudor PRC). These provide access to expertise in the field of ICT through the University of Luxembourg and its European network of partner universities, and technology partners.

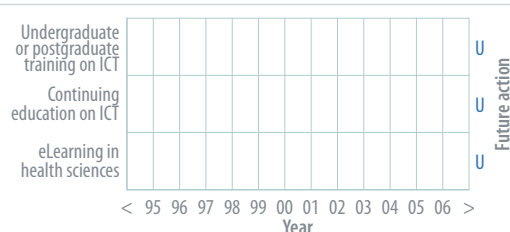


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

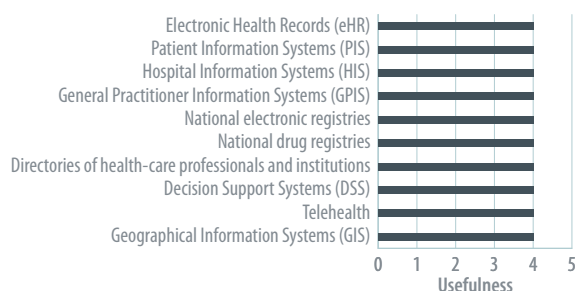


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated as very useful if WHO could offer these as generic prototypes for adaptation. Among the specified eHealth services information on effective/best eHealth practices and advice on eHealth norms and standards are reported as extremely useful. The rest of the listed services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Norway

Enabling environment – policies and strategies to support the information society

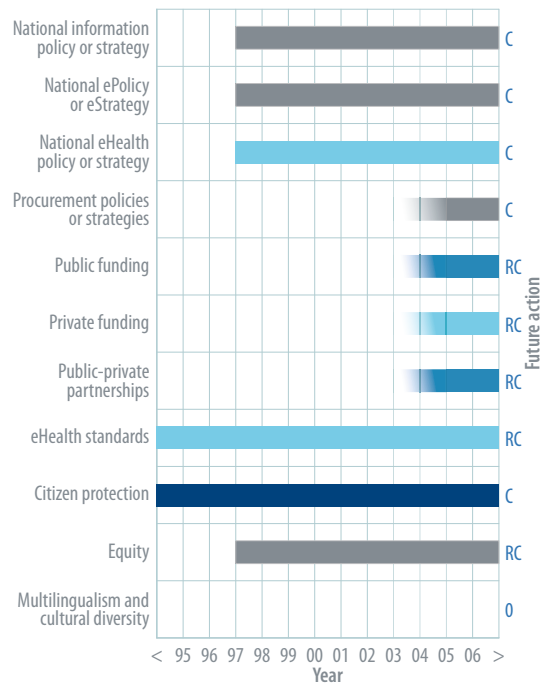


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Norway reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and will continue. Regulations to protect the privacy and security of individual patient data where eHealth is used were introduced in 1980 and have been rated as extremely effective and are likely to continue. The provision of public funding and the formation of public-private partnerships to foster the use of ICT within the health sector are considered very effective actions. Among several ongoing activities, Norway highlights the Lighthouse programme and the electronic interchange of health information (ELIN) project, both targeting the social and health care sector. Additionally, the web site 'Min side' [My page], targeting the general public, is mentioned. The establishment of the Norwegian Health Net (http://www.norsk-helsenet.no/tiki-view_articles.php), described as the backbone of eHealth services and systems, is reported to be the most effective action in this field. Norway states that the national coordination of financial, legal and security aspects of eHealth poses the most significant challenge in this area.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 1997 and is rated as very effective and likely to continue. In 2004, a national policy to reduce the costs of ICT infrastructure for the health sector was introduced. This is considered a very effective action which is likely to be reviewed and continued. Norway indicates that it works very effectively with intersectoral and nongovernmental partners to promote infrastructure development. The picture archive and communication systems (PACS) and Electronic Health Records are highlighted as other important projects in building ICT infrastructure for the health sector. The geography of Norway and its dispersed population pose a significant challenge for developing a telecommunications infrastructure. The Norwegian Health Net was created through the development of regional networks and their merging into the national Health Net proved a significant challenge, as the various regions had chosen different technologies. Today the Norwegian Health Net is implemented in all regions.

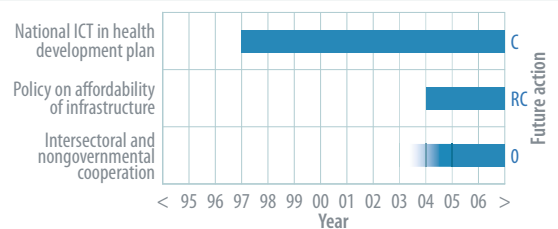


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

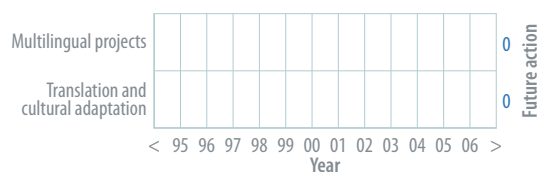


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Norway has not developed a large amount of health content in other languages since the number of people in the country who do not speak Norwegian is very low and information in other languages is already available online.

Country indicators	Population (000s)	4 565	OECD country	Yes	Main telephone lines*	48.64 [03]
	GDP per capita (Int \$)	37 031	World Bank category	1	Internet users*	39.37
	Total health expenditure (% of GDP)	10.3	ICT Diffusion Index	0.6859	Mobile phone subscribers*	90.89

Content – access to information and knowledge

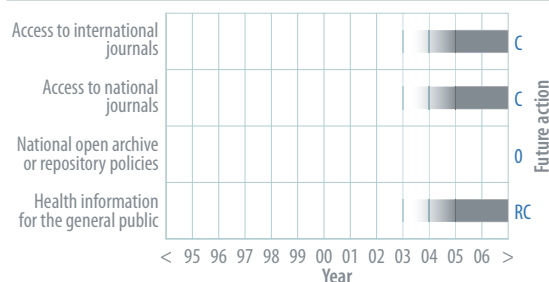


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 2005. An initiative to create and provide electronic health information for the general public will be reviewed and continued over the next two years. Several governmental institutions are, in addition to nongovernmental organizations, patient organizations and commercial services, developing web sites with health content for the general public. Legal issues concerning the grey area between health information and health advice is mentioned as a challenge. To date, no decision has been made as to whether a policy for a digital national open archive for scientific research (published within the country) will be implemented.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals are offered in Norway. These educational programmes will continue over the next two years. Health sciences courses through eLearning for health professionals (in training and practice) have been very effective and will be reviewed and continued. Other important initiatives are the basic ICT training courses awarding a certificate (Datakortet); a Masters programme in telemedicine and eHealth; and ICT training for health-care professionals. The most effective action in this field is the inclusion of ICT training as part of the general education for health professionals and the provision of online training courses for those who have not yet received their basic training. The lack of hardware and Internet connectivity in health care institutions pose significant challenges.

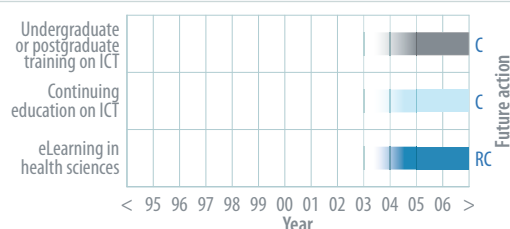


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

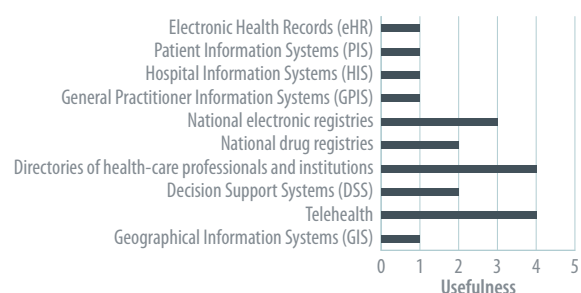


Figure 6. Preferred generic eHealth tools to be provided by WHO

Telehealth and directories of health-care professionals are rated as very useful eHealth tools if the World Health Organization could offer these as generic prototypes for adaptation to Norway. Of the specified eHealth services, information on effective/best eHealth practices, advice on eHealth norms and standards and information on trends and developments in eHealth are considered very useful. Norway adds that Telemedicine and eHealth services have been in place since the 1980s and are in the process becoming part of the general health services.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Poland

Enabling environment – policies and strategies to support the information society

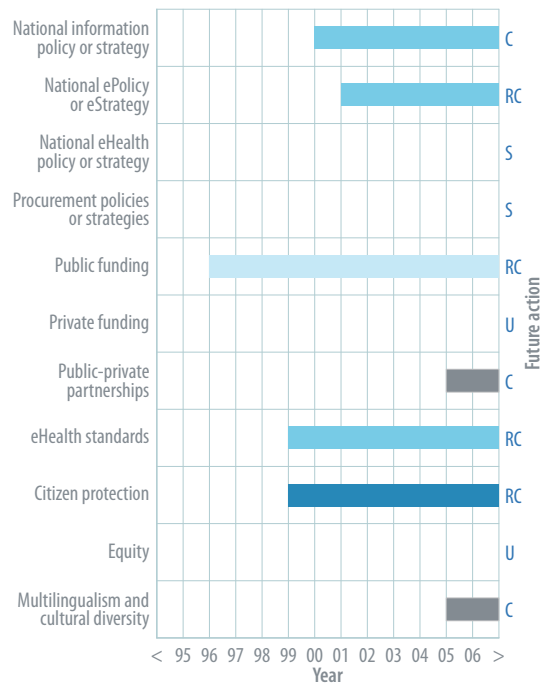


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Poland reports that the majority of the actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are likely to continue. Among national mechanisms an information policy and an ePolicy were implemented in 2000 and 2001, respectively, and rated as moderately effective. Public funding for ICT support of programmes addressing national health priorities has been provided since 1996 and public-private partnerships to foster the use of ICT within the health sector have been formed since 2005. Norms and standards for eHealth systems, services or applications have been effectively adopted since 1999. The same year regulations to protect the privacy and security of individual patient data where eHealth is used were introduced and this has been rated as very effective. The implementation of a national eHealth policy is expected to commence by 2008, as will the implementation of procurement policies to guide software, hardware and content acquisition in the health sector. To date, no decision has been made as to which of the remaining listed actions will be introduced over the next two years. The most effective action is reported to be the standardization of medical administrative data such as central registers of insured persons, health professionals, providers of medical services and infectious diseases. This has facilitated the effective processing and management of data in the health care system.

Infrastructure – access to information and communication technologies

The implementation of a national policy to reduce the costs of ICT infrastructure for the health sector will commence by 2008. Poland indicates that it works very effectively with intersectoral and nongovernmental partners to promote infrastructure development and will continue to use this approach. Currently, no decision has been made as to whether a national plan for the development of ICT in health, which sets targets for health sector connectivity, will be introduced in the next two years.

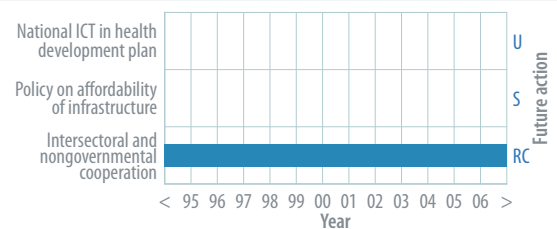


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

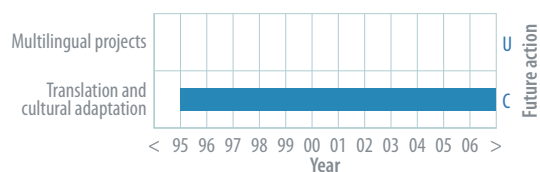


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

At this stage, no decision has been made concerning the introduction of multilingual projects. However, the translation and cultural adaptation of existing high-quality content (created either locally or abroad) has been supported since 1995, and is considered very effective.

Country indicators	Population (000s)	38 205	OECD country	Yes	Main telephone lines*	31.85 [03]
	GDP per capita (Int \$)	11 530	World Bank category	2	Internet users*	23.35
	Total health expenditure (% of GDP)	6.5	ICT Diffusion Index	0.3424	Mobile phone subscribers*	59.91

Content – access to information and knowledge

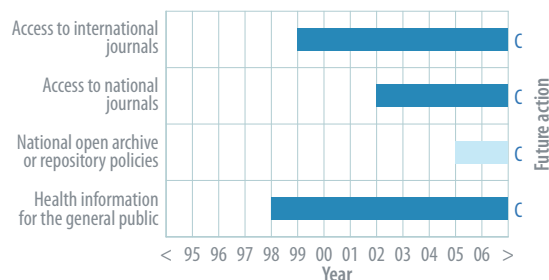


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1999 and 2002, respectively. The provision of locally created health information for the general public began in 1998. All these services have been very effective. In 2005 a digital national open archive for scientific research, published within the country, was launched. These services are expected to continue over the next two years. A countrywide assessment of ICT use, conducted in 2004, has been very useful. The cost of access to medical databases has eventually been lowered, which had been one of the major challenges in this area. The tax on Internet access for households has also been reduced.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1998 and ICT skills programmes in the ongoing training of health-care professionals since 2000. They have been rated as very effective and will be reviewed and continued over the next two years. There are plans to introduce health sciences courses through eLearning for health professionals (in training and practice) by 2008. The implementation of ICT courses as part of medical and postgraduate academic programmes is also considered an important step towards the adoption of international standards. However, shortage of instructors is posing a significant challenge, which is being addressed through systematic training.

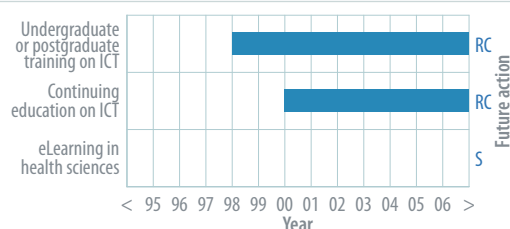


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

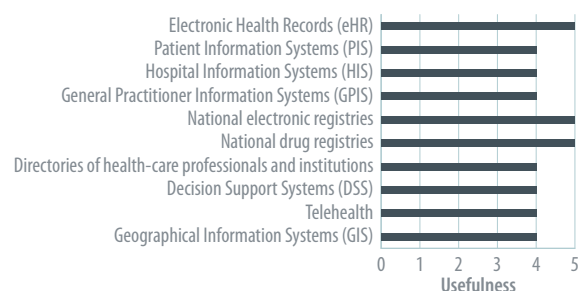


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Poland. The specified eHealth services are considered from moderately to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Russian Federation

Enabling environment – policies and strategies to support the information society

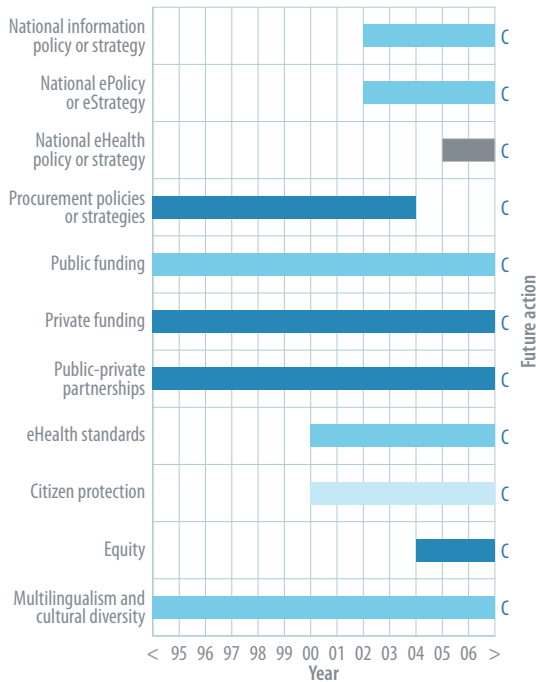


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Russian Federation reports that all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and they are expected to continue. The majority of these actions are considered moderately to very effective. Important initiatives are the consolidation of the work of chief scientists in the area of health computerization, and the establishment of medical informatics associations. The most effective actions initiated, include the federal programme ‘Electronic Russia’; attracting non-budgetary sources of funding; and the participation of international organizations (which has attracted additional funding). Other important initiatives are the establishment of a committee for standardization within the area of ICT in health, and the creation of a testing centre for software used in health care. Ensuring the general public participation in the global open information society and the automation of resource management are reported as significant challenges.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was implemented in 2002, and intersectoral and nongovernmental collaboration was introduced in 1993. Both initiatives are rated as moderately effective and are expected to continue. There are plans to design a policy on affordability of infrastructure by 2008. The Russian Federation describes centralizing the compulsory medical insurance (OMC) system as the most effective action in building ICT infrastructure for the health sector. Standardization issues within the ICT field pose significant challenges.

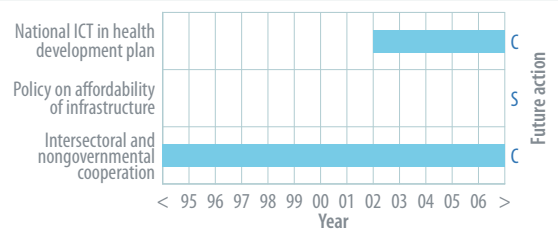


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

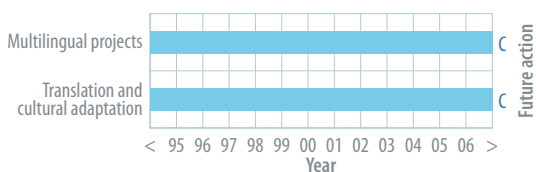


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in the Russian Federation through the introduction of multilingual projects, and support of translation and cultural adaptation. These actions were implemented in 1991 and are likely to continue. The development of Russian-language versions of international web sites is highlighted as another important initiative. The establishment of Russian-language electronic libraries is described as the most important action. However, ensuring access by Russian speakers to foreign sources of medical information remains a significant challenge.

Country indicators	Population (000s)	144 618	OECD country	No	Main telephone lines*	27.47
	GDP per capita (Int \$)	9 832	World Bank category	2	Internet users*	11.1
	Total health expenditure (% of GDP)	5.6	ICT Diffusion Index	0.262	Mobile phone subscribers*	51.61

Content – access to information and knowledge

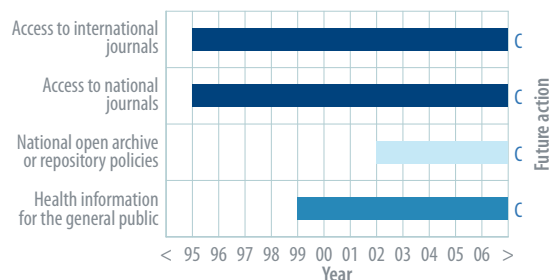


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1995, and this service has been extremely effective. A policy for a digital national open archive for scientific research (published within the country) was implemented in 2002 and health information for the general public has been created and provided since 1999, the latter rated as a very effective initiative. These services are expected to continue over the next two years. The establishment of electronic medical libraries is expressed as the most important action in the field of extending access to the community.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students, introduced in 1973, have been very effective. ICT skills programmes in the ongoing training of health-care professionals have been offered since 1995 and are rated as slightly effective. Health sciences courses through eLearning for health professionals (in training and practice) were introduced in 2002 and are considered moderately effective. All these educational programmes are likely to continue over the next two years. The training of specialists is considered a challenge in the area of building ICT capacity in the health sector.

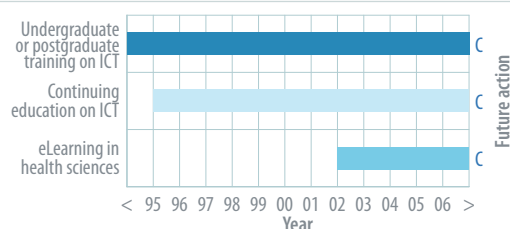


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

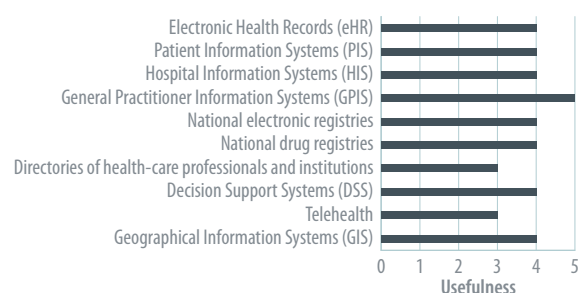


Figure 6. Preferred generic eHealth tools to be provided by WHO

General Practitioner Information Systems (GPIS) are rated as an extremely useful tool if the World Health Organization could offer these as a generic prototype for adaptation to the Russian Federation. The majority of remaining listed eHealth tools are rated very useful. Among the listed eHealth services, advice on methods for monitoring and evaluation of eHealth services, and advice on eLearning programmes are considered extremely useful. Participation in international conferences and fora for regular exchange of experiences are mentioned as additional activities that would be extremely useful.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Slovakia

Enabling environment – policies and strategies to support the information society

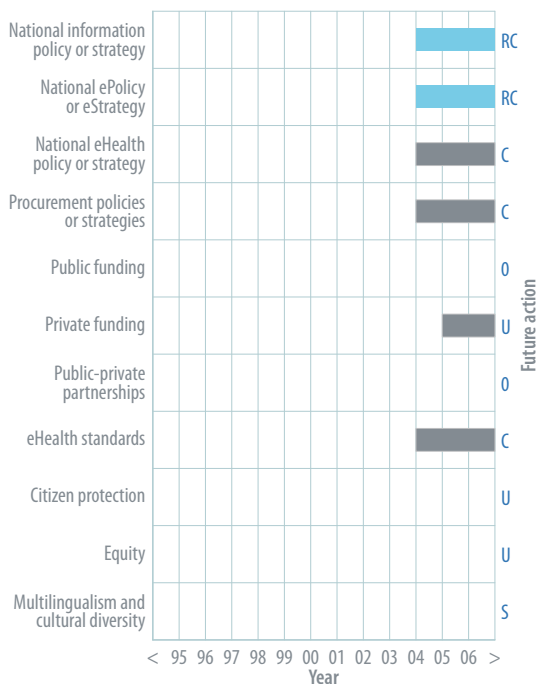


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Slovakia reports that half of the actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken, the majority of them likely to continue over the next two years. The promotion of availability of information in local languages in the recognition of cultural diversity is likely to be introduced by 2008. There are, to date, no plans to introduce regulations to protect the privacy and security of patient data. The implementation, in 2004, of a national eStrategy, which sets out the vision and objectives to promote the use of ICT across all sectors, is described as the most important initiative; it is expected to stimulate action in legislature and the implementation of international standards. Slovakia notes, however, that due to reforms by the Ministry of Health in 2004–2005, the implementation of the actions related to eHealth policies (specified in the Strategy on Implementing the Information Society) have been postponed. The Institute of Health Information and Statistics has been appointed by the Ministry of Health to organize a board of experts – eHealth Committee – to elaborate a national road map for the development and implementation of eHealth programmes in Slovakia. Increased cooperation with other institutions is expected to follow.

Infrastructure – access to information and communication technologies

A national policy to reduce the costs of ICT infrastructure for the health sector will be implemented in 2006. Currently, no decision has been made as to which of the remaining listed actions in improving access to information and communication technologies in the health sector will be taken over the next two years.

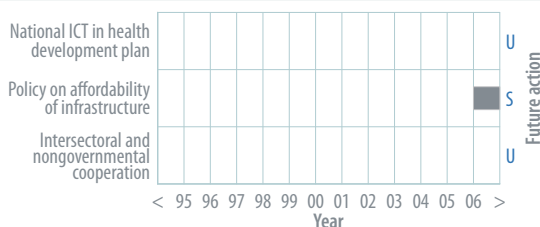


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

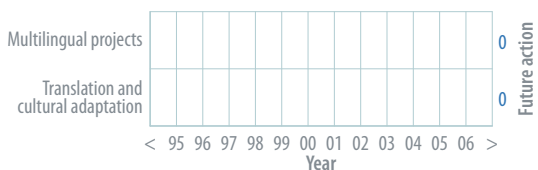


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

At this stage, none of the specified actions to promote the development of electronic multicultural health content have been taken.

Country indicators	Population (000s)	5 380	OECD country	Yes	Main telephone lines*	23.22
	GDP per capita (Int \$)	13 118	World Bank category	2	Internet users*	42.27
	Total health expenditure (% of GDP)	5.9	ICT Diffusion Index	0.3299	Mobile phone subscribers*	79.39

Content – access to information and knowledge

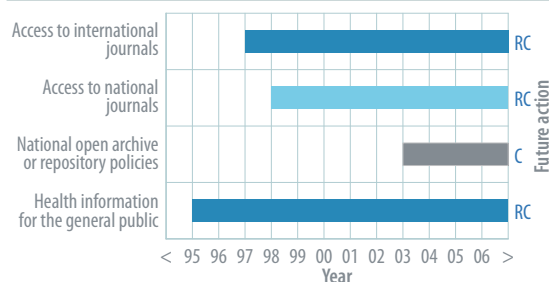


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1997 and 1998, respectively. Provision of locally created health information for the general public commenced in the 1990s. These services have been moderately to very effective and will be reviewed and continued over the next two years. A digital national open archive or repository for scientific research (published within the country) was launched in 2003 and is likely to continue. The national medical bibliography, Bibliographia Medica Slovaca, is highlighted as an important initiative to provide professionals with online access to health content. Slovakia reports the creation of a number of health-related web sites established by health institutions as the most effective action in this field, along with

the initiative providing health-related web sites to the general public. A consortium of Slovak libraries has been created (project eIFL), to provide access to medical databases at affordable rates.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals have been slightly effective and will be reviewed and may be continued over the next two years. There are plans to introduce health sciences courses through eLearning for health professionals (in training and practice) by 2008.

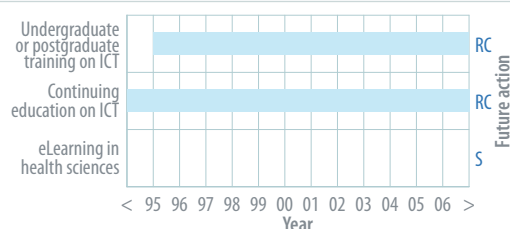


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

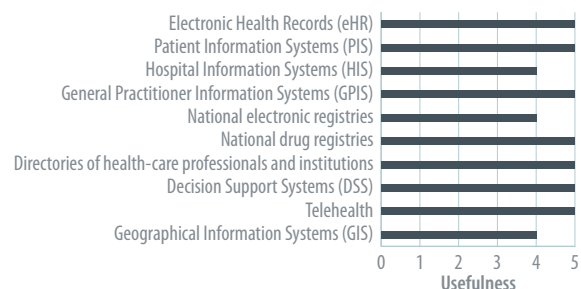


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Slovakia. The specified eHealth services are considered from very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Switzerland

Enabling environment – policies and strategies to support the information society

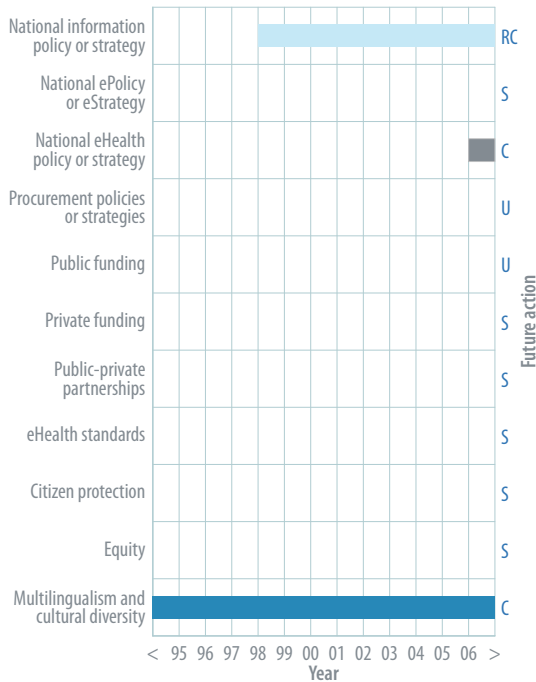


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Switzerland reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector will be taken in the next two years. A national information policy, implemented in 1998, is rated as slightly effective and will be reviewed and continued. Recognition of cultural diversity through the provision of information in local languages is promoted historically based on the constitution of 1291. It points out that patient privacy is incorporated within the National Health Insurance Act, however, legislation is not specific to eHealth. An important initiative to promote an enabling environment for ICT is the federal medical tariff system, TarMed, which, while providing comprehensive coverage of ICT infrastructure, is not specific to eHealth. Management and funding are shared by the federal and cantonal health care systems. Switzerland refers to its distinctly federal state organization with many actors and complex administrative processes, and points out that significant efforts to develop eHealth are undertaken at a local, cantonal and private sector levels. The current updating of the Swiss Information Society Strategy by the Government was complemented by a national conference on eHealth (2004). The revised Information Society Strategy, expected to be accepted by 2006 by the Bundesrat, will act as a framework strategy that will explicitly address eHealth and the need to develop a national eHealth strategy. The Swiss Federal Office of Public Health (BAG) has commenced preparations according to the revised strategy and inter alia initiated 'Taskforce eHealth'.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health is likely to be implemented in the next two years. There are currently no plans to introduce a policy on affordability of infrastructure. Intersectoral and nongovernmental collaboration commenced in 2005 and is likely to be reviewed and continued. Important initiatives are the Swiss National Health Insurance Act and the health insurance card, which has the potential to be developed into an electronic health card (smart card). Investments have been made in the administrative areas of infrastructure for eHealth. A significant challenge is to provide scientific evidence and evaluation on the benefits of ICT for health.

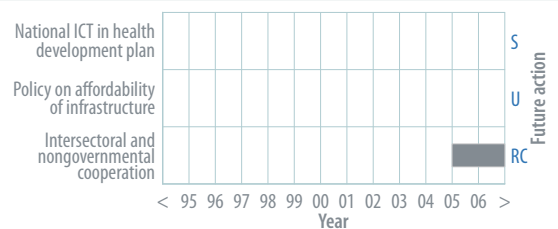


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

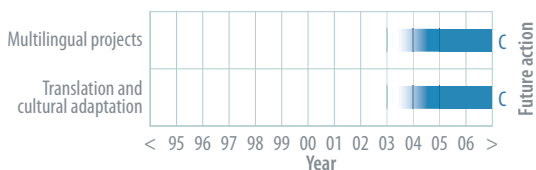


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in Switzerland through the introduction of multilingual projects, and support of translation and cultural adaptation. These initiatives are considered very effective and will continue. According to Switzerland's constitution, any social programme must take cultural and linguistic diversities into consideration. The Swiss Federal Office of Public Health provides public health information on its web site in German, French, Italian and English. The English language taking over as the new 'lingua franca' is described as a challenge in the area of ICT.

Country indicators	Population (000s)	7 339	OECD country	Yes	Main telephone lines*	70.97
	GDP per capita (Int \$)	32 805	World Bank category	1	Internet users*	47.2
	Total health expenditure (% of GDP)	11.5	ICT Diffusion Index	0.6507	Mobile phone subscribers*	84.63

Content – access to information and knowledge

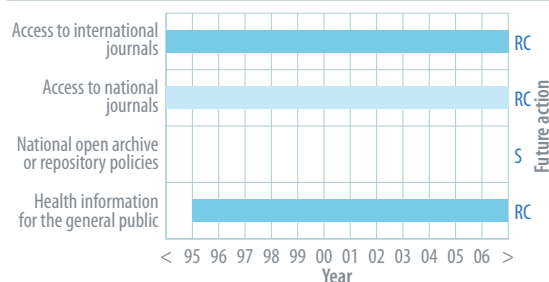


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1990. The creation and provision of health information for the general public in electronic format began in 1995. These services are likely to be reviewed and continued. There are plans to introduce a policy for a digital national open archive for scientific research by 2008. Swiss Academies and University libraries promote an 'Open Archive Initiative'. The following is offered in German, French, Italian and English on the BAG web site: information on prevention and monitoring (influenza, severe acute respiratory syndrome, HIV/AIDS, drugs and addiction, chemical and radiation hazards); electronic forms to report diseases subject to registration; and access to databases for ongoing epidemics in Switzerland. The most

important actions to promote access to electronic health content are described to be mainly due to academic or private sector initiatives. Lack of scientific evaluation of the various aspects linked to the use of electronic health content is reported to pose a significant challenge.

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health-care professionals will be introduced in the next two years. Health sciences courses through eLearning for health professionals (in training and practice) have been offered since 2000. A decision has yet to be made as to whether this programme will continue as it has not received a positive evaluation. Medical eLearning courses are being supported through the national initiative 'Swiss Virtual Campus' (e.g. Computers for Health). Health professionals' associations also offer online courses in the ongoing training of health professionals. There is, however, no educational plan for health care activities at the national level. Switzerland notes the need for an overall eHealth blueprint in the area of building ICT capacity in the health sector.

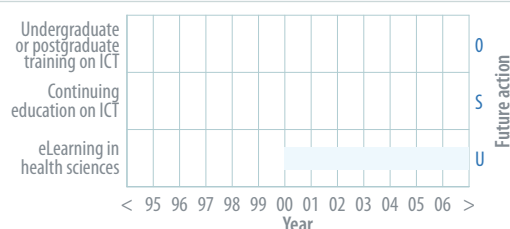


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

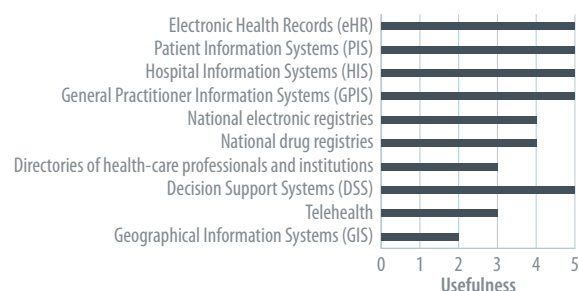


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated from very to extremely useful if WHO could offer these as generic prototypes for adaptation to Switzerland. 'Telehomecare' is mentioned as an additional tool that would be extremely useful. The majority of the specified eHealth services are also considered very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Turkey

Enabling environment – policies and strategies to support the information society

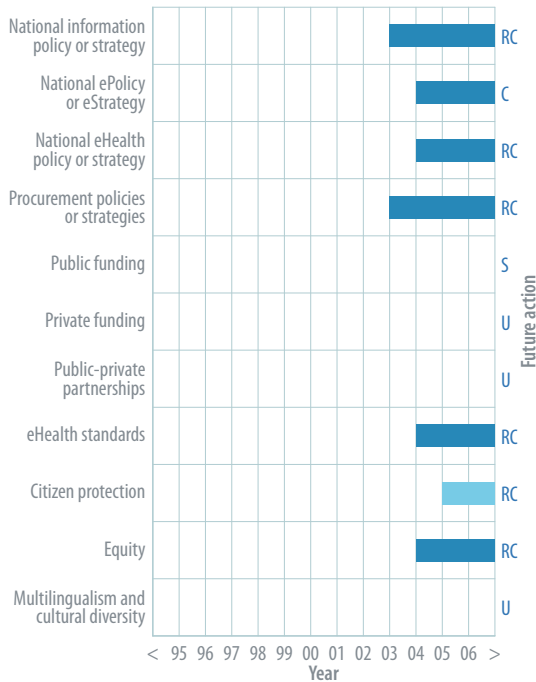


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Turkey reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. Most are rated as very effective and are likely to be reviewed and continued over the next two years. Provision of public funding for ICT support of programmes addressing national health priorities will start by 2008. The remainder of the listed actions have not been implemented at this stage and no decision has been made as to which of them will be introduced. Turkey highlights the implementation of the National Health Information System project in 2003 under the Ministry of Health as a significant action. Ten working groups comprising members from governmental institutions, the private sector, nongovernmental organizations, universities, and social partners conducted inter alia an assessment of the technological situation within their respective fields. The eHealth Working Group, coordinated by the Ministry of Health and developed in the context of 'eTransformation Turkey', has developed modules of eHealth services. Turkey's eHealth Project Proposal, prepared by the Health Transformation Programme and eTransformation Turkey has been accepted by the International Telecommunications Union. As a further step Turkey's eHealth Implementation Plan has been developed. To meet the various challenges in this area Turkey wishes to create a department for ICT and health within the Ministry of Health.

Infrastructure – access to information and communication technologies

The implementation in 2001 of a national plan for the development of ICT in health, which sets targets for health sector connectivity, is reported to be very effective and will likely be reviewed and continued. A policy on affordability on infrastructure for the health sector was introduced in 2003, and intersectoral and nongovernmental cooperation to promote infrastructure development commenced the same year. These initiatives are rated as very effective and will continue. The introduction of asymmetric digital subscriber lines (ADSL) by Turkish Telecom is described to be the most effective action to build infrastructure for ICT in the health sector. This has reduced the cost of connectivity overall, and enabled family physicians to access the Family Medicine Information System as part of the Health Transformation Programme.

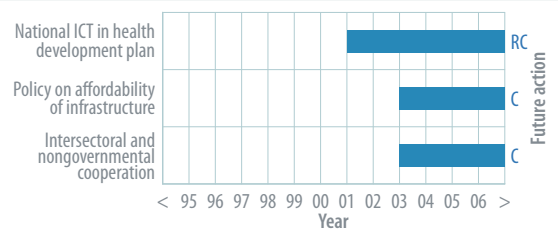


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

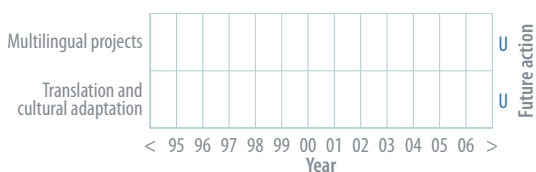


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken in the next two years.

Country indicators	Population (000s)	70 713	OECD country	Yes	Main telephone lines*	26.45
	GDP per capita (Int \$)	6 969	World Bank category	2	Internet users*	14.13
	Total health expenditure (% of GDP)	7.6	ICT Diffusion Index	0.3033	Mobile phone subscribers*	47.99

Content – access to information and knowledge

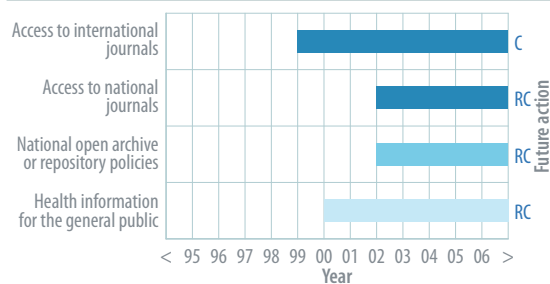


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1999 and 2002, respectively. The former is rated as very effective and will continue over the next two years. The latter is also rated as very effective, and will be reviewed. In 2002, a digital national open archive for scientific research (published within the country) was launched and is rated as a moderately effective service. The creation and provision of health information for the general public in electronic format began in 2000. Both these services are likely to be reviewed and continued.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 2003 and ICT skills programmes in the ongoing training of health-care professionals since 2000. These educational programmes are rated as moderately effective and will be reviewed and continued. There are plans to introduce health sciences courses through eLearning for health professionals (in training and practice) by 2008.

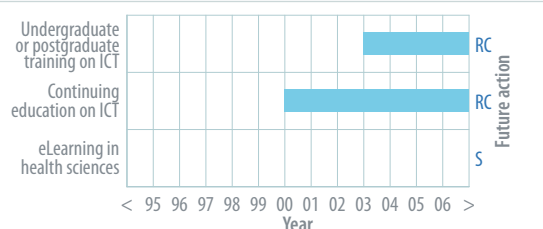


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

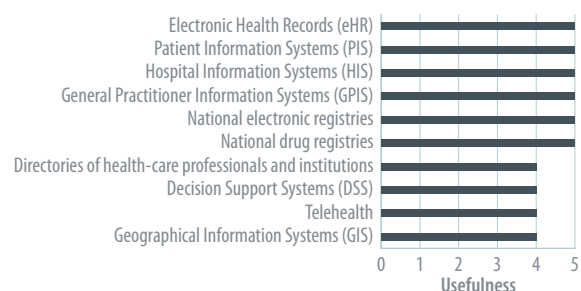


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Turkey. Advice on human resources development for eHealth is rated as an extremely useful eHealth service. The rest of the specified services are considered from moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

United Kingdom of Great Britain and Northern Ireland

Enabling environment – policies and strategies to support the information society

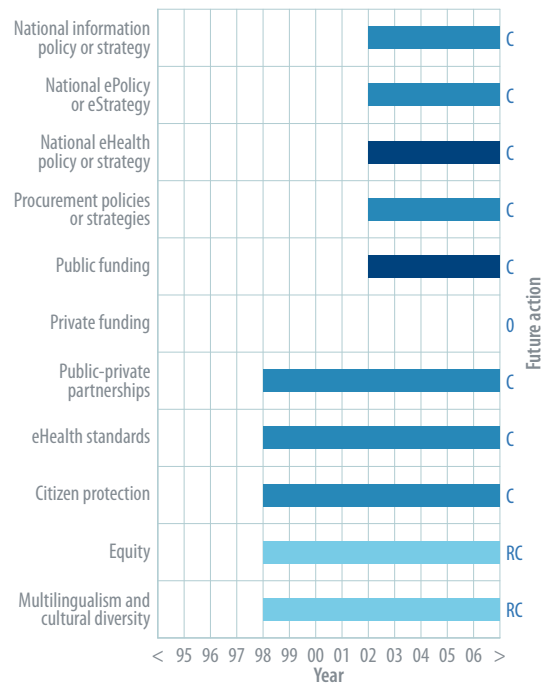


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The United Kingdom of Great Britain and Northern Ireland reports that it has taken all but one of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector. These actions are expected to continue. It highlights the strategic review of health care provision, 'Securing our Future Health: Taking a Long-Term View – the Wanless Review'. This led to the launch of the National Programme for information technology (IT) in the National Health Service (NHS), a programme spanning over 10 years, which created a national information infrastructure to support health care delivery in England. Key success factors were a centrally led and managed procurement process, coupled with secure funding specifically for ICT investment. Similar actions specific to Scotland, Wales and Northern Ireland are being developed. One of the most significant challenges has been securing public and professional confidence in the information governance arrangements and privacy and confidentiality measures around holding and processing sensitive health information electronically. This has been dealt with through extensive consultation with the public and health professionals, and maintaining transparent policies regarding the use of health data. A framework for information governance has been established, developed in full consultation with health-care professionals (arising out of the Caldicott review, all NHS bodies have senior clinicians appointed to oversee the confidentiality of patient data). The National Programme for IT infrastructure (see above) is being implemented with rigorous security measures including the

use of smartcards for health-care professionals and mechanisms for patients to define what information they wish to be shared and under what circumstances.

Infrastructure – access to information and communication technologies

The listed actions, implemented in 2002, are rated as extremely effective and likely to continue. The above-mentioned Wanless Review is noted as an important initiative in this field. A significant challenge has been the scale and complexity of the health care delivery process, identifying the needs of a large and diverse community of users who work in many different organizations, from large teaching hospitals to single-handed general practitioner practices. This has been met in England by a centrally managed procurement process. The National Programme for IT in England consists of specific procurement criteria based on the formal Official Journal of European Union (OJEU) process: only major suppliers who could demonstrate proven ability to deliver a programme on this scale were selected; a clear set of requirements and scope for implementation were provided; rigorous testing of technical and interoperability standards occurred; adopting a service-provision strategy whereby the technical support arrangements are the responsibility of the supplier, not the NHS. The other countries of the United Kingdom (that have devolved responsibility for health care provision) are making separate arrangements.

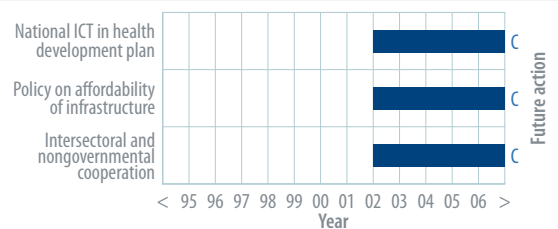


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

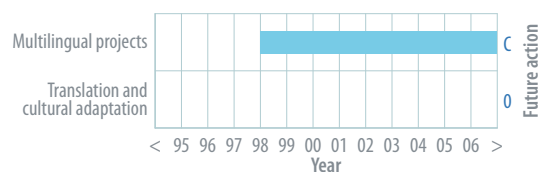


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects were introduced in 1998 to develop multilingual electronic health content. NHS Direct Online (<http://www.nhsdirect.nhs.uk>) is highlighted as a key action and although it is an English-language site, NHS Direct and local NHS organizations provide translation facilities for patients on request. This is considered the most cost-effective approach. NHS Direct Online is also currently developing quality assured, evidence-based, health information leaflets in English and 12 other languages. Supporting minority languages (especially non-European) and providing health advice in an appropriate cultural context poses a significant challenge.

Country indicators	Population (000s)	59 554	OECD country	Yes	Main telephone lines*	56.35
	GDP per capita (Int \$)	29 825	World Bank category	1	Internet users*	62.88
	Total health expenditure (% of GDP)	8	ICT Diffusion Index	0.6085	Mobile phone subscribers*	102.16

Content – access to information and knowledge

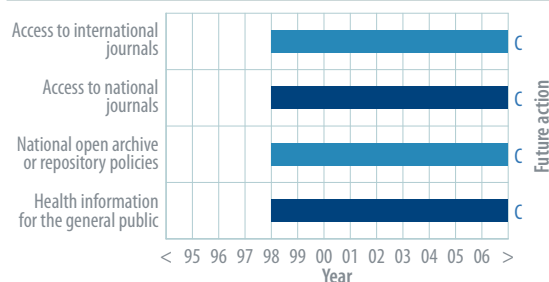


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

The specified actions to promote access to electronic health content were implemented in 1998, rated from very to extremely effective and are expected to continue. The most effective action is described as being the establishment of 'NHS Direct Online' as a complementary service to the 'NHS Direct' telephone advice service. Success factors include: promoting it under the trusted NHS 'brand' as a quality assured source of high-quality information; central funding and provision of resources; building on well-established and trusted pilot projects; working closely with a wide network of academic, private and voluntary sector information providers; implementation as part of an integrated set of services for public health information including telephone advice service and digital TV service, as well as linking it to the national

knowledge service component of the National Programme for IT. Similar actions specific to Scotland, Wales and Northern Ireland are being developed. The most significant challenge has been to ensure that publicly accessible health information is of the highest quality and wholly consistent with best clinical practice. This has been met by ensuring that the information is clearly presented as part of the overall NHS health care provision, and that all information provided is sourced by accredited clinical professionals and has gone through rigorous clinical review.

Capacity – human resources knowledge and skills

ICT capacity has been built by the implementation of the listed educational programmes since 1998. These programmes are expected to continue over the next two years. The most effective action has been the creation of the NHS University (NHSU). The NHS currently invests over £3 billion a year on education and training for its staff. NHSU provides learning opportunities for NHS staff and other caregivers by creating learning environments throughout the sector, and will therefore be a major contributor to the implementation of the NHS Plan, to the modernization of social care, and to the nation's 'Skills Strategy'.

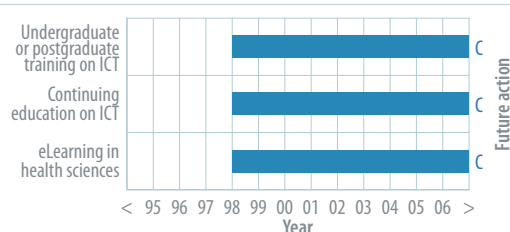


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

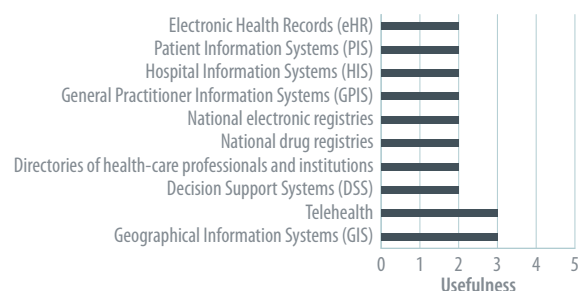


Figure 6. Preferred generic eHealth tools to be provided by WHO

Telehealth and Geographical Information Systems are rated as moderately useful if the World Health Organization could offer these as generic prototypes for adaptation to the United Kingdom of Great Britain and Northern Ireland. The majority of the specified eHealth services are considered moderately useful.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants



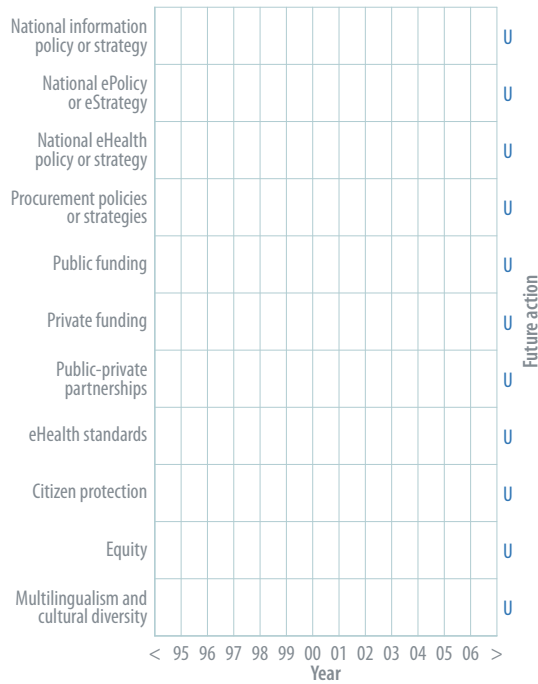
WHO EASTERN MEDITERRANEAN REGION



Afghanistan**	272	Iraq		Oman	288	Syrian Arab Republic**	296
Bahrain**	274	Jordan	282	Pakistan		Tunisia	
Djibouti	276	Kuwait		Qatar		United Arab Emirates	298
Egypt	278	Lebanon	284	Saudi Arabia**	290	Yemen	300
Iran (Islamic Republic of)	280	Libyan Arab Jamahiriya		Somalia	292		
		Morocco	286	Sudan	294		

Afghanistan

Enabling environment – policies and strategies to support the information society



Afghanistan reports that none of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented and a decision remains to be made as to which actions will be taken.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector was supported in Afghanistan through intersectoral and nongovernmental cooperation from 2004 to 2005. This is reported to have been very effective and a decision remains to be made as to which further actions may be taken in this field.

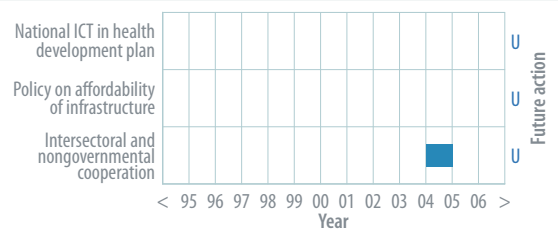
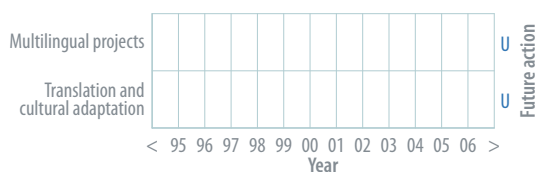


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

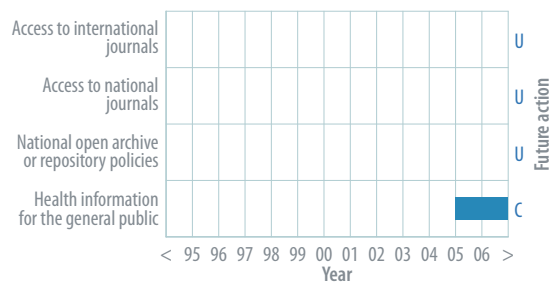


At this stage, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	27 231	OECD country	No	Main telephone lines*	0.2
	GDP per capita (Int \$)	405	World Bank category	4	Internet users*	0.1
	Total health expenditure (% of GDP)	6.5	ICT Diffusion Index	...	Mobile phone subscribers*	2.41

Content – access to information and knowledge



Online access to health content has been provided in Afghanistan through the availability of electronic health information for the general public. Creating and providing health information for the general public in electronic format commenced in 2005 and is rated as very effective. This action will continue over the next few years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Currently, none of the listed actions to build ICT capacity in the health sector have been implemented and a decision remains to be made as to which actions will be taken by 2008.

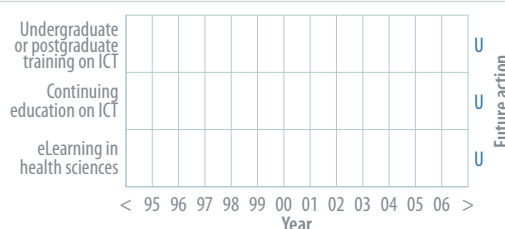


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

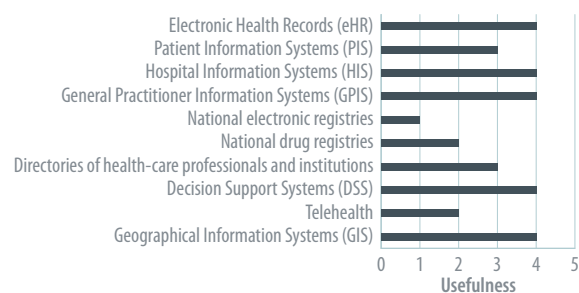


Figure 6. Preferred generic eHealth tools to be provided by WHO

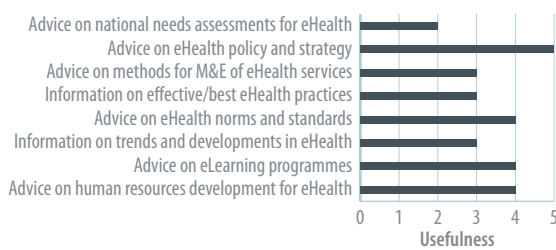


Figure 7. Preferred eHealth services to be provided by WHO

Electronic Health Records (eHR), Hospital Information Systems (HIS), General Practitioner Information Systems (GPIS), Geographical Information Systems (GIS) and Decision Support Systems (DSS) are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on eHealth policy and strategy is considered an extremely useful eHealth service.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Bahrain

Enabling environment – policies and strategies to support the information society

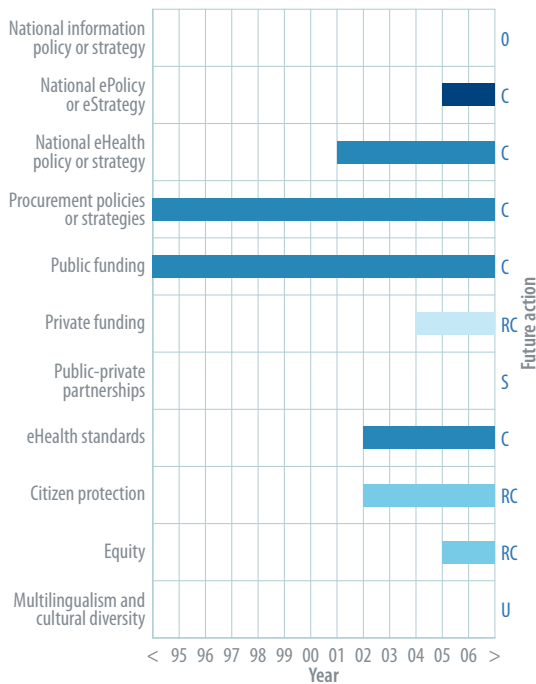


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Bahrain reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented and are likely to continue over the coming two years. Many of the implemented actions are considered very effective and the national ePolicy, introduced in 2005, is rated as extremely effective. Public-private partnerships to foster the use of ICT within the health sector are expected to be introduced by 2008. The development of an eHealth strategy (in 2001) and the continuous follow-up of its implementation is described as the most effective action in this area. Budget allocation, stakeholder participation and approval processes are reported as significant challenges.

Infrastructure – access to information and communication technologies

Both a national plan for the development of ICT in health, which sets targets for health sector connectivity, and a national policy to reduce the costs of ICT infrastructure for the health sector were implemented in 1997. Intersectoral and nongovernmental cooperation to promote infrastructure development was introduced in the 1990s and is rated as very effective. These initiatives are expected to continue. Bahrain notes a comprehensive network infrastructure, with its application of advanced technology for connecting all government health care facilities, as the most effective action in this field. Budgetary issues, lengthy approval procedures and the need to strengthen the local area network are reported to be significant challenges in building ICT infrastructure for the health sector.

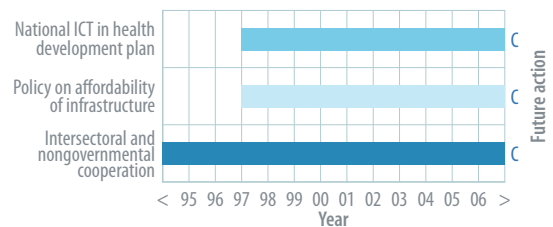


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

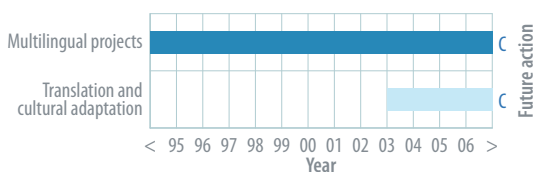


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects have been successfully introduced in Bahrain since 1985, to promote the development and use of new electronic health content in multiple languages. The translation and cultural adaptation of existing high-quality content (created either locally or abroad) has been supported since 2003. These actions are expected to continue over the next two years. The Ministry of Health's web site provides health content in Arabic and English. However, application systems are mainly in English. For this reason the lack of comprehensive health applications in Arabic is reported as the most significant challenge in this field.

Country indicators	Population (000s)	706	OECD country	No	Main telephone lines*	25.92
	GDP per capita (Int \$)	19 928	World Bank category	1	Internet users*	20.67
	Total health expenditure (% of GDP)	4.1	ICT Diffusion Index	0.4229	Mobile phone subscribers*	87.92

Content – access to information and knowledge

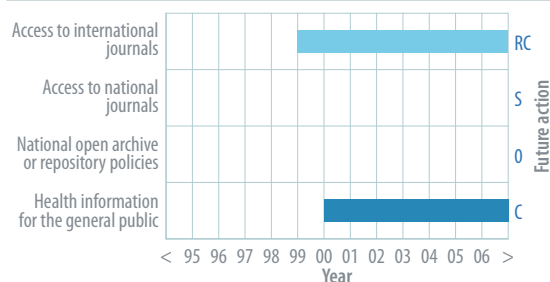


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to electronic international journals since 1999. This service is rated as moderately effective and is likely to be reviewed and continued. By 2008 health professionals in Bahrain should have access to national journals online. The creation and provision of health information for the general public in electronic format began in 2000, and is considered very effective. The comprehensive Ministry of Health web site, which is kept updated on a regular basis, is described as the most effective action in the provision of access to information and knowledge. However, Bahrain reports that limited online services in general pose a significant challenge in this field.

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health-care professionals have been offered since 2001 and health sciences courses through eLearning for health professionals (in training and practice), since 2003. These educational programmes are likely to be reviewed and continued over the next two years. Local universities offer ICT courses within their postgraduate programmes. However, the use of ICT for health is not yet part of the undergraduate or postgraduate university curricula. Funding for training programmes is reported to pose a significant challenge.

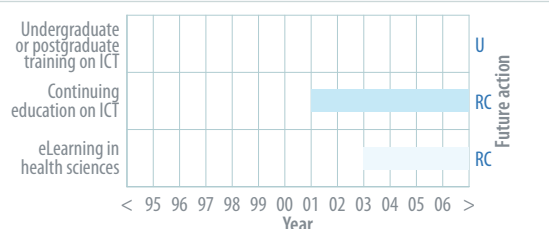


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

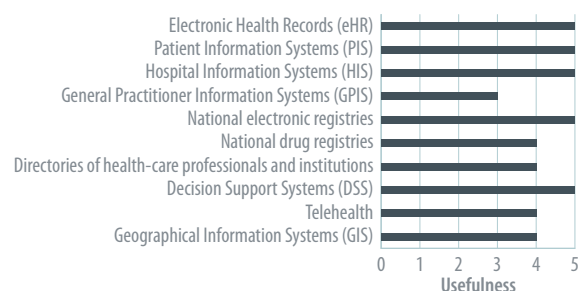


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Bahrain. Among the listed eHealth services, advice on eHealth norms and standards, and information on trends and developments in eHealth are rated as extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Djibouti

Enabling environment – policies and strategies to support the information society

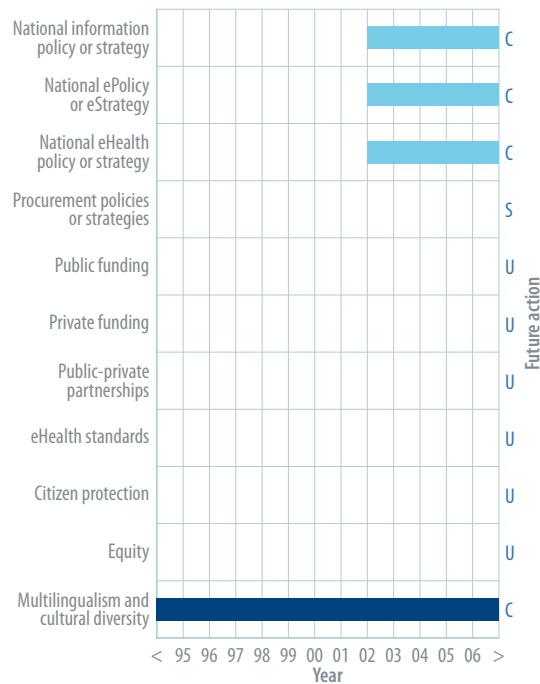


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Djibouti reports that four of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken; they will continue over the next two years. National mechanisms such as an information policy, an eStrategy, and an eHealth policy have been established to promote the use of ICT since 2002/2003. This has so far been moderately effective. The promotion of availability of information in local languages and the recognition of cultural diversity has been extremely effective and will continue. Procurement policies to guide software, hardware and content acquisition in the health sector are planned to be implemented by 2008. A decision remains to be made as to which of the remaining listed actions will be introduced in the next two years. Tax reduction on information products and equipment, and a 50% reduction on telecommunication costs are rated so far as the most effective actions in building an enabling environment for the use of ICT in the health sector.

Infrastructure – access to information and communication technologies

To date, none of the specified actions to support ICT infrastructure development have been implemented.

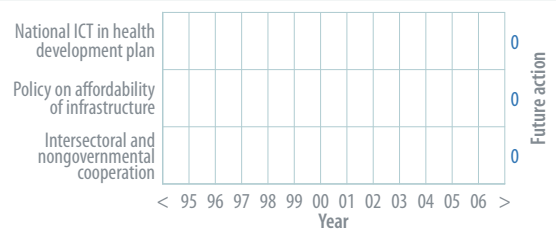


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

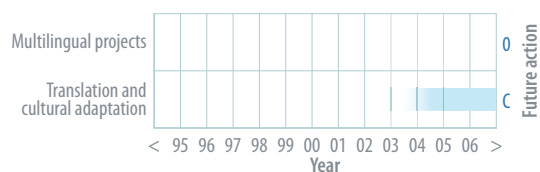
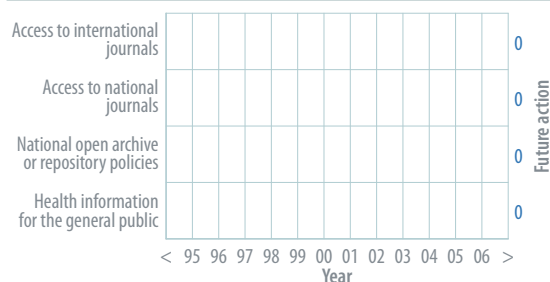


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in Djibouti through the translation and cultural adaptation (localization) of existing high-quality content (created either locally or abroad). This has been slightly effective and will continue over the next few years.

Country indicators	Population (000s)	765	OECD country	No	Main telephone lines*	1.63
	GDP per capita (Int \$)	1 265	World Bank category	3	Internet users*	1.32
	Total health expenditure (% of GDP)	5.7	ICT Diffusion Index	0.1613	Mobile phone subscribers*	5.07

Content – access to information and knowledge



At this stage, none of the specified actions to promote online access to health content have been implemented in the health sector and a decision remains to be made as to which actions will be taken in this field.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Currently, none of the listed actions to build ICT capacity in the health sector have been implemented.

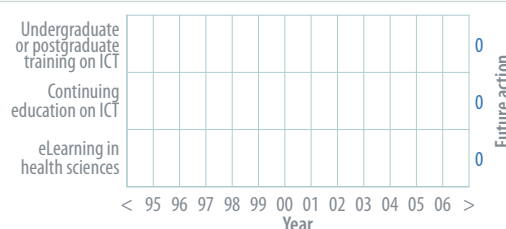


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

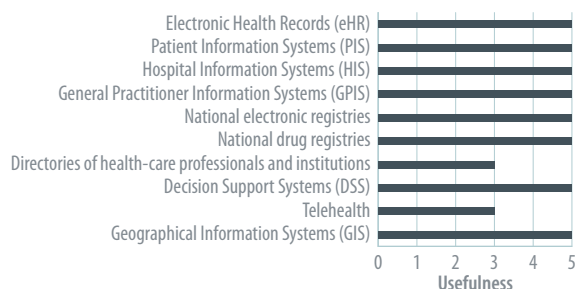


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

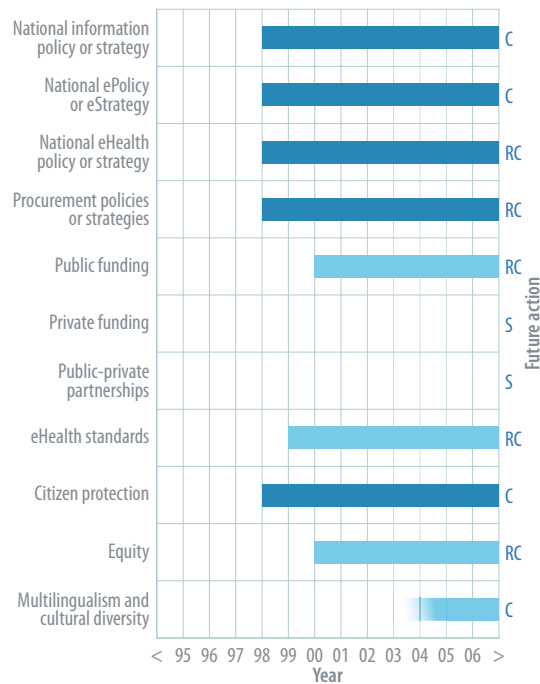
The majority of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation by Djibouti. The majority of the specified eHealth services are also considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Egypt

Enabling environment – policies and strategies to support the information society



Egypt reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken between 1998 and 2000. These actions are rated from moderately to very effective and are predicted to continue over the next two years. There are plans to provide private funding for ICT support of programmes addressing national health priorities, and to form public-private partnerships to foster the use of ICT within the health sector by 2008.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was implemented in 1998, and a national policy to reduce the costs of ICT infrastructure for the health sector in 1999. Intersectoral and nongovernmental cooperation to promote infrastructure development has been ongoing since 1998. These actions are rated as very effective and are likely to continue over the coming two years.

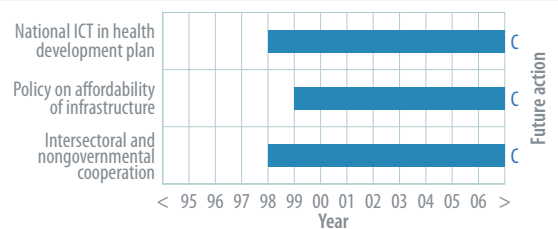
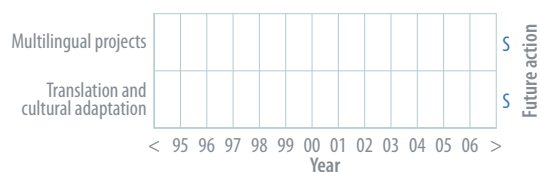


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

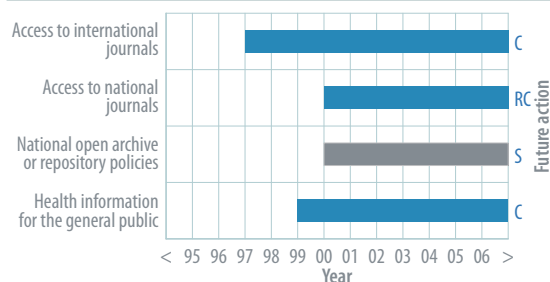


Multilingual projects and support of translation and cultural adaptation are planned to be introduced by 2008 to promote the development of electronic multicultural health content in Egypt.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	71 267	OECD country	No	Main telephone lines*	13.52
	GDP per capita (Int \$)	4 042	World Bank category	3	Internet users*	5.57
	Total health expenditure (% of GDP)	5.8	ICT Diffusion Index	0.2254	Mobile phone subscribers*	10.92

Content – access to information and knowledge



All of the listed programmes to develop or provide electronic health content for the medical or research communities have been implemented (1997–2000), the majority rated as very effective. These initiatives are likely to continue.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals have been offered since 1991 and are rated as very effective. Health sciences courses through eLearning for health professionals (in training and practice) have been offered since 2000 and are reported to be moderately effective. All of these educational programmes will be reviewed and are likely to be continued over the next two years. Egypt notes the need for orientation on eHealth and eLearning technologies, and training in the development and management of such systems.

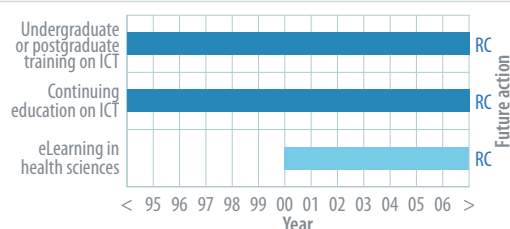


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

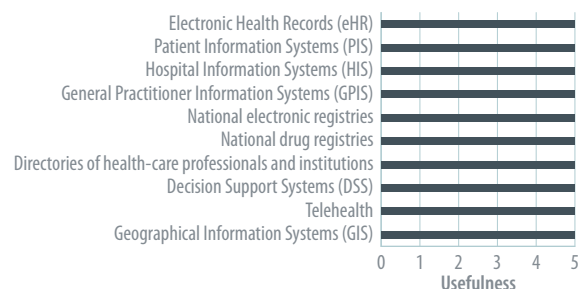


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

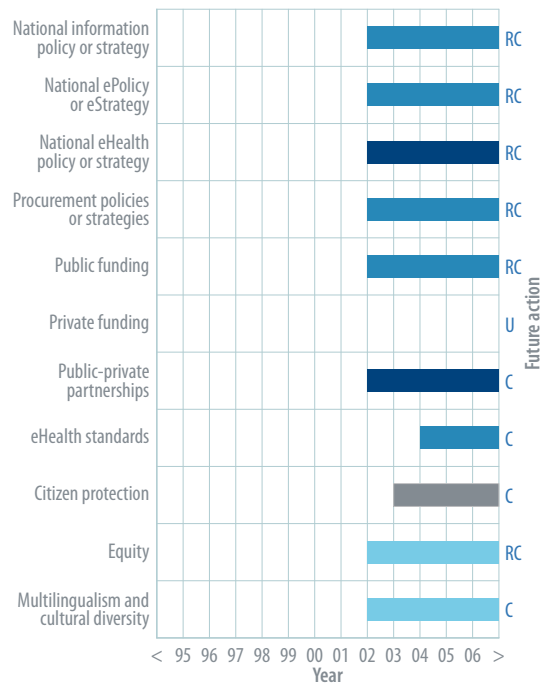
All of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Egypt. All but one of the specified eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Iran (Islamic Republic of)

Enabling environment – policies and strategies to support the information society



The Islamic Republic of Iran reports that all but one of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken, the majority are rated from very to extremely effective. They will be reviewed and are likely to be continued over the next few years. In 2004, an eHealth regional conference was held within the country and a targeted framework for an eHealth portfolio programme and project management was developed. Two years before that, a national committee of stakeholders was established to formulate an eHealth strategic plan. This initiative is rated as the most effective action to date in building an enabling environment for the use of ICT in the health sector. The most significant challenge has been aligning change management with eHealth project management and finding ways of enhanced collaboration between sectors.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health, a policy on affordability of infrastructure, and intersectoral and nongovernmental cooperation. The national plan, which sets targets for health sector connectivity, was implemented in 2002 and is reported to be extremely effective. In 2004, an agreement was signed with the Ministry of ICT to provide the required infrastructure including the use of data centres. This has been very effective and will continue over the next few years. The presence of a national plan for ICT and the commitment of other organizations to move this plan forward is rated as the most effective action so far in building ICT infrastructure for the health sector. The most significant challenge in this field is providing infrastructure to remote areas of the country.

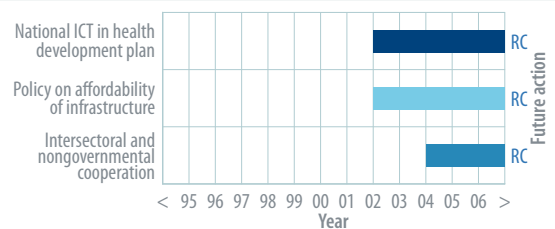


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

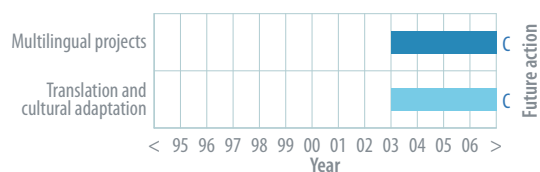


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Electronic multicultural health content has been promoted in the Islamic Republic of Iran since 2003, through the introduction of multilingual projects and the support of translation and cultural adaptation. Since 2004, work is being conducted on a semantic project based on "Wordnet", to empower the multilingual capabilities of software. Providing a 'rule engine' through the use of "Protégé" software has advanced the semantic capabilities of Wordnet, and this is noted as the most effective action taken to provide electronic multicultural health content. However, the technical requirements of running semantic multilingual projects pose a significant challenge in this field.

Country indicators	Population (000s)	68 172	OECD country	No	Main telephone lines*	21.97 [03]
	GDP per capita (Int \$)	7 659	World Bank category	3	Internet users*	7.88
	Total health expenditure (% of GDP)	6.5	ICT Diffusion Index	0.2801	Mobile phone subscribers*	6.16

Content – access to information and knowledge

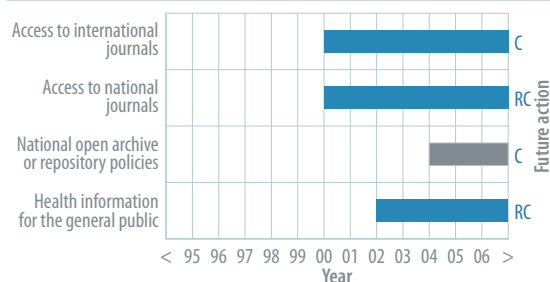


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content has been provided through national and international electronic journals, a national open archive for scientific research and the availability of electronic health information for the general public. Access to electronic journals was introduced in 2000. These services have been very effective and will be reviewed and continued. In 2003, a web site was established for the accreditation of medical journals and the following year the electronic evaluation, assessment and ranking of national journals, commenced. Provision of access to international journals has been the most effective action taken to promote access to electronic health content. However, the provision of the required infrastructure and maintenance in remote areas of the country is reported to be the most significant challenge in this field.

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate and postgraduate training in ICT, continuing education in ICT, and through eLearning in health sciences. They are all rated as moderately effective and will be reviewed and continued over the next two years. The Islamic Republic of Iran reports that orientation advocacy workshops began in 2003 for the managerial division of the Ministry of Health, encouraging staff to take ICT related courses. This has been extremely effective in building ICT capacity in the health sector. However, producing suitable content required to conduct these national training programmes poses a significant challenge.

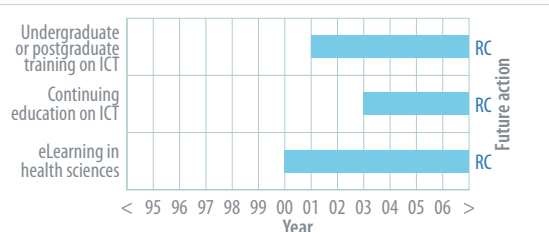


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

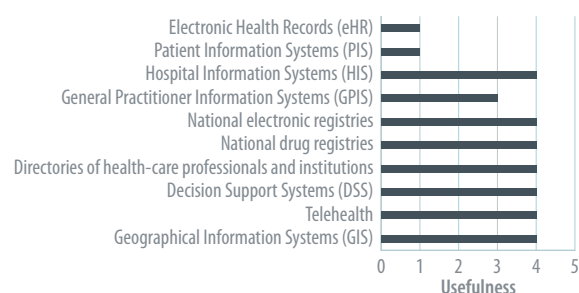


Figure 6. Preferred generic eHealth tools to be provided by WHO

Hospital Information Systems (HIS), national electronic registries, national drug registries, Geographical Information Systems (GIS), Decision Support Systems (DSS), telehealth, and directories of health-care professionals and institutions are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on eHealth norms and standards is considered an extremely useful eHealth service.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Jordan

Enabling environment – policies and strategies to support the information society

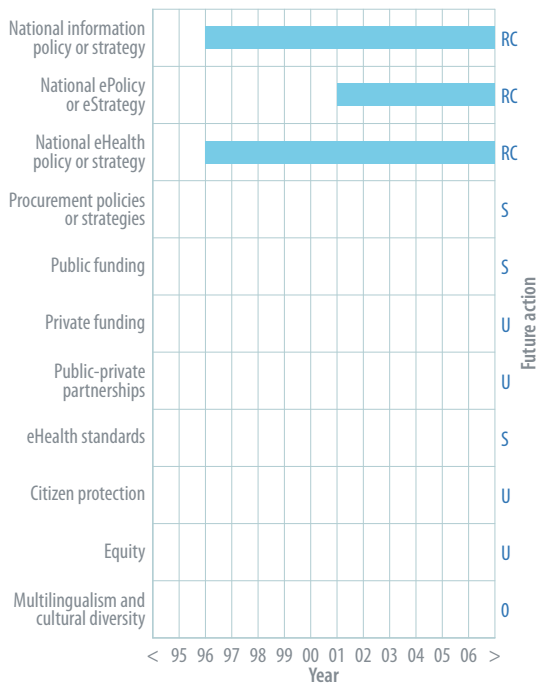


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Jordan reports that among actions to promote an enabling environment for information and communication technologies (ICT) in the health sector, national policies for information and for eHealth were implemented in 1996. In 2001, a national ePolicy was implemented to promote the use of ICT across all sectors. These actions are rated as moderately effective and will be reviewed and continued over the next two years. Procurement policies to guide software, hardware and content acquisition in the health sector, public funding for ICT support of programmes addressing national health priorities, and the adoption of norms and standards for eHealth systems, services or applications are all predicted to commence by 2008. To date, no decision has been made as to which of the remaining actions to build an enabling environment for the use of ICT in the health sector will be taken over the next two years. While there is a great deal of knowledge and enthusiasm about eHealth in Jordan, practitioners feel the eHealth domain could be improved through better sharing of information and coordination of efforts. Limited funds and skills, are reported as significant challenges in this field.

Infrastructure – access to information and communication technologies

Jordan plans to implement a national plan for the development of ICT in health, which sets targets for health sector connectivity, by 2008. A national policy to reduce the costs of ICT infrastructure for the health sector is also likely to be introduced by that time. Intersectoral and nongovernmental cooperation to promote infrastructure development was introduced in 2000. This initiative will be reviewed and continued over the next two years. The successful introduction of the Health InterNetwork Access to Research Initiative (HINARI) in 2002 is highlighted as an achievement in this field, and it will be reviewed and continued. The most effective action is described as the building of a communications backbone that connects all of Jordan's health institutions, which will facilitate the development and sharing of eHealth applications. Funding and difficulty in finding donors and partners are reported as being significant challenges in building ICT infrastructure for the health sector.

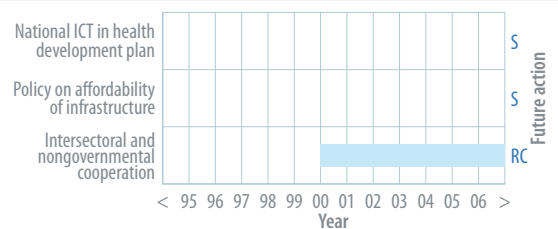


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

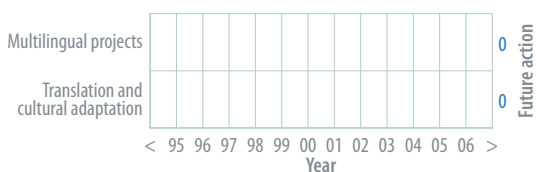


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

This section of the survey was not completed.

Country indicators	Population (000s)	5 412	OECD country	No	Main telephone lines*	11
	GDP per capita (Int \$)	4 670	World Bank category	3	Internet users*	10.69
	Total health expenditure (% of GDP)	9.4	ICT Diffusion Index	0.2948	Mobile phone subscribers*	28.41

Content – access to information and knowledge

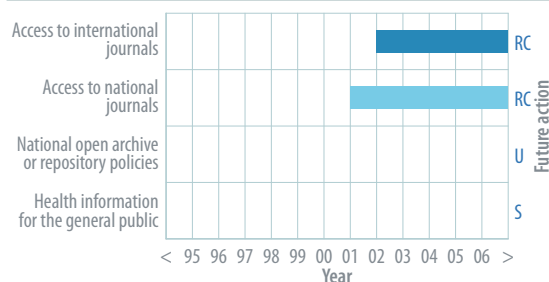


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through national and international electronic journals since 2001 and 2002, respectively. The former is rated as moderately effective, and the latter as very effective. These services are expected to be reviewed and continued. At this stage, no decision has been made as to whether a policy for a digital national open archive for scientific research (published within the country) will be introduced over the next two years. Creating and providing health information for the general public in electronic format is expected to commence by 2008. Jordan highlights the web site <http://www.eARABdoctors.com>, a private initiative by medical specialists, which produces information products and eLearning courses, as an effective action in this field. Target audiences include

medical practitioners, medical students, pharmacists and paramedics; services include eLearning and pharmaceutical information for the Web, personal digital assistants (PDA) and mobile telephones. HINARI is described as the most effective action in the field of extending access to the medical and research community. Insufficient investment in ICT is reported as being a challenge.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 2002. These programmes are rated as moderately effective and are likely to be reviewed and continued. ICT skills programmes in the ongoing training of health-care professionals, and health sciences courses through eLearning for health professionals (in training and practice) will start by 2008. The private sector is described as being more active in this field than the public sector. Jordan highlights the initiative led by eARABdoctors developing eLearning programmes and offering them online for free (all courses are in English). The Ministry of Health provides basic skills courses in ICT for all health professionals, which are compulsory and run on a continuous basis. However, there are few professionals who have completed a degree in Medical Informatics.

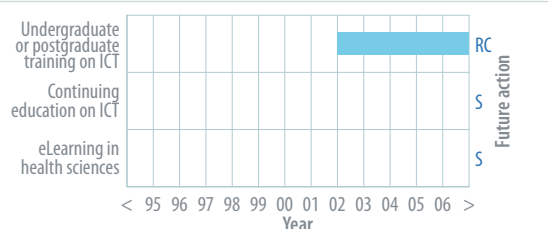


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

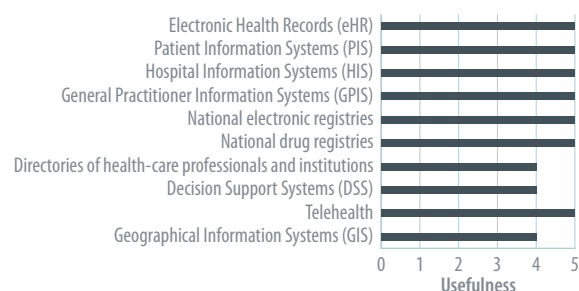


Figure 6. Preferred generic eHealth tools to be provided by WHO

All of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Jordan. Disease surveillance systems are mentioned as an additional tool that would be very useful. Advice on eHealth norms and standards is considered extremely useful while the rest of the listed eHealth services are rated as very useful. In addition, identifying and developing joint eHealth collaborative projects would be very useful.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Lebanon

Enabling environment – policies and strategies to support the information society

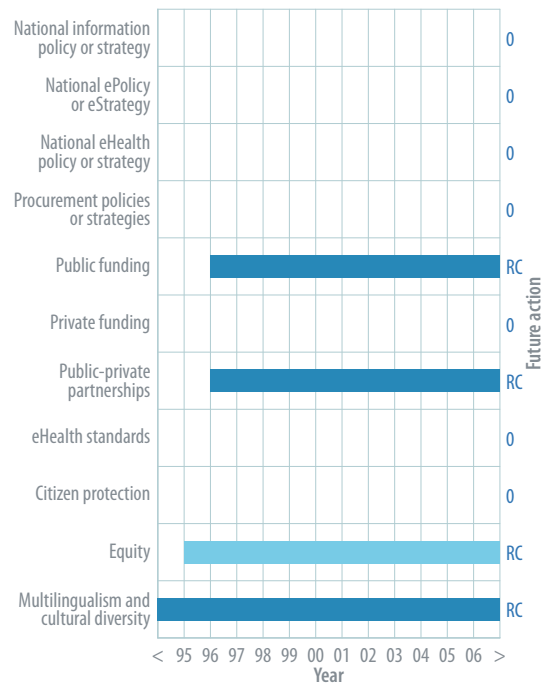


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Lebanon reports that actions to provide public funding and to form public-private partnerships to support information and communication technologies (ICT) within the health sector were implemented in 1996, and have been very effective to date. Policies to promote inclusiveness and equitable access to eHealth (i.e. irrespective of culture, education, language, geographical location, physical and mental ability, age and gender) were implemented in 1995, and are rated as moderately effective. Recognition of cultural diversity and the promotion of information in local languages has been a very effective initiative. These programmes are likely to be reviewed and continued over the next two years. Among other actions highlighted are: the human resource registration system (directory of medical staff at country level and used by the Ministry of Health; the pharmacist registration system; the Ministry of Health web site; and the inventory mapping project 'Carte Sanitaire' developed with Geographic Information Systems (GIS). The introduction of a VISA billing system used by the Ministry of Health with a group of hospitals, and the Public Fund Beneficiary Database are described as the most effective actions to build an enabling environment for the use of ICT in the health sector.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2004, and intersectoral and nongovernmental cooperation to promote infrastructure development, in 1995. Both initiatives are rated as very effective and will be reviewed and continued.

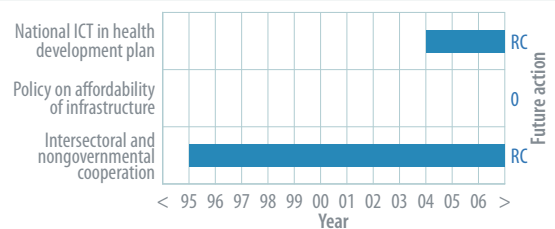


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

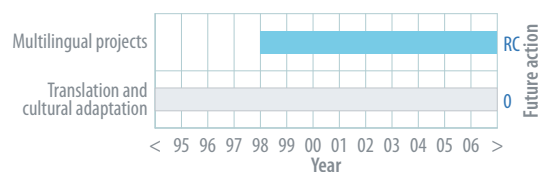
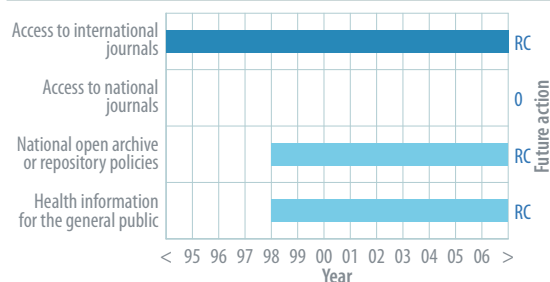


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in Lebanon through the introduction of multilingual projects and support of translation and cultural adaptation. An initiative creating special projects to promote the development and use of new electronic health content in multiple languages was introduced in 1998. This has been moderately effective and will be reviewed and continued over the next two years.

Country indicators	Population (000s)	3 504	OECD country	No	Main telephone lines*	17.75
	GDP per capita (Int \$)	7 152	World Bank category	2	Internet users*	16.9
	Total health expenditure (% of GDP)	10.2	ICT Diffusion Index	0.305	Mobile phone subscribers*	25.01

Content – access to information and knowledge



Health professionals have had access to international electronic journals since 1990. This project is rated as very effective and will be reviewed and continued. A policy for a digital national open archive for scientific research published within the country was implemented in 1998, and creating and providing health information for the general public in electronic format commenced that same year. Lebanon notes that both services are moderately effective and expects to review and continue them.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1984 and are rated as very effective. ICT skills programmes in the ongoing training of health-care professionals and health sciences courses through eLearning for health professionals in training and practice were introduced in 2000, both rated as moderately effective. Lebanon plans to review and continue these educational programmes.

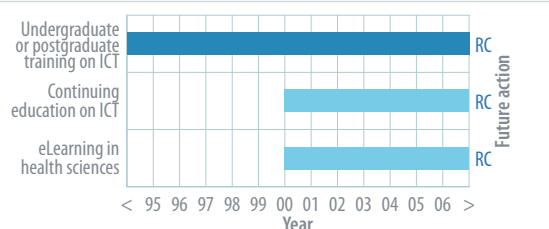


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

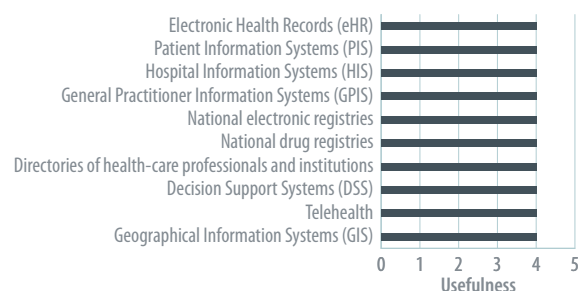


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation to Lebanon. The specified eHealth services are considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Morocco

Enabling environment – policies and strategies to support the information society

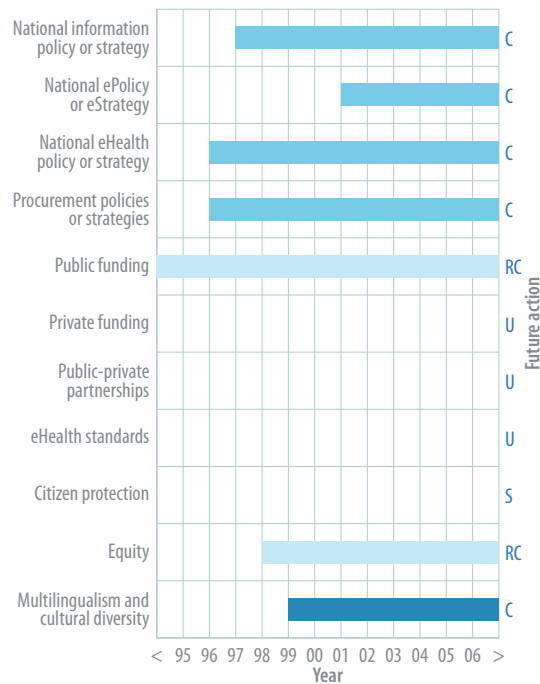


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Morocco reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. Rated from slightly to moderately effective, these actions are expected to continue over the next two years. Of note is the provision of information in local languages, implemented in 1999, which is considered a very effective initiative. Regulations to protect the privacy and security of individual patient data where eHealth is used is likely to be introduced by 2008. To date, no decision has been made as to which of the remaining actions will be taken over the next two years. The most effective action is described to be the preparation and development (in 1992) of a 'master plan' for computer technology and information within the Ministry of Health (revised in 2004). The most significant challenges are reported to be the development of ICT skills, funding and operational costs for connectivity between the various sectors within the Ministry of Health.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2004, and intersectoral and nongovernmental cooperation to promote infrastructure development in 1995. Both initiatives are rated as moderately effective and will continue. At this stage, no decision has been made as to whether a national policy to reduce the costs of ICT infrastructure for the health sector will be introduced in the next two years.

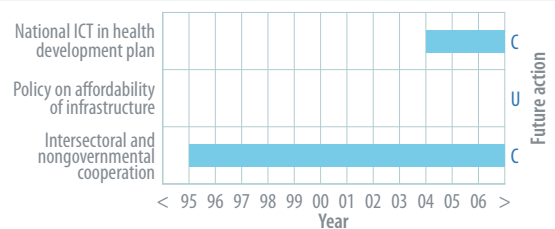


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

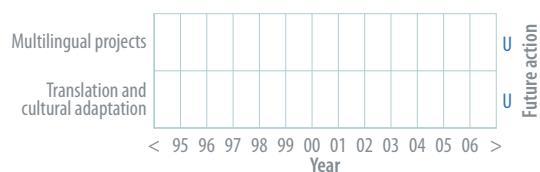


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken by 2008.

Country indicators	Population (000s)	30 568	OECD country	No	Main telephone lines*	4.38
	GDP per capita (Int \$)	4 324	World Bank category	3	Internet users*	11.71
	Total health expenditure (% of GDP)	5.1	ICT Diffusion Index	0.1877	Mobile phone subscribers*	31.23

Content – access to information and knowledge

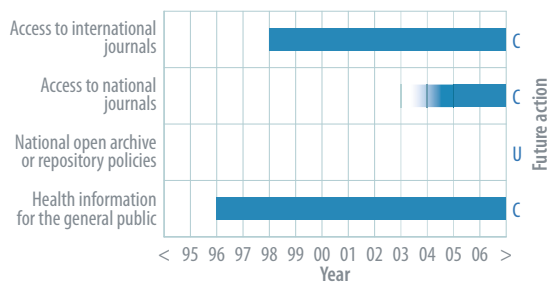


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international electronic journals since 1998. Access to national electronic journals is also being provided. In 1996 Morocco started creating and providing health information for the general public in electronic format. All these services are considered very effective and will continue. At this stage, no decision has been made as to whether a policy for a digital national open archive for scientific research, published within the country, will be implemented by 2008. The development of a referenced national portal for the Ministry of Health and the establishment of an online centralized documents database are described as most important actions. Developing health content in electronic format and lack of human resources with ICT skills are reported as significant challenges in the field of extending access.

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health-care professionals were introduced in 1989 and will continue. ICT skills courses as a part of university curricula for health sciences students and health sciences courses through eLearning for health professionals in training and practice are planned to commence by 2008. Another important initiative to build ICT capacity in the health sector is described to be a project funded by the United Nations Population Fund, providing initial training for health professionals working for the Ministry of Health.

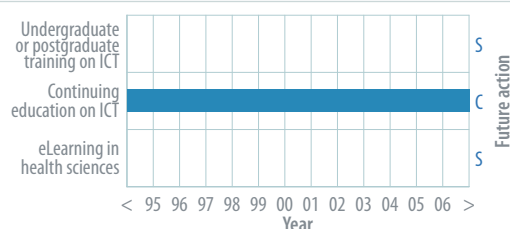


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

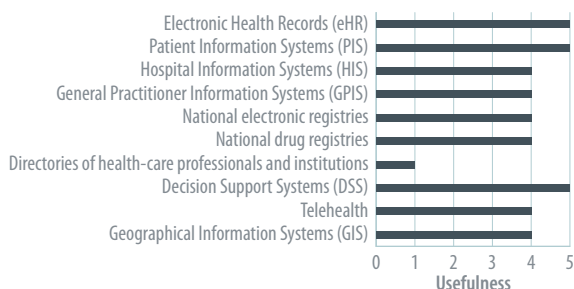


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Morocco. The majority of the specified eHealth services are considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Oman

Enabling environment – policies and strategies to support the information society

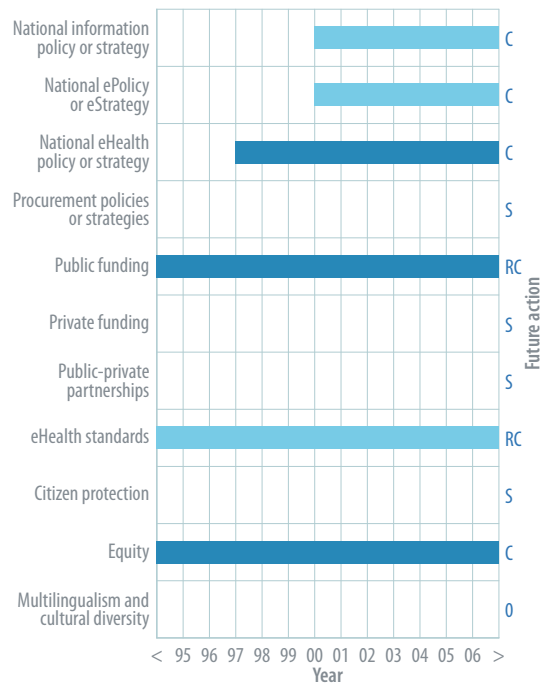


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Oman reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They are rated from moderately to very effective and are expected to continue over the next two years. The implementation of procurement policies to guide software, hardware and content acquisition in the health sector is planned to start by 2008. So are the actions for providing private funding for ICT support of programmes addressing national health priorities; forming of public-private partnerships to foster the use of ICT within the health sector; and promoting inclusiveness and equitable access to eHealth. The introduction of ICT in remote areas of the country and sourcing a satisfactory level of funding for its support are described as the most effective actions taken to build an enabling environment for the use of ICT in the health sector. Significant challenges in this field are reported to be inadequate training and lack of appropriate and cost effective telecommunication. A national eHealth information system has been implemented, which by the end of 2006 will cover the eHealth-based transactions and procedures of all health care institutions in the country.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 1995. This is reported to be moderately effective and will be reviewed and continued. Oman expects to introduce a national policy to reduce the costs of ICT infrastructure for the health sector by 2008. Currently, no decision has been made as to whether intersectoral and nongovernmental cooperation to promote infrastructure development will be introduced over the next two years. Consultancy missions from international organizations (e.g. the World Health Organization [WHO] and the International Telecommunications Union) have provided significant assistance in building ICT infrastructure for the health sector.

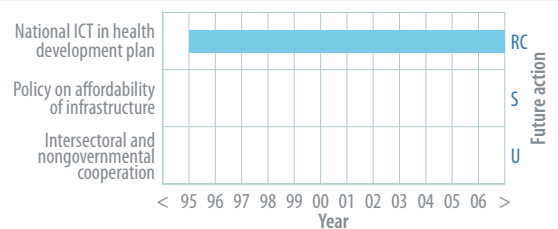


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

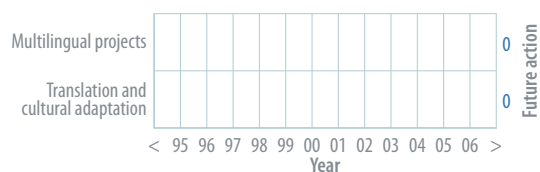
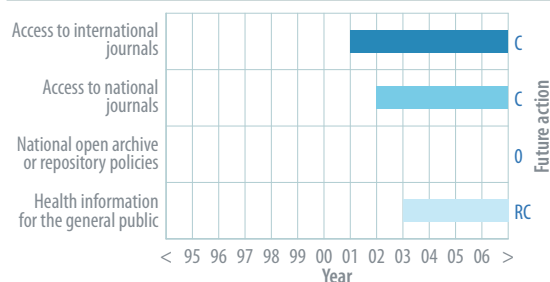


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

This section of the survey was not completed.

Country indicators	Population (000s)	2 511	OECD country	No	Main telephone lines*	10.05
	GDP per capita (Int \$)	13 017	World Bank category	2	Internet users*	10.14
	Total health expenditure (% of GDP)	3.2	ICT Diffusion Index	0.3104	Mobile phone subscribers*	33.32

Content – access to information and knowledge



Health professionals have had access to online health content through international and national electronic journals since 2001 and 2002, respectively. The former is rated as very effective and the latter as moderately effective. These services will continue over the next two years. Oman creates and provides health information for the general public in electronic format since 2003 and will continue to do so over the next two years. Costs and coordination among institutions are mentioned as significant challenges in the provision of access.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 2002 and are planned to continue. In 1997, ICT skills programmes in the ongoing training of health-care professionals were introduced and will be reviewed and continued. These educational programmes are rated as very effective. Health sciences courses through eLearning for health professionals (in training and practice) will be introduced by 2008. Oman notes that ICT training is a prerequisite for health professionals before they begin working.

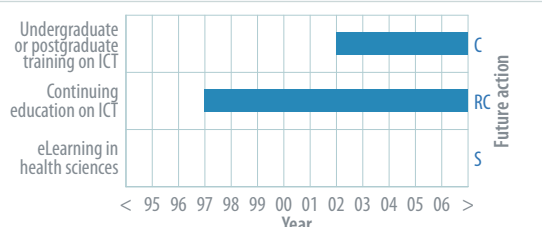


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

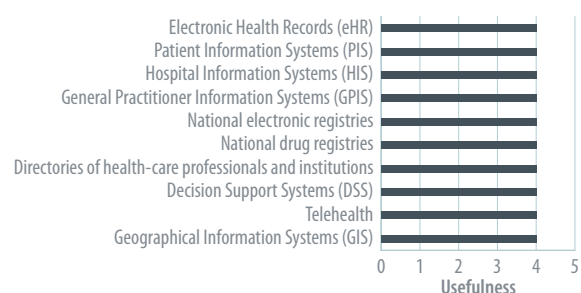


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

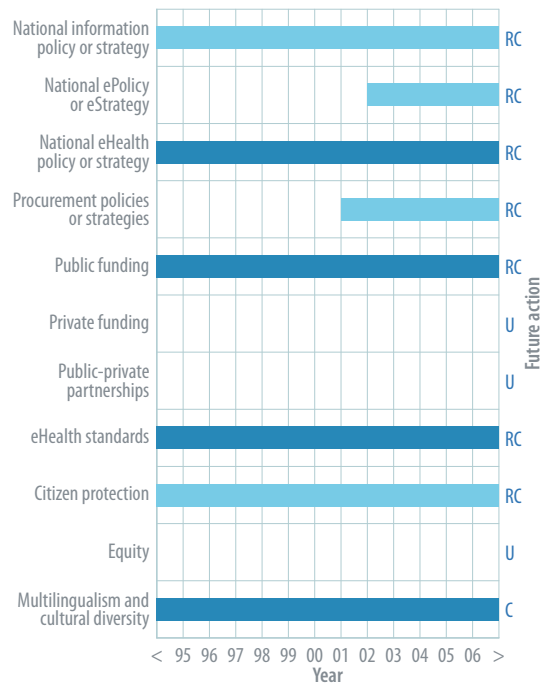
All of the listed eHealth tools are rated as very useful if WHO could offer these as generic prototypes for adaptation. Radiology and laboratory information systems would be very useful additional diagnostic tools. All of the specified eHealth services are also considered very useful. Additionally, Oman notes that advice on eLegislation and eHealth information security would be of interest.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Saudi Arabia

Enabling environment – policies and strategies to support the information society



Saudi Arabia reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They have been rated from moderately to very effective. National information and eHealth policies were implemented in 1988, as was the provision of information in local languages to recognize cultural diversity. Public funding, norms and standards for eHealth systems, and the promotion of inclusiveness and equitable access to eHealth were implemented in 1990 and 1991. Procurement policies were introduced in 2001 and a national ePolicy in 2002. All of these actions are likely to be reviewed and continued over the next two years. The most effective initiative is described as the provision of ongoing public funding for the deployment of ICT in the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector has been supported in Saudi Arabia since 1988 through a national plan for the development of ICT in health, and by intersectoral and nongovernmental collaboration. Both these initiatives are rated as very effective and likely to continue. Since 1985 a national policy has been in place to reduce the costs of ICT infrastructure for the health sector; it has been moderately effective and is expected to be reviewed and continued over the next two years. Networking the majority of the regions with the Ministry of Health is highlighted as an important initiative in building ICT capacity and connectivity in the health sector. The most important action is described as being enhancing health sector connectivity (according to a national technology roadmap). Problems in communication channels still pose a challenge, which is being addressed through the allocation of funds for developing the communications sector.

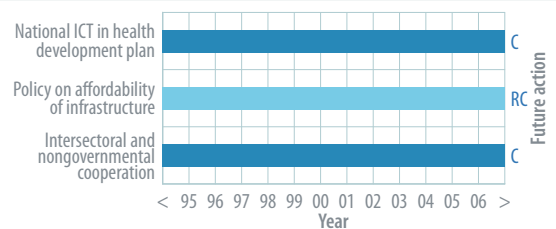


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

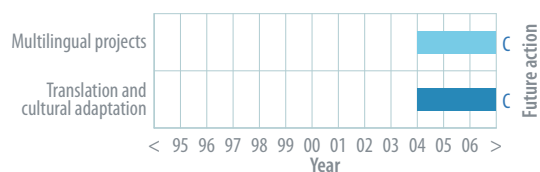
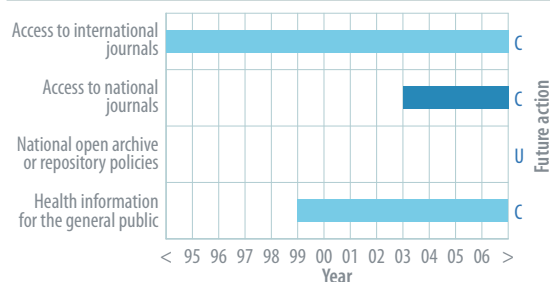


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted through the introduction of multilingual projects and support of translation and cultural adaptation. Both actions were implemented in 2004 and are rated as moderately and very effective, respectively. They are likely to continue over the next two years. The cultural diversity of the country is described as a significant challenge, which is being addressed by promoting multilingual health information.

Country indicators	Population (000s)	23 326	OECD country	No	Main telephone lines*	14.83
	GDP per capita (Int \$)	14 431	World Bank category	1	Internet users*	6.36
	Total health expenditure (% of GDP)	4	ICT Diffusion Index	0.3148	Mobile phone subscribers*	36.82

Content – access to information and knowledge



Health professionals have had access to online health content through international and national electronic journals since 1994 and 2003, respectively. The former is rated moderately effective, and the latter as very effective. In 1999 Saudi Arabia started creating and providing online health information for the general public, which has been moderately effective. All of these services will continue. There are currently no plans to introduce a national open archive for scientific research published within the country.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1990 and have been rated as moderately effective. ICT skills programmes were introduced in the ongoing training of health-care professionals in 2003 and have been very effective. These educational programmes are likely to be continued. At this stage, no decision has been made as to whether health sciences courses through eLearning for health professionals (in training and practice) will be introduced by 2008.

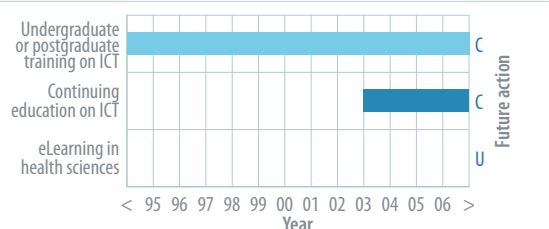


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

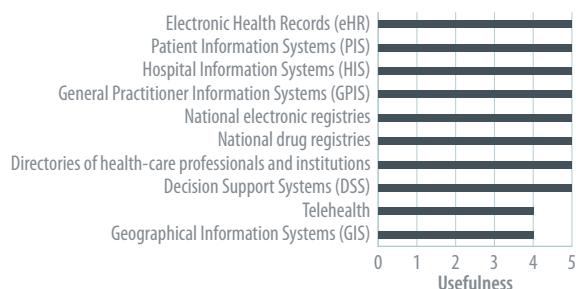


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

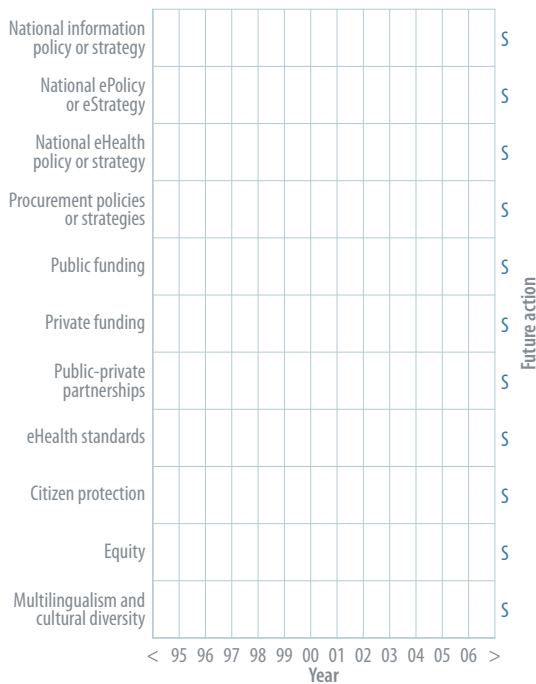
The majority of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Saudi Arabia. The majority of the specified eHealth services are also rated, as extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Somalia

Enabling environment – policies and strategies to support the information society



Somalia reports it plans to start the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector by 2008.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

To date, none of the specified actions to support ICT infrastructure development have been taken. However, these initiatives are likely to be introduced in the next two years.

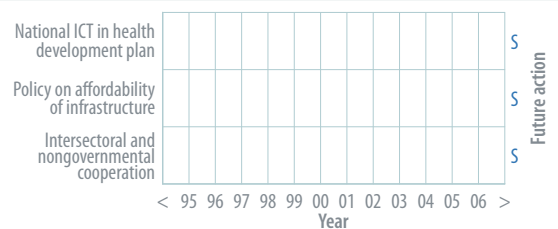
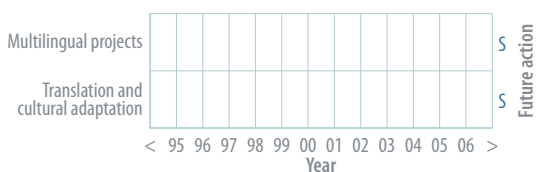


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

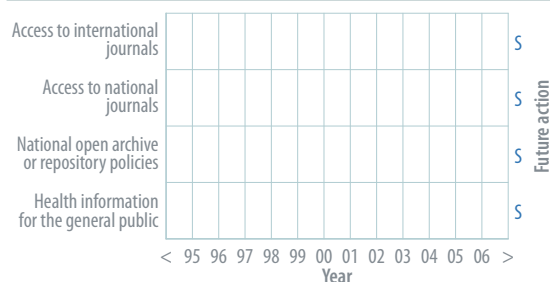


Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented but there are plans for them to be introduced by 2008.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	7 708	OECD country	No	Main telephone lines*	1.67
	GDP per capita (Int \$)	...	World Bank category	4	Internet users*	1.67
	Total health expenditure (% of GDP)	...	ICT Diffusion Index	...	Mobile phone subscribers*	4.17

Content – access to information and knowledge



Initiatives to promote access to electronic health content are expected to commence by 2008.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Somalia plans to begin projects to build ICT capacity in the health sector in the coming two years.

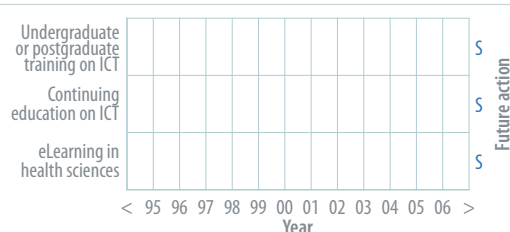


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

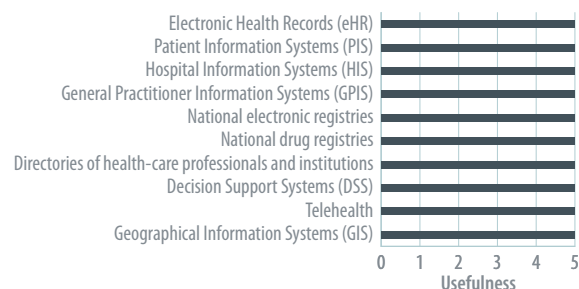


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

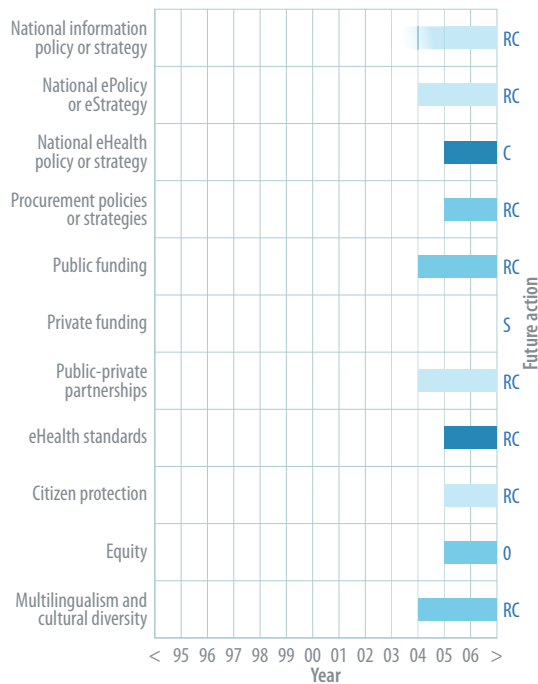
All of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Somalia. The specified eHealth services are also considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Sudan

Enabling environment – policies and strategies to support the information society



The Sudan reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector were introduced in 2004/2005, the main part of them expected to be reviewed and continued over the next two years. Private funding for ICT support of programmes addressing national health priorities is expected to begin by 2008. The most important initiatives in the Sudan have been the provision of access to the recently updated telecommunications infrastructure (fibre optics covering most of the country) and a new eHealth strategy. The acceptance of the new technologies among users and the training of health professionals are reported as significant challenges.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, implemented in 2005, is rated as very effective and is likely to continue over the next two years. A national policy to reduce the costs of ICT infrastructure for the health sector will be introduced by 2008. Intersectoral and nongovernmental cooperation commenced in 2004 and is likely to be reviewed and continued. The most effective actions in this field are a pilot national telemedicine network (currently including five sites); a national health care management information system (MIS) and a tele-education project for continuing medical education/continuing professional development (CME/CPD). Developmental and operational costs for hardware, software and services are reported as significant challenges.

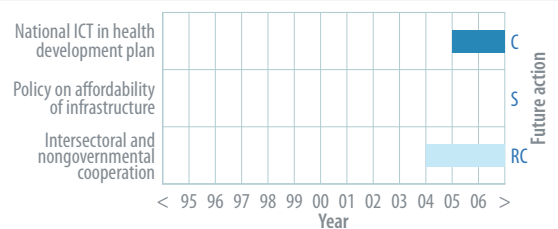
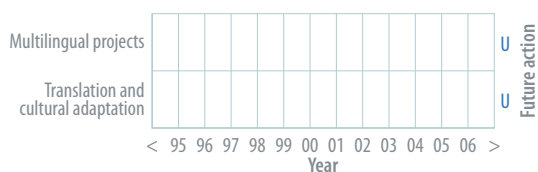


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



At this stage, none of the specified actions to promote the development of electronic multicultural health content have been taken and no decision has been made as to which actions may proceed over the next two years.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	34 856	OECD country	No	Main telephone lines*	2.98
	GDP per capita (Int \$)	1 250	World Bank category	4	Internet users*	3.3
	Total health expenditure (% of GDP)	4.3	ICT Diffusion Index	0.1962	Mobile phone subscribers*	3.04

Content – access to information and knowledge

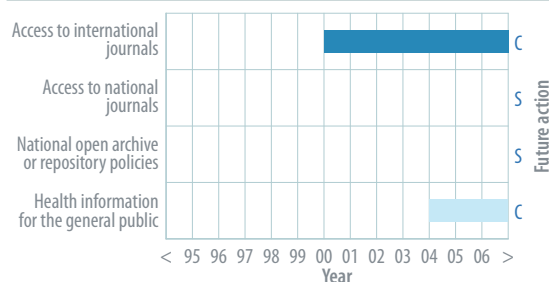


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content for health professionals has been provided in the Sudan through international electronic journals since 2000, and is rated as very effective. Electronic health information for the general public was introduced in 2004 and is rated as slightly effective. Both initiatives are expected to continue. There are plans to provide access to national electronic journals and to implement a policy for a digital national open archive for scientific research by 2008. Encouraging computer literacy at the primary school level, offering computers at low cost and providing Internet connection at local dialling rates are listed as important promotional initiatives. Poverty and high illiteracy rates are reported as major challenges to the accessibility of information.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 2002 and ICT skills programmes in the ongoing training of health-care professionals since 2005. These programmes are rated as very and moderately effective, respectively. It is expected that health sciences courses through eLearning for health professionals (in training and practice) will be introduced by 2008. The implementation of ICT training for health professionals is described as an important project. However, lack of funds and skilled instructors pose significant challenges.

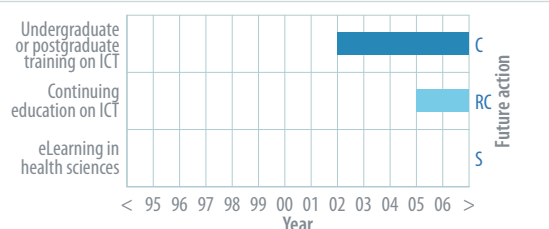


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

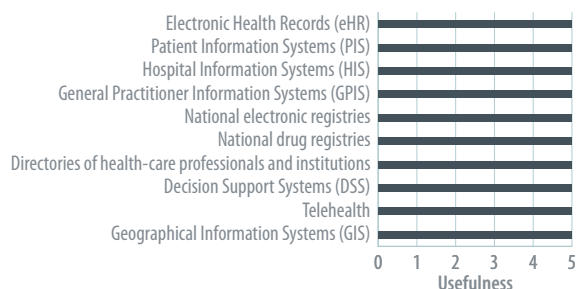


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to the Sudan. A medical data dictionary and digital security are mentioned as additional tools that would be very useful. The specified eHealth services are considered extremely useful and telemedicine or eHealth protocols are listed as additional services of interest.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	O No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Syrian Arab Republic

Enabling environment – policies and strategies to support the information society

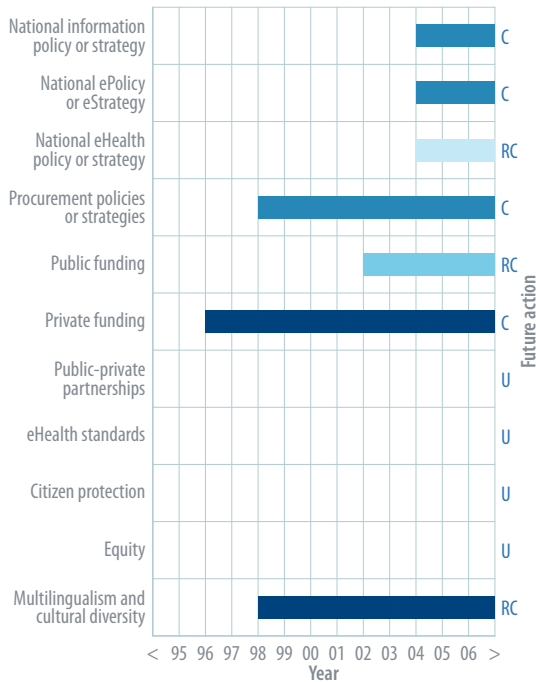


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

The Syrian Arab Republic reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are predicted to continue. Private funding for ICT support of programmes addressing national health priorities, begun in 1996, and the provision of information in local languages to recognize cultural diversity, started in 1998, are initiatives that are rated as extremely effective. Many of the other actions taken are rated as very effective. Those programmes already implemented are expected to continue. To date, no decision has been made as to which of the remaining listed actions will be taken over the next two years. The most effective action in building an enabling environment for the use of ICT in the health sector is a national ICT strategy that includes legislative, administrative and technical components. However, the development of legislation with regard to ICT use in various fields, including health, is reported to remain a significant challenge.

Infrastructure – access to information and communication technologies

The Syrian Arab Republic plans to introduce a national plan for the development of ICT in health, which sets targets for health sector connectivity, by 2008. Intersectoral and nongovernmental cooperation to promote infrastructure development commenced in 2002 and has been a very successful initiative which will continue. At this stage, no decision has been made as to whether a national policy to reduce the costs of ICT infrastructure for the health sector will be introduced over the next two years. The most effective initiative described is the Public Data Network (PDN) being established in the country to promote connectivity and information sharing within the health sector. One of the most significant challenges is intersectoral cooperation; this is being dealt with through the national ICT strategy. Funding for communication equipment required by the health sector has been partially solved by donations and grants.

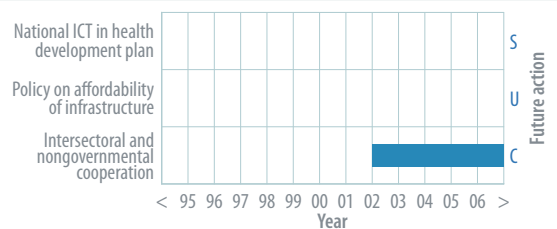


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

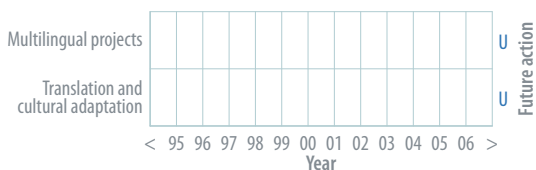


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken in the coming two years.

Country indicators	Population (000s)	18 129	OECD country	No	Main telephone lines*	14.6
	GDP per capita (Int \$)	2 244	World Bank category	3	Internet users*	4.39
	Total health expenditure (% of GDP)	5.1	ICT Diffusion Index	0.2456	Mobile phone subscribers*	12.87

Content – access to information and knowledge

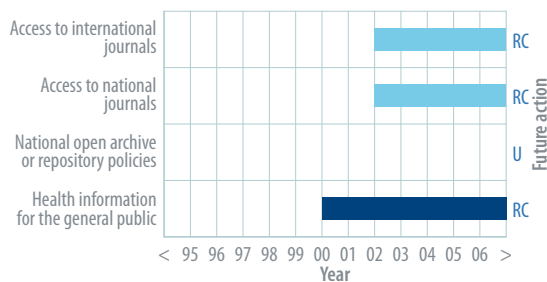


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 2002, and this service is rated as moderately effective. In 2000, the Syrian Arab Republic started creating and providing health information for the general public in electronic format. This is rated as an extremely effective initiative. These services will be reviewed and continued. At this stage, no decision has been made as to whether a policy for a digital national open archive or repository for scientific research will be implemented by 2008. The Ministry of Health web site is highlighted as an important initiative, which provides medical advice and information in addition to information on Ministry of Health services and activities.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals have been offered since 1999 and are rated from moderately to very effective. Health sciences courses through eLearning for health professionals in training and practice were introduced in 2004 and are rated as moderately effective. These programmes are likely to continue. ICT training provided in medical and nursing schools, and ICT training courses for staff in health facilities are described as important projects in building ICT capacity in the health sector. Decision-makers in the Ministry of Health are also given introductory ICT courses to encourage their staff to take ICT training courses.

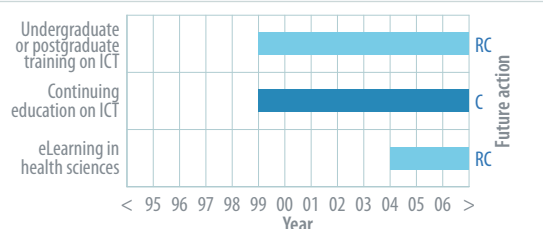


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

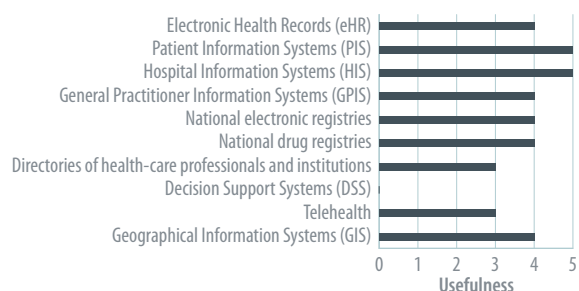


Figure 6. Preferred generic eHealth tools to be provided by WHO

The majority of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to the Syrian Arab Republic. The majority of the listed eHealth services are also considered very to extremely useful.



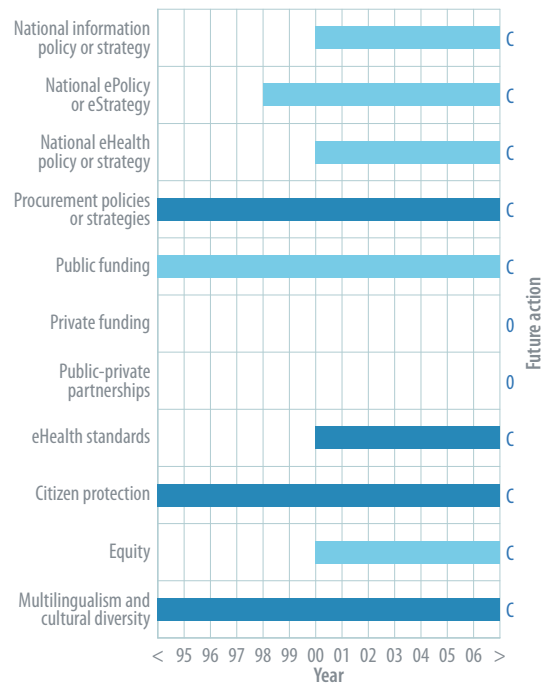
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

United Arab Emirates

Enabling environment – policies and strategies to support the information society



The United Arab Emirates reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. The implemented actions are rated from moderately to very effective and are predicted to continue over the next two years. Additionally, there are plans to initiate a nationwide eHealth programme. The recent re-organization of health care facilities has slightly delayed its implementation.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, and a national policy to reduce the costs of ICT infrastructure for the health sector were both implemented in 2000. In 1990, intersectoral and nongovernmental cooperation to promote infrastructure development commenced. These initiatives are rated as very effective and are predicted to continue. The licensing of health care facilities and medical professionals, begun in 1994, is mentioned as another important initiative in this field. The existence of overall regulatory control is highlighted as the most important action in the provision of access.

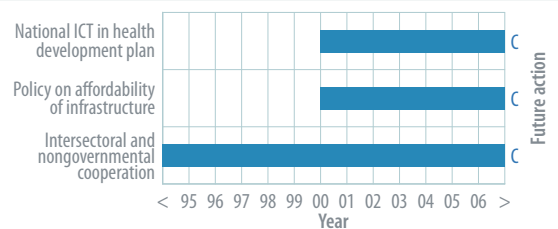
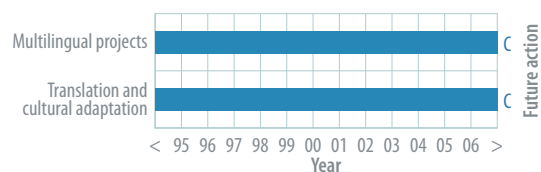


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

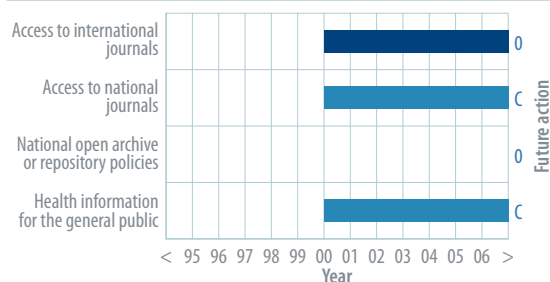


The development of electronic multicultural health content is promoted in the United Arab Emirates through the introduction of multilingual projects and support of translation and cultural adaptation. Both programmes, initiated in 1994, are considered very effective and likely to continue.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	4 031	OECD country	No	Main telephone lines*	27.32
	GDP per capita (Int \$)	18 820	World Bank category	1	Internet users*	31.85
	Total health expenditure (% of GDP)	3.3	ICT Diffusion Index	0.5724	Mobile phone subscribers*	84.71

Content – access to information and knowledge



Health professionals have had access to online health content through international and national electronic journals since 2000. These programmes are rated as extremely and very effective, respectively. Creating and providing health information for the general public in electronic format commenced in 2000 and is rated as very effective. All these services are likely to continue. The Ministry of Health’s web site (<http://www.moh.gov.ae>) is noted as an important initiative to promote access to electronic health content.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1996, and are rated as moderately effective. In the same year ICT skills programmes in the ongoing training of health-care professionals were introduced, and rated as very effective. Since 2000, health sciences courses through eLearning for health professionals in training and practice have been offered successfully. These educational programmes are expected to continue over the next two years.

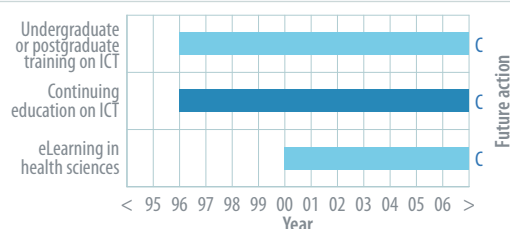


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

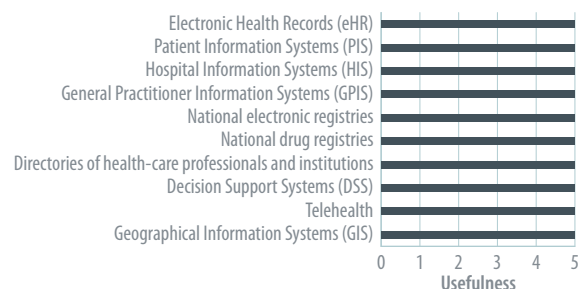


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

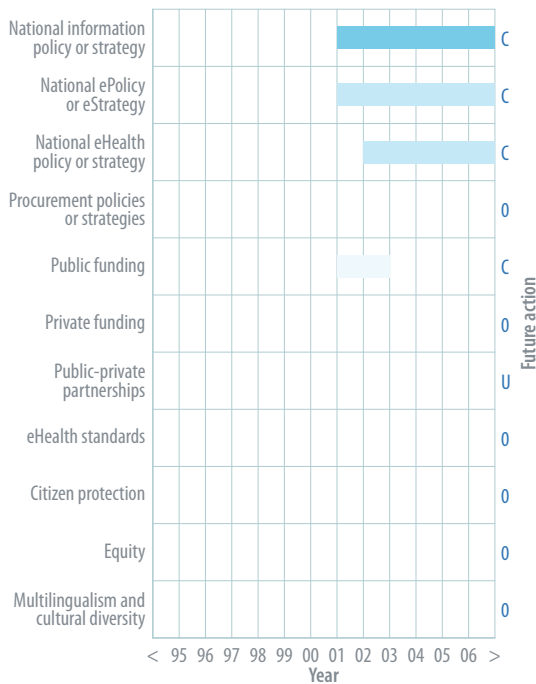
All of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to the United Arab Emirates. All listed eHealth services are rated as very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	0 No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Yemen

Enabling environment – policies and strategies to support the information society



Yemen reports that among actions to promote an enabling environment for information and communication technologies (ICT) in the health sector, both a national information policy and a national ePolicy were implemented in 2001. A national eHealth policy was introduced in 2002. Public funding for ICT support of programmes addressing national health priorities has been provided since 2001. These actions are expected to continue over the next two years. To date, no decision has been made as to whether public-private partnerships to foster the use of ICT within the health sector will be formed by 2008.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2002 and is reported to be moderately effective. This action is likely to continue. A decision remains to be made whether intersectoral and nongovernmental collaboration will be cultivated.

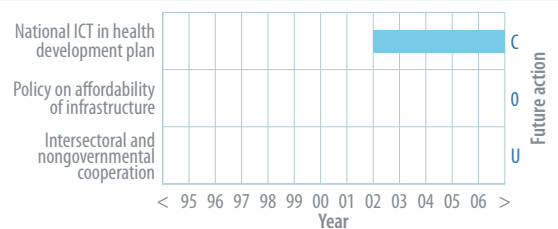
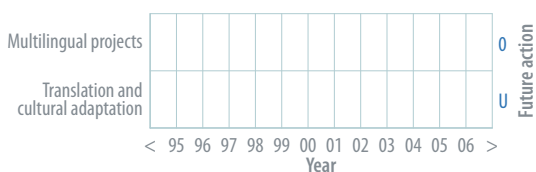


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

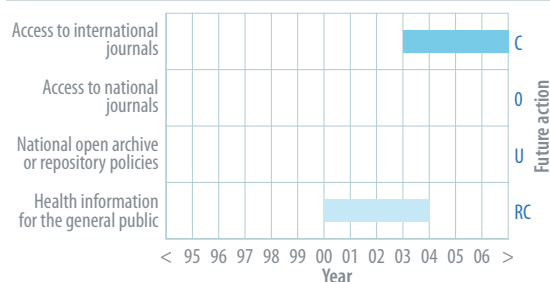


At this stage, none of the specified actions to promote the development of electronic multicultural health content have been taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	19 702	OECD country	No	Main telephone lines*	3.85
	GDP per capita (Int \$)	1 616	World Bank category	4	Internet users*	0.87
	Total health expenditure (% of GDP)	5.5	ICT Diffusion Index	0.1881	Mobile phone subscribers*	5.17

Content – access to information and knowledge



Health professionals have had access to online health content through international electronic journals since 2003. This is rated as moderately effective and is expected to continue. Provision of locally-created health information for the general public began in 2000 and is likely to be reviewed and continued. A decision remains to be made as to whether a digital national open archive for scientific research (published within the country) will be introduced by 2008.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills programmes in the ongoing training of health-care professionals have been offered since 2002. They are rated as very effective and are likely to be continued over the next two years. However, training of health professionals in the use and benefits of ICT pose a significant challenge. Maintaining institutional memory is a major challenge in this area; staff knowledgeable in ICT often leave for better paid positions elsewhere.

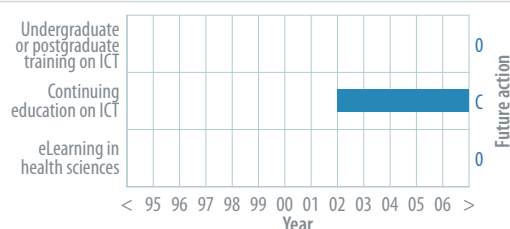


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

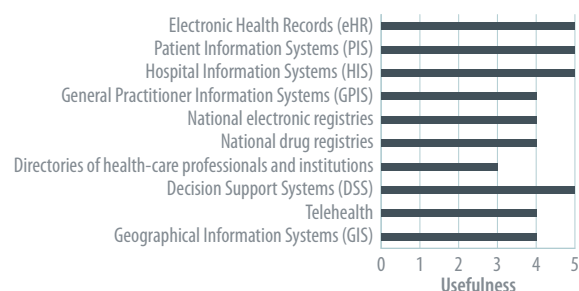


Figure 6. Preferred generic eHealth tools to be provided by WHO

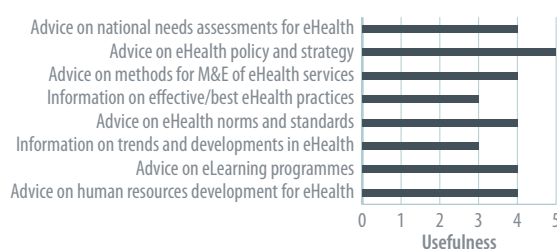
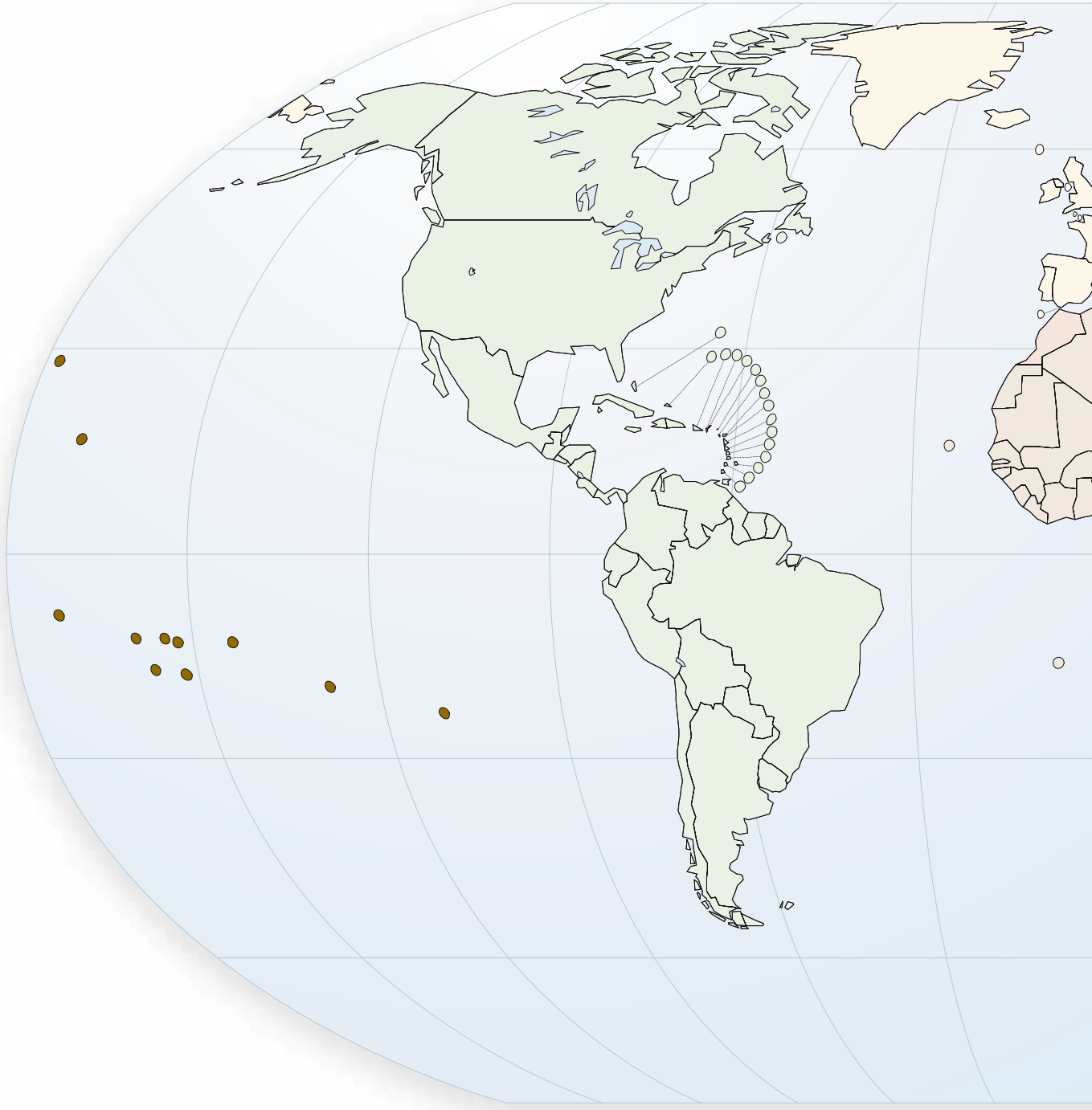


Figure 7. Preferred eHealth services to be provided by WHO

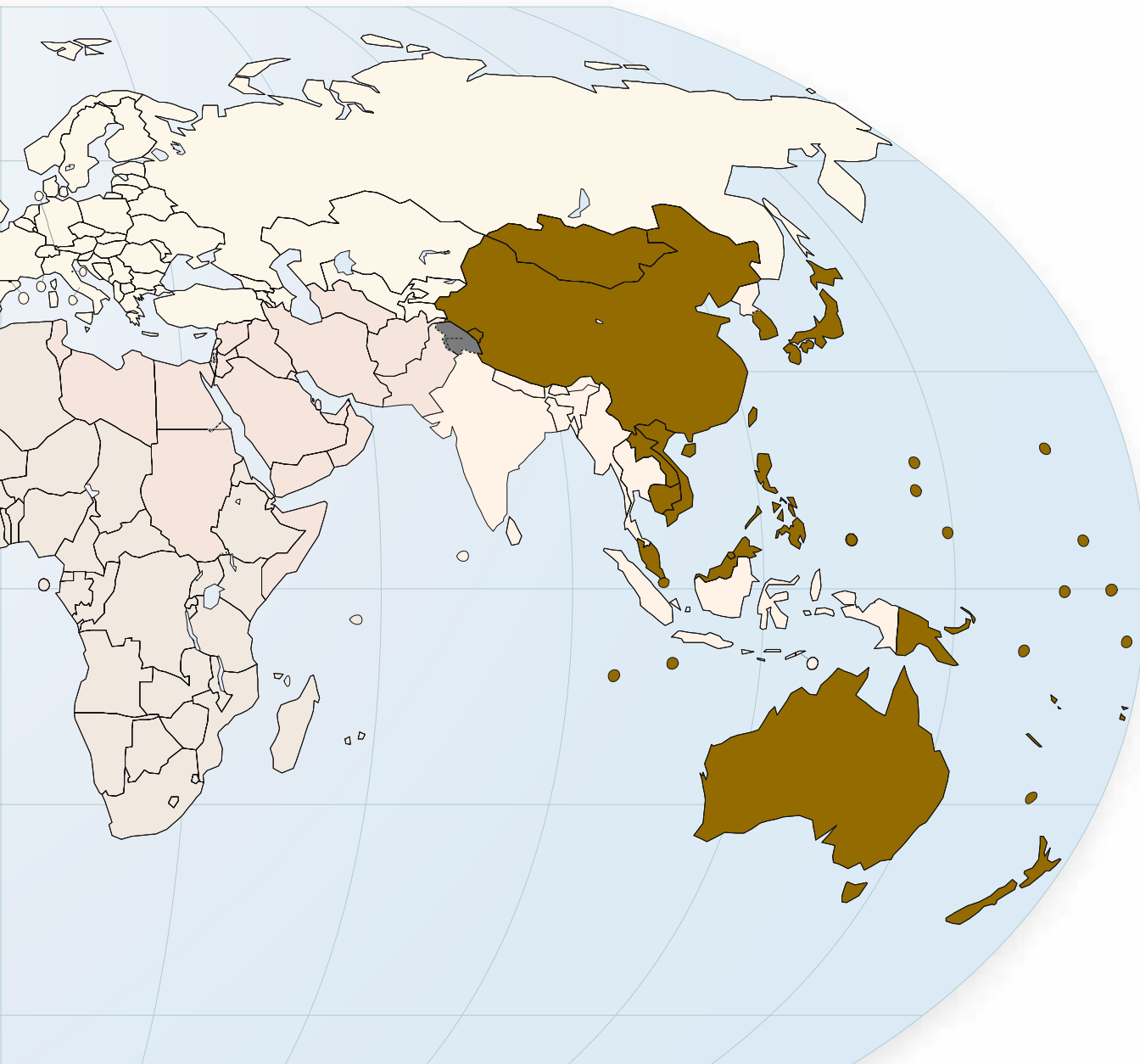
The majority of the listed eHealth tools are rated from very to extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to Yemen. Advice on eHealth policy and strategy is rated as extremely useful, and the rest of the listed eHealth services are considered from moderately to very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants



WHO WESTERN PACIFIC REGION



Australia	304	Lao People's Democratic Republic	New Zealand	Solomon Islands
Brunei Darussalam	306	Malaysia	312	Tokelau*
Cambodia.....		Marshall Islands	Papua New Guinea	Tonga
China	308	Micronesia (Federated States of)	Philippines	322
Cook Islands.....		Mongolia	314	Tuvalu
Fiji	310	Nauru	Republic of Korea	318
Japan.....			Samoa	Viet Nam
Kiribati.....			Singapore	324

Australia

Enabling environment – policies and strategies to support the information society

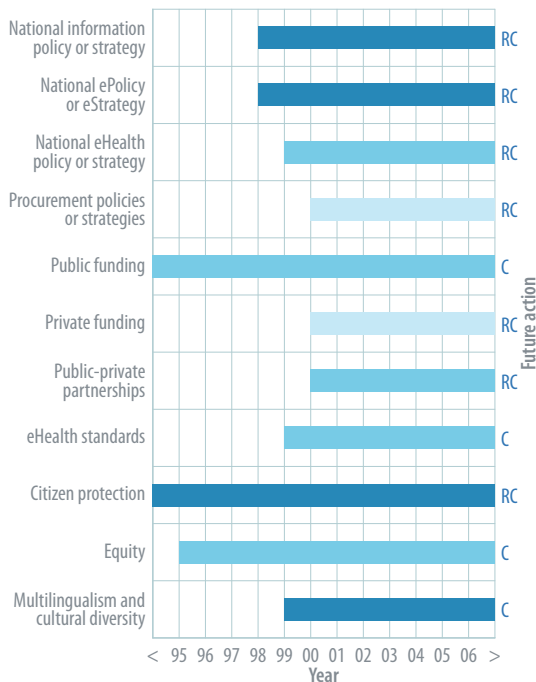


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Australia reports that all of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They will be continued over the next two years. Highlighted as a very effective action is the Consumers' Health Forum, which is funded to provide consultation with consumers and report on eHealth issues. Another important achievement has been the development of minimum website standards to which all Australian Government agencies providing online content must adhere to. Reported as a most effective action in building an enabling environment for the use of ICT in the health sector has been the establishment of the Australian Government's Practice Incentives Program and Broadband for Health Program; both have provided substantial financial assistance for the use of ICT in general practices and community pharmacies. The vast majority of Australia's general practitioners (GPs) now use eHealth software for medication management, and the functionality of this software is increasingly enabling a move from paper to electronic records. The funding and delivery of health services is reported as being a significant challenge in this field. The Australian Government is working collaboratively with the Australian States and Territories to form a strong partnership to encourage: interoperability; improve provider connectivity and security; and establishing national health IM&ICT governance arrangements. The partnership between the Australian Government and all jurisdictions in eHealth represents significant strategic influence over future developments.

Infrastructure – access to information and communication technologies

All listed actions to support ICT infrastructure development for the health sector have been taken and are rated from moderately to very effective. They will continue over the next two years. Australia highlights various successful programmes in this field which include Connect Australia (incorporating Broadband Connect, previously Higher Bandwidth Incentive Scheme [HiBIS] Clever Networks, Mobile Connect and Backing Indigenous Ability), Information Technology Online Program (ITOL), National Communications Fund, Practice Incentives Program, Broadband for Health, Managed Health Networks Grants, HealthConnect, National eHealth Transition Authority and National Broadband Strategy. The most effective action taken in this field has been the establishment of NEHTA by all jurisdictions as the national vehicle to facilitate cooperation in developing the foundations of eHealth. NEHTA is based on a collaborative approach to enable reform through eHealth and is jointly funded and governed by all Australian jurisdictions. NEHTA has been commissioned to 'fast track' the implementation of standards and infrastructure to connect information across the Australian health care system. This work includes: progressing the development of clinical data standards; consent models; patient, provider and product directories; and shared electronic health records.

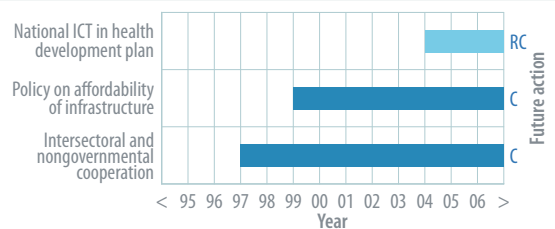


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

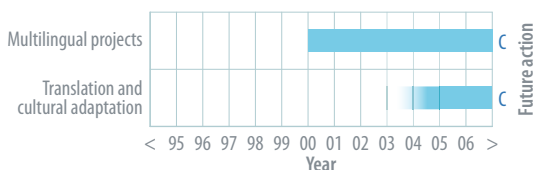


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The development of electronic multicultural health content is promoted in Australia through the introduction of multilingual projects and the support of translation and cultural adaptation. These have been rated as moderately effective and will continue over the next two years. The most effective action taken by Australia to ensure the provision of multicultural health content has been to provide linkages to multicultural websites through HealthInsite. The most difficult challenge has been to ensure that individuals from multicultural backgrounds are aware that multicultural content exists and is available through online sources.

Country indicators	Population (000s)	19 873	OECD country	Yes	Main telephone lines*	58.55
	GDP per capita (Int \$)	30 253	World Bank category	1	Internet users*	65.28
	Total health expenditure (% of GDP)	9.5	ICT Diffusion Index	0.6511	Mobile phone subscribers*	82.76

Content – access to information and knowledge

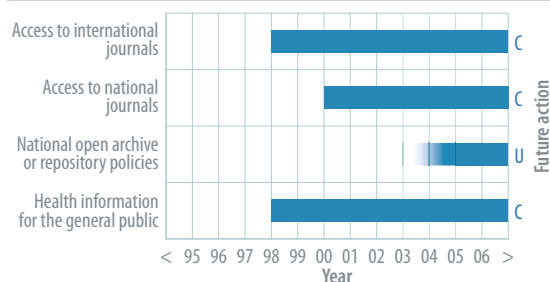


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Australia indicates that all listed actions to promote online access to health content have been taken and are rated as very effective. It highlights various proceedings in this field, including the development of a proposal for a national consortium of libraries to purchase a range of electronic information resources, and HealthInsite, an Australian Government initiative funded by the Department of Health and Ageing which aims to improve the health of Australians by providing easy access to quality online medical information. The most effective action to promote access to electronic health content has been through state and territory health department-based systems, which were developed as part of the National Health Development Fund (NHDF), 1998–2003.

The project was established to provide all clinicians in each state and territory with access to an electronic clinical library providing resources to support clinical decision-making, research and education. The most significant challenge to date has been the limited access for health professionals in the private sector (GPs, allied health, aged care, community pharmacy) to online health information, which impacts upon the efficiency and effectiveness of patient care.

Capacity – human resources knowledge and skills

All actions listed have been taken to build ICT capacity in the health sector. They are rated from moderately to very effective and will continue over the next two years. Australia highlights in this field the existence of the Health Informatics Society of Australia (HISA), the Australian College of Health Informatics (ACHI) and HealthInsite. Among the most effective actions is the development of a national statement on health workforce health informatics capacity building and the development of an implementation plan to improve the information management and ICT capacity of Australia's health workforce. A significant challenge to build ICT capacity in the health sector is the competing health workforce priorities for resource allocation.

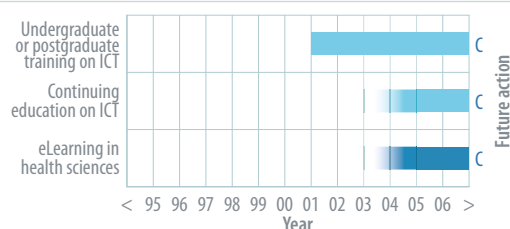


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

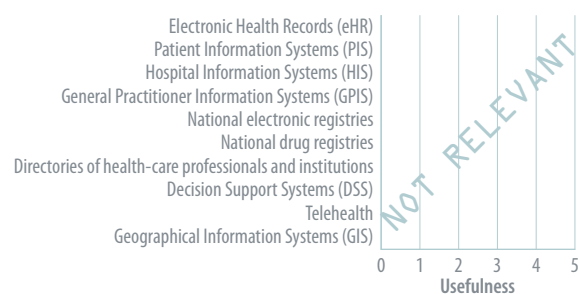


Figure 6. Preferred generic eHealth tools to be provided by WHO

Australia reports that it has already commenced development of standards relating to many of the eHealth tools described in Figure 6 through the National eHealth Transition Authority Ltd. (NEHTA). As such, it reports that it would not be relevant to receive generic prototypes for adaptation. Advice on methods for monitoring and evaluation of eHealth services, advice on eHealth norms and standards, and information on effective/best eHealth practices are considered extremely useful eHealth services by Australia.

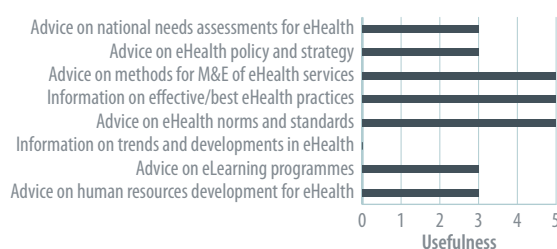


Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Brunei Darussalam

Enabling environment – policies and strategies to support the information society

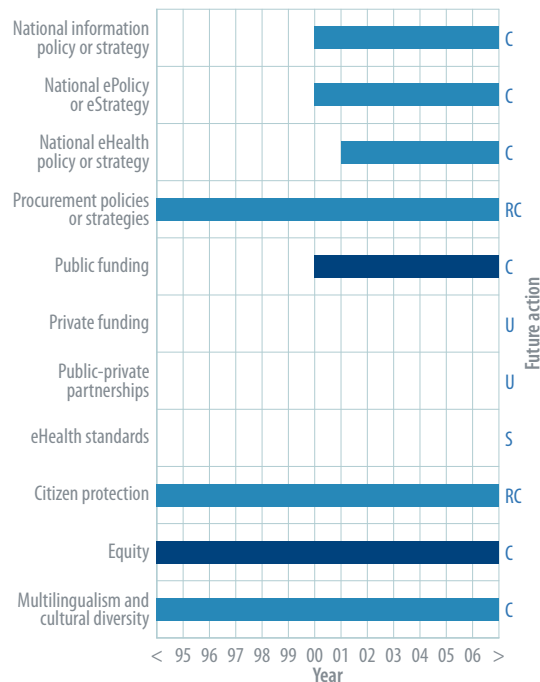


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Brunei Darussalam reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from very to extremely effective. They will continue over the next two years. Norms and standards for eHealth systems, services or applications will likely be adopted in the near future. Since 1980 various policies have been implemented to promote inclusiveness and equitable access to eHealth. This has been extremely effective and will continue over the next few years. The allocation of funds to implement various eHealth projects and the establishment of the Brunei Information Technology Council are rated among the most effective actions in building an enabling environment for the use of ICT in the health sector. Significant challenges include the implementation of an integrated eGovernment; ensuring public access to eGovernment services (and widespread use); ensuring accuracy, integrity and completeness of information; and sustaining ICT initiatives.

Infrastructure – access to information and communication technologies

Brunei Darussalam supports ICT infrastructure development for the health sector through a national plan for the development of ICT in health, a policy on affordability of infrastructure and intersectoral and nongovernmental cooperation. The former, which sets targets for health sector connectivity, was implemented in 2001 and is reported to be extremely effective. The allocation of funds for building ICT infrastructure for the health sector is rated as the most effective action in this field. The most significant challenge reported is the lack of coherent standards and guidelines for building ICT infrastructure.

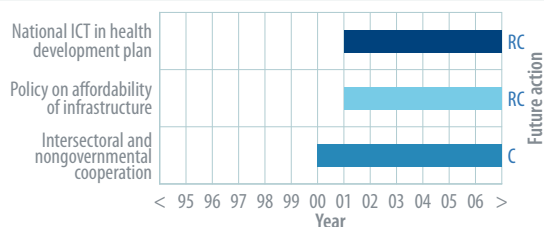


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

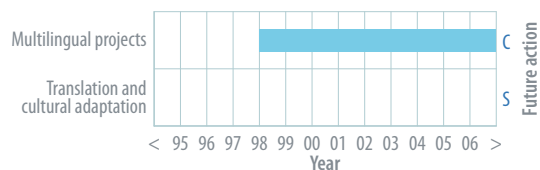
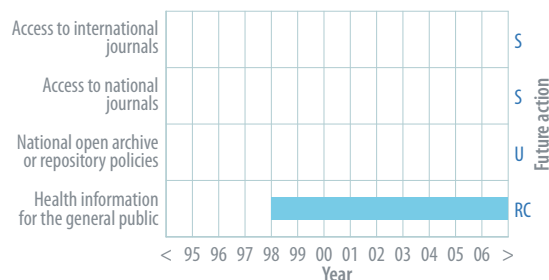


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Brunei Darussalam promotes the development of electronic multicultural health content through the introduction of multilingual projects (initiated in 1998). This has been moderately effective and will continue over the next few years. Translation and cultural adaptation of existing high-quality content (created either locally or abroad) is likely to commence by 2008.

Country indicators	Population (000s)	358	OECD country	No	Main telephone lines*	25.57 [02]
	GDP per capita (Int \$)	19 334	World Bank category	1	Internet users*	15.3
	Total health expenditure (% of GDP)	3.5	ICT Diffusion Index	0.4159	Mobile phone subscribers*	...

Content – access to information and knowledge



Brunei Darussalam provides online access to health content for the general public. Initiated in 1998, it has been moderately effective, and will be reviewed and continued. Access to national and international electronic journals will be introduced over the next two years. The organization of ICT-related electronic health conferences is the most effective action in this field to date. The country's goal is to increase the amount of people accessing electronic health content.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT capacity has been built through the use of undergraduate and postgraduate training and continuing education in ICT. University curricula for health sciences students include ICT skills courses, which have been very effective and will continue over the next few years. Providing ICT skills programmes in the ongoing training of health-care professionals has also been very effective and will continue over the next two years.

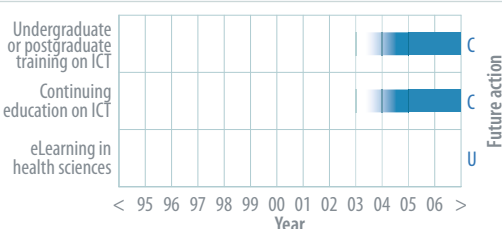


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

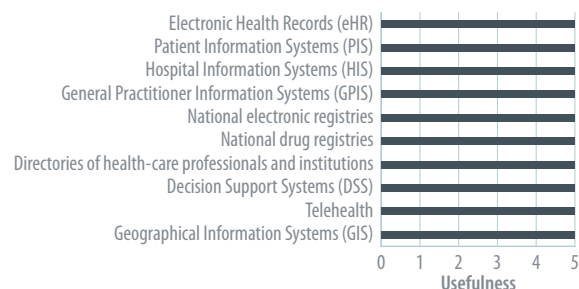


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on eHealth policy and strategy, advice on eHealth norms and standards, and information on effective/best eHealth practices are considered extremely useful eHealth services.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

China

Enabling environment – policies and strategies to support the information society

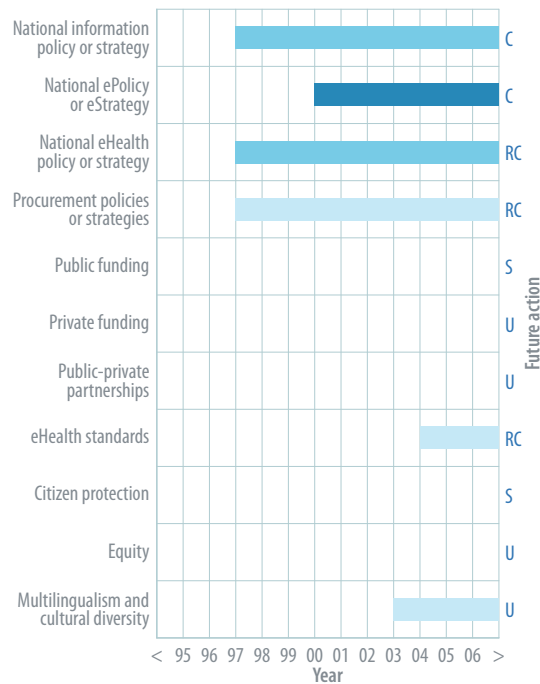


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

China reports that more than half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken and are rated from slightly to very effective. They are likely to be reviewed and continued over the next two years. National mechanisms such as an information policy, an eStrategy, and an eHealth policy have been put in place to promote the use of ICT. Public funding for ICT support of programmes addressing national health priorities is planned for the near future, as is the introduction of regulations to protect the privacy and security of individual patient data where eHealth is used. The most effective actions in this field include: in 1997 the first national conference on ICT was organized with the goal of preparing the 2010 view and the next 5-year plan. This was followed by a national plan for ICT improvement (2002). That same year, the Ministry of Health prepared the Guidelines for Development of National Health Information 2003-2010. Following the SARS outbreak in 2003, the government sought to create a public health information system. A 3-year plan to establish a public health information system has been developed accordingly, which specifies sub-systems, including a web-based disease surveillance information system, an emergency response information system, health inspection and a supervisory information system. The slow development of ICT law and regulation in the health sector and the creation of health information standards pose significant challenges in this field.

Infrastructure – access to information and communication technologies

ICT infrastructure development for the health sector is supported through a national plan for the development of ICT in health. This plan, which sets targets for health sector connectivity, was initiated in 2004 and is reported to be moderately effective. It will be reviewed and continued over the next few years.

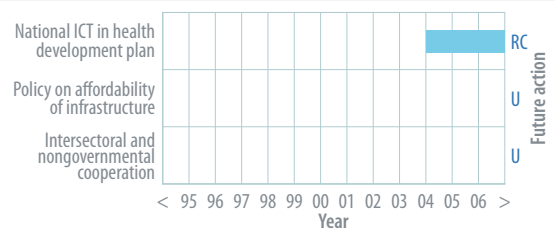


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

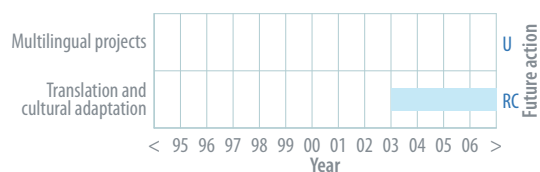


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

China promotes the development of electronic multicultural health content through the support of translation and cultural adaptation of existing high-quality content (created either locally or abroad). This action has been slightly effective and will be reviewed and continued over the next two years.

Country indicators	Population (000s)		OECD country	No	Main telephone lines*	23.98
	GDP per capita (Int \$)	4 958	World Bank category	3	Internet users*	7.23
	Total health expenditure (% of GDP)	5.6	ICT Diffusion Index	0.2115	Mobile phone subscribers*	25.76

Content – access to information and knowledge

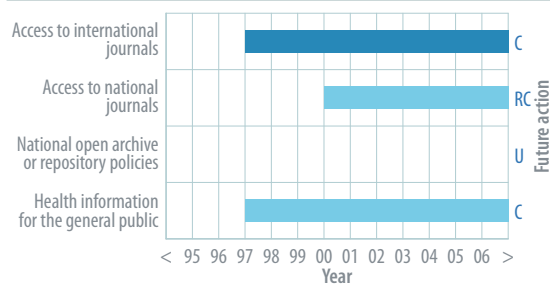


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Online access to health content is provided through national and international electronic journals, and through the availability of electronic health information for the general public. China highlights the initiation of a medical and medicine science data-sharing project in 2005. The goal of this project is to establish a platform to collect and share the results and data of all national research projects. The most significant challenge for information sharing is providing a mechanism of ownership recognition of the information by the specific institution that collected it.

Capacity – human resources knowledge and skills

China has built ICT capacity through the use of undergraduate and postgraduate training in ICT, continuing education in ICT, and eLearning in health sciences. ICT skills courses as a part of university curricula for health sciences students have been offered since 1993 and this action is rated as moderately effective. China has been providing ICT skills programmes in the ongoing training of health-care professionals since 1997 and this has also been moderately effective. In 1998 China started offering health sciences courses through eLearning for health professionals in training and practice. Training and workshops are being organized to improve ICT capability among health personnel but the lack of experts trained in ICT, medicine and management poses a significant challenge in this field.

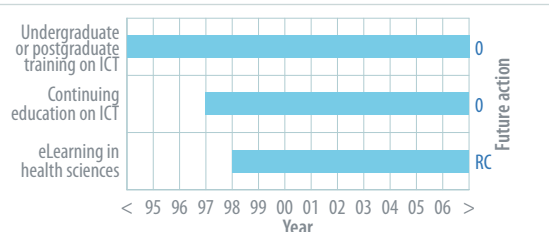


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

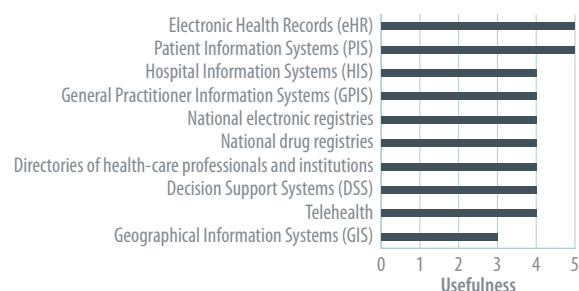


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

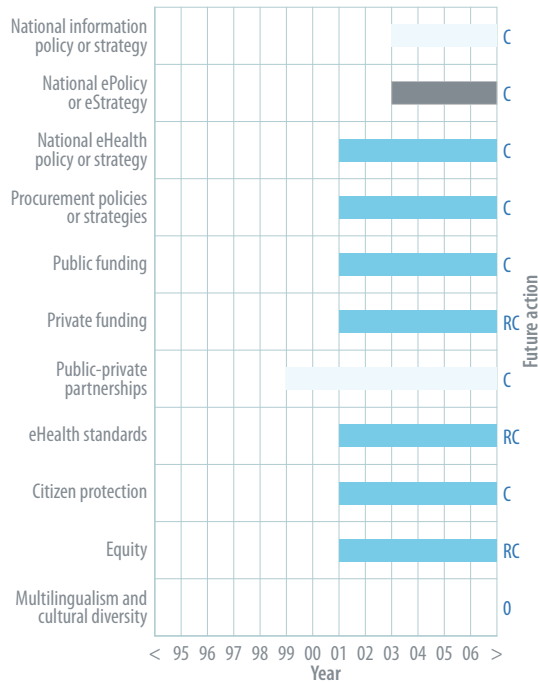
Electronic Health Records (eHR), and Patient Information Systems (PIS) are rated as extremely useful eHealth tools. The majority of other listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation. Advice on national needs assessments for eHealth, advice on eHealth policy and strategy, and advice on eHealth norms and standards are considered extremely useful eHealth services. All remaining listed eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	O No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Fiji

Enabling environment – policies and strategies to support the information society



Fiji reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken; most of them are rated as moderately effective. The actions so far taken are expected to continue. The most effective initiatives in building an enabling environment for the use of ICT in the health sector are reported as being the contribution by the ICT unit at national and divisional levels within the Ministry of Health, the establishment of the post of an information project officer, the introduction of patient information systems (PATIS) and the ongoing training of health staff. Securing ongoing financial support and a stable electric power supply are identified as significant challenges in this area, as is a reliable telecommunications network.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

All of the listed actions to support the development of ICT infrastructure for health have been implemented since 2001. They are considered moderately effective and are likely to be reviewed and continued over the next two years. Among the most effective actions, the following systems are mentioned: PATIS, asset management, finance management information systems and human resources systems. Financial support and ICT training are reported among the challenges in building ICT infrastructure for the health sector.

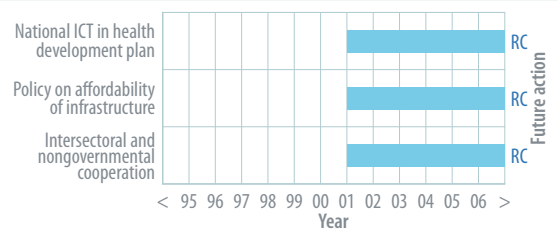
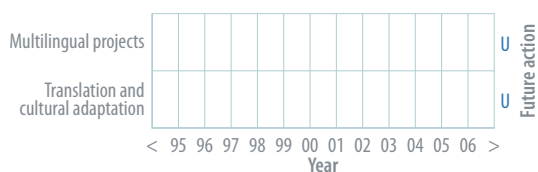


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

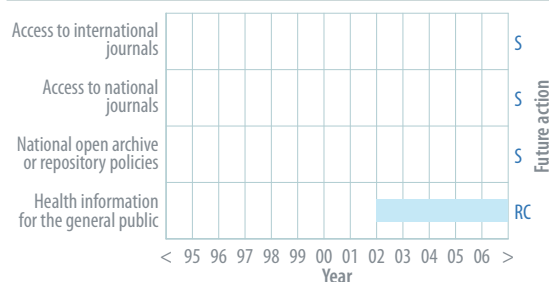


Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken by 2008.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	834	OECD country	No	Main telephone lines*	12.35 [03]
	GDP per capita (Int \$)	5 873	World Bank category	3	Internet users*	7.2
	Total health expenditure (% of GDP)	3.7	ICT Diffusion Index	0.2762	Mobile phone subscribers*	13.31

Content – access to information and knowledge



In 2002, Fiji began creating and providing health information in electronic format. This is likely to be reviewed and continued. The remaining listed actions to promote access to electronic health content are expected to start by 2008. Fiji notes the development of the Ministry of Health's web site as one of its most effective actions in providing health information to the public. A lack of expertise in maintaining the web site, however, poses a significant challenge.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

Fiji has been providing ICT skills courses as a part of university curricula for health sciences students since 2002 and ICT skills programmes in the ongoing training of health-care professionals since 2001. Health sciences courses through eLearning for health professionals have been offered since 2002. All of these educational programmes are likely to continue. Teleconferencing and distance learning are noted as important initiatives in building ICT capacity in the health sector. However, Fiji notes the need for a trained ICT coordinator. Cost and resources, extending bandwidth and providing technical support are challenges in this field.

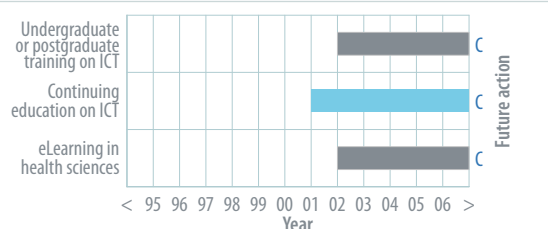


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

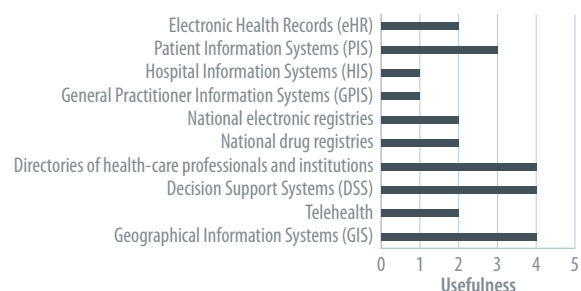


Figure 6. Preferred generic eHealth tools to be provided by WHO

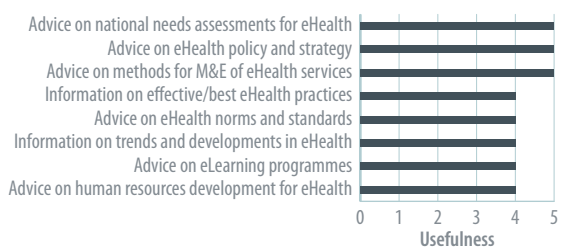


Figure 7. Preferred eHealth services to be provided by WHO

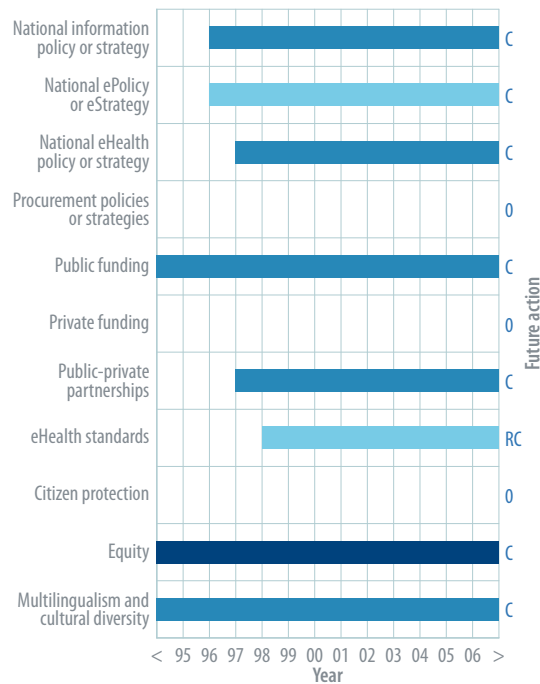
Directories of health-care professionals and institutions, Decision Support Systems (DSS) and Geographical Information Systems (GIS) are rated as very useful eHealth tools if the World Health Organization could offer these as generic prototypes for adaptation to Fiji. The specified eHealth services are considered from very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Malaysia

Enabling environment – policies and strategies to support the information society



Malaysia reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been taken. They are rated from moderately to extremely effective and are likely to continue over the next two years. Other actions highlighted are the launch of the multimedia super corridor (MSC), a comprehensive ICT and multimedia development project; the introduction of the Smart School; a telehealth project; and the implementation of eGovernment to promote ePolicy. Resistance to technological changes are reported to pose challenges in the area of building an enabling environment for the use of ICT in the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health was implemented in 1995 and is rated as slightly effective. Intersectoral and nongovernmental cooperation was introduced the same year and is considered moderately effective. Both initiatives are expected to continue. A policy on affordability of infrastructure is planned to commence in 2008. Malaysia describes as successful initiatives the universal services project (introduced in 2001), which aims to reduce the digital divide between ICT use in cities and rural areas, and the provision of Internet access to schools, libraries and clinics in rural areas. The most effective action in building ICT infrastructure for the health sector is reported to be the introduction of the Health Management Information System (HMIS) (currently in phase II). High costs, inadequate human resources, computer illiteracy and extending infrastructure throughout the country are reported as the most significant challenges in this field.

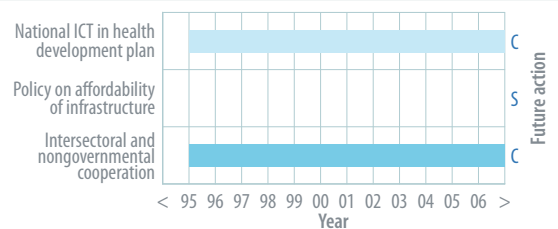


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

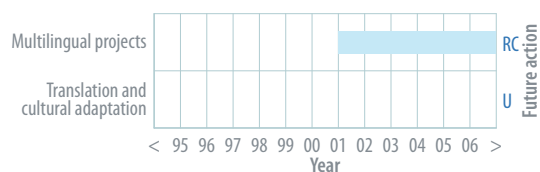


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Special projects to promote the development and use of new electronic health content in multiple languages were introduced in 2001 and have been slightly effective. The introduction of Mass Customized/Personalized Health Information and Education (MCPHIE), also known as Health Online, is considered the most important action in providing electronic multicultural health information. Creating appropriate content for the target audiences is reported to be the most significant challenge in this area.

Country indicators	Population (000s)	24 437	OECD country	No	Main telephone lines*	17.38
	GDP per capita (Int \$)	9 761	World Bank category	2	Internet users*	38.62
	Total health expenditure (% of GDP)	3.8	ICT Diffusion Index	0.4042	Mobile phone subscribers*	57.12

Content – access to information and knowledge

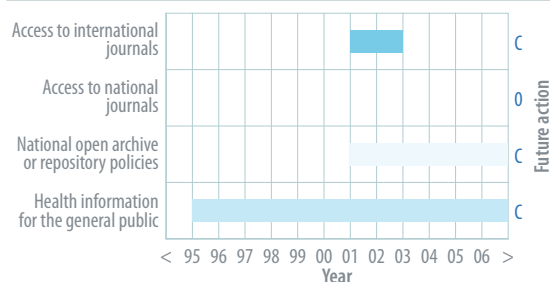


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals for health professionals was introduced in 2001, initially for a two-year period. As it has been moderately effective, the service will continue over the next two years. A policy for a digital national open archive for scientific research (published in Malaysia) was also enacted in 2001. The provision of this service is likely to continue. Creating and providing health information for the general public in electronic format commenced in 1995. It is rated as slightly effective and will continue. Provision of online national journals has not been offered to date. The introduction of the Health Online portal for personalized health information is mentioned as another important initiative. Online access to medical journals for all health professionals in government services is described as the most

effective initiative. Providing universal access to medical journals is, together with budget planning, considered a significant challenge in this field.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students, offered since the late 1970s, and ICT skills programmes in the ongoing training of health-care professionals, since the late 1980s, are rated as extremely effective. Health sciences courses through eLearning for health professionals (in training and practice) were introduced in 2000 and are considered moderately effective. Malaysia predicts that these educational programmes will continue over the next two years.

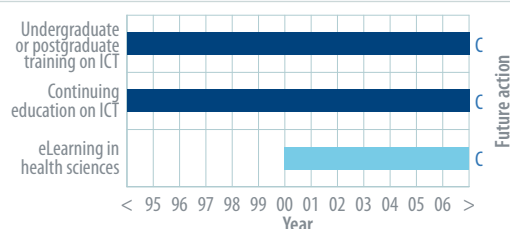


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

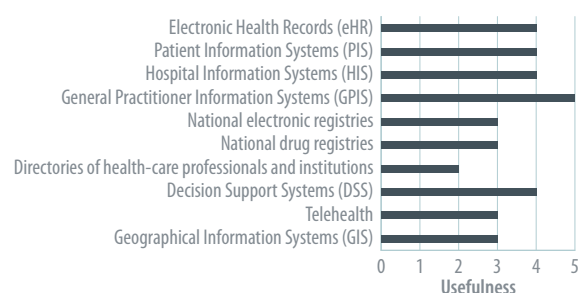


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

General Practitioner Information Systems (GPIS) is rated as an extremely useful tool if WHO could offer them as a generic prototype for adaptation to Malaysia. The majority of the remaining listed eHealth tools are rated from moderately to very useful. Among the specified eHealth services, advice on methods for monitoring and evaluation of eHealth services, and advice on eLearning programmes are considered moderately useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Mongolia

Enabling environment – policies and strategies to support the information society

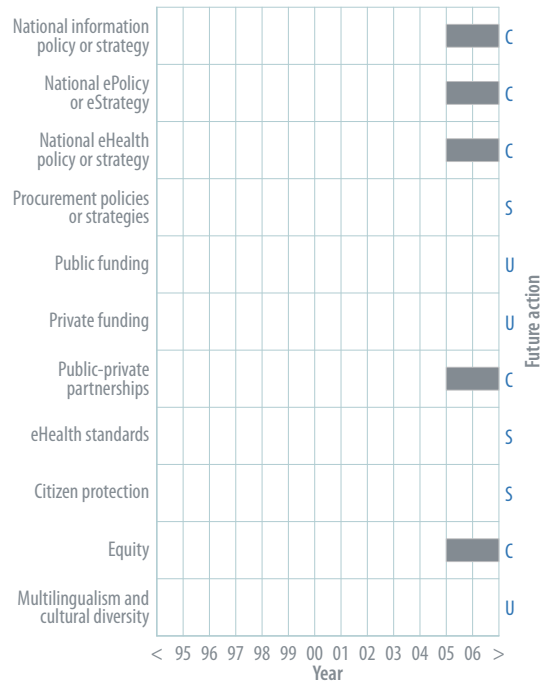


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Mongolia reports that half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector were started in 2005, and are expected to continue over the next two years. By 2008 the country plans to implement procurement policies to guide software, hardware and content acquisition, introduce norms and standards for eHealth systems, and adopt regulations to protect the privacy and security of individual patient data where eHealth is used. To date, no decision has been made as to which of the remaining actions to build an enabling environment for the use of ICT in the health sector will be taken over the next two years. Mongolia highlights international and donor support as the most effective actions in this area. The computerization of the records of public health institutions and the introduction of ICT in the health sector were both initiated in 1996 with the support of the World Health Organization (WHO). The most significant challenge is securing ongoing public funding for ICT support, which Mongolia feels is essential for ensuring sustainability of ICT initiatives in the health sector.

Infrastructure – access to information and communication technologies

A national policy to reduce the costs of ICT infrastructure for the health sector was implemented in 2005 and is predicted to continue over the next two years. Mongolia indicates that it works successfully with intersectoral and nongovernmental partners to promote infrastructure development and will continue to do so. International aid and donor support has been most effective in providing health organizations in all the provinces and the capital with equipment and Internet access. All of the provincial health departments are reported to use the Internet increasingly for data transfer. The most significant challenge is reported to be the high costs for ICT equipment, which all need to be imported.

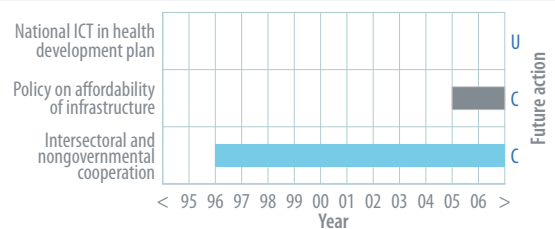


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

The government has, however, taken measures to exempt ICT technology from customs duty and value added tax; the results include a significant increase in the availability of affordable technology products.

Cultural and linguistic diversity, and cultural identity

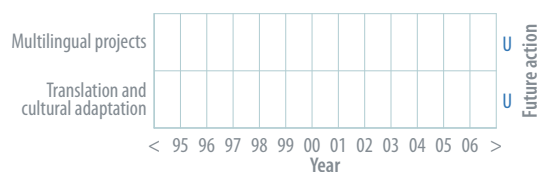


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and no decision has been made as to which actions will be taken. The majority of current health research material and guidelines are in English. However, physicians and other health professionals have limited knowledge of English, which poses a significant challenge. To date, no effective measures have been taken neither to improve English skills of health professionals nor to establish a mechanism for the translation of some of the essential publications.

Country indicators	Population (000s)	2 583	OECD country	No	Main telephone lines*	5.62 [03]
	GDP per capita (Int \$)	2 100	World Bank category	4	Internet users*	7.6
	Total health expenditure (% of GDP)	6.7	ICT Diffusion Index	0.2704	Mobile phone subscribers*	12.98

Content – access to information and knowledge

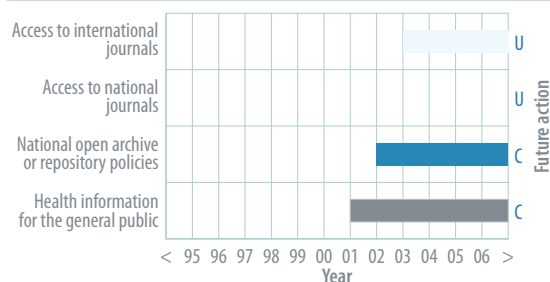


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Access to international electronic journals was introduced in 2003. A policy for a digital national open archive for scientific research was successfully implemented in 2002. In 2001 Mongolia started creating and providing health information for the general public in electronic format. Both of these services will continue over the next two years. Database creation is highlighted as an important initiative in the provision of access to electronic health content. These databases cover topics on a diverse range of health issues, for example: human resources; health facilities, inventory of health equipment; drugs and vaccinations; and health situation reports that include research reports, health indicators, publications and guidelines. Additionally, the national health database (<http://www.moh.mn>) has been established for policy-

and decision-makers. All these databases are regularly updated and improved on the basis of feedback from users. Access to international electronic journals is, however, still limited.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students have been offered since 1990. This action is rated as slightly effective and will be reviewed and continued. ICT skills programmes in the ongoing training of health-care professionals have been provided since 1995. This is rated as a moderately effective initiative. Health sciences courses through eLearning for health professionals have been offered since 2003. Both educational programmes are predicted to continue over the next two years. Few ICT professionals are currently working in the health sector due to unfavourable employment conditions and this is considered a significant challenge in this field. The action plan for the strengthening of ICT in the health sector (within the Strategic Plan to Develop HMIS for 2006–2010) is expected to be the first step in addressing this challenge.

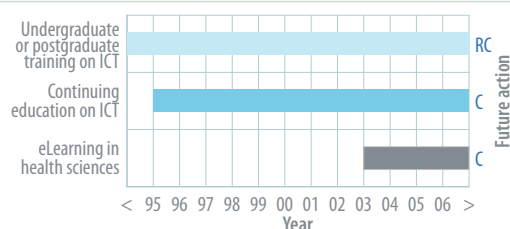


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

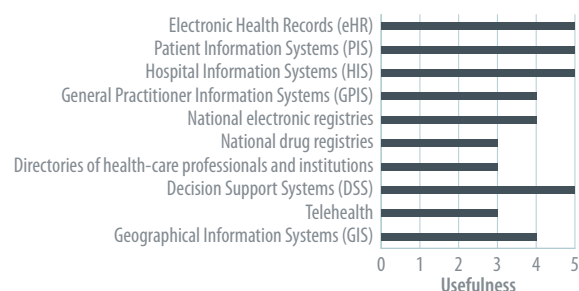


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

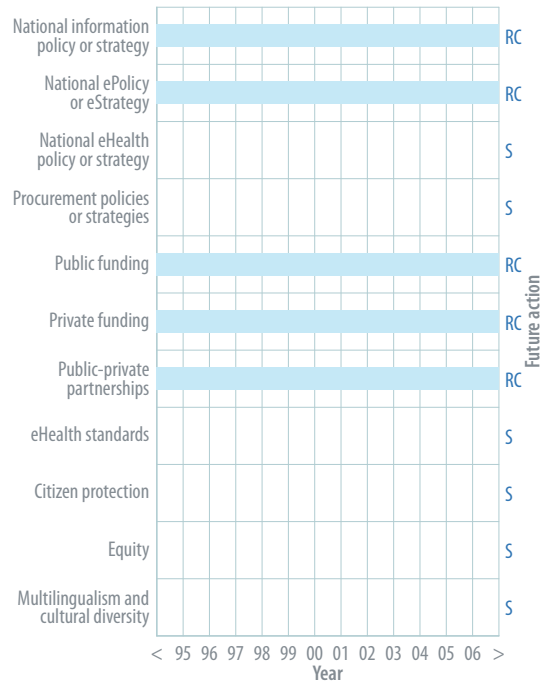
The majority of the listed eHealth tools are rated from very to extremely useful if WHO could offer these as generic prototypes for adaptation to Mongolia. A Financial Management Information System is mentioned as an additional tool that would be extremely useful. All of the specified eHealth services are considered very to extremely useful.

Legend	Effectiveness	Future action	Usefulness
■	Extremely effective	C To be continued	5 Extremely useful
■	Very effective	RC To be reviewed & continued	4 Very useful
■	Moderately effective	S To be started	3 Moderately useful
■	Slightly effective	P To be stopped	2 Slightly useful
■	Not effective	U Undecided	1 Not useful
■	Unknown effectiveness	0 No data / No action	0 No data
■	Start date unknown		
■	No data		

* per 100 inhabitants

Philippines

Enabling environment – policies and strategies to support the information society



The Philippines reports that almost half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented and will be reviewed and continued over the next two years. The rest of the listed actions should be introduced by 2008. The national ICT policy is described as the most important action taken in this field. To date, ICT projects are often funded by grants from donor agencies or from special government budgets. Including these projects within the regular government budget is considered a significant challenge. A priority activity is to develop a model framework that provides clear strategies and direction to achieve desired goals and objectives in the eHealth domain.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

There are plans to implement a national plan for the development of ICT in health and a national policy to reduce the costs of ICT infrastructure for the health sector by 2008. The Philippines indicates that since 1985 it works with intersectoral and nongovernmental partners to promote infrastructure development. This initiative will be reviewed and continued over the next two years. The Multipurpose Community Telecenter (MCT) (<http://www.barangayconnect.ph>), which provides access to community information, including selected transcriptions in the local dialect, and the use of cellular infrastructure to provide health information are highlighted by the Philippines as a significant initiative.

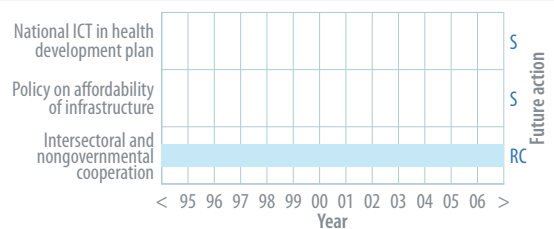


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

The most important initiatives are described as the introduction of the Internet by PHNet; the Philippine Research, Education and Government Information Network (PREGINET), which advances the development of next-generation network technologies, applications and services to make these technologies accessible and affordable to user communities; and the Short Messaging System (SMS) with 25 million cellular service subscribers. The Department of Health has initiated a programme for answering health queries by SMS from the general public. Insufficient funds for the health sector remain a significant challenge.

Cultural and linguistic diversity, and cultural identity

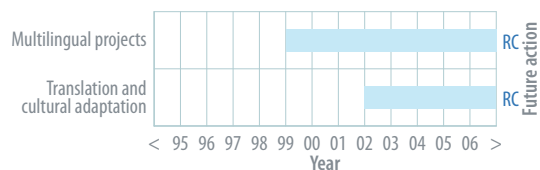


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

The listed actions have been introduced and will be reviewed and continued. The Philippines notes the development of the Community Health Information Tracking System (CHITS), which is designed for government health centres to track and monitor patients. Of particular importance is the embedded localization module that enables translation into local languages. The University of the Philippines has a project translating terms used in Medical Subject Headings (MeSH) into Filipino, the national language. The development of multilingual content for advocacy poses a significant challenge, as there are five major languages and more than one hundred dialects in the country.

Country indicators	Population (000s)	80 166	OECD country	No	Main telephone lines*	4.16
	GDP per capita (Int \$)	5 490	World Bank category	3	Internet users*	5.32
	Total health expenditure (% of GDP)	3.2	ICT Diffusion Index	0.294	Mobile phone subscribers*	39.85

Content – access to information and knowledge

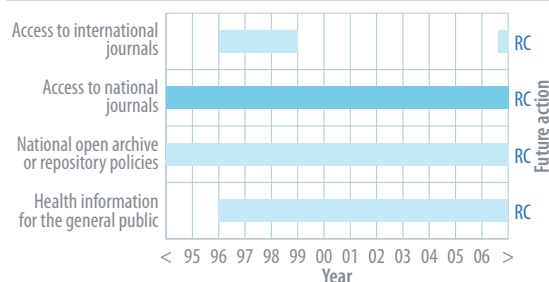


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

All of the services listed to extend access to the community have been introduced and are predicted to continue over the next two years. Important actions are described to be the creation of the eHealth portal (1995) as a virtual community for Philippine health research, health care delivery, and health science and technology development; the Department of Health web site (1997) providing a source of health information for the general public; the development of the Philippine eLibrary (2004), which links multidisciplinary libraries; and the online public access catalogue (OPAC) (1991) of medical and health libraries. The Health Research and Development Information Network (HERDIN) (<http://www.herdin.ph>) (1985), a specialized network of documentation and information centres engaged in health research and development

activities with a bibliographic information retrieval system for Philippine health research is also highlighted as an effective action in this field. The Philippines highlights the need for translation of health information to local languages. The updating and maintenance of databases are mentioned among the most significant challenges.

Capacity – human resources knowledge and skills

All of the educational programmes listed in this area have been introduced. The Philippines reports these actions to have been slightly effective. They will be reviewed and continued. The recently implemented telementoring and telehealth project, Buddy Works, will enable access to health knowledge and expertise for those in geographically remote areas. The Department of Health provides continuing ICT training for health professionals; the courses ranging from introductory courses to programming, as well as Internet and specialized Geographical Information Systems instruction. The migration of locally-trained health professionals, especially nurses with training in ICT for health, to positions abroad is reported as the most significant challenge in this area.

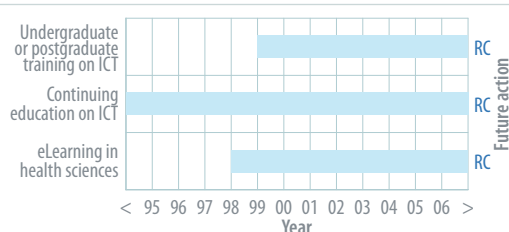


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

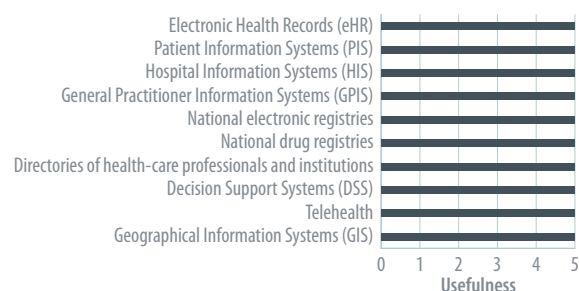


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

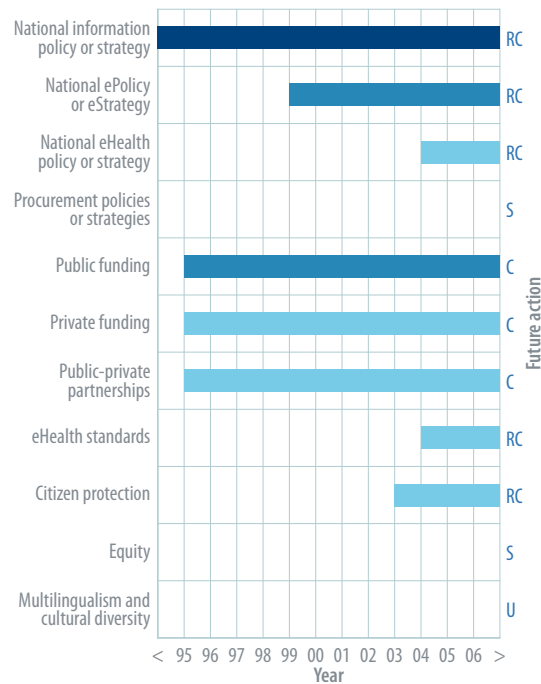
All of the listed eHealth tools are rated as extremely useful if the World Health Organization could offer these as generic prototypes for adaptation to the Philippines. The specified eHealth services are also considered extremely useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	O No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

Republic of Korea

Enabling environment – policies and strategies to support the information society



The Republic of Korea reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented. The national information policy is rated as extremely effective and the rest of the implemented actions as moderately to very effective. These actions are predicted to continue over the next two years. There are plans to introduce procurement policies to guide software, hardware and content acquisition in the health sector, and policies to promote inclusiveness and equitable access to eHealth by 2008. The Republic of Korea highlights the introduction of electronic medical records, ePrescription and telemedicine as key actions which are contributing to the use of ICT in the health sector.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2004 and is reported to be moderately effective. This project will be reviewed and continued over the next two years. A national policy to reduce the costs of ICT infrastructure for the health sector will likely be introduced by 2008. A decision remains to be made as to whether intersectoral and nongovernmental cooperation to promote infrastructure development will be introduced in the next two years.

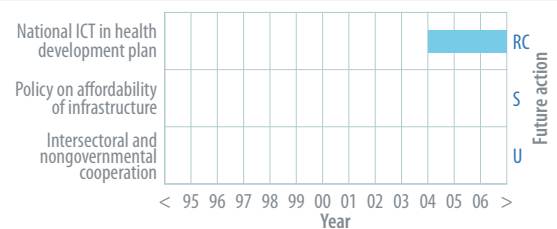
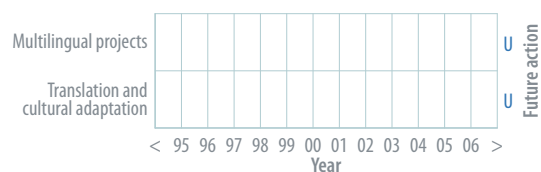


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

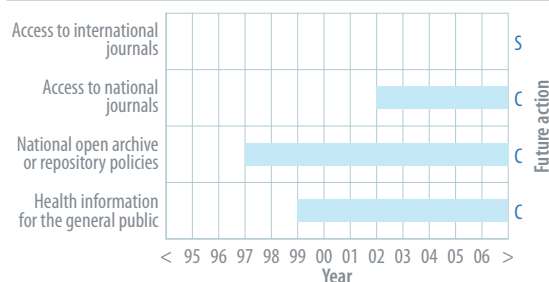


Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and no decision has been made as to which actions will be taken.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	47 849	OECD country	Yes	Main telephone lines*	55.31
	GDP per capita (Int \$)	19 274	World Bank category	1	Internet users*	65.68
	Total health expenditure (% of GDP)	5.6	ICT Diffusion Index	0.616	Mobile phone subscribers*	76.09

Content – access to information and knowledge



The Republic of Korea intends to provide health professionals with access to international electronic journals by 2008. Access to national electronic journals was introduced in 2002, and a policy for a digital national open archive for scientific research published within the country, in 1997. Creating and providing health information for the general public in electronic format commenced in 1999. These services are rated as slightly effective and will continue over the next two years.

Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students (undergraduate and postgraduate) have been offered since 2000 and are rated as slightly effective. The same year, ICT skills programmes in the ongoing training of health-care professionals were introduced; health sciences courses through eLearning for health professionals started in 2003. These educational programmes are considered moderately effective and are predicted to continue.

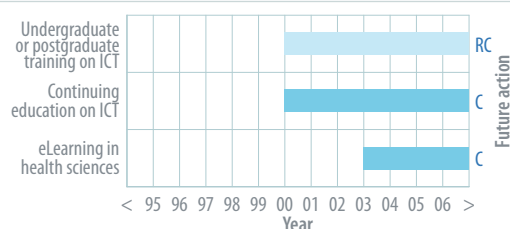


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

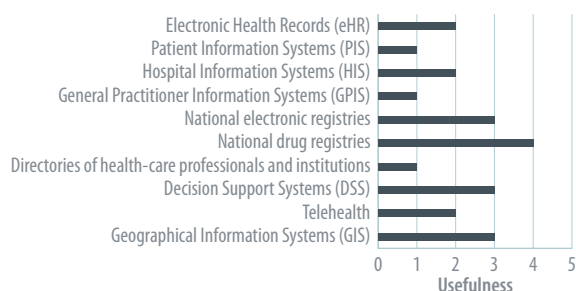


Figure 6. Preferred generic eHealth tools to be provided by WHO

Among the listed eHealth tools national drug registries are rated as very useful if the World Health Organization could offer them as a generic prototype for adaptation to the Republic of Korea. Information on effective/best eHealth practices is considered an extremely useful eHealth service, while the rest of the specified services are rated from moderately to very useful.



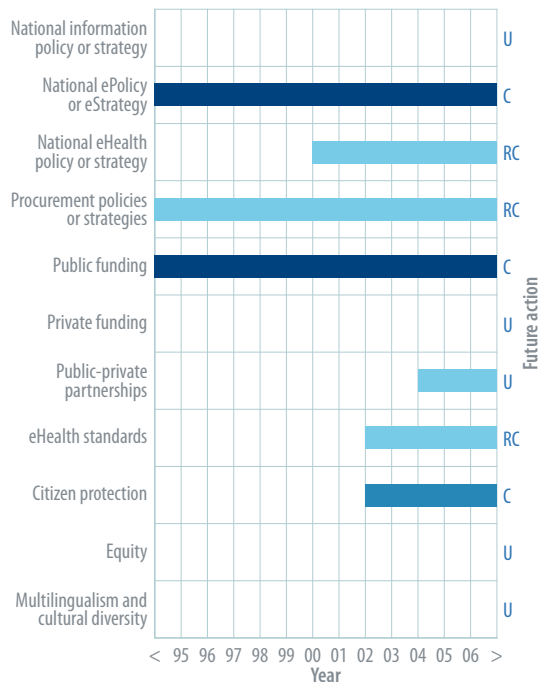
Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Singapore

Enabling environment – policies and strategies to support the information society



Singapore reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented and are expected to continue over the next two years. The national ePolicy to promote the use of ICT across all sectors has been extremely effective, as has public funding for ICT support of programmes addressing national health priorities. Regulations to protect the privacy and security of individual patient data where eHealth is used are rated as very effective. It remains to be decided as to whether action will be taken to implement any of the remaining listed actions to build an enabling environment for the use of ICT in the health sector. The inclusion of eHealth within the eGovernment plan is described as the most effective initiative in this area; it has helped provide impetus for further action in the health domain and synergy with other sectors.

Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2000 and is reported to be moderately effective. This initiative is likely to be reviewed and continued. No decision has been made, to date, as to whether a policy on affordability of infrastructure will be implemented or if intersectoral and nongovernmental cooperation to promote infrastructure development will be introduced. The most effective actions in the provision of access to ICT are described to be government support through funding and the development of the MediNet infrastructure, dedicated to connecting the health sector. Singapore highlights the provision of a broadband network as an important initiative in providing affordable and rapid access to information.

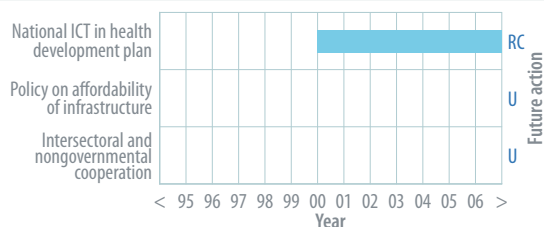
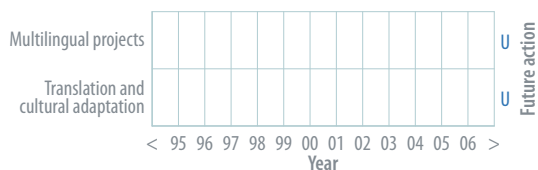


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity



Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken. English is reported as being the language used in business and administration within Singapore.

Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Country indicators	Population (000s)	4 220	OECD country	No	Main telephone lines*	43.2
	GDP per capita (Int \$)	25 964	World Bank category	1	Internet users*	56.12
	Total health expenditure (% of GDP)	4.5	ICT Diffusion Index	0.663	Mobile phone subscribers*	89.47

Content – access to information and knowledge

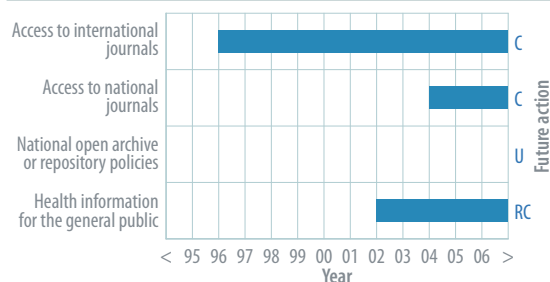


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1996 and 2004, respectively. These services have been very effective and will continue. Creating and providing health information for the general public in electronic format commenced in 2002 and is also rated as very effective. This action will be reviewed and continued. There is as yet no decision on whether a policy for a digital national open archive for scientific research will be introduced over the next two years. The consolidation of all content in a single Health and Environment Town on the eCitizen portal is described to be the most effective action in the field of extending access to the community.

Capacity – human resources knowledge and skills

To date, no decision has been made as to whether ICT skills courses will be offered as a part of university curricula for health sciences students. The provision of ICT skills programmes in the ongoing training of health-care professionals and health sciences courses through eLearning for health professionals in training and practice, (started in 1998/1999), have been very effective and will continue over the next two years. However, encouraging health professionals to use ICT in their work poses a significant challenge. Compatibility issues concerning systems developed at different times, and for different purposes, are also mentioned as challenges in building ICT capacity in the health sector.

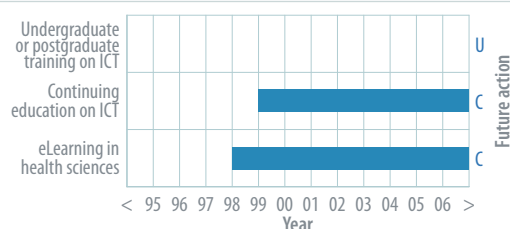


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

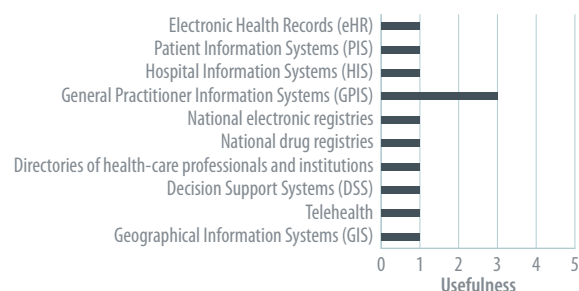


Figure 6. Preferred generic eHealth tools to be provided by WHO

Among eHealth tools General Practitioner Information Systems (GPIS) are rated as moderately useful if the World Health Organization could offer these as generic prototypes for adaptation to Singapore. Information on effective/best practices and advice on eHealth norms and standards are rated as very useful eHealth services. Information on trends and developments in eHealth, advice on eLearning programmes, and advice on human resources development for eHealth are all rated as moderately useful.



Figure 7. Preferred eHealth services to be provided by WHO

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Tonga

Enabling environment – policies and strategies to support the information society

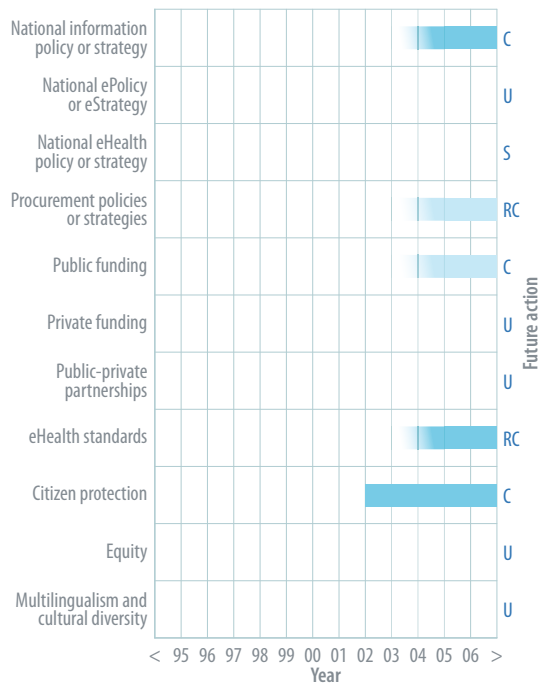


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Tonga reports that nearly half of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented and will continue. A national eHealth policy to promote the use of ICT across all sectors is likely to be introduced by 2008. To date, no decision has been made as to which of the remaining listed actions will be adopted in the next two years. Notably an ICT plan for the Ministry of Health is being developed. Internet and e-mail access for staff at the Ministry of Health and in the government is described as the most important action, together with the ICT training centre and access to the Pacific Open Health Learning Network (POHLN) for eLearning. The establishment of the government ICT committee is yet another important initiative. High costs for connectivity, insufficient bandwidth and difficulty in retaining skilled staff in the country are reported as significant challenges.

Infrastructure – access to information and communication technologies

A national plan for the development of ICT in health, which sets targets for health sector connectivity, was implemented in 2005 and may be reviewed and continued. Also noted, was the introduction of a national policy to reduce the costs of ICT infrastructure for the health sector, and intersectoral and nongovernmental cooperation to promote infrastructure development. These activities are rated as moderately effective and will continue over the next two years. There are successful projects on education and Internet connectivity in process, supported by international and donor agencies. Tonga highlights that the deregulation of the telecommunications market has resulted in significantly lower costs for ICT. However, due to its population size and geographical location, base costs for ICT infrastructure are likely to remain high. Cross-regional cooperation and collaboration with development partners in the Pacific is suggested as an effective approach.

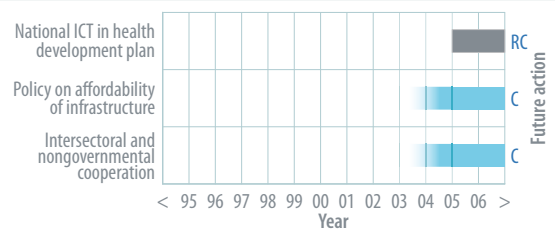


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

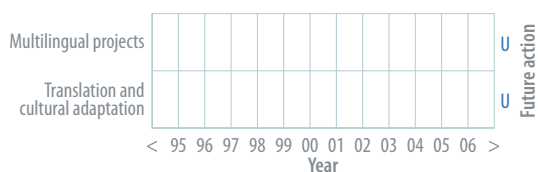


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

Currently, none of the specified actions to promote the development of electronic multicultural health content have been implemented and a decision remains to be made as to which actions will be taken.

Country indicators	Population (000s)	102	OECD country	No	Main telephone lines*	11.29 [02]
	GDP per capita (Int \$)	4 581	World Bank category	3	Internet users*	2.88
	Total health expenditure (% of GDP)	6.5	ICT Diffusion Index	0.2526	Mobile phone subscribers*	3.38

Content – access to information and knowledge

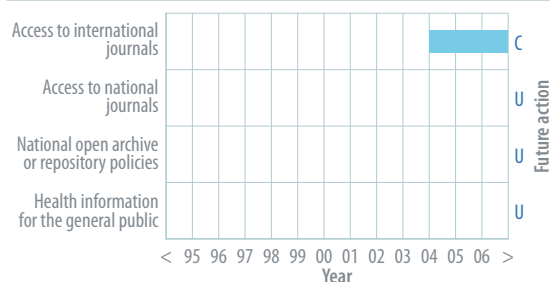


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international electronic journals since 2004. This service has been moderately effective and will continue. Currently no decision has been made as to which of the remaining listed actions will be introduced over the next two years. POHLN and the computer-training centre are highlighted as the most important actions in the field of extending access to the community. The training centre at the school of nursing provides access to the library resources at the nursing school at Auckland University. Full text articles can be obtained through the World Health Organization (WHO) and through contacts with hospitals and universities abroad. Coordination and funding are reported as challenges in this area.

Capacity – human resources knowledge and skills

All of the listed educational programmes to build ICT capacity in the health sector have been implemented. They have been rated as very effective and are predicted to continue. The POHLN training centre is also highlighted in this area, as it provides an opportunity for nurses and other health professionals to practice their ICT skills. However, to date, few tasks and procedures in the health sector have been computerized, and applying newly acquired ICT skills into daily work poses a significant challenge.

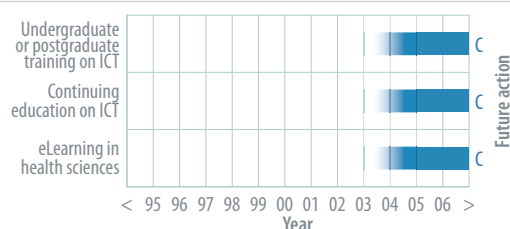


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

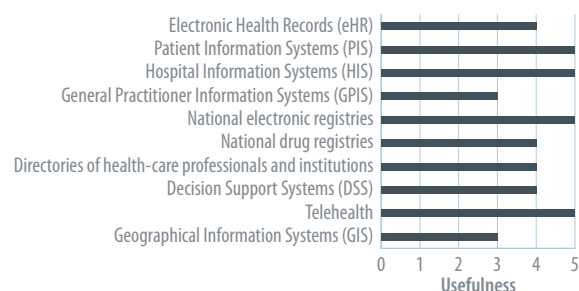


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

The majority of the listed eHealth tools are rated from very to extremely useful if WHO could offer these as generic prototypes for adaptation to Tonga. The majority of the specified eHealth services are considered very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
Very effective	RC To be reviewed & continued	4 Very useful	
Moderately effective	S To be started	3 Moderately useful	
Slightly effective	P To be stopped	2 Slightly useful	
Not effective	U Undecided	1 Not useful	
Unknown effectiveness	0 No data / No action	0 No data	
Start date unknown			
No data			

* per 100 inhabitants

Viet Nam

Enabling environment – policies and strategies to support the information society

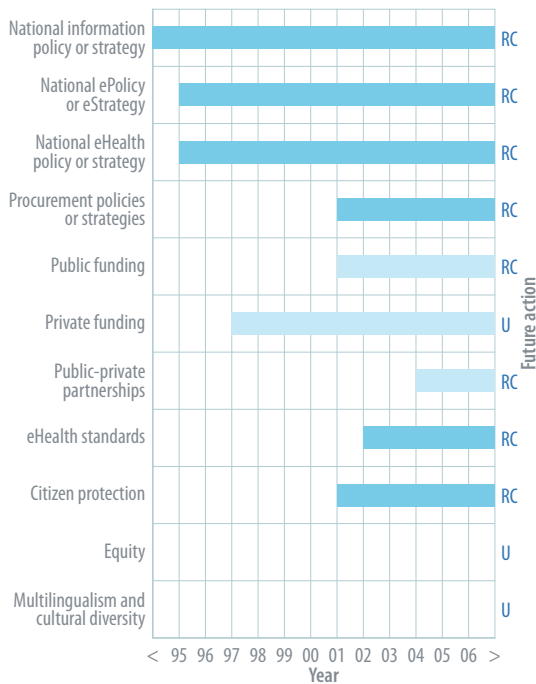


Figure 1. Enabling environment for ICT in the health sector: actions taken or planned within 2 years and their effectiveness rating

Viet Nam reports that the majority of the listed actions to promote an enabling environment for information and communication technologies (ICT) in the health sector have been implemented, and are expected to be reviewed and continued over the next two years. The actions are rated from slightly to moderately effective. A national information policy, ePolicy and eHealth policy were introduced in the mid-1990s. It is unknown whether private funding for ICT support of programmes addressing national health priorities will continue. To date, no decision has been made as to which of the remaining actions will be introduced by 2008. Inadequate skills and funds are described as the most significant challenges in building an enabling environment for the use of ICT in the health sector.

Infrastructure – access to information and communication technologies

Viet Nam has implemented a national plan for the development of ICT in health and a national policy to reduce the costs of ICT infrastructure for the health sector. The country rates these actions as moderately effective and plans to review and continue them over the next two years. Intersectoral and nongovernmental cooperation to promote infrastructure development was implemented in 1997. This is rated as slightly effective and a decision remains to be made as to whether it will continue.

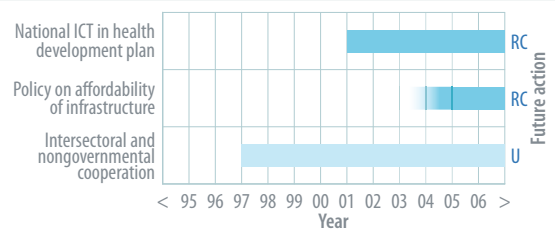


Figure 2. ICT infrastructure development for the health sector: actions taken or planned within 2 years and their effectiveness rating

Cultural and linguistic diversity, and cultural identity

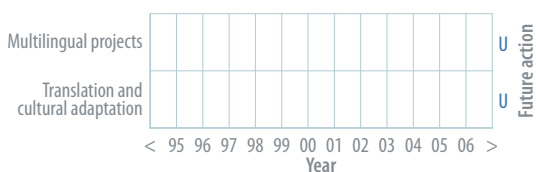


Figure 3. Electronic multicultural health content: actions taken or planned within 2 years and their effectiveness rating

To date, none of the specified actions to promote the development of electronic multicultural health content have been implemented and no decision has been made as to which actions will be taken. The numerous languages spoken in Viet Nam make the provision of electronic multicultural health content a significant challenge.

Country indicators	Population (000s)	82 000	OECD country	No	Main telephone lines*	12.28
	GDP per capita (Int \$)	3 007	World Bank category	4	Internet users*	7.12
	Total health expenditure (% of GDP)	5.2	ICT Diffusion Index	0.2531	Mobile phone subscribers*	6.01

Content – access to information and knowledge

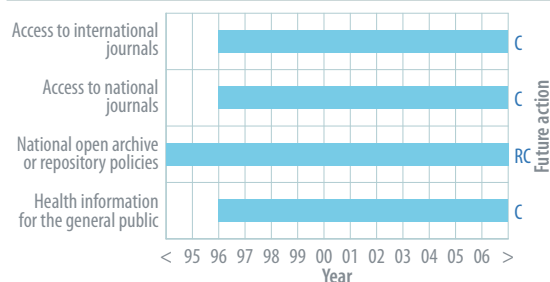


Figure 4. Online access to health content: actions taken or planned within 2 years and their effectiveness rating

Health professionals have had access to online health content through international and national electronic journals since 1996. The general public gained access to health information in electronic format that same year. These services have been moderately effective and will continue. A policy for a digital national open archive for scientific research published in Viet Nam was successfully implemented in 1991 and will be reviewed and is likely to continue over the next two years. The Ministry of Health ePortal and its connection to the government and local departments is described as the most effective action. Funding is reported to be a significant challenge in the provision of access to electronic health content.

Capacity – human resources knowledge and skills

ICT skills courses as a part of university curricula for health sciences students and ICT skills programmes in the ongoing training of health-care professionals have been offered since 1994/1995. These educational programmes have been moderately effective and are likely to be reviewed and continued. A decision remains to be made as to whether health sciences courses through eLearning for health professionals in training and practice will be introduced by 2008. The lack of an ICT training centre is described as the most significant challenge in building ICT capacity in the health sector.

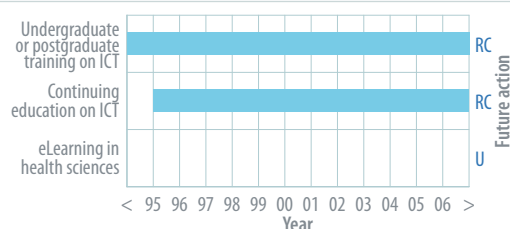


Figure 5. ICT capacity in the health sector: actions taken or planned within 2 years and their effectiveness rating

eHealth tools and eHealth services

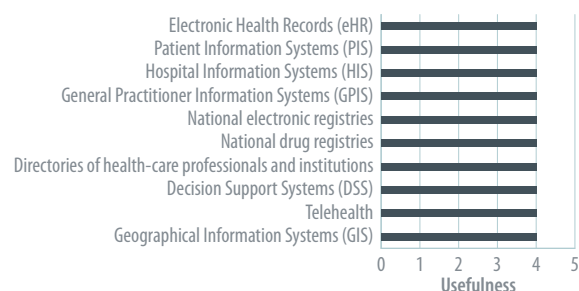


Figure 6. Preferred generic eHealth tools to be provided by WHO



Figure 7. Preferred eHealth services to be provided by WHO

All of the listed eHealth tools are rated as very useful if the World Health Organization could offer these as generic prototypes for adaptation to Viet Nam. The specified eHealth services are also considered very useful. Consultant support is mentioned as an additional service that would be very useful.

Legend	Effectiveness	Future action	Usefulness
	Extremely effective	C To be continued	5 Extremely useful
	Very effective	RC To be reviewed & continued	4 Very useful
	Moderately effective	S To be started	3 Moderately useful
	Slightly effective	P To be stopped	2 Slightly useful
	Not effective	U Undecided	1 Not useful
	Unknown effectiveness	0 No data / No action	0 No data
	Start date unknown		
	No data		

* per 100 inhabitants

List of WHO Member States and Associate Members¹

Afghanistan**	272	Dominica	Malawi	136	Serbia		
Albania	218	Dominican Republic	178	Malaysia	312	Seychelles	148
Algeria	92	Ecuador	Maldives	206	Sierra Leone	150	
Andorra		Egypt	278	Mali	138	Singapore	320
Angola	94	El Salvador	180	Malta		Slovakia	262
Antigua and Barbuda		Equatorial Guinea		Marshall Islands		Slovenia	
Argentina	164	Eritrea	116	Mauritania	140	Solomon Islands	
Armenia	220	Estonia	236	Mauritius		Somalia	292
Australia	304	Ethiopia	118	Mexico	184	South Africa	
Austria	222	Fiji	310	Micronesia (Federated States of)		Spain	
Azerbaijan		Finland	238	Monaco		Sri Lanka	212
Bahamas	166	France**	240	Mongolia	314	Sudan	294
Bahrain**	274	Gabon	120	Morocco	286	Suriname	192
Bangladesh	198	Gambia	122	Mozambique	142	Swaziland	152
Barbados		Georgia		Myanmar	208	Sweden	
Belarus	224	Germany	242	Namibia		Switzerland	264
Belgium	226	Ghana	124	Nauru		Syrian Arab Republic**	296
Belize	168	Greece		Nepal	210	Tajikistan	
Benin	96	Grenada		Netherlands		Thailand	214
Bhutan	200	Guatemala		New Zealand		The former Yugoslav Republic of Macedonia	
Bolivia		Guinea	126	Nicaragua		Timor-Leste	
Bosnia and Herzegovina		Guinea-Bissau	128	Niger	144	Togo	154
Botswana**	98	Guyana		Nigeria	146	Tokelau*	
Brazil	170	Haiti		Niue		Tonga	322
Brunei Darussalam	306	Honduras	182	Norway	256	Trinidad and Tobago	
Bulgaria		Hungary	244	Oman	288	Tunisia	
Burkina Faso	100	Iceland	246	Pakistan		Turkey	266
Burundi	102	India	204	Palau		Turkmenistan	
Cambodia		Indonesia		Panama**	186	Tuvalu	
Cameroon	104	Iran (Islamic Republic of)	280	Papua New Guinea		Uganda	156
Canada**	172	Iraq		Paraguay	188	Ukraine	
Cape Verde		Ireland		Peru	190	United Arab Emirates	298
Central African Republic	106	Israel	248	Philippines	316	United Kingdom of Great Britain and Northern Ireland	268
Chad	108	Italy		Poland	258	United Republic of Tanzania	
Chile	174	Jamaica		Portugal		United States of America	
China	308	Jordan	282	Puerto Rico*		Uruguay	
Colombia		Kazakhstan		Qatar		Uzbekistan	
Comoros	110	Kenya	130	Republic of Korea	318	Vanuatu	
Congo	112	Kiribati		Republic of Moldova		Venezuela (Bolivarian Republic of)**	194
Cook Islands		Kuwait		Romania		Viet Nam	324
Costa Rica**	176	Kyrgyzstan		Russian Federation	260	Yemen	300
Côte d'Ivoire		Lao People's Democratic Republic		Rwanda		Zambia	160
Croatia	228	Latvia	250	Saint Kitts and Nevis		Zimbabwe	
Cuba		Lebanon	284	Saint Lucia			
Cyprus	230	Lesotho	132	Saint Vincent and the Grenadines			
Czech Republic	232	Liberia		Samoa			
Democratic People's Republic of Korea	202	Libyan Arab Jamahiriya		San Marino			
Democratic Republic of the Congo	114	Lithuania	252	Sao Tome and Principe			
Denmark	234	Luxembourg	254	Saudi Arabia**	290		
Djibouti	276	Madagascar	134	Senegal			

¹ List of Member States at the time of survey closure by mid-August 2006.

* WHO Associate Members

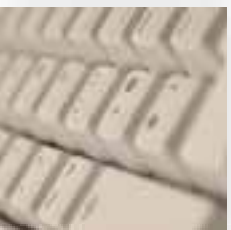
** WHO Member States not included in the analysis

Bold indicates survey respondents

BUILDING FOUNDATIONS for eHEALTH

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