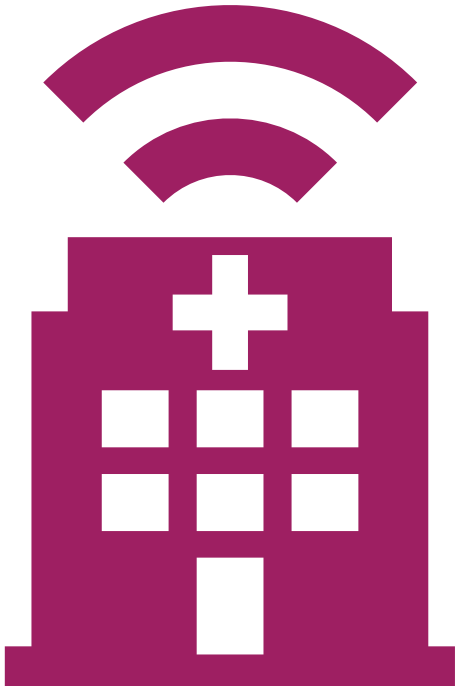


CONNET ALL
HEALTH CENTRES
AND HOSPITALS
WITH ICTs

Target 5: Connect all health centres and hospitals with ICTs[1]

Executive summary

In 2003, the World Summit on the Information Society (WSIS) brought together key players from around the globe to begin deliberations on how to bridge the digital divide that separates rich from poor countries. The ambitious mission included a target to connect health centres and hospitals. The health sector is recognised as information intensive; processing the vast volumes of data generated can no longer efficiently be done manually. Today, ICT is becoming central to the effective operation of health systems and services, although progress is uneven.

The first challenge to the measurement of Target 5 is the lack of globally accepted definitions for health system facilities, including hospitals and health centres. Facilities can vary within and between countries, thus making standardization of measurement difficult. Another important factor is that technology is in a constant state of development, therefore measurements made today may not be relevant in five years' time.

This chapter builds a picture of progress in health sector connectivity since 2003 by using the limited data available. Data from the ITU survey on the 2013 WSIS targets questionnaire (*Partnership*, 2013) show promising progress in connectivity trends for health centres and hospitals. Results show that almost 80 per cent of responding countries have connected 75–100 per cent of their hospitals. The connectivity figures are not quite as high for health centres, with 65 per cent of countries having connected 75–100 per cent. However, this is still an indication of good progress for those countries that responded. Patient information data are less conclusive.

This chapter explores alternative approaches to measuring Target 5, including the use of proxy data for the uptake of an online knowledge service providing scientific journals to health institutions (HINARI)[2] and the adoption of eHealth strategies by countries. The first approach is proposed as a reliable measurement of health facility connectivity as it is only available to health institutions with Internet access in developing countries. The data are collected by the World Health Organization (WHO) annually and show solid and linear growth over the period 2003–2013. The growth of the number of connected institutions has grown an impressive 600 per cent from an original baseline in 2003 of 792 connected institutions to 5 584 at the end of 2013. The monitoring of the adoption of eHealth strategies is proposed as another data source. An eHealth strategy can be a good indication of a government's view of the importance of eHealth and the role it will play in strengthening the health sector, including the building of connectivity. WHO actively supports the development of eHealth strategies in countries and reports on their adoption. The WHO Global Observatory for eHealth reports that the number of countries with eHealth strategies is showing a steady rise. In 2009, 55 countries indicated that they had eHealth strategies and in 2013 this number had grown to 85.

The limitations of relying on country connectivity data for measuring eHealth progress are highlighted. It is proposed that the eHealth domain is better understood through extending studies

to include surveys. WHO, through its Global Observatory for eHealth (GOe), conducts global and thematic eHealth surveys. The Organisation for Economic Co-operation and Development (OECD) is spearheading the use in countries of a model survey, particularly in the area of electronic health records.

WSIS +10 is a catalyst for all stakeholders to review progress in health sector connectivity since 2003 and to plan for the way forward. This chapter recognises the strengths and limitations of the current approach and makes two recommendations for future monitoring:

- data on connectivity for Target 5, as well as the measurement of growth in access to the world's medical knowledge, be provided by the WHO Global Observatory for eHealth (GOe) through an analysis of enhanced WHO HINARI programme records
- data on the development and implementation of national eHealth strategies and their content be reported for Target 5 by the GOe as an indicator of eHealth uptake in countries.

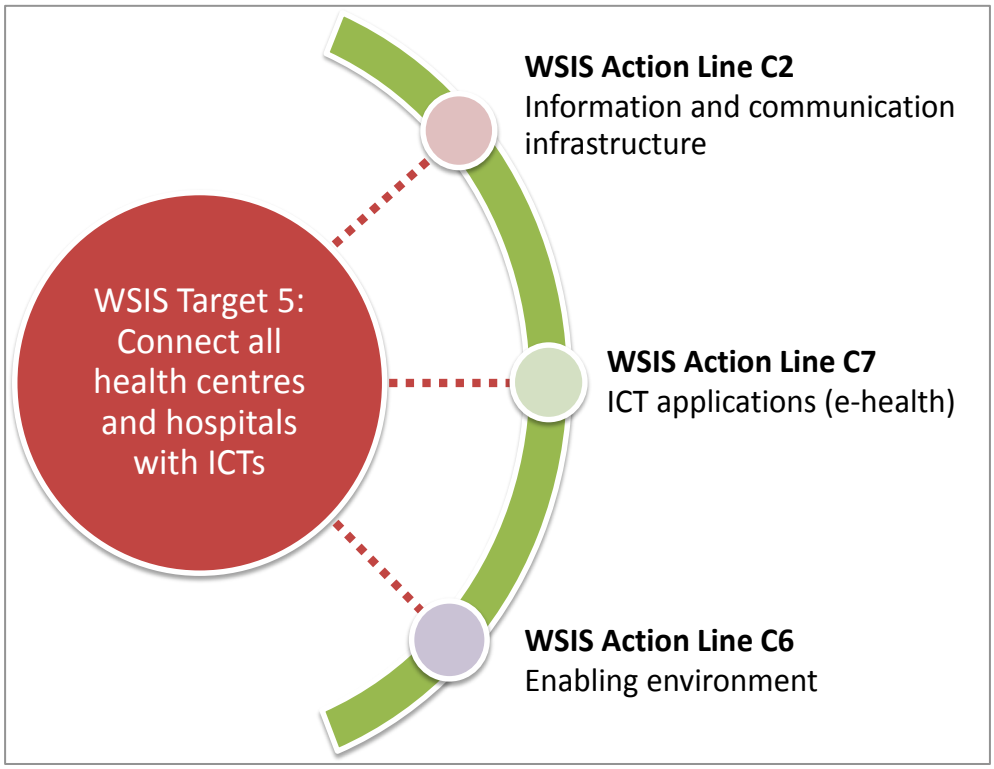
Introduction

The World Summit on the Information Society (WSIS) held in Geneva (2003) and Tunis (2005) brought together governments, civil society and the business sector to deliberate over how ICTs) could play a central role in the development of a global information society. Ten targets were identified in the Geneva *Plan of Action* (ITU, 2005). The ultimate goal of the WSIS targets is to connect citizens and the institutions that serve them, to provide the ICT infrastructure to deliver the tools and services of the information age. The purpose of Target 5, in particular, is to encourage governments to provide the necessary connectivity to all health centres and hospitals. Note that "all" was added to the 2011 WSIS statistical framework document (*Partnership*, 2011) to address the measurability issues around the target.

In the Geneva *Declaration of Principles*, the first WSIS phase, stakeholders shared a vision of ICT opportunities for all. ICT applications were identified as beneficial for the health sector through improving the efficiency of health-care services and the provision of health information to the general public. In the *Tunis Agenda for the Information Society*, the second WSIS phase, stakeholders aligned WSIS Target 5 to fit more closely with the UN Millennium Development Goals (MDGs), demonstrating their commitment to improving access to global health knowledge and telemedicine (ITU, 2005). It was recommended that Target 5 and MDG Goal 8F, which promotes public-private partnerships, be strategically aligned in order to facilitate access to the benefits of ICT for all.

Target 5 needs to be considered within the context of complementary WSIS action lines: C2 states that countries should provide and improve ICT connectivity, including for health institutions; C6 addresses the need for an enabling environment; and C7 highlights the benefits of ICT applications, including eHealth applications in all aspects of life (ITU, 2005). Figure 5.1 shows the relationships between Target 5 and the WSIS action lines.

Figure 5.1: Relevance of Target 5 to WSIS action lines

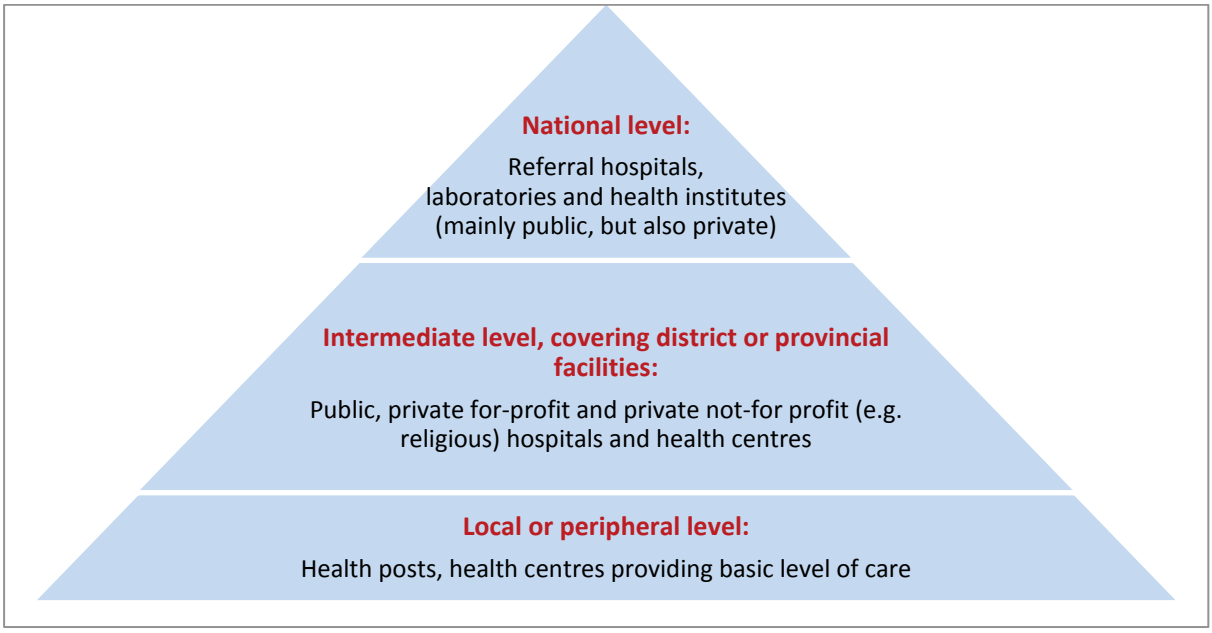


The World Health Organization (WHO) broadly defines eHealth as the "use of ICT for health" (WHO, 2009). The use of eHealth is an effective tool for supporting health-care service delivery and increasing health system efficiency. Public health services in countries are undergoing major transformation with the adoption of eHealth. Examples of some uses of eHealth include:

- **Telehealth:** The delivery of health care services where distance is a critical factor. This is done through the use of ICT for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers (WHO, 2008).
- **Mobile health (mHealth):** A medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs) and other wireless devices (WHO, 2011a).
- **Electronic Health Records (EHR):** Provider-centric electronic records used by healthcare professionals to store and manage patient health information and data, and include functionalities that directly support the care delivery process.
- **Decision-support systems (DSS):** The use of online information resources for clinical decision-making.
- **E-learning for health:** The use of ICT for educating and training health-care professionals and students.
- **E-journals:** The use of ICT to create and store electronic journals for widespread distribution across the Internet or through CDs/DVDs if online connectivity is unavailable.

A fundamental challenge to the measurement of Target 5 is the definition of health facilities. Hospitals and health centres need to be measured for connectivity; however, health systems and their facilities differ significantly within and between countries. There is currently no universal definition for health facilities. Another important factor is the lack of data concerning the total number of each type of facility (see Figure 5.2) by country. This makes estimating the degree of uptake of ICT connectivity by facility type a further challenge.

Figure 5.2: Types of health facilities by country administrative levels



Source: WHO/eHealth.

Figure 5.2 is a pyramid showing three geographic and administrative layers within most country healthcare systems including national, intermediate and local levels. At the national level, the health facilities usually include hospitals that provide tertiary care. This is health care provided by specialists after referral from primary or secondary care. These hospitals are generally public, although, some may be privately funded. Research institutes and diagnostic laboratories may also operate at the national level and sometimes at the intermediate level.

The intermediate level describes district or provincial services that offer health care through hospitals or health centres. Hospitals at this level generally offer secondary care or specialist care referred from a primary care centre. They can be public, private, or special hospitals founded by religious orders. The local level is where most people seek care first. It consists of primary health services in the local community, usually provided by a general practitioner or practice nurse. In rural areas, these services are often provided by health posts.

The pyramid shows the diversity and complexity of health systems and the numerous options for point of care where access to the Internet could be required. It illustrates that the number of health facilities is greatest at the local level, decreasing at the intermediate level and further at the national level.

Another aspect to consider regarding measurement is the technology itself. Technology, by its nature is in a state of constant evolution, therefore the measurement of one kind of ICT used for a specific function in one year may not be relevant in another year. The Organisation for Economic Co-operation and Development (OECD) proposes a practical way of dealing with this through its model survey approach. The OECD's model survey method is characterised by a series of discrete, self-contained modules that ensure flexibility and adaptability in rapidly changing environments. The approach focuses on developing indicators using a functionality-based method. Importantly, it supports technology-neutrality in that the questions neither require nor assume utilisation of a particular technology (OECD, 2010).

During the 2010 review of the WSIS targets, analysis of Target 5 highlighted that there were substantial efforts required in order to achieve the goals proposed by the WSIS stakeholders (ITU, 2010). Many countries were already in the process of introducing ICT in hospitals and health centres. However, as mentioned, there is no agreed international definition for the description, and therefore measurement, of 'health facilities'. The closest established indicator is the number of hospital beds per 10 000 population. This is published annually by WHO in the *World Statistics Database.*[3] Unfortunately, this indicator does not assist with the number and type of hospitals in a country.

In summary, the measurement of the number and type of healthcare facilities is problematic due to issues of definition as well as the difficulty in accessing accurate country records.

Availability of data and scope

ITU and the Partnership on Measuring ICT for Development sent out WSIS targets questionnaires in 2009 (ITU) and 2013 (*Partnership*) in an attempt to measure progress in achieving the WSIS targets, based on the following indicators identified in the 2011 WSIS statistical framework:

Indicator 5.1: Proportion of public hospitals with Internet access, by type of access

Indicator 5.2: Proportion of public health centres with Internet access, by type of access

Indicator 5.3: Level of use of computers and the Internet to manage individual patient information.

All three indicators present statistical challenges. In particular, for indicators 5.1 and 5.2, the definitions of public hospitals and public health centres, respectively, are unlikely to be comparable across countries. See *Partnership* (2011) for a more complete discussion of this issue.

The 2013 WSIS targets questionnaire was sent to 195 countries and 59 responded (30 per cent overall response rate). Of the responding countries, 33 (17 per cent) answered question 5.1, 23 (12 per cent) answered 5.2 and 13 (7 per cent) answered question 5.3. Regarding comparative data between the first and second surveys, there were insufficient numbers to make statistically valid comparisons (9 countries for 5.1, 4 for 5.2 and 3 for 5.3). However, general observations were made relating to 5.1.

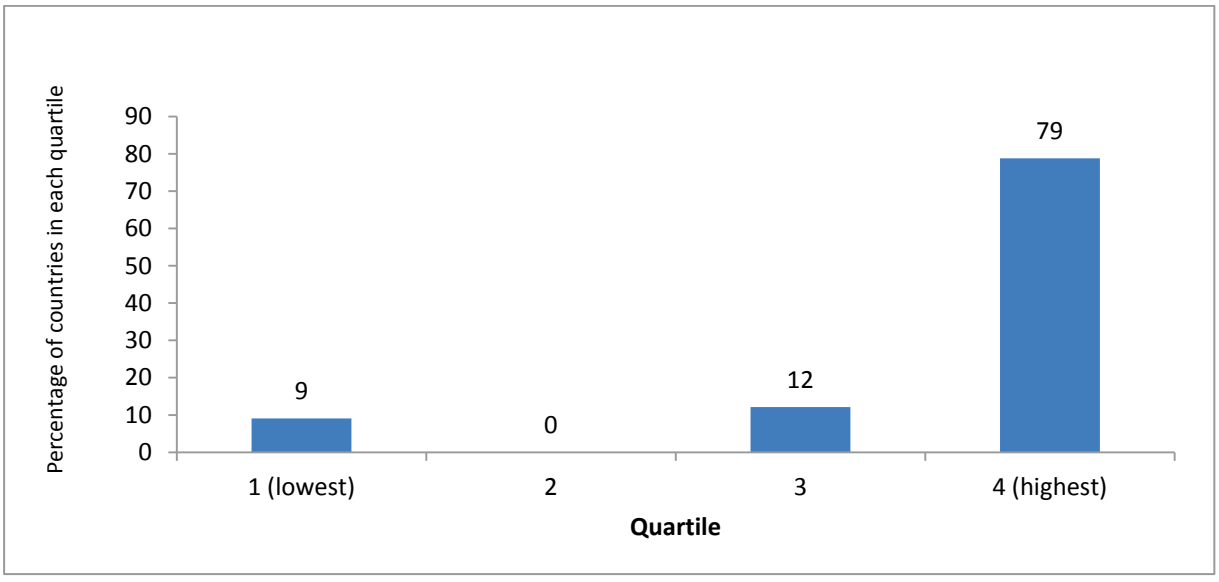
It should be noted that the WHO GOe does not compile indicators 5.1 to 5.3, nor does any other international organization.

Achievements against Target 5

Public hospitals Internet access

Chart 5.1 shows the breakdown of public hospital access to the Internet by responding countries. The percentage of hospitals with access was broken down into quartiles to facilitate analysis and visualization. Quartiles are as follows: 0–24 per cent of hospitals with Internet connectivity – quartile 1; 25–49 per cent – quartile 2; 50–74 per cent – quartile 3; 75–100 per cent – quartile 4. The question also asked countries to specify the type of Internet access, such as broadband, narrowband, mobile broadband etc. As only a few countries provided this information, without data to the contrary, it is assumed that the type of access is broadband. The chart shows that the majority of responding countries (79 per cent) have between 75–100 per cent of their public hospitals connected to the Internet. The figures are much lower for hospitals in the first and third quartiles, with only 9 per cent and 12 per cent of responding countries, respectively, offering Internet access.

Chart 5.1: Hospitals with Internet access, by quartile, 2013



Source: Partnership on Measuring ICT for Development WSIS Targets Questionnaire, 2013 (*Partnership*, 2013).

Table 5.1 shows public hospital connectivity data for individual countries between 2009/2010 and 2013. It shows that by the end of 2013, all public hospitals had Internet connectivity in two-thirds of responding countries. Growth patterns since the previous survey in 2009/2010 are not possible to ascertain as the sample size from the previous survey is too small. By individual country, there was particularly impressive growth in the examples of Georgia (from 20 to 100 per cent), Jordan (from 10 to 100 per cent) and Venezuela (from 2 to 73 per cent). The results from responding countries are encouraging, though it is not possible to determine whether this is a global trend. The sample is also possibly biased in that it may have attracted countries that had relatively positive results to report.

Table 5.1: Internet connectivity in public hospitals, by country

Country	2013 % of public hospitals connected to the Internet	2009/2010* % of public hospitals connected to the Internet
Azerbaijan	57	18*
Bhutan	100	
Bulgaria	65	
Burundi	0	
Colombia	100	
Congo	80	
Czech Republic	100	70
Denmark	100	
Dominican Republic	80	
El Salvador	100	
Estonia	100	
Finland	100	100
Georgia	100	20*
Iran, Islamic Rep.	100	
Japan	100	
Jordan	100	10*
Latvia	100	100*
Lebanon	100	
Lesotho	67	
Lithuania	100	100
Maldives	100	
Mexico	85	
Nauru	100	100*
Nigeria	10	
Portugal	100	98*
Spain	100	100*
Thailand	100	
Turkey	100	100*
United Arab Emirates	100	
Uruguay	100	
Venezuela, Bolivarian Republic of	73	2*
Viet Nam	98	
Yemen	24	

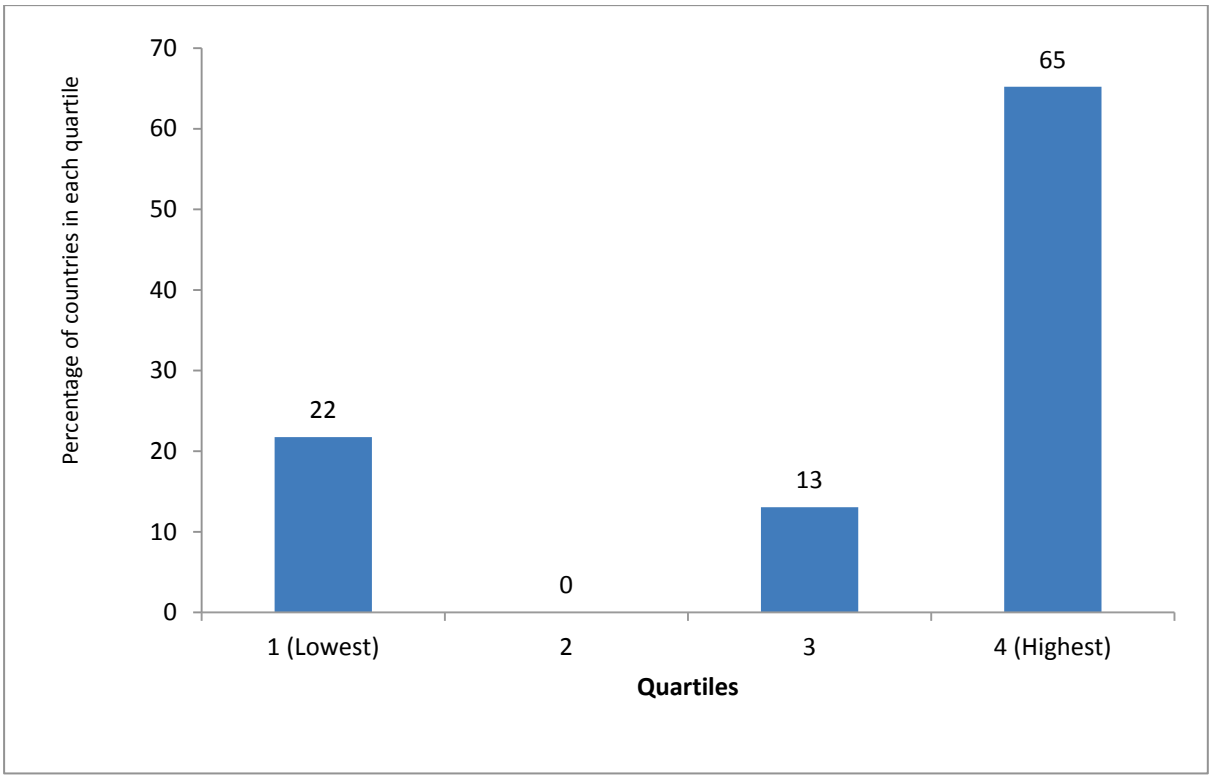
Source: Partnership on Measuring ICT for Development WSIS Targets Questionnaire, 2013.

Note: * represents 2010 data provided in the 2013 survey.

Health centres Internet access

Chart 5.2 shows the breakdown of public health centre access to the Internet by responding countries. As with Indicator 5.1, without data to the contrary it is assumed that the type of Internet access provided to health centres is broadband. The chart shows that the majority of responding countries (65 per cent) have between 75–100 per cent of their health centres connected to the Internet. The figures are much lower for health centres in the first and third quartiles, with only 22 per cent and 13 per cent of countries, respectively, offering Internet access.

Chart 5.2: Public health centres with Internet access, by quartile, 2013



Source: Partnership on Measuring ICT for Development WSIS Targets Questionnaire, 2013.

Table 5.2 shows that by the end of 2013, all public health centres had Internet connectivity in two-fifths of responding countries. Growth patterns since the previous survey in 2009/2010 are not possible to determine as the sample size from that survey is too small. Compared with hospital connectivity, there is a lower proportion of countries with all health centres connected. Additionally, in countries without universal coverage, the proportions tend to be lower than for hospitals. This is most probably due to operational differences between health centres and hospitals. Connecting hospitals is likely to be a higher priority for governments as there is generally a greater volume of data collection, processing and transmission in hospitals compared to health centres.

The results from responding countries are moderately encouraging but it is clear there is much work to be done before all public health centres are connected.

Table 5.2: Internet connectivity in public health centres, by country

Country	2013 % of health centres connected to the Internet	2009/2010 % of health centres connected to the Internet
Azerbaijan	100	100
Bhutan	8	
Bulgaria	35	
Congo	80	
Czech Republic	82	
Denmark	100	
Dominican Republic	68	
El Salvador	12	
Estonia	100	
Finland	100	
Georgia	100	
Iran, Islamic Rep.	90	
Jordan	70	
Lebanon	100	
Lesotho	1	
Lithuania	99	
Maldives	98	
Mexico	10	
Nauru	100	100
Thailand	100	
Turkey	100	
United Arab Emirates	58	
Venezuela, Bolivarian Republic of	20	1
Viet Nam	97	

Source: Partnership on Measuring ICT for Development WSIS Targets Questionnaire, 2013.

Use of computers and the Internet to manage individual patient information

Indicator 5.3 is level of use of computers and the Internet to manage individual patient information. Unfortunately, there are no existing data sources to adequately measure this indicator. The 2011 WSIS statistical framework suggested the use of data from Global Observatory for eHealth survey. However, there are no relevant data available from that source.

Alternative approaches to measurement of Target 5

Indicators 5.1, 5.2 and 5.3 pose several challenges that make their collection and reporting difficult. It is clear that there is an overall lack of global data on these indicators, primarily because neither governments nor international agencies are collecting and reporting on these indicators. Secondly, there are also major issues concerning indicator definitions as there are no commonly agreed upon definitions for these indicators. This is a particular problem for defining statistical units, 'public

hospitals' and 'public health centres' (see the 2011 WSIS statistical framework) for a fuller discussion). It is therefore suggested that other indicators be found which can reflect developments in connectivity as well as the uptake of eHealth by countries.

The following section discusses alternative approaches to measuring progress on Target 5. The monitoring of these indicators will be more achievable and the information gained likely to have broader value in the overall context of eHealth development in countries.

The proposed indicators are:

- the uptake of HINARI
- the adoption of eHealth strategies.

HINARI – connectivity driven by the need for content

A potential proxy indicator on connectivity of public sector health-related institutions is the uptake of an online knowledge service made available to health facilities in developing countries. This service is HINARI (Health InterNetwork Access to Research Initiative) and it can only be accessed if there is Internet connectivity within the institution. In collaboration with its publishing partners, WHO provides access to up to 13 000 online biomedical journals in hospitals, research institutions and health centres. HINARI is offered at no, or very low, cost depending on the country. Countries are assessed for eligibility based on four factors: total GNI (World Bank figures), GNI per capita (World Bank figures), United Nations least developed country (LDC) status and the Human Development Index (HDI).[4]

To gain access to HINARI, institutions must complete a subscription form and, if required, pay the annual fee. The subscription form does not ask the institution to specify whether it is a hospital, health centre or research institution, so analysis by these categories is currently not possible. It also does not ask the institution whether it has narrowband or broadband access.

The number of HINARI institutions in a country is a direct reflection of the number of health-related institutions with access to the service and therefore with Internet connectivity. It follows that an indicator based on HINARI would provide reliable information on country level connectivity.

More specifically, HINARI data could be used as a data source for indicators 5.1 and 5.2 if:

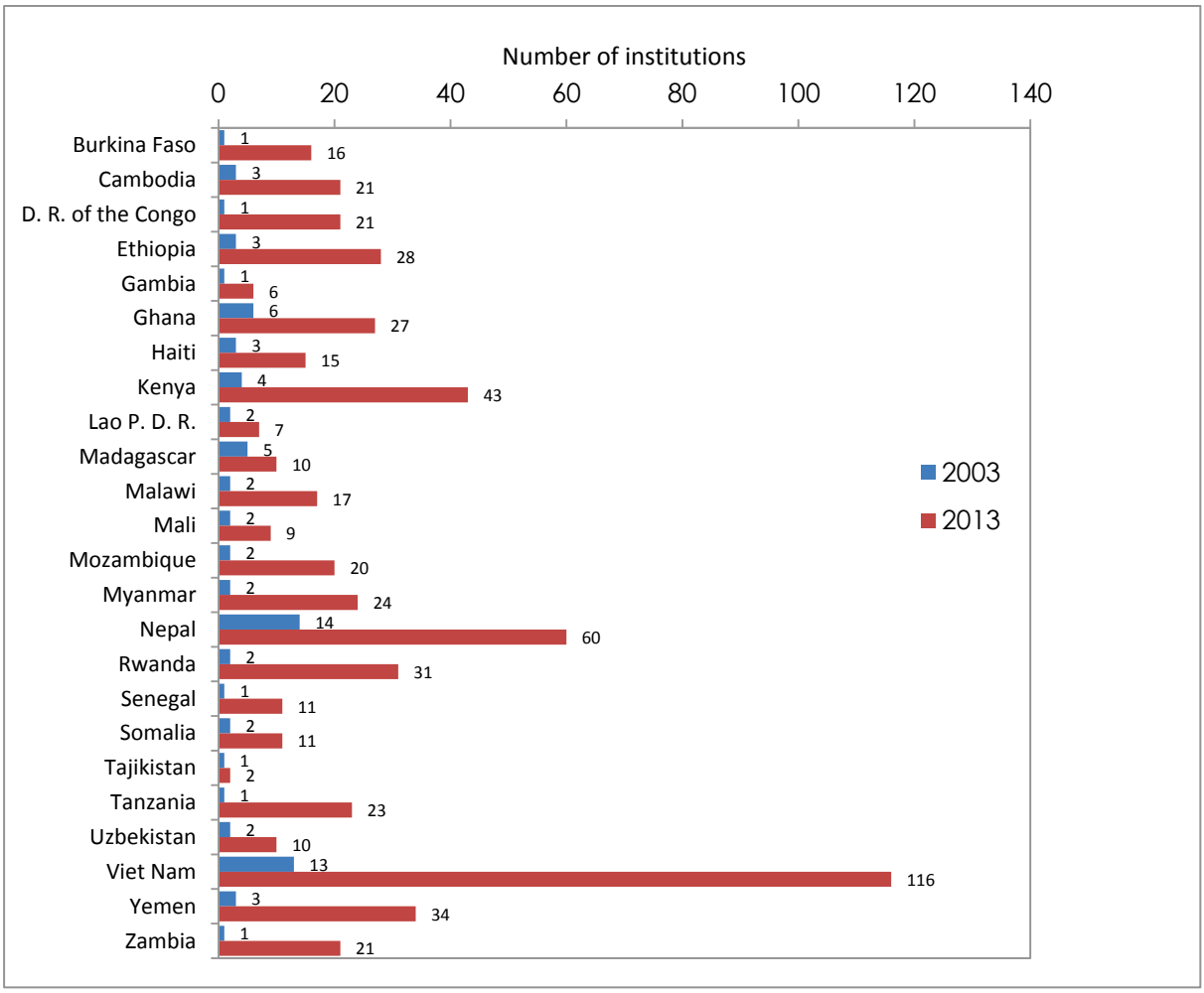
- data were split by type of institution and
- supplementary data on the number of public hospitals and health centres in countries were available.

In this case, the percentage of connected institutions, by type, could be calculated for countries participating in HINARI.

Access to HINARI would be only one of the Internet-based services that hospitals and other health-related institutions would use. Other benefits from Internet access would include communication by health professionals via e-mail as well as the possibility of using electronic health records (EHR) if available. Once connected to the Internet, hospitals could consider offering *Telehealth* services to isolated patients.

Chart 5.3 shows growth in the number of connected health-related institutions[5] in low-income countries from 2003 to 2013. Some countries show more growth than others, with particularly strong growth in Kenya, Nepal and Viet Nam.

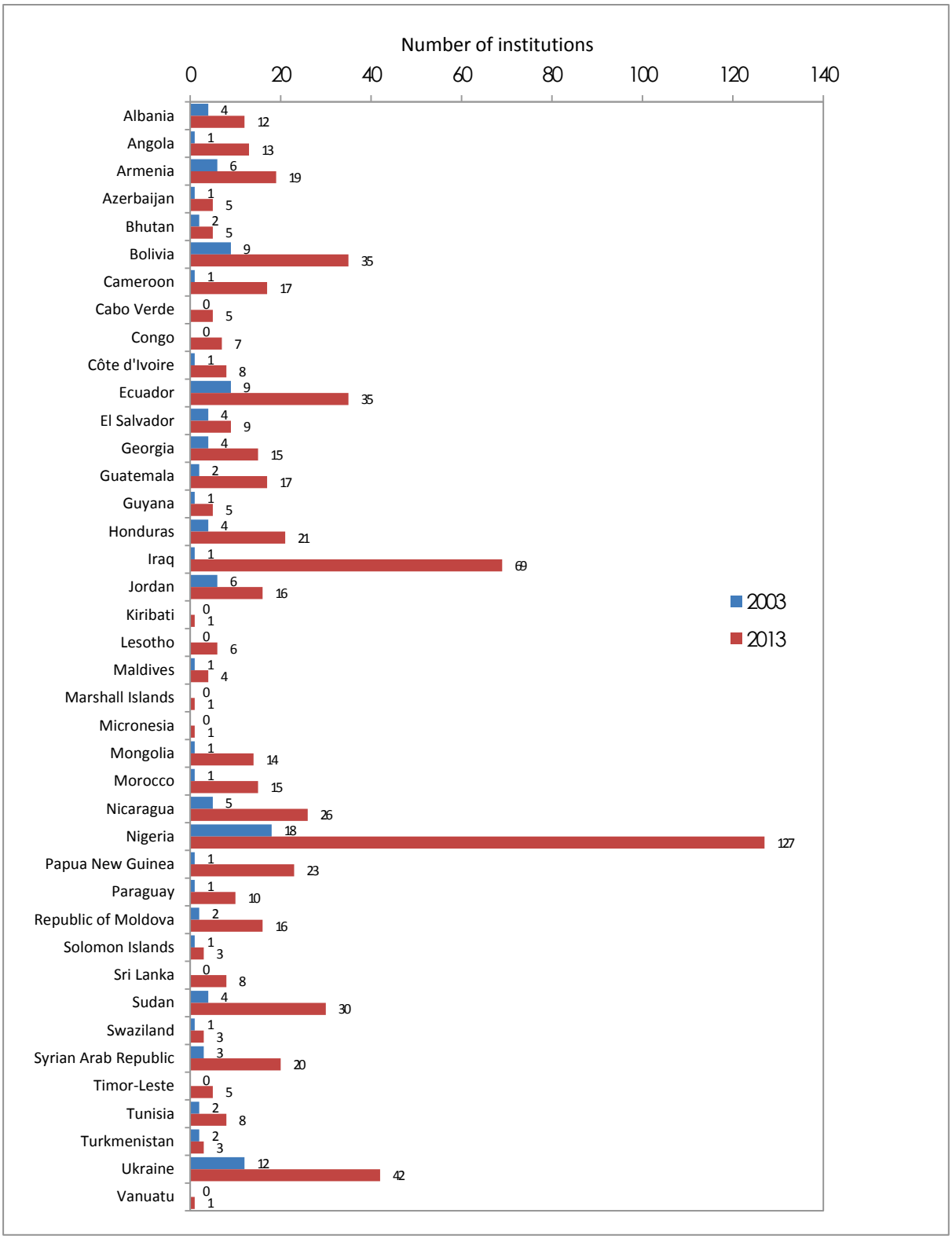
Chart 5.3: Health-related institutions, access to HINARI, low income countries



Source: HINARI project files, 2014.

Chart 5.4 shows that many low to middle income countries display substantial growth in the number of HINARI institutions. Of particular note is the growth in countries such as Bolivia, Ecuador, Iraq, Nigeria and Ukraine.

Chart 5.4: Health-related institutions, access to HINARI, low–middle income countries

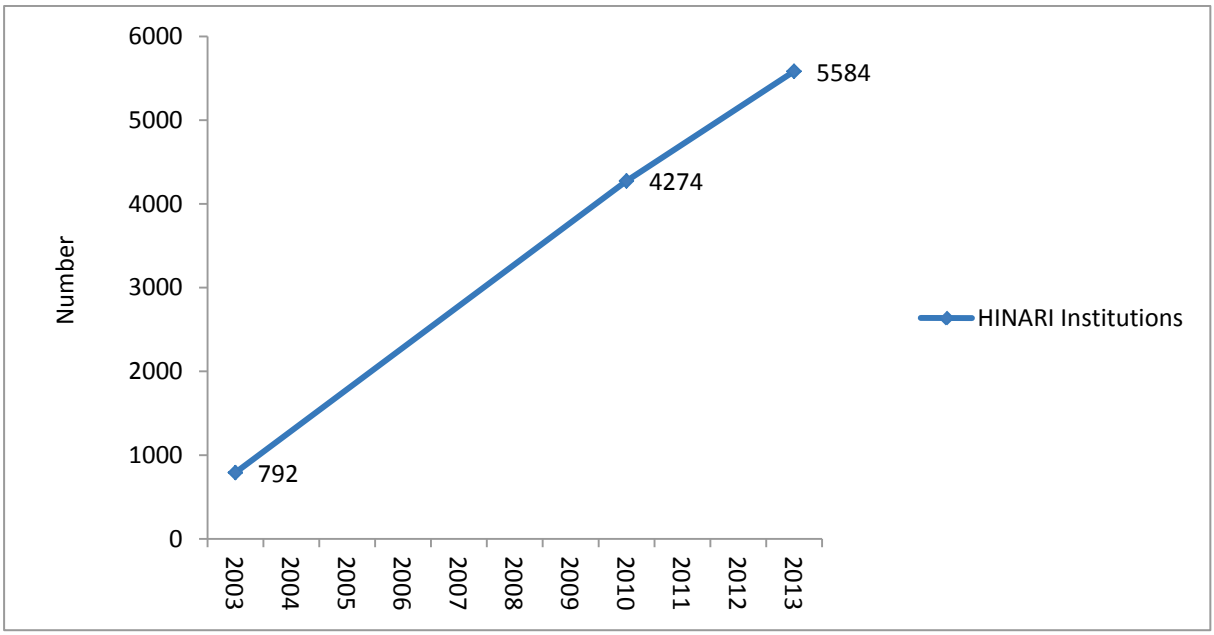


Source: HINARI project files, 2014.

Note: The country of Sudan split in 2011.

Chart 5.5 shows the strong growth in the number of HINARI institutions, from an original baseline in 2003 of 792 connected institutions. By 2010, the number had increased by 440 per cent to 4 274. At the end of 2013, the number of institutions reached 5 584, representing growth of over 600 per cent from 2003.

Chart 5.5: Growth in number of HINARI institutions, 2003–2013



Source: HINARI project files, 2014

Adoption of eHealth strategies

A current priority area for WHO, based on the expressed needs of many member states, is to offer support for the development of national eHealth strategies. The strategic introduction of ICT to support the health sector is complex and requires both careful planning and multi-sectoral collaboration. An effective eHealth strategy should present the strategic context for the introduction of eHealth and the eHealth components required to meet national eHealth objectives. Central to developing a sound eHealth strategy is the recognition that eHealth represents a collaborative effort between the health, information technology and telecommunications sectors, as well as requiring active involvement from both the public and private sectors.

The existence of an eHealth strategy can be a good indication that a national government recognises the significance and role that eHealth can play in the health sector. The proposed indicator for this measure is the percentage of countries with an eHealth strategy, with the target being 100 per cent of countries by 2020. This is currently one of the main indicators used by WHO to assess the extent of its work with member states in the eHealth domain.

The WHO Global Observatory for eHealth closely monitors the development and adoption of eHealth strategies by countries. A dedicated directory has been created on the Observatory's website[6] to list countries with national eHealth strategies, as well as making available the details of the strategy. The baseline for the number of national strategies in 2009 was 55; this had grown to 85 by the end of 2013 and represents growth from 28 per cent to 44 per cent of all WHO member states. However, the result shows that much remains to be done before all member states have an eHealth strategy to guide their eHealth implementation.

However, the existence of a strategy is not enough to make a broad assessment as to the state of eHealth in countries. Other factors should also be considered, such as the extent of its implementation and the scope of eHealth solutions proposed.

WHO is working with ITU to support countries in the development of eHealth strategies. For the first time, member states have access to a comprehensive and expert guide, the *National eHealth Strategy Toolkit* (WHO and ITU, 2012) as well as intensive training workshops for stakeholders. A national eHealth strategy supports the achievement of Target 5 through:

- planning for government funding and policy support for funding connectivity in healthcare facilities
- creating an enabling environment to support connectivity and eHealth approaches
- the collaboration of ministries of health, communications and finance for eHealth governance and strategic planning
- providing funding for its sustainability.

Extending our understanding of eHealth

In the previous section, two alternative methods were proposed for measuring progress in Target 5. This section explores the use of other relevant indicators to provide a more comprehensive overview of the uptake of eHealth in countries. All of these sources are complementary in that they study the use of ICT for health but in different ways. Together they give a richer view of the status of eHealth in countries.

Sources include:

- thematic surveys – topic specific and targeting a subset of member states
- comprehensive and high-level global surveys – covering key eHealth themes and targeted at all member states
- model surveys – flexible in design and approach.

Innovation and eHealth for women's and children's health

This is a good example of the use of a thematic survey concerning the application of eHealth for women's and children's health in developing countries. The 75 countries targeted were identified by the UN Commission on Information and Accountability for Women's and Children's Health.[7] The respondents were specialists in women's and children's health and ICT. In mid-2013, GOe conducted a survey of countries with the greatest need and least available resources (WHO, 2011) to establish a baseline for the use of ICT to support the health of women and children. Sixty-four countries responded, a response rate of 85 per cent, reflecting strong country interest. The survey investigated areas such as the use of ICT in health monitoring and surveillance, registration of vital events, monitoring indicators and electronic health information systems.

The results are reported in a joint WHO–ITU publication, *Innovation and eHealth for women's and children's health* (WHO, 2014) It shows the vital role played by ICT in helping achieve the MDGs and how innovations in eHealth are saving the lives of women and their children in some of the most vulnerable populations around the world.

Box 5.1: Use of ICT for women's and children's health – CoIA recommendations and key findings

Coordinated inter-sectoral planning: Well-coordinated inter-sectoral planning is fundamental to limiting the proliferation of pilot projects, recognizing the role of standards and interoperability, and building capacity of the health workforce.

- Recommendation: Ministries of health and their partner organizations should foster inter-sectoral collaboration in planning and implementing eHealth services and information systems.

Moving to electronic data collection: The current situation in most countries is a blend of paper and electronic systems. Moving to electronic formats is intended to improve reliability, accuracy, timeliness, cost-effectiveness and reporting.

- Recommendation: Coordinate the collection of indicators via electronic means as part of an integrated plan for implementing eHealth services for women's and children's health.
- Recommendation: Support the adoption of district web-based reporting initiatives with the goal of integrating health information systems for reproductive, maternal, newborn and child health (RMNC).
- Recommendation: Identify and adopt ICT-enabled RMNCH resource tracking systems in alignment with other public expenditure information management systems.

eHealth strategy: Most countries reported having a women's and children's health policy or strategy referring to eHealth, and a far lesser number refer to eHealth within their RMNCH strategies. These two policies should be complementary.

- Recommendation: RMNCH policies need to recognize the importance of eHealth to support their goals, and concurrently, national eHealth strategies should promote the use of eHealth for RMNCH.

eHealth initiatives knowledge base: A global inventory of eHealth initiatives (including mHealth and social media) is a valuable planning resource for countries to learn from each other's experiences.

- Recommendation: To promote knowledge sharing, countries are encouraged to regularly contribute their eHealth initiatives to the WHO global eHealth database.

Electronic RMNCH content: As Internet connectivity and services become more established, so do the opportunities for improving access to information for citizens and health-care professionals. Simultaneously, the use of social media, the development of websites providing RMNCH information, or decision support systems for health-care professionals are all contributing to eHealth services being provided.

- Recommendation: Improve the quality and scope of electronic RMNCH information for both citizens and health-care professionals for delivery in available and appropriate e-formats.

Enabling eHealth programmes

ICT training: The fundamental challenge of building human capacity for health is clear. While those with training may now have the skills to learn online, many professionals still do not know how to acquire the ICT capabilities they need to access knowledge and training online.

- Recommendation: Enable online learning for health-care professionals using affordable ICT solutions and training approaches appropriate to the local context.

Privacy: Governance and policy at the national level must strive to find the right balance between measures to safeguard privacy, confidentiality and security while enabling the management of data sources to support research and decision-making.

- Recommendation: National information policy should address the privacy and accountability implications of using eHealth, including in the provision of RMNCH services.

Source: WHO (2014) Global Observatory for eHealth, Innovation and eHealth for women's and children's health.

Global eHealth surveys

Global eHealth surveys are conducted periodically by the WHO GOe. The first two surveys in 2005 and 2009/2010 established baseline figures. The third survey will be conducted during 2014 and will focus on the role of eHealth in member states' efforts towards universal health coverage. The aim of universal health coverage is for all people to receive quality health services that meet their needs,

without exposing them to financial hardship. The survey will explore how the following thematic areas can contribute to the goal of universal health coverage:

- uptake of eHealth foundation policies and strategies
- deployment of mHealth initiatives in countries
- application of telehealth solutions
- adoption of e-earning for health professionals and students
- legal and ethical frameworks for electronic patient information
- legislation and initiatives concerning online child safety, Internet pharmacies and health information on the Internet
- governance and organization of eHealth in countries.

The strength of global surveys is that they provide data from a large number of countries with varying economic situations and health priorities, thereby providing a comprehensive picture of the eHealth landscape. However, a disadvantage is that they are normally carried out at the national level and therefore only provide national data.

The OECD model survey

Model surveys offer flexibility while maintaining comparability. The OECD model survey functionality approach has been endorsed by the European Commission (EC) and WHO. One of the prime challenges of a model survey is to ensure that the terminology has comparable meaning across countries. This means that when changes to questions are made by individual countries, they are done in ways that maintain comparability. For example, for many countries, the terms electronic medical record (EMR) and electronic health record (EHR) have different meanings. These differences in interpretation and approaches across countries impede meaningful benchmarking. To avoid such issues, OECD has chosen to focus on developing a model survey using indicators that reflect functionality.

The model survey uses three broad categories of contextual indicators including:

- availability and use of electronic records and health information exchange
- availability and use of functionalities that support patient engagement with electronic records
- availability and use of telecommunications technologies to support health care delivery.

Importantly, this approach also supports technology-neutrality which means the questions neither require nor assume a particular technology. This is forward-looking in that it does not hinder the future use, or development, of technologies. The OECD approach was adopted by the European Commission in 2013 to benchmark deployment of eHealth among general practitioners in the European Union (EU) and more recently by Brazil.[8] The Working Group on ICT measurement of the Statistical Conference of the Americas, coordinated by the National Statistics Office of the Dominican Republic and Economic Commission for Latin America and the Caribbean is adapting the OECD model survey for use in Latin America.

Sample of international data sources

The number of international agencies currently contributing data to the pool of eHealth knowledge is limited and includes those shown in Table 5.3. What is clear from the table is that the nature and scope of data collected by these organizations is a distinct reflection of their mandates. The GOe of

the World Health Organization, established in 2005, is the only observatory to specialise in the collection and analysis of data on trends and developments in eHealth worldwide.[9] The OECD collects selected health and ICT-related data; however, coverage is primarily of OECD member countries, with the exception of a few observer countries (Argentina, Brazil, China, Egypt and South Africa). The Health care Information and Management Systems Society (HIMSS) is a global not-for-profit organization that focuses on achieving better health through use of information technology. It is well established in North America and is now expanding in Europe, Asia and the Middle East.[10]

Table 5.3: Sample of international sources of ICT and health data

Key areas studied and indicators	Strengths	Limitations
World Health Organization, Global Observatory for eHealth (GOe)		
• global survey data on eHealth from over 110 countries every 4 years • data on the uptake of eHealth technologies and related policies	• all 194 WHO member states are invited to participate • data focusing on the adoption of eHealth policies and other supporting actions that provide an enabling environment for growth of eHealth in countries • eHealth country profiles for all participating WHO member states • data collected on a regular basis • special theme surveys conducted in addition to global surveys	• data collected at national level therefore information at regional or local level not available • survey results based on self-reporting by eHealth experts in country • expert informants often change from survey to survey
Organisation for Economic Co-operation and Development (OECD)		
• data on ICT and health at the country level • literature reviews and case studies of ICTs for health in OECD countries	• data available for the 34 OECD countries and now working with most BRIC countries • a range of ICT indicators as well as health-system indicators for OECD countries • case studies on eHealth in OECD countries	• selective data on ICT and health
Health care Information and Management Systems Society (HIMSS)		
• detailed information on ICT usage at the health-facility level, including the type of network connection and service provider, for over 5 100 hospitals and 32 000 medical facilities in the US and Canada • now expanding operations to Europe, Asia and Middle East • EMR adoption model – scores hospitals based on their level of EMR adoption • hospital benchmark reports	• continuously updated data based on annual survey of health facilities • established data quality assurance procedures, HIMSS peer-reviewed research analysis	• data available for health facilities in the US and Canada, although coverage spreading

Source: WHO/eHealth.

Conclusions and recommendations

The results for Indicator 5.1 show that by the end of 2013 all public hospitals had Internet connectivity in two-thirds of responding countries. This is a good indication that solid progress is being made in those countries. Results for Indicator 5.2 show that there has been less progress in

health centre connectivity; by the end of 2013, all public health centres had Internet connectivity in two-fifths of responding countries. HINARI data provide reliable information on the number of connected health-related institutions in low and low-middle income countries. In the ten years, 2003 to 2013, the number of connected institutions across all HINARI countries grew significantly, from 792 to 5 584. No results are shown for Indicator 5.3 as there were insufficient data for a meaningful analysis.

Measurement of progress against Target 5 has significant challenges due to the overall lack of systematically collected data. The *Partnership* surveys are currently the sole source of data for all three indicators. The WSIS + 10 review provides an ideal opportunity to reassess the existing WSIS targets and review what is being measured, by whom and for what purpose. This chapter has shown that the extent of connectivity of hospitals and health centres to the Internet is difficult to measure globally. Although having this data would indeed be useful for planning and funding purposes, there is more value in trying to understand how eHealth systems are emerging, what they do, and how they are transforming health care delivery. The Global Observatory for eHealth, through its periodic global surveys, attempts to study the uptake of eHealth based on quantitative and qualitative descriptions of eHealth systems and services, as well as important enabling factors such as the policy and legal environments. It is proposed that Target 5 connectivity indicators be revised with the aim of making the data more applicable in the broader global context of eHealth.

Country connectivity data broken down by hospitals and health centres is challenging for any agency to collect. However, similar data collected by the WHO HINARI programme is more readily available and could be collected and reported at regular intervals. Not only does it provide a reliable indication concerning connectivity of health facilities, but it also allows for reporting in another important WSIS area – enabling access to the world's medical knowledge. Data collected through HINARI could be enhanced by asking subscribing institutions additional questions, such as type of institution and level of connectivity. This information could be used in conjunction with data on the number of public hospitals/health centres in countries to derive data for indicators 5.1 and 5.2 for those countries participating in HINARI.

It is recommended that from 2015, data on connectivity for Target 5, as well as the measurement of growth in access to the world's medical knowledge, be provided through an analysis of enhanced WHO HINARI programme records. The target will be set to 100 per cent of countries to provide Internet connectivity to health facilities by 2020.

As part of its vision, WSIS recognises the vital importance for countries to develop and implement eHealth strategies that support the strategic use of ICT within the health sector. The existence of a national eHealth strategy that has been implemented is a good indicator of progress in the uptake of eHealth in countries. WHO considers this a priority area for its activities and is currently working with ITU to ensure that member states are given guidance and support in developing their national eHealth strategies.

WHO, through the GOe surveys, will continue to monitor and report on the progress of member states in the development and implementation of eHealth strategies. In addition to data already collected, it is proposed that the scope of the policy content be recorded so as to provide a more complete description of the trends in eHealth development.

It is recommended that from 2015, data on the development and implementation of national eHealth strategies and their content be reported for Target 5 as an indicator of eHealth uptake in

countries. The target for the proposed indicator is to have 100 per cent of countries with an eHealth strategy by 2020.

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Endnotes

[1] The original WSIS indicator was worded slightly differently "Connect health centres and hospitals with ICTs".

[2] Health InterNetwork Access to Research Initiative, http://www.who.int/hinari/en/.

[3] WHO (2013) World Statistics Database, 2013, http://www.who.int/gho/publications/world_health_statistics/en/.

[4] WHO HINARI access to research in health programme, 2014, http://www.who.int/hinari/en/.

[5] Although some health-related research institutions are included in the programme, the prime targets are health care institutions.

[6] See GOe website, www.who.int/goe.

[7] WHO (2012) Accountability for Women's and Children's Health, http://www.who.int/woman_child_accountability/countries/en/.

[8] Cristiano Codagnone & Francisco Lupiañez-Villanueva (2013) Benchmarking deployment of ehealth among general practitioners. European Commission DG Communications Network, http://www.nic.br/imprensa/.

[9] WHO Global Observatory for eHealth, www.who.int/goe.

[10] Health care Information and Management Systems Society, http://www.himss.org/.

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