

# eHealth and innovation in women's and children's health: A baseline review

Based on the findings of the 2013 survey of CoIA countries by the WHO Global Observatory for eHealth



## WHO Library Cataloguing-in-Publication Data

eHealth and innovation in women's and children's health: a baseline review: based on the findings of the 2013 survey of CoLA countries by the WHO Global Observatory for eHealth, March 2014.

1.Telemedicine - trends. 2.Women's Health. 3.Children Welfare. 4.Maternal Welfare. 5.Medical Informatics - trends. 6.Health Surveys. I.World Health Organization.

ISBN 978 92 4 156472 4 (WHO)

(NLM classification: W 26.5)

ISBN 978 92 61 14671 9 (ITU)

## © World Health Organization and International Telecommunication Union 2014

All rights reserved. Publications of the World Health Organization are available on the WHO website ([www.who.int](http://www.who.int)) or can be purchased from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: [bookorders@who.int](mailto:bookorders@who.int)). Requests for permission to reproduce or translate WHO publications –whether for sale or for non-commercial distribution– should be addressed to WHO Press through the WHO website ([www.who.int/about/licensing/copyright\\_form/en/index.html](http://www.who.int/about/licensing/copyright_form/en/index.html)).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization or the International Telecommunication Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization or the International Telecommunication Union in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization and the International Telecommunication Union to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization or the International Telecommunication Union be liable for damages arising from its use.

Photocredits: Cover (left to right): ©AJ Cotton | Dreamstime, ©Pinky Patel | Photoshare, ©WHO, ©David Alexander | Photoshare. Page 6: ©WHO, ©Kornwa | Dreamstime, ©Urvish Joshi | Photoshare. Page 24: ©Teck Yong Lam | iStock, ©Trifan-Pop Calin | iStock, ©Djembe | Dreamstime. Page 51: ©Josh Nesbit | Photoshare. Page 53: © Lawrence Ko | Photoshare. Page 56: ©Josemaria Toscano | Dreamstime, ©Embe2006 | Dreamstime, ©Megan Bedford | Dreamstime. Page 63: ©Vishal Shah | shutterstock. Page 71: ©Melissa May | Photoshare. Page 76: ©Caitlin Cohen | Photoshare, ©Kheng ho Toh | Hemera, ©WHO. Page 80: © A J Cotton | Dreamstime, © Bowie15 | Dreamstime, © 2012 Diana Mrazikova/ Networks/ Senegal | Photoshare. Page 146: © Filmfoto | Dreamstime, ©WHO.

Printed in Geneva, Switzerland

# eHealth and innovation in women's and children's health: A baseline review

Based on the findings of the 2013 survey of CoIA countries by the WHO Global Observatory for eHealth

March 2014

# TABLE OF CONTENTS

ACRONYMS	1
ACKNOWLEDGEMENTS	2
FOREWORD	3
EXECUTIVE SUMMARY	4
PART 1: HOW THE USE OF ICT IS HELPING IMPLEMENT COIA RECOMMENDATIONS	6
FINDINGS ON RECOMMENDATION 1 : Health monitoring and surveillance	11
FINDINGS ON RECOMMENDATION 1 : Systems for the registration of vital events	13
FINDINGS ON RECOMMENDATION 2 : Systems for monitoring RMNCH indicators	15
FINDINGS ON RECOMMENDATION 3 : National electronic health information systems	20
FINDINGS ON RECOMMENDATION 4 : Status of resource tracking systems	21
PART 2: ADVANCES IN THE DEVELOPMENT OF NATIONAL EHEALTH STRATEGIES AND PROGRAMMES SUPPORTING WOMEN'S AND CHILDREN'S HEALTH	24
National eHealth strategies	27
eHealth for women and children	30
Types of eHealth initiatives supporting women's and children's health	32
Providing access to information for citizens and health-care professionals	36
Enabling eHealth programmes	40
Training	40
Online safety for children	43
Privacy	45
Addressing the challenges of implementing eHealth services	49
CONCLUSIONS AND RECOMMENDATIONS	51
REFERENCES	53

ANNEX 1: CASE STUDIES	56
Case study one - Programme Mwana: Text messaging accelerates early infant HIV diagnosis in rural Zambia	57
Case study two - Aarogyam: Leveraging ICT tools to achieve maternal and child health goals	63
Case study three - Text messaging-based alert system helps improve maternal and child health in Rwanda	71
ANNEX 2: SURVEY METHODS	76
ANNEX 3: COUNTRY INSIGHTS	80
ANNEX 4: SUMMARY OF SURVEY RESPONSES	148

## Table of figures

<b>Figure 1:</b> Adoption of ICT in health surveillance and monitoring eHealth initiatives, responding CoIA countries, by type of initiative (%)	11
<b>Figure 2:</b> Adoption of ICT for monitoring and surveillance and status, responding CoIA countries (%)	11
<b>Figure 3:</b> Countries' use of electronic information systems to record vital events	13
<b>Figure 4:</b> Year the electronic information system was introduced in responding countries	13
<b>Figure 5:</b> Availability of at least one electronic information system to collect and report health data at the district level, responding CoIA countries	20
<b>Figure 6:</b> Availability of resource tracking system to report total health expenditure, by finance source, per capita	21
<b>Figure 7:</b> Type of total health expenditure tracking system used	22
<b>Figure 8:</b> Availability of resource tracking system to report total RMNCH expenditure by finance source, per capita	22
<b>Figure 9:</b> Type of RMNCH resource tracking system used	22
<b>Figure 10:</b> Strategy for Women's and Children's Health	26
<b>Figure 11:</b> Strategy for Women's and Children's Health mentions use of eHealth, mHealth or social media	26
<b>Figure 12:</b> National eHealth Policy or Strategy	27
<b>Figure 13:</b> Year of adoption of eHealth Strategy by CoIA countries	28
<b>Figure 14:</b> Implementation status of eHealth policies and strategies	28
<b>Figure 15:</b> Reference to women's and children's health within National eHealth Strategy	30
<b>Figure 16:</b> Women's and children's health initiatives supported by eHealth	30
<b>Figure 17:</b> Adoption of eHealth initiatives among responding CoIA countries, by type of initiative (%)	33
<b>Figure 18:</b> Adoption of eHealth initiatives and their stages, responding CoIA countries (%)	34
<b>Figure 19:</b> Types of eHealth initiatives and their stages, responding CoIA countries from the WHO African region (%)	34
<b>Figure 20:</b> Types of eHealth initiatives and their stages, responding CoIA countries from all other WHO regions (%)	34
<b>Figure 21:</b> Percentage of CoIA countries using social media to promote women and children's health programmes	36
<b>Figure 22:</b> Country production of web sites dedicated to issues concerning women's and children's health	37

<b>Figure 23:</b> Publishing of country data on women's and children's health . . . . .	37
<b>Figure 24:</b> Adoption of eHealth initiatives to provide health-care professionals access to information, responding CoIA countries, by type of initiative (%) . . . . .	37
<b>Figure 25:</b> Adoption of eHealth initiatives and their stages, responding CoIA countries (%) . . . . .	38
<b>Figure 26:</b> Percentage of individuals using the Internet, CoIA countries (2011) . . . . .	39
<b>Figure 27:</b> ICT training offered in tertiary institutions for students of Health Sciences . . . . .	41
<b>Figure 28:</b> Continuing education in ICT for health professionals . . . . .	41
<b>Figure 29:</b> Government Initiatives on internet safety and literacy . . . . .	43
<b>Figure 30:</b> Government initiatives on Internet safety and literacy, aimed specifically to protect children . . . . .	43
<b>Figure 31:</b> Law requires safety technologies to be applied to protect children's use of Internet in public places . . . . .	44
<b>Figure 32:</b> Internet Service Providers legally mandated to provide online safety technologies to protect children . . . . .	44
<b>Figure 33:</b> CoIA countries with legislation that protects the privacy of personally identifiable data . . . . .	45
<b>Figure 34:</b> CoIA countries with legislation that protects the privacy of health-related data held in digitized format in an EHR or EMR . . . . .	46
<b>Figure 35:</b> Countries requiring explicit parental consent to create a child's EHR or EMR . . . . .	46
<b>Figure 36:</b> Countries allowing parental access to and right to correct errors found in a child's EHR or EMR . . . . .	46
<b>Figure 37:</b> Countries have legislation that grants children the right to control their individual EHR or EMR . . . . .	47
<b>Figure 38:</b> Countries with legislation that enables sharing health-related data between national health-care entities through electronic records. . . . .	47
<b>Figure 39:</b> Countries with legislation that enables sharing health-related data with national health-care entities in other countries through electronic records . . . . .	47
<b>Figure 40:</b> Barriers to the implementation of eHealth services, responding CoIA countries (%). . . . .	49
<b>Figure 42:</b> Mwana's implementation results shown at the province level . . . . .	58
<b>Figure 43:</b> Impact of Results160 in Zambia (as of 2011). . . . .	60
<b>Figure 44:</b> Results160's impact in the Luapula Province (2011). . . . .	61
<b>Figure 45:</b> Consistent reduction in the IMR and NMR and increase in child immunization coverage figures between 2008 and 2011 in Amroha . . . . .	67
<b>Figure 46:</b> Increase in child immunization coverage figures between 2008 and 2011 in Amroha . . . . .	68
<b>Figure 47:</b> Increase in percentage of women receiving ANC/PNC by 32 percentage points between 2008 and 2011 in Amroha . . . . .	68
<b>Figure 48:</b> Reduction of MMR by 16% and increase in percentage of women receiving ANC/PNC by 32 percentage points between 2008 and 2011 in Amroha . . . . .	68
<b>Figure 50:</b> RapidSMS-MCH system information flow. . . . .	72
<b>Figure 49:</b> Rwanda's Musanze District . . . . .	72
<b>Figure 51:</b> Impact of RapidSMS system on ANC first visits, infant deaths, and deaths in utero, Musanze District (2010-2011). . . . .	74

## ACRONYMS

<b>ANC</b>	Antenatal Care	<b>LHV</b>	Lady Health Visitor
<b>ANM</b>	Auxiliary Nurse Midwife	<b>M&amp;E</b>	Monitoring and Evaluation
<b>ASHA</b>	Accredited Social Health Activist	<b>MCTS</b>	Mother and Child Tracking System
<b>BCG</b>	Bacillus Calmette–Guérin	<b>MDGs</b>	Millennium Development Goals
<b>CHW</b>	Community Health Worker	<b>MIS</b>	Monitoring Information System
<b>CMO</b>	Chief Medical Officer	<b>MMR</b>	Maternal Mortality Rate
<b>CoIA</b>	United Nations Commission on Information and Accountability for Women's and Children's Health	<b>MOOC</b>	Massively Open Online Course
<b>DICOM</b>	Digital Imaging and Communications in Medicine	<b>NHA</b>	National health account
<b>DLHS</b>	District Level Household and Facility Survey	<b>NHS</b>	UK National Health Service
<b>DPT</b>	Diphtheria, Pertussis, Tetanus	<b>NMR</b>	Neonatal Mortality Rate
<b>DSS</b>	Decision support systems	<b>NRHM</b>	National Rural Health Mission
<b>EHR</b>	Electronic health record	<b>PCR</b>	Polymerase Chain Reaction process
<b>EMR</b>	Electronic medical record	<b>PNC</b>	Postnatal Care
<b>EWEC</b>	UN “Every Woman, Every Child” Global Strategy	<b>RCH</b>	Reproductive and Child Health
<b>GOe</b>	Global Observatory for eHealth	<b>RMCH</b>	Reproductive, Maternal, and Child Health
<b>GSMA</b>	Global System for Mobile communications Association	<b>RMNCH</b>	Reproductive, Maternal, Neonatal, and Child Health
<b>HIMS</b>	Health Information Management System	<b>SMS</b>	Short Messaging Service
<b>HL7</b>	Health Level Seven International	<b>SNOMED</b>	Systematized Nomenclature of Medicine
<b>ICD</b>	International Classification of Diseases	<b>SRS</b>	Sample Registration System
<b>ICMEC</b>	International Centre for Missing and Exploited Children	<b>UNFPA</b>	United Nations Population Fund
<b>ICT</b>	Information and Communication Technology	<b>UNICEF</b>	United Nations Children's Fund
<b>ID</b>	Identification	<b>UP</b>	Uttar Pradesh
<b>IMR</b>	Infant Mortality Rate	<b>USAID</b>	United States Agency for International Development
<b>ITU</b>	International Telecommunication Union	<b>WHO</b>	World Health Organization
<b>IVRS</b>	Interactive Voice Response System	<b>ZCHARD</b>	Zambia Centre for Applied Health Research and Development
<b>KOICA</b>	Korea International Cooperation Agency	<b>ZPCT</b>	Zambia Prevention Care & Treatment Partnership

# ACKNOWLEDGEMENTS

This publication is based on a WHO/ITU joint survey that explored the use of eHealth for women's and children's health in countries that are covered by the Commission on Information and Accountability for Women's and Children's Health (CoIA). It was conducted by the World Health Organization (WHO) and the International Telecommunication Union (ITU) through the WHO Global Observatory on eHealth (GOe). Experts in 64 responding countries helped shape this report by sharing their knowledge and completing the survey. We wish to acknowledge the special effort made by Bangladesh contributors in piloting the survey and providing valuable feedback before its launch.

Authors and reviewers who contributed to this publication include: Peter Drury, Lilia Perez-Chavolla, Misha Kay, Jo Wood, and Daphne Liu. Data processing and visualization were performed by Mohamed Nour, seconded from the WHO Eastern Mediterranean Regional Office to support this project. The text was reviewed by Najeeb Al Shorbaji, Joan Dzenowagis, Frederik Kristensen, Jessie Schutt-Aine-Madkaud, and Diana Zandi.

WHO regional focal points including Jyotsna Chikersal, Hani Farouk, Clayton Hamilton, Mark Landry, David Novillo, and Miguel Peixoto encouraged the CoIA countries in their regions to participate. In addition, Rosemary Byanyima and Rodolfo Soares provided support to countries, especially in the African Region.

Country case studies were developed with the support of Aditi Dayal, from OneWorld International Foundation, for India; Erica Kochi and Lastone Chitembo, from UNICEF, for Zambia; and Richard Gakuba, National eHealth Coordinator, and Erick Gaju, of the Ministry of Health, for Rwanda.

The design and layout of this publication were managed by Jillian Reichenbach Ott, of Genève Design. Misha Kay and Hani Eskandar, of WHO and ITU respectively, jointly managed this project, coordinating the work for the two organizations. The final draft was edited by Thomson Prentice.



## FOREWORD

As part of our ongoing commitment to eHealth, we are pleased to jointly publish *eHealth and innovation in women's and children's health: A baseline review*. This study compiles information from 64 of the 75 Commission on Information and Accountability for Women's and Children's Health (CoIA) countries which together have 98% of the world's maternal and infant mortality. These countries have responded to a detailed survey about the many ways in which the use of information and communication technologies (ICTs), and in particular eHealth, is helping reduce that global burden. The report highlights what has been achieved and identifies barriers to progress. It will help governments and development partners identify where further investment is required. For the first time, it provides a systematic overview of where each country's strengths and weaknesses are in implementing ICTs for women's and children's health, through a collection of Country Insights.

This report shows how, on a daily basis, eHealth innovations are improving access to care and assisting women to take control of their own health. Advances such as these are providing pregnant women, mothers and young children with better health care services and advice. Case studies illustrate how, through the use of ICTs, health-care professionals and the women and children they care for, are better able to share important health information as well as communicate amongst themselves more easily and effectively. This work has been so successful that what began as local projects have now been adopted nationally. We are also encouraged to note that two thirds of countries have introduced electronic national health information systems.

WHO and ITU wish to thank all those who participated in the survey. Through the detailed information they provided, they have enabled us to prepare this report highlighting the important role of eHealth for maternal and child health in developing countries.



Dr Marie-Paule Kieny  
Assistant Director-General  
Health Systems and Innovation (HIS)  
World Health Organization



Mr Brahima Sanou  
Director  
Telecommunication Development Bureau (BDT)  
International Telecommunication Union

# EXECUTIVE SUMMARY

## Context

Action for women's and children's health is a global imperative, reflected in Millennium Development Goals (MDGs) 4 and 5, which seek to reduce maternal and infant deaths by 2015 (1). This joint report by the World Health Organization (WHO) and the International Telecommunication Union (ITU) demonstrates the vital role that information and communication technologies (ICTs), and particularly eHealth<sup>1</sup>, play in helping achieve those targets. It demonstrates how, every day, innovations in eHealth are saving the lives of women and their children in some of the most vulnerable populations around the world.

The United Nations' Secretary-General's *Global Strategy for Women's and Children's Health* (2) was launched in 2010 to accelerate action on the MDGs through a better process for global reporting, oversight and accountability for women's and children's health. This led to the creation of the United Nations Commission on Information and Accountability (CoIA) (3) and an accountability framework for monitoring, review and action, focused on the 75 countries which together have 98% of the world's maternal and child mortality. The framework links accountability for resources to the results, outcomes and impacts they produce.

## Reporting results

Information plays a critical role in supporting implementation of the ten recommendations on resource tracking and oversight of results and resources, nationally and globally. ICTs and eHealth applications are central to these functions.

An independent Expert Review Group (iERG), established by WHO in 2012, reports to the UN Secretary-General on progress and results in implementing the recommendations. To inform that effort, WHO's Global Observatory for eHealth (GOe) launched a survey to collect and analyse data on progress being made in the uptake of eHealth in developing countries – particularly for the benefit of women's and children's health.

This is the report of the WHO GOe survey, to which 64 of the 75 CoIA countries responded. Over 300 eHealth and maternal and child health experts contributed their specialist knowledge to the survey. WHO and ITU then joined forces to analyse the findings and present them here.

<sup>1</sup> eHealth is the effective use of information and communication technology (ICT) for health. Source: Global Observatory for eHealth, 2008: <http://www.who.int/goe/BFeuroFull.pdf?ua=1>.

## Quiet revolution

Communication over the Internet and mobile phone has become commonplace and a nearly indispensable part of daily life for much of the world's population. Remarkable technological advances have taken us from the bulky personal computer to the laptop, smart-phones and wearable devices. These ICTs are instruments of change – transforming the way people live, work and interact. They are supporting health authorities and health-care professionals through eHealth, by helping citizens everywhere to live longer and healthier lives. A theme of this report is how these instruments of change are part of a “quiet revolution” in which many far-reaching health-related changes are now taking place.

Numerous countries are already using mobile phones to improve health. The Internet is expanding rapidly and with it access to essential health information and advice. Governments are finding new avenues, including official websites and social media, to provide more information to their populations, and to promote women's and children's health programmes. They are steadily moving towards ICT-based integrated health information systems, and adopting eHealth policies and strategies, guided by the joint WHO/ITU *National eHealth Strategy Toolkit*.

These trends are set to continue in the coming years and to have profound effects on people at all levels. At the family level, pregnant women and mothers are becoming better informed on healthy pregnancy, safe delivery and improved infant and child protection. At national and community levels, official registrations of births, deaths and causes of death are gradually improving. Registering a child's birth is the first step in realizing its right to health through the continuum of care.

## Findings and recommendations

Some of the report's most encouraging findings and recommendations include: 94% of countries have a national policy or strategy for women's and children's health; and over 90% are monitoring most of the key indicators on women's and children's health. Sixty-nine per cent have implemented, at least partially, an electronic information system to register births, deaths, and causes of death. Fifty-six per cent of countries report that eHealth is supporting major women's and children's health initiatives.

While progress is being made, there is much more to be done to improve inter-sectoral collaboration and promotion of eHealth. This report highlights the many difficulties that stand in the way of eHealth adoption with the aim of overcoming them. These challenges can include lack of government commitment in some cases, lack of skilled health professionals and expertise in others, and lack of funding and infrastructure almost everywhere.

The report makes a number of recommendations. Among the most important are for countries to promote inter-sectoral collaboration in their efforts, to include electronic data collection as part of an integrated plan for implementing eHealth services for women's and children's health, and to adopt eHealth programmes for reproductive, maternal, newborn and child health (RMNCH). They are also urged to develop eHealth policies and strategies and to act on barriers that impede progress.

The recommendations are intended to help countries build on the work already done – much of it impressive – and find ways to accelerate the pace at which they can further improve the health of every woman and every child.



# PART 1: HOW THE USE OF ICT IS HELPING IMPLEMENT COIA RECOMMENDATIONS



## Introduction

This baseline review of eHealth and innovation focuses on the first four recommendations of the Commission in Information and Accountability for Women's and Children's Health (ColA).

### The recommendations that are the basis for this report:

1. **Vital events:** By 2015, all countries have taken significant steps to establish a system for registration of births, deaths and causes of death, and have well-functioning health information systems that combine data from facilities, administrative sources and surveys.
2. **Health indicators:** By 2012, the same 11 indicators on reproductive, maternal and child health, disaggregated for gender and other equity considerations, are being used for the purpose of monitoring progress towards the goals of the 2010 *Global Strategy for Women's and Children's Health*.
3. **Innovation:** By 2015, all countries have integrated the use of Information and Communication Technologies in their national health information systems and health infrastructure.
4. **Resource tracking:** By 2015, all 75 countries where 98% of maternal and child deaths take place are tracking and reporting, at a minimum, two aggregate resource indicators: (i) total health expenditure by financing source, per capita; and (ii) total reproductive, maternal, newborn and child health expenditure by financing source, per capita.

These recommendations concern the role of information and communication technologies (ICTs) in information systems that exist or are being implemented in countries around the world to support services for reproductive, maternal, newborn and child health (RMNCH). These systems are themselves the foundation for the fast-expanding use of innovations including eHealth initiatives that help deliver these services.

The Executive Summary of this report has alluded to a "quiet revolution" in ICT and eHealth that is having profound effects on the health of people worldwide. The revolution is "quiet" in the sense that the remarkable progress documented here is being achieved. But it is a revolution, nonetheless, transforming in many ways how health professionals and their partners interact with the individuals, families and communities in their care. Specifically, this report deals with those interactions with mothers and their children. It demonstrates how ICTs and eHealth applications play an essential role in meeting all the maternal and child health recommendations that form its basis.



A companion document to this report reviewed each of the ten CoIA recommendations, highlighting the contributions ICT applications can provide in their implementation and in fast-tracking the fulfilment of the MDGs 4 and 5. It recognized that in the near term, the CoIA recommendations seek to promote the use of ICT in the implementation of a range of projects to support women's and children's health in several key areas. It then made a crucial statement – “Without a national strategy and plan fully in place, projects implemented to achieve quick progress might need to be revisited after several years' time. It is therefore recommended to develop, in parallel, a national eHealth strategy that includes reproductive, maternal, neonatal, and child health (RMNCH) as a priority and aims to ensure the best use of funds. Such strategy should also take account of the potential short-term nature of any projects and include a transition plan in the planning process” (4).

The first four of the recommendations, focused on generating better information for better results, including resource tracking, and these are the prime focus of this report. In their work plan (5) CoIA provided indicators/targets for each of their recommendations (Table 1). For each of the recommendations, the iERG also proposed (6) a set of core indicators for monitoring country progress in implementing them. In making its first recommendation, CoIA observed: “Many countries do not have well-functioning integrated health information systems that combine information from population-based sources, such as surveys, with facility and administrative data. Major efforts are required to move towards one sound country system that meets all data needs for women's and children's health; ICTs provide new opportunities to do so” (6).

The aim of the survey was “to collect and analyse data on progress being made in the uptake of eHealth in countries – particularly in the use of eHealth for the benefit of women's and children's health” (6). The next section briefly examines and discusses the results of the survey for each of these recommendations. The results are then given in greater detail in the subsequent section.

The report then goes on, in Part 2, to examine advances in the development of national eHealth strategies and programmes supporting women's and children's health in the countries responding to the survey.

Table 1: CoIA ICT recommendations with indicators and targets by CoIA and iERG

Indicator Name	Indicators and targets - CoIA	Indicators and targets - iERG	Comments
Recommendation 1 — Vital events: By 2015, all countries have taken significant steps to establish a system for registration of births, deaths and causes of death, and have well-functioning health information systems that combine data from facilities, administrative sources and survey.			
Birth registration	HIS: At least 50 countries have timely and accurate core coverage indicator data to inform annual reviews with appropriate data quality controls (20 by 2013) CRVS: At least 50 countries have completed an assessment and developed a plan, and have taken significant steps towards implementation by 2015 (>20 by 2013)	At least 75% of births registered	Actual birth registration coverage rate will be available for each country
Death registration		At least 60% of deaths registered	Actual death registration coverage rate will be available for each country
Maternal death Reviews		At least 90% of maternal deaths notified and reviewed	Additional indicator could be % of countries in which maternal death is a notifiable event
CRVS improvement		CRVS improvement plan approved by country government in place	This involves a systematic CRVS assessment and the development of a comprehensive multi-sectoral plan
Recommendation 2 — Health indicators: By 2012, the same 11 indicators on reproductive, maternal and child health, disaggregated for gender and other equity considerations, are being used for the purpose of monitoring progress towards the goals of the Global Strategy.			
Coverage indicators	By 2013, at least 50 countries use and have up-to-date accurate data on the core indicators, disaggregated, as part of their M&E systems	Statistics for 8 coverage indicators are available for at least one of the two preceding years, disaggregated by equity stratifiers	The data may be derived from surveys or facility data, and are disaggregated by sex, wealth and district where possible; information will be gathered by indicator; reliability will be assessed; facility data will be available annual, survey data 2-3 times every 5 years
Impact indicators		Data for the 3 impact indicators are available based on data collected in the preceding three years, disaggregated by equity stratifiers	The data may be based on surveys, census or registration systems, and disaggregated by sex, wealth and district where possible; mortality data are usually collected in retrospective surveys

Indicator Name	Indicators and targets - CoIA	Indicators and targets - iERG	Comments
Recommendation 3 — eHealth and innovation: By 2015, all countries have integrated the use of Information and Communication Technologies in their national health information systems and health infrastructure.			
eHealth strategy and innovation	By 2015, at least 50 countries have developed, and are implementing, eHealth strategies including specifics on how this benefits information and accountability for women’s and children’s health	National eHealth strategy and plan is in place	These plans need to be comprehensive and cover all relevant health data sources
Web-based reporting		All districts are part of a national web based system to report health data and receive feedback	One country led system is operational, reporting facility and administrative data, forming the basis for good and rapid analysis and transparency
Recommendation 4 — Resource tracking: By 2015, all 74 countries where 98% of maternal and child deaths take place are tracking and reporting, at a minimum, two aggregate resource indicators: (i) total health expenditure by financing source, per capita; and (ii) total reproductive, maternal, newborn and child health expenditure by financing source, per capita.			
Total health expenditure	By 2013, at least 50 countries use and have up-to-date and accurate data on the two indicators, as part of their M&E system	Total health expenditure per capita was tracked during the two preceding years, by financing source	To track data on both preceding years are required
RMNCH expenditure		RMNCH expenditure per capita is tracked during the two preceding years, by financing source	To track data on both preceding years are required; the indicator refers to government and external sources

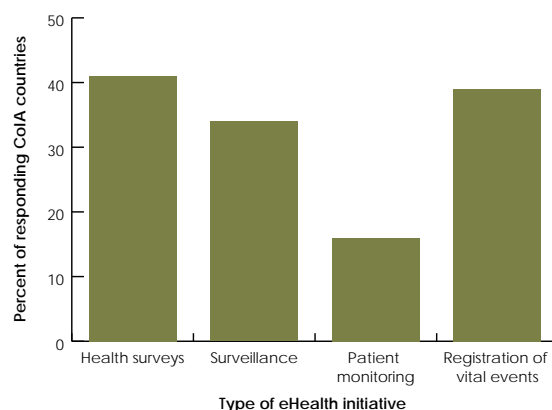


## FINDINGS ON RECOMMENDATION 1 : Health monitoring and surveillance

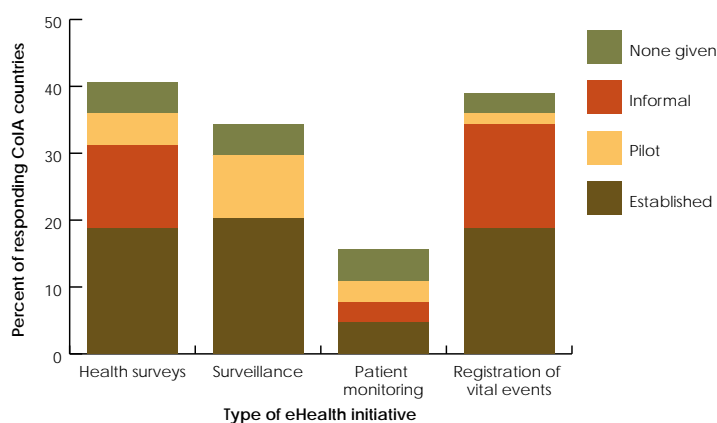
The survey asked countries about the use of ICT (informal, pilot or established)<sup>2</sup> in health surveys, surveillance, patient monitoring the registration of vital events, and the status of implementation.

Forty-eight per cent of the responding countries have adopted at least one type of eHealth initiative for the monitoring and surveillance of maternal, neonatal and paediatric patients. Health surveys are the most frequently used method (41%), closely followed by the use of ICT for the registration of vital events – specifically, births, deaths, infant and maternal deaths, and causes of death (39%). The next most frequently used method was surveillance (34%) (Figures 1 and 2).

**Figure 1: Adoption of ICT in health surveillance and monitoring eHealth initiatives, responding CoIA countries, by type of initiative (%)**



**Figure 2: Adoption of ICT for monitoring and surveillance and status, responding CoIA countries (%)**



<sup>2</sup> Informal refers to initiatives that are not a part of an organized programme, but involve the use of eHealth services; *pilot* indicates initiatives that focus on testing and evaluating the use of eHealth in a given situation; and *established* indicates ongoing eHealth services that have operated for a minimum of 3 years and are supported through funds provided by the government or other sources. The category of *none given*, used in the graphs for this section, applies to countries that described eHealth initiatives, but failed to indicate their current stage of implementation. Source: Global Observatory for eHealth, 2010: [http://whqlibdoc.who.int/publications/2011/9789241564168\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2011/9789241564168_eng.pdf?ua=1).

Some countries conduct periodical national demographic and health surveys to gather information on critical indicators, while others do so to collect data specifically on CoIA indicators. It is a token of the “quiet revolution” that several countries reported piloting the use of smartphones and tablets to collect data on family planning, maternal and infant morbidity and mortality, and on the utilisation of health services by these target populations. Others are adopting these technologies to assess the quality of service provided at point of care and to conduct annual accreditation of health facilities. Figure 2 shows that about one in five survey respondents already has well-established programmes for surveillance, health surveys and the registration of vital events. Pilots and informal projects focusing on health surveys and vital events registration are also being introduced in countries (17% respectively).

## Discussion

Underlying the use of eHealth in the context of integrating health monitoring and surveillance, vital events registration (and indeed all aspects of health care), are the challenges of developing and implementing standards (7) that address some specific requirements – such as interoperability, security, mobility and reliability – necessary for supporting advanced eHealth applications. Attention also needs to be paid to training health survey and birth registration data collectors, alignment of standards between donor/survey agencies, training in coding for RMNCH conditions, including cause of death (e.g. using ICD-10).

The 34% adoption of ICT in surveillance programmes demonstrates the importance of this type of activity. These surveillance initiatives utilize technologies including mobile phones and text messages to collect information and support early interventions. In the case of Zambia, discussed in detail in Annex 1, the implementation of UNICEF's RapidSMS platform has accelerated the speed of early infant diagnosis (EID) for HIV. This is indeed revolutionary.

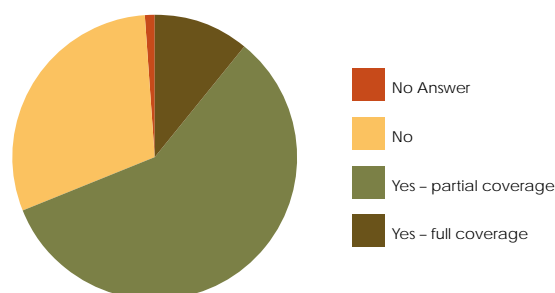
Technological and cost barriers have limited the adoption of patient monitoring initiatives that rely on remote sensors or imaging devices to capture patient data. Nevertheless, 16% of the responding CoIA countries (Figure 2) already reported some activity in this area, with initiatives targeting RMNCH care, such as the use of teleradiology in some private and teaching hospitals in Kenya, of sonography tests for pregnant women in India, and of foetus-heart monitoring in China. Such innovations for health were unimaginable only a few years ago. Other interesting programmes are being implemented in Pakistan, with its remote patient monitoring systems for antenatal care, and in Bangladesh, with a pilot home monitoring system for diabetic patients.

## FINDINGS ON RECOMMENDATION 1 : Systems for the registration of vital events

This recommendation was also concerned that countries take significant steps to establish a system for registering births, deaths and causes of death. Such a system is an essential first step in giving children a “passport to protection” (discussed later in this section) and in understanding why people die and how their deaths might be prevented. The GOe survey did not explicitly enquire about maternal death reviews or steps taken to improve civil registration, but did ask if births and deaths and causes of death were recorded using electronic information systems (with full or partial coverage).

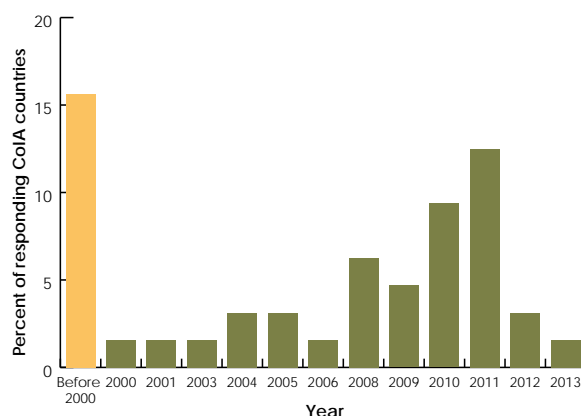
Of the responding countries, 69% have implemented, at least partially, an electronic information system to record vital events (Figure 3 and Annex 4 Part B). This is the most common use for electronic information systems in these countries, and is an important and encouraging benchmark. Some of the countries without electronic systems in place to register vital events indicated they are planning to introduce them.

**Figure 3: Countries' use of electronic information systems to record vital events**



However, of the countries that reported having such a system, only 11% indicated having full coverage (Egypt, Guatemala, Mexico, Peru, Rwanda, Tajikistan and Turkmenistan); the others reported using a spectrum of approaches. These approaches included local paper-based systems, stand-alone computers that produce CDs, or official telegram weekly letters, all sent for electronic processing at national level. Partial coverage can be due to several reasons, including introduction of the systems only in the last few years, with insufficient time since then to achieve full implementation. The eHealth revolution does not move at the same speed everywhere (Figure 4).

**Figure 4: Year the electronic information system was introduced in responding countries**



Partial coverage can also mean the system has been adopted only in some areas of the country, where a pilot is being implemented, or used only at central and provincial levels. Similarly, some systems are used to

register vital events that take place in hospitals, but not births or deaths that occur at the community level, outside health-care facilities.

Another important observation from Figure 4 is the surge in the number of electronic information systems that were introduced from 2008 to 2011. This peak was mainly observed in countries from sub-Saharan Africa, with 14 out of 21 (67%) introducing an electronic system for recording births and deaths between this period. Although countries did not indicate their motivation for introducing these systems, it is possible that there was increased financial support from donors to help with this effort.

## Discussion

Many countries still have to resolve difficulties in deciding responsibilities for data collection and systems integration between different ministries. One of the challenges identified by the iERG was “insufficient inter-sectorality, weak information technology platforms” (6). These are evident even for the most widespread electronic information systems of those surveyed. What are some of the issues underlying the current fragmentary picture that need to be addressed?

To illustrate the “inter-sectorality” challenges, consider some of the issues surrounding the registration of births. Apart from being the first legal acknowledgement of a child's existence, birth registration is central to ensuring that children are counted and have access to basic services such as health, social security and education. In effect, birth registration is a child's “passport to protection” (from child labour, forcible conscription in armed forces, child marriage, trafficking, sexual exploitation, etc.). As UNICEF also has noted: “Universal registration is one of the most powerful instruments to ensuring equity over a broad scope of services and interventions for children” (8).

Article 7 of the Convention of the Rights of the Child states that “the child shall be registered immediately after birth and shall have the right from birth to a name, the right to acquire a nationality and, as far as possible, the right to know and be cared for by his or her parents” (9), and CoIA notes that ICTs have great potential to help countries overcome persistent obstacles in developing birth registration. To realize this potential, alignment is needed between hospital (public and private) and community-based information systems. The processes of collection, storage and use of birth registration data (and the associated training) must provide for child protection, confidentiality, and privacy. The risks of black market/counterfeit birth registration documents (e.g. being used in trafficking or illegal adoptions) must be managed.

Developing and implementing these complex information systems involves different ministries (e.g. health, home affairs); regional or district authorities and civil registration authorities; public and private hospitals; donor and private agencies; and technology providers and training organizations. Progress is often slow and fragmented, particularly if attention is focused on technical or organizational solutions in isolation from each other. The challenges of developing digital birth registration using mobile phones are beginning to be explored, for instance in Liberia and Kenya, and may provide insights into how these can be addressed.

Several initiatives have sought to decentralize the registration of births, infant and maternal deaths and causes of death by improving the access of community health facilities to ICT – mainly computers, smartphones, and mobile phones. India, Rwanda, and Zambia have implemented mHealth initiatives that improve the tracking of pregnancies, births and deaths at the community level and thereby help improve the national records. These three initiatives and some of the lessons drawn from their implementation are presented in the case studies included in Annex 1 of this report.

The more detailed findings from this survey can be used to support the work of the multi-partner working group established to propose a global alliance to strengthen Civil Registration and Vital Statistics (CRVS) systems (6).

## FINDINGS ON RECOMMENDATION 2 : Systems for monitoring RMNCH indicators

### Introduction

Having reviewed the 11 MDG indicators and 39 indicators used by the Countdown to 2015 for Maternal, Newborn and Child Survival (10), CoIA recommended a small subset of 11 core indicators to ensure the collection of consistent and timely data needed to hold governments and development partners accountable for progress in improving women's and children's health, without adding to countries' reporting requirements.

Within the 11 indicators, three concerned “impact”:

- Maternal mortality ratio
- Under-five child mortality
- Children under-five who are stunted.

In the survey, countries were asked if they monitored each individual impact and coverage indicator, how frequently, and in what format the monitoring occurred. The survey found that monitoring of the 11 key indicators is widespread, with 6 indicators being monitored by over 90% of countries, most frequently on an annual basis. However, the uptake of electronic formats for data collection and processing has been slow, with only 3-6% of countries reporting their use. More than half combine the use of paper and electronic formats.

### Results

In Table 2, the first 3 indicators concern “impact”, and the remainder “coverage”. A summary of survey responses by country is given in Annex 4 Part B.

Table 2: Status, frequency and format of 11 monitoring indicators

Indicator	Monitoring status			Frequency of monitoring						Monitoring format			
	Yes	No	No Answer	Every year	Every 2 years	Every 3 years	Every 4 years	Every 5 years	More than every 5 yrs	Electronic	Paper	Both	No Answer
Maternal mortality ratio	95%	0%	5%	27%	0%	5%	11%	41%	9%	3%	30%	59%	8%
Under-five child mortality with proportion of newborn deaths	97%	2%	1%	31%	6%	3%	5%	39%	6%	3%	31%	56%	9%
Children under five who are stunted <sup>17</sup>	92%	3%	5%	30%	8%	6%	3%	38%	3%	3%	30%	52%	16%
Met need for contraception	84%	11%	5%	22%	5%	5%	5%	39%	5%	3%	25%	56%	16%
Antenatal care coverage	92%	5%	3%	61%	6%	0%	2%	17%	0%	6%	28%	58%	8%
Antiretroviral prophylaxis	81%	9%	10%	72%	3%	0%	2%	5%	0%	6%	22%	55%	17%
Skilled attendant at birth	94%	3%	3%	58%	6%	0%	3%	19%	2%	3%	23%	67%	6%
Postnatal care for mothers and babies	75%	19%	6%	52%	5%	2%	0%	16%	0%	3%	16%	53%	28%
Exclusive breast-feeding for six months	84%	11%	5%	38%	6%	3%	5%	30%	0%	3%	25%	53%	19%
Vaccination	92%	2%	6%	72%	3%	2%	0%	9%	0%	6%	23%	59%	11%
Antibiotic treatment for pneumonia	69%	19%	12%	44%	5%	3%	2%	19%	0%	5%	16%	48%	31%

<sup>3</sup> Percentage of children under five years old whose height-for-age is below minus two standard deviations from the median of the WHO Child Growth Standards. Source: WHO, 2014: <http://www.who.int/childgrowth/en>.

*Maternal mortality ratio*

Maternal Mortality Ratio (MMR) is the ratio of the number of maternal deaths per 100,000 live births from any cause related to or aggravated by pregnancy or its management, excluding accidental or incidental causes (11). Almost all responding countries (95%) are monitoring MMR, with 27% doing so every year and 41% every five years. Monitoring is performed using both paper and electronic formats in 59% of countries.

*Under-five child mortality with the proportion of newborn deaths*

Almost all countries (97%) are monitoring the mortality of under-five year olds, either every year (31%) or every five years (39%), with both paper and electronic formats being used in 56% of countries.

*Children under five who are stunted*

Ninety-two per cent of countries are monitoring the number of children under five who have stunted growth. Monitoring is conducted every five years in 38% of countries and annually in 30%. Only 3% report using electronic formats for data collection, whereas 30% use paper, and 52% use a combination of the two.

*Met need for contraception*

The met need for contraception is the measurement of the proportion of women aged 15-49 who are married or in union and who have met their need for family planning. This means that they do not want any more children or want to wait at least two years before having a baby, and are using contraception. This indicator is measured less frequently (84%). A combination of electronic and paper formats is used by 56% of countries.

*Antenatal care coverage*

Antenatal care coverage is a measure of the percentage of women aged between 15 and 49 with a live birth who received antenatal care by a skilled health provider at least four times during their pregnancy. Ninety-two per cent of the countries reported monitoring this indicator, annually among 61% of them. Electronic monitoring is used in just 6% of countries, paper in 28%, and combined formats in 58%.

*Antiretroviral prophylaxis*

This indicator monitors two treatments of two target groups, including antiretroviral prophylaxis among HIV-positive pregnant women to prevent vertical transmission of HIV, and antiretroviral therapy for women who are treatment-eligible. Eighty-one per cent of countries reported monitoring this indicator, 72% on an annual basis. Monitoring formats include digital (6%), paper (22%), and a combination of both (55%).

*Skilled attendant at birth*

This indicator is a measure of live births attended by skilled health personnel. A skilled attendant is an accredited health professional – such as a midwife, doctor or nurse – who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns (12). Almost all countries are monitoring this indicator (94%), most of them annually (58%). The most common monitoring format is paper and electronic (67%), with only 3% reporting the use of electronic systems alone, and 23% using only paper.

*Postnatal care for mothers and babies*

This indicator measures the percentage of mothers and babies who received postnatal care visit within two days of childbirth. Seventy-five per cent of responding CoIA countries monitor this indicator, with 52% doing so annually, and just 16% monitoring every five years. Electronic data collection is low (3%), and paper is 16%. A combination of the two formats is used by 53% of countries.

*Exclusive breast feeding*

Exclusive breastfeeding for six months is an indicator that measures the percentage of infants aged 0-5 months who are exclusively breastfed for six months after birth. Four out of five countries reported measuring this indicator; 35% do so annually and 30% every five years.

*Vaccination*

This indicator measures the percentage of infants aged 12-23 months who have received three doses of the diphtheria/pertussis/tetanus vaccine. Nine out of ten countries measure this indicator and 72% do so annually. Combined paper and electronic formats for monitoring are most common (59%), with electronic formats alone representing 6%, and paper 23%.

*Antibiotic treatment for pneumonia*

Antibiotic treatment for pneumonia is the final indicator in this collection and measures the percentage of children aged 0-59 months with suspected pneumonia who receive antibiotics. Only 69% are monitoring this indicator. Monitoring frequency ranges from every year (44% of countries) to every five years (19%). Only 5% reported using electronic data collection, 16% use paper, and 48% use a combination of both.



## Discussion

This survey found that the least monitored coverage indicator was antibiotic treatment for pneumonia (at 69% of countries), followed by postnatal care for mothers and babies (75%). Some coverage indicators, for vaccination and skilled attendant at birth, were being monitored by 92% and 94% of the countries, respectively.

It is not certain whether “being monitored” equates to “being used”, and used by whom and for what purposes. The iERG suggest that “in too many countries, where data are available, these (coverage) indicators are not being used – especially for skilled birth attendance, exclusive breastfeeding, antenatal care, met need for contraception, and antibiotic treatment for pneumonia” (6). Further work is needed to explore this contention.

The three impact indicators are monitored in 92-97% of the reporting countries. However, the concern is the frequency of monitoring. Only 27-31% of countries monitor on an annual basis; 38-41% of countries monitor every five years; and 3-9% of countries monitor at longer intervals.

As found for Recommendation 1, the combination of paper and electronic formats is invariably the most used. Evidently, the data gathering and information management systems are not currently capable of enabling performance monitoring data to be used on an annual basis in most countries (particularly for the impact indicators). More needs to be done to integrate this data with that from health facilities. The use of the WHO data-quality report card methodology is beginning to show improvements, but significant progress is unlikely to occur until the uptake of electronic formats for monitoring increases rapidly. At present, only 3-6% of countries are reporting their use as the sole monitoring format.

CoIA recognized that “ICTs provide new possibilities to capture and process data, link information systems, increase the timeliness of information produced, and store data for institutional memory” (3). The challenge now is how best to take a holistic view of the requirements, which is addressed in Recommendation 3.

## FINDINGS ON RECOMMENDATION 3 : National electronic health information systems

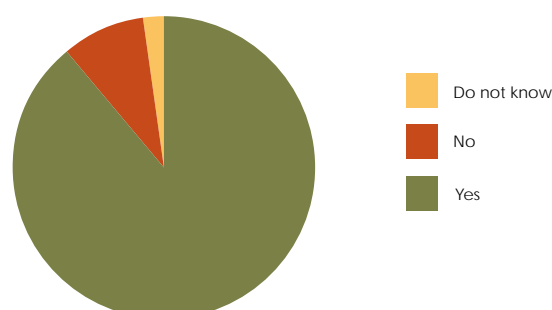
### Introduction

Recommendation 3 focuses on the integration of ICT in the national health information systems and health infrastructure. The indicator of progress was the development and implementation of national eHealth strategies, which is further considered later in this report. The objective is to have all countries integrate the use of ICT in their national health information systems and health infrastructure. The survey asked whether countries had, as recommended, at least one electronic information system (HIS) able to collect and report health data at the district level.

### Results

Nine out of ten of the responding countries confirmed that at least one HIS has been implemented at the district level (Figure 5 and Annex 4 Part B). Twelve countries also reported using, or planning to use, the District Health Information System 2 (DHIS2)<sup>4</sup>; indeed more than 20 CoIA countries have reported using it (13). The national ministry of health (or federal/provincial health departments) manage all these systems, although several countries volunteered that not everywhere was covered by DHIS2.

**Figure 5: Availability of at least one electronic information system to collect and report health data at the district level, responding CoIA countries**



Some countries are using electronic information systems to track specific diseases, such as malaria, HIV and tuberculosis; others have complemented the implementation of a national HIS for collecting district health data with HIS that track maternal and child health statistics, support surveillance, and collect health infrastructure information.

<sup>4</sup> The DHIS platform was developed under the Health Information Systems Programme (HISP), coordinated by the Department of Informatics at the University of Oslo, and supported by The Norwegian Research Council, NORAD, The University of Oslo, and The Norwegian Centre for International Cooperation in Education. Source: Health Information Systems Programme, 2014: <http://www.hisp.org/index.php>.

## Discussion

The survey results show many examples of hospital or community information systems, or innovative pilots. The case studies in Annex 1 illustrate how district level systems can evolve to support solutions at a national level, for example in India and Zambia. The overall picture, however, substantially supports the iERG finding of “weak information technology platforms”. Some countries plan to expand the use of ICTs and platforms gradually to computerise public health facilities nationally, introducing for example electronic appointment systems, mobile and web-based appointment reminders and follow-up systems.

The coordination and integration of these initiatives, and others needed to underpin them (e.g. standards, training, privacy), requires a holistic perspective. The CoIA's associated target that eHealth strategies are developed to deliver this is dealt with in Part 2.

## FINDINGS ON RECOMMENDATION 4 : Status of resource tracking systems

### Introduction

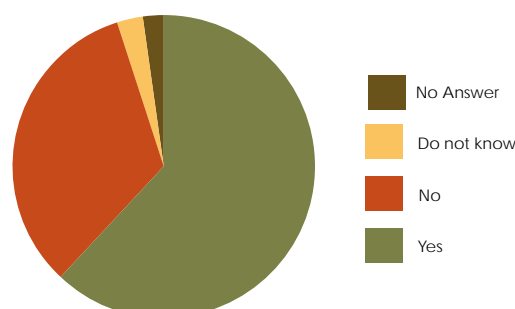
Recommendation 4 recognized the critical importance of tracking resources in terms of transparency, credibility and ensuring that funds are used as intended and reach those who need them most. This requires at least two aggregate resource indicators: (i) total health expenditure by financing source, per capita; and (ii) total reproductive, maternal, newborn and child health expenditure by financing source, per capita. The GOe survey asked about the status and coverage of resource tracking systems.

### Results

#### *Resource tracking system for total health expenditure*

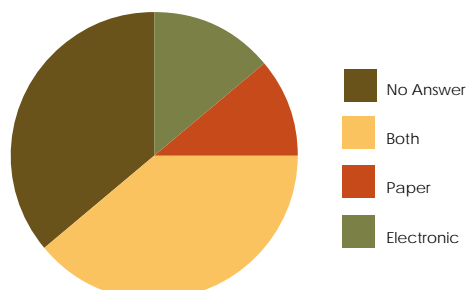
Of the 64 countries, 62% have adopted the first of these indicators (Figure 6). The most common method is a combination of paper-based and electronic systems (39%) (Figure 7).

**Figure 6: Availability of resource tracking system to report total health expenditure, by finance source, per capita**



Only 14% of countries rely exclusively on an electronic system to track these expenditures, and only 11% use a paper-based system (Figure 7). Most tracking is conducted nationally but in some countries it is also carried out at regional and district levels.

**Figure 7: Type of total health expenditure tracking system used**

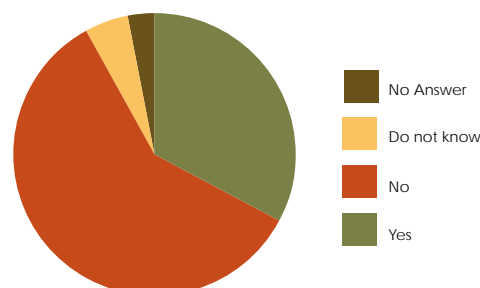


The responsibility for resource tracking systems is managed by the ministry of health of each country. However, in some countries, the responsibility is shared with other ministries, such as the ministry of finance.

### *Resource tracking system for total RMNCH expenditure*

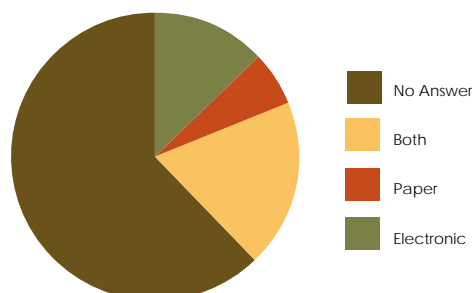
One in three countries have adopted a resource tracking system to report total RMNCH expenditure by funding source, per capita; which is a smaller percentage than for total health expenditure systems (Figure 8).

**Figure 8: Availability of resource tracking system to report total RMNCH expenditure by finance source, per capita**



In tracking RMNCH total expenditure, 19% of the countries use a combination of paper-based and electronic systems. As with total health expenditure tracking systems, only a few countries (12%) use electronic systems exclusively. The other 6% reporting countries continue to rely only on a paper-based system (Figure 9).

**Figure 9: Type of RMNCH resource tracking system used**



As with tracking total health expenditures, the ministry of health is the main entity responsible for maintaining and operating the RMNCH expenditure tracking system in most countries.

## Discussion

Well-established procedures exist in many of these systems to generate national health accounts, with frameworks to guide them provided by WHO (14), including specifically for child health (15).

Twenty-one countries in the survey have specific RMNCH systems, compared with 40 with systems tracking total expenditure. However, the same patterns of paper-based and/or electronic data capture, and central/local management arrangements apply. There are, too, similar challenges in capturing the relevant data, for example from private and donor partners. Establishing RMNCH sub-accounts, and the data collection systems to support them, is being addressed with a Health Account Production Tool and templates for ICT-enabled data collection being developed by several partners in support of CoIA (13).

For at least 36 countries, implementing the recommendations has been stimulated since May 2013 by the availability of catalytic funding to create Country Accountability Frameworks (CAFs). Almost all the other countries are finalising their CAFs (13). Monitoring progress in the use of ICT support for RMNCH is necessary both in the context of CAFs and the national programmes of eHealth strategy development that all countries need.





# PART 2: ADVANCES IN THE DEVELOPMENT OF NATIONAL EHEALTH STRATEGIES AND PROGRAMMES SUPPORTING WOMEN'S AND CHILDREN'S HEALTH



## Introduction

In 2010, the global strategy for women's and children's health – “*Every Woman, Every Child*” (EWEC) – set out the key areas for urgent action to enhance financing, strengthen policy and improve service delivery. The EWEC support for the development and implementation of country-led health plans (6) did not specifically require inclusion of eHealth, mHealth or social media, but it did suggest that “strengthening national capacities also requires harmonized investment in monitoring and evaluation systems, to improve the availability and quality of data. This must support countries' efforts to strengthen their health information systems”.

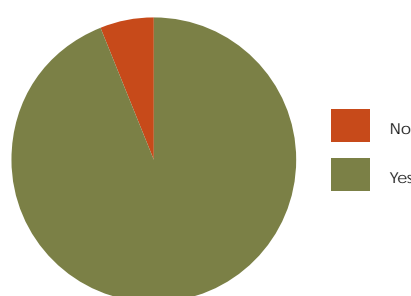
The Global Campaign to support “*Every Woman, Every Child*” recognized that mobile phones and broadband Internet access for new health-care services are excellent examples of how the private sector can contribute, and that “it is gratifying to note that two out of every three new mobile subscribers are women. Mobile services at scale represent an enormous area of potential growth, and social and financial inclusion of the most vulnerable populations” (6).

The survey asked if countries have a national policy or strategy for women's and children's health, and, if so, if it referred to the use of eHealth, mHealth, or social media.

## Results

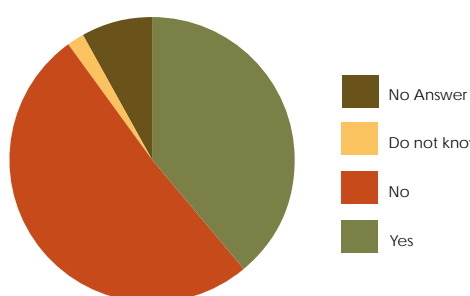
Ninety-four per cent of countries do have such a national policy or strategy (Figure 10), most likely included in national reproductive health policies, often as a main priority. Strategies for child survival, sexual and reproductive health and maternal newborn child health and nutrition are other important related policies.

Figure 10: Strategy for Women's and Children's Health



Thirty-nine per cent of countries reported that their national policy or strategy for women's and children's health refers to the use of eHealth, mHealth, or social media, with most citing mHealth, telemedicine or social media as the dominant ICT tool (Figure 11).

Figure 11: Strategy for Women's and Children's Health mentions use of eHealth, mHealth or social media



## Discussion

While most countries do have a national policy or strategy for women's and children's health, Figure 11 also shows they could do with more support in eHealth applications. The 2010 EWEC report noted that "more than 100 countries are now exploring the use of mobile phones to achieve better health" (2); however, the survey responses suggest that the policy guidance on the role ICT can play in supporting delivery of RMNCH services may need to be reinforced.

As WHO has argued (16), strengthening health systems requires different components to be considered together to improve outcomes. One of these relates to RMNCH service delivery, and another is linked to health information systems. It is important to identify the key barriers to delivering proven health interventions effectively and then developing a holistic eHealth strategy to overcome them.

If RMNCH services can be treated as a whole, they only require an eHealth strategy that focuses on them. But in reality, mothers and children need coordinated life-long care that also involves other health services. The ICT to support these services needs to be coordinated to avoid their fragmentation, and to optimise costs and benefits. While eHealth and innovation are certainly required to support improvements in RMNCH, they also need to be introduced in the context of a national eHealth strategy.



## National eHealth strategies

### Introduction

Given the recommendation that “by 2015, all countries have integrated the use of Information and Communication Technologies in their national health information systems and health infrastructure” (3), the survey addressed their associated indicator of progress, the first element of which is that countries have developed and are implementing national eHealth strategies.

Three main questions were posed concerning generic eHealth strategies:

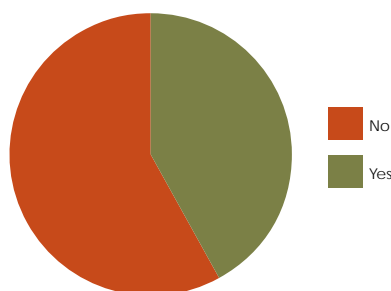
- Did they have one, and if so when was it adopted?
- Has it been fully or partially implemented?
- Was there special funding allocated to support implementation?

### Results

#### *Existence and adoption of an eHealth strategy*

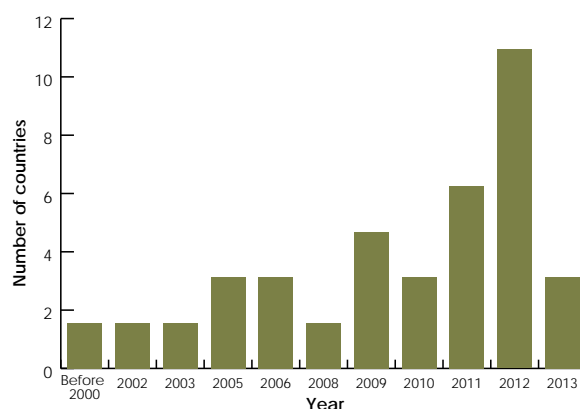
After the 2009-2010 GOe survey and further Internet research, 16 eHealth strategies from CoIA countries were made available on the GOe website (17). The 2013 survey results indicate that of the 64 countries that participated, 27 (42%) have a national eHealth policy or strategy (Figure 12 and Annex 4 Part A).

**Figure 12: National eHealth Policy or Strategy**



There has been a steady increase in the adoption of eHealth policies by countries over the last ten years, with a sharp increase in 2012, when seven countries – Afghanistan, China, Guatemala, South Africa, Togo, Zambia and Zimbabwe – reported having adopted an eHealth strategy (Figure 13).

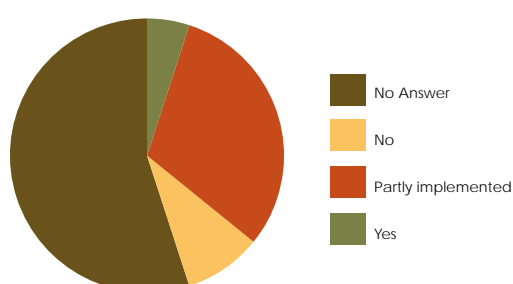
**Figure 13: Year of adoption of eHealth Strategy by CoIA countries**



### *Implementation status*

However, only 5% of countries report having implemented the strategy (Figure 14). A further 31% have “partly” implemented the strategy and 9% have not begun implementation.

**Figure 14: Implementation status of eHealth policies and strategies**



For many countries, their eHealth strategy was often part of a wider Health Information System (HIS) strategy, eGovernment strategy or other ICT initiative. If the strategy has been “partly” implemented, it is usually in the form of a hospital-based Electronic Medical Record (EMR), a pilot programme in isolated regions, mHealth solution, or eLearning programme. Many respondents cited telemedicine as an early implementation action.

### *Funding support to assist with the implementation of eHealth policies*

Of the 27 countries with an eHealth strategy, 22 received special funding for its implementation (Annex 4 Part A). Several countries received funding assistance from a variety of external agencies; others reported they required funding in order to progress.

## Discussion

Since 2005 the World Health Assembly has urged Member States to develop long-term strategic plans for eHealth services (18), in advice that has been recently reinforced (19), along with recommendations concerning eHealth standardization and interoperability (20). A national eHealth strategy sets out the vision and objectives to promote the use of ICT in the health sector. To help develop them a *National eHealth Strategy Toolkit* was produced and published jointly by the World Health Organization and the International Telecommunication Union (21). It gives guidance on how health systems as a whole (including RMNCH) can be supported with eHealth.



"The National eHealth Strategy Toolkit is an expert, practical guide that provides governments, their ministries and stakeholders with a solid foundation and method for the development and implementation of a national eHealth vision, action plan and monitoring framework. All countries, whatever their level of development, can adapt the Toolkit to suit their own circumstances."

[http://www.itu.int/pub/D-STR-E\\_HEALTH.05-2012](http://www.itu.int/pub/D-STR-E_HEALTH.05-2012)

While only 42% (27) of responding countries have a national eHealth strategy, some progress is being made in meeting the first element of the CoIA target that by 2015 "at least 50 countries have developed and are implementing eHealth strategies".

Developing and implementing an eHealth strategy involves the orchestration of many stakeholders. Some countries have cited difficulties

in coordination, funding and monitoring. Others said implementation was underway, but not at the rate that was originally planned, or that some parts of the strategy had been implemented, and others were due at a later stage. Funding may also be a relevant issue. Of the 27 countries with an eHealth strategy, 22 confirmed they had received some special funding to assist. This suggests a growing recognition of the need to invest in eHealth to deliver benefits.

eHealth strategies are needed to address the challenge of strengthening health systems. They need to be aligned to national policy for health care and its delivery on the ground, just as policies for workforce and finance, for RMNCH services need to be aligned with those being pursued by other clinical services within a country's health system.

Developing the information systems to support vital registration, monitoring the 11 core RMCH indicators, district-level information systems and resource tracking are all part of an eHealth strategy. Sharing knowledge and good practice (as well as learning from mistakes) is important in developing and implementing eHealth strategies that support eHealth for women and children, demonstrating the benefits of eHealth's co-ordinated use in this context. This introduces the crucial second element of the CoIA target: that countries are implementing national eHealth strategies linked to RMNCH.

# eHealth for women and children

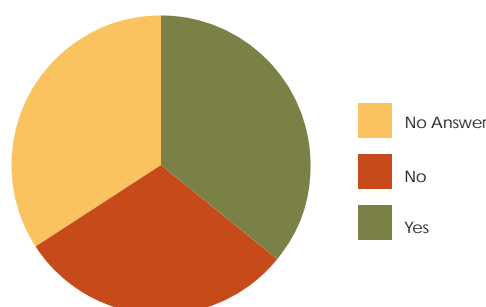
## Introduction

The previous section has discussed the extent to which countries in the survey have implemented, or begun to implement, a national eHealth strategy. This section now turns to the main focus of the report – whether countries with such strategies explicitly include reproductive, maternal, newborn and child health (RMNCH), as in Recommendation 3, as an indicator for progress.

## Results

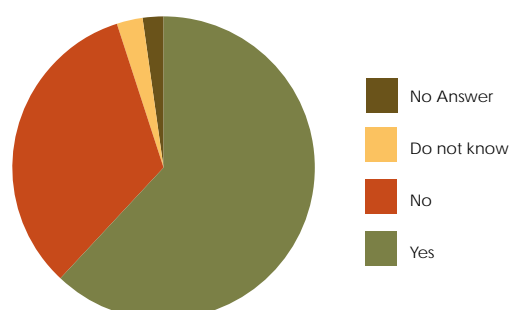
In response, only 36% of the countries reported RMNCH as an indicator for progress in their strategies (Annex 4). This is low, and furthermore, 34% of countries did not answer the question. Of the 30% of respondents reporting that their eHealth strategy did *not* refer explicitly to women's and children's health (Figure 15), several indicated that the policy being planned will specifically include women's and children's health. Others stated it was simply part of a broader strategy for eHealth or reflected in plans to deliver the MDGs.

**Figure 15: Reference to women's and children's health within National eHealth Strategy**



Many countries (62%) reported that major women's and children's health initiatives are being supported by eHealth (Figure 16).

**Figure 16: Women's and children's health initiatives supported by eHealth**



Examples cited of how eHealth is being used to support women's and children's services included:

- Supporting vaccination campaigns and social mobilization through the use of mobile phone messages;
- Using eLearning to help raise standards of basic midwifery and community nursing care as well as developing common medical registries of pregnant women and neonatal information;
- Development of a telemedicine network, linking major maternity hospitals to provincial and county hospitals for teleconsultation, teleeducation and telementoring for surgery;
- Collection of data on the HIV-positive pregnant women from national HIV/AIDS programmes; and
- Distribution of laptops and handheld devices with Internet connectivity to all community clinics and health workers to capture data on CoIA indicators.

## Discussion

The survey results show that while there are many initiatives to support delivery of health services for women and children, knowledge of eHealth use and its effectiveness is incomplete. For eHealth services in general the picture is the same. For example, in Uganda, there were so many eHealth initiatives that in January 2012 the Ministry of Health issued a directive that all eHealth projects/initiatives be stopped until they had secured approval with the Ministry, agreed sustainability mechanisms, and could ensure interoperability with DHIS2. This was because although the Ugandan government recognized the potential advantages of ICT, the development of an enabling environment needed to be guided by a clear eHealth policy and strategic framework.

Demonstrating effectiveness is also a challenge. For example, and in the context of a randomised control trial as the “gold standard”, Free et al (22) suggest that SMS appointment reminders showed modest benefits and may be appropriate for implementation, but little else in mHealth. They stress the need for more high-quality trials that should be undertaken in resource-limited settings as well as in high-income countries, and, ideally, these trials should consider interventions that combine mHealth and conventional approaches.

How are so many initiatives to be co-ordinated and the effective ones promoted as part of an eHealth strategy that supports women's and children's health? One approach to the sometimes bewildering range of projects is to focus on some key programmes of work, and to share knowledge of progress being made.

# Types of eHealth initiatives supporting women's and children's health

## Introduction

To improve understanding of the range of initiatives which support the provision of women's and children's health services, the GOe survey asked country respondents to identify the type of eHealth initiatives currently underway in their countries, as well as the implementation stage of such programmes (informal, pilot, or established)<sup>5</sup>. Participants were invited to select from any number of the following seven categories of eHealth initiatives:

- **Health call centres/health-care telephone helpline:** Use of ICT by trained health professionals to provide health advice and triage services for new and expectant mothers;
- **Education and information:** Use of ICT to provide new and expectant mothers with education and information on health topics;
- **Treatment compliance:** Use of short message service (SMS) and other ICT applications by health services to send new and expectant mothers reminder messages aimed at achieving medication compliance for themselves, their infants, or older children;
- **Appointment reminders:** Messages sent using ICT to new and expectant mothers to make or attend an existing appointment, such as reminder messages for antenatal care;
- **Citizen feedback regarding services:** Use of ICT to allow citizens to provide feedback or complaints concerning health services;
- **Community mobilization/health promotion campaigns:** Use of ICT for health promotion or to alert new and expectant mothers of particular health campaigns; and
- **Telemedicine/Teleconsultation:** Consultation between health practitioners about patients by using ICT.

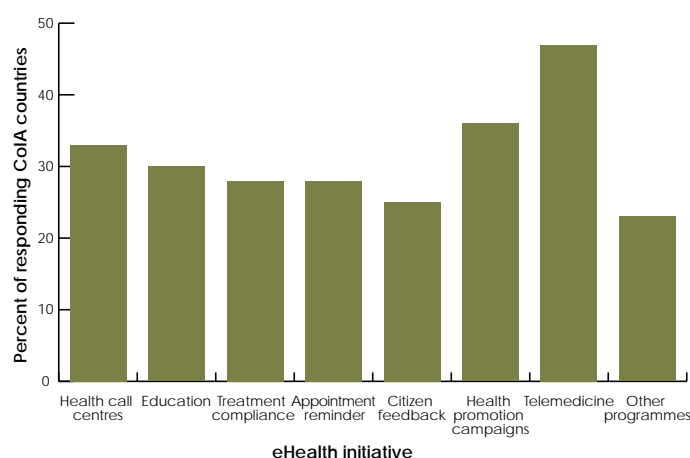
Participants were also given the opportunity to describe other eHealth initiatives that support RMNCH outside these categories.

## Results

Of the 64 CoA countries that participated in the survey, 56% reported having adopted eHealth initiatives to support the provision of RMNCH services. Telemedicine/teleconsultation was the most frequently adopted with 47% of countries currently implementing this type of service (Figure 17). In general, the African region tends to have a lower percentage of eHealth programmes implemented compared to the other WHO regions.

<sup>5</sup> Informal refers to initiatives that are not a part of an organized programme, but involve the use of eHealth services; pilot indicates initiatives that focus on testing and evaluating the use of eHealth in a given situation; and established indicates ongoing eHealth services that have operated for a minimum of 3 years and are supported through funds provided by the government or other sources. The category of none given, used in the graphs for this section, applies to countries that described eHealth initiatives, but failed to indicate their current stage of implementation. Source: Global Observatory for eHealth, 2010: [http://whqlibdoc.who.int/publications/2011/9789241564168\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2011/9789241564168_eng.pdf?ua=1).

**Figure 17: Adoption of eHealth initiatives among responding CoIA countries, by type of initiative (%)**



ICTs – ranging from SMS to radio programmes, and from print media to Internet websites – also play an essential role in 36% of the countries to help inform mothers and pregnant women about important health topics through safe motherhood, national immunization, and breastfeeding promotion campaigns, among others. These health promotion campaigns focus on encouraging women to adopt health practices necessary for a healthy pregnancy, safe delivery, and for improved infant/child nutrition and health. These activities are complemented by eHealth initiatives that provide personalized health advice and referral services through health call centres and maternal and child hotlines (33%) and by programmes that promote health education (30%).

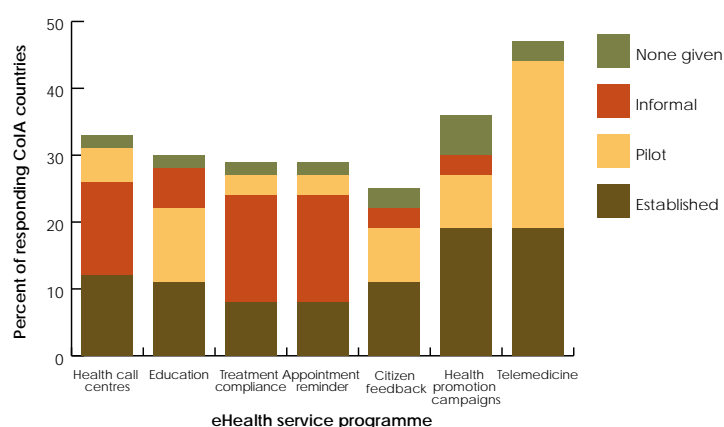
Moreover, as illustrated in depth in this report's case studies of India, Rwanda, and Zambia, countries are increasingly adopting ICTs, and in particular mobile cellular telephony, to improve the attendance of pregnant women to routine antenatal care appointments, to remind nursing women of immunization appointments for their new born babies, and to enhance ARV medication compliance and postnatal care, among other applications.

The survey shows that 28% of the countries have adopted eHealth initiatives for treatment compliance and for appointment reminders, respectively. Less common initiatives, such as those facilitating citizen feedback are also gaining momentum, with 25% of the countries using surveys, radio and television programmes, among other means, to track public satisfaction with the quality of health services provided, so as to improve service delivery, address abuses, and help resolve grievances.

Other eHealth initiatives reported by 23% of countries included the use of mobile telephony, SMS and mapping technology for stock management, to exchange technical information, and for emergency responses and notifications; the use of SMS to distribute health statistics or to reduce the turnaround time of HIV early infant diagnosis results to health facilities, health-care workers and mothers infected with HIV (Case study 1); and the use of SMS to distribute information on family planning methods.

Most eHealth initiatives being implemented are still at the pilot or informal stages (Figure 18). Yet, 9-16% of countries have been able to continue the implementation and funding of eHealth initiatives focusing on treatment compliance, appointment reminders, education, health call centres, and citizen feedback for at least three years, and 19% have well established telemedicine programmes and health promotion campaign initiatives.

Figure 18: Adoption of eHealth initiatives and their stages, responding CoIA countries (%)



Comparing the adoption of eHealth initiatives across WHO regions is difficult due to disparities in the number of CoIA countries within each region; whereas five of the regions have between five and nine CoIA countries, there are 42 in WHO's African region. Nevertheless, some insights can be drawn from comparing the 32 responding countries from the African region to the 32 from the other five WHO regions. Figures 19 and 20 indicate some differences on the type of eHealth initiatives the regions have prioritized.

Figure 19: Types of eHealth initiatives and their stages, responding CoIA countries from the WHO African region (%)

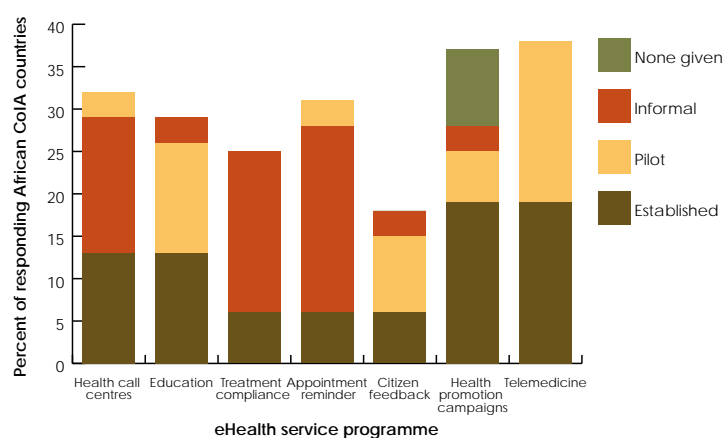
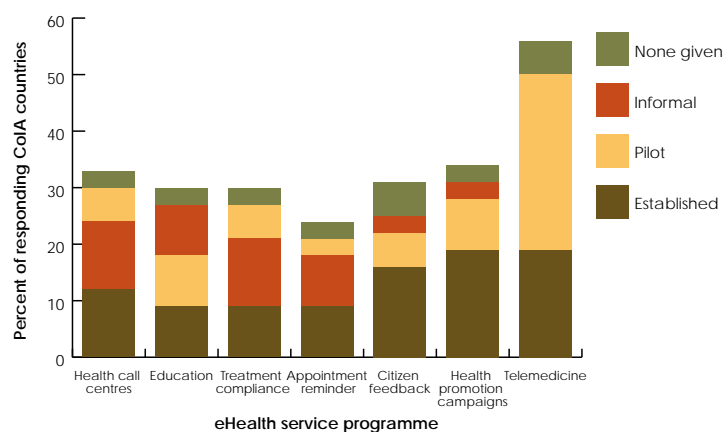


Figure 20: Types of eHealth initiatives and their stages, responding CoIA countries from all other WHO regions (%)





All WHO regions have given priority to implementing telemedicine and teleconsultation programmes (38% Africa and 56% other WHO regions), with 19% of the countries in the African region and the same percentage in the other regions reporting well-established initiatives. Responding countries in the African region tend to have fewer well-established programmes for citizen feedback, treatment compliance, and appointment reminders than countries in the other WHO regions; however, African countries surpass the other countries in the percentage of health call centres and education programmes. Countries in the African region also tend to have a larger percentage of programmes in pilot stage for the first four categories being considered, while countries in the other regions tend to report a higher percentage of informal programmes than their African counterparts across the different categories.

## Discussion

With 56% of the participating countries reporting eHealth initiatives to support RMNCH, a useful baseline has been recorded. It is not surprising to find that most initiatives are still at the pilot or informal stage. The challenge is how to find those that have the potential to go to scale as sustainable solutions. Many of these initiatives are delivering popular benefits to citizens. As knowledge, skills and infrastructure capabilities increase, so does the potential for the rapid proliferation of solutions in countries. This is not a situation particular to these countries. Many eHealth initiatives are being developed globally. But the preferred direction of development, as expressed in the report of the Rockefeller study on eHealth, is to make the shift “from silos to systems” (23).

The three case studies in Annex 1 provide a number of lessons on scaling up eHealth initiatives (primarily involving text messaging) to the national level. These include:

- Government commitment to innovation, its co-ordination of partners and national infrastructure standards (e.g. identifiers and architectures) enable the use at national scale of mobile technology and other ICTs in RMNCH services. Moreover, engaging the MoH from the planning phase increases the value of an eHealth initiative by integrating it into the country's long-term health programmes.
- Collaboration in public-private partnerships with other non-profit organizations and the private sector, in particular with the mobile operator, can help control and even significantly reduce the costs of the project, making scalability and sustainability feasible.
- The engagement of both community health workers and community members is crucial to sustainability.
- ICT tools and training may be best introduced initially as a supplement rather than a replacement for manual systems of working.
- Open source software, local development teams, localisation of content can all contribute to success, and to a scalable solution.

This survey provides a useful baseline from which to review how progress is made on challenges that have to be addressed before being able to realise the potential that a more connected approach to health care can offer.

The approach to managing the eHealth programmes for women's and children's health has one particularly large group of stakeholders: mothers. Most mothers are very ready to adopt new technologies if they are affordable, socially acceptable and deliver benefits to them and their children. For health-care professionals too, the new technical infrastructures are offering a way out of professional isolation, and the ability to become more active players in the development of systems that suit their requirements. Engaging both these key stakeholders by helping them to take good decisions should help guide the selection of solutions that can become established at scale.

# Providing access to information for citizens and health-care professionals

## Introduction

Advances in technology and the deployment of broadband-based services, particularly mobile, are opening up new opportunities for accessing health knowledge for both citizens and health-care professionals. The survey explored the use of social media and online publishing to raise awareness of issues concerning women's and children's health. The survey also addressed how health-care professionals can access:

- **Information:** Publications, databases, images or videos related to women's and children's health using ICT;
- **Decision support systems:** Decision support systems (DSS) at the point of care;
- **Patient records:** Maternal or child Electronic Medical Records/ Electronic Health Records (EMR/EHR) at the point of care.

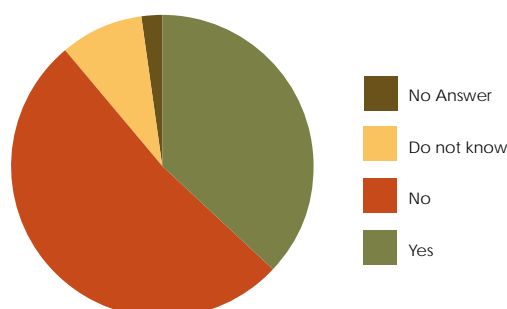
The survey asked participants to select from these three categories of initiatives and provide information on their implementation stage (informal, pilot, or established)<sup>6</sup>.

## Results

### *Social Media and publishing online*

Thirty-seven per cent of the countries have taken advantage of social media such as Facebook™, and micro blogging services, such as Weibo™ in China and Twitter™ worldwide, to disseminate health information on women and children's programmes (Figure 21). Other countries are also using websites and video to provide health information via sites like YouTube, as in the case of Myanmar.

**Figure 21: Percentage of CoIA countries using social media to promote women and children's health programmes**

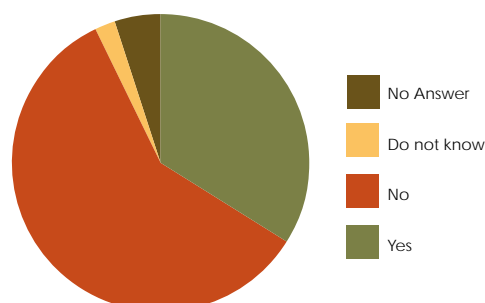


Whereas social media usage for women and children programmes varies from country to country, raising awareness of existing programmes and campaigns has been reported as the most common application. Key programmes promoted through these services include family planning, HIV/AIDS, maternity care, child issues, breastfeeding, and parental guidance. Moreover, these media are also being used for health promotion, to facilitate debates and online chats, for advocacy and fundraising, as well as for obtaining public feedback on health services.

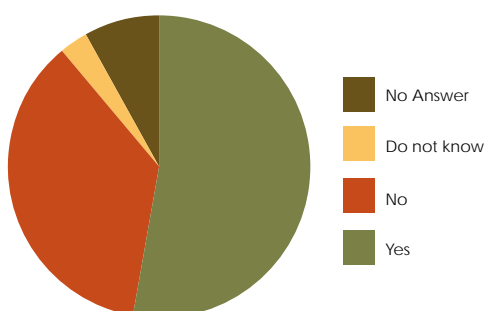
<sup>6</sup> *Informal* refers to initiatives that are not a part of an organized programme, but involve the use of eHealth services; *pilot* indicates initiatives that focus on testing and evaluating the use of eHealth in a given situation; and *established* indicates ongoing eHealth services that have operated for a minimum of 3 years and are supported through funds provided by the government or other sources. The category of *none given*, used in the graphs for this section, applies to countries that described eHealth initiatives, but failed to indicate their current stage of implementation. Source: Global Observatory for eHealth, 2010: [http://whqlibdoc.who.int/publications/2011/9789241564168\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2011/9789241564168_eng.pdf?ua=1).

The majority of responding countries do not produce their own national web sites (59%), with only 34% reporting having done so (Figure 22). The survey results also show that 53% of countries regularly publish on the Internet information concerning women's and children's health (Figure 23).

**Figure 22: Country production of web sites dedicated to issues concerning women's and children's health**



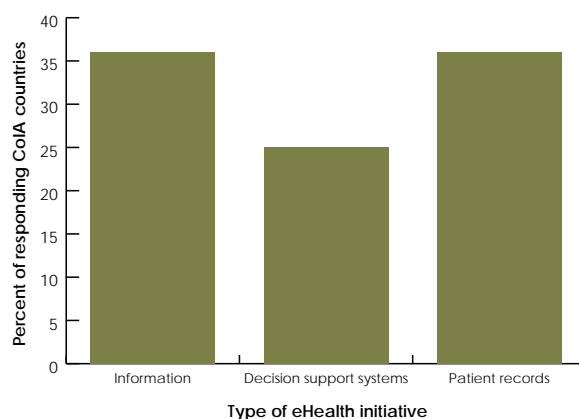
**Figure 23: Publishing of country data on women's and children's health**



### *Access to information for health-care professionals*

The survey shows that 45% of the countries have adopted eHealth initiatives to provide access to information for health-care professionals at point of care. Of the three types of initiatives considered, EMR/EHR systems (patient records) and information initiatives have been the most commonly adopted, both at 36%, followed by decision support systems (25%) (Figure 24).

**Figure 24: Adoption of eHealth initiatives to provide health-care professionals access to information, responding CoIA countries, by type of initiative (%)**



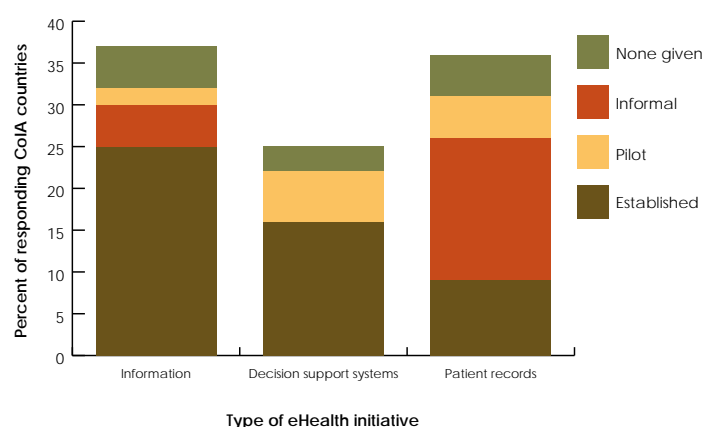
A few countries, such as Ghana and Malawi, are developing e-registration initiatives at the point of care that seek to improve maternal and child health care. In Malawi, for example, antenatal electronic medical records are helping health-care professionals manage electronically information on antenatal care visits, preventive medication, laboratory tests, and vitals monitoring, among other data.

CoIA countries are also adopting programmes to help health-care professionals access databases and electronic libraries with information related to maternal and child health. Some countries reported having national health research depositories, digital libraries and websites where health-care professionals and other researchers can access international scholarly literature. Sudan, for example, is piloting a website for its National Reproductive Health Programme.

Although only 25% of the countries are adopting initiatives that help health-care professionals in their decision-making processes, several of these initiatives are specifically focused on improving health-care professionals' decision-making for maternal and child health care. Burkina Faso, for instance, has a well-established electronic consultation registry for health-care professionals that seeks to improve the quality of treatment of children under five years old. Similarly, in Guatemala, the established programme of TulaSalud, targeted to women and children, uses videoconference technology to help doctors at the community level present clinical cases to specialists in larger hospitals and obtain a second opinion to support their decision-making processes and strengthen the quality of care provided.

Figure 25 shows that the adoption of ICT for accessing patient records at the point of care is a recent endeavour, with 22% of the countries reporting these initiatives as still in informal or pilot stages. In contrast, 25% of the countries indicate having well-established programmes to give health-care professionals access to information, and 16% for initiatives supporting health-care professionals' decision-making processes.

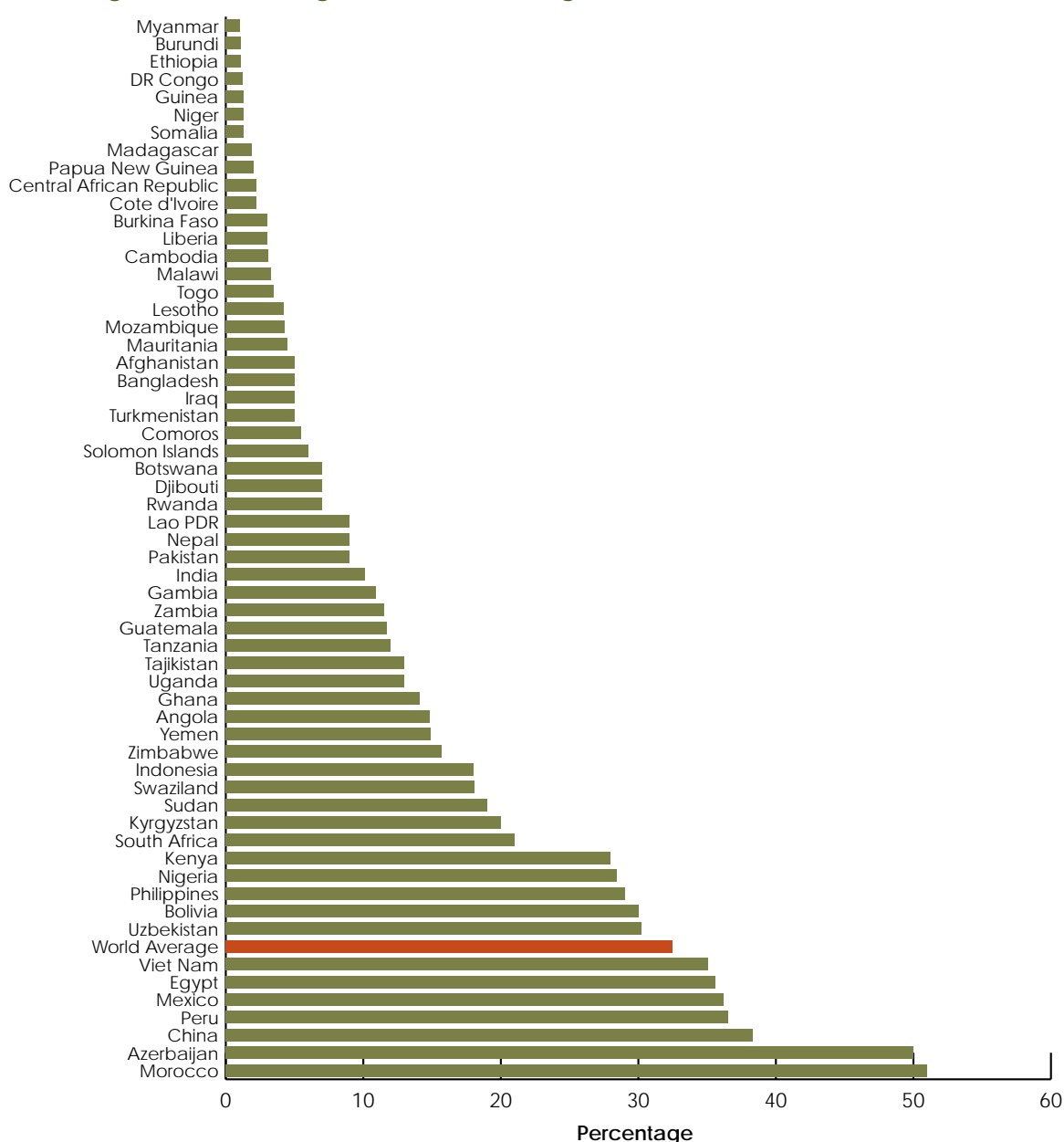
**Figure 25: Adoption of eHealth initiatives and their stages, responding CoIA countries (%)**



## Discussion

The increased uptake of wireless broadband technology among the survey countries is rapidly improving their population's access to Internet services. Although penetration data for this service is not available for all CoIA countries, ITU data shows that the percentage of individual Internet users ranged from 1% to 55% of the population in 2011 (Figure 26).

Figure 26: Percentage of individuals using the Internet, CoIA countries (2011)



Source: Broadband Commission (2012). *The State of Broadband 2012*, pp. 88-89.

Increased access to the Internet has provided governments in the 75 countries new avenues, including MoH web sites and social media, to provide health information to their population and promote women and children's programmes. For example, women can use web sites to get advice on what to expect during pregnancy, and to recognise symptoms of concern. However, the quality of the information needs to be high and its guidance (e.g. on when to seek help) understood by women and health-care professionals alike.

Enabling better-informed decisions, whether by citizens or health-care professionals (and policy-makers), has been transformed by the availability of ICT-enabled solutions; and these trends are set to continue at an accelerating pace. But, while welcome, these trends also bring the challenges of dealing with poor quality and uncoordinated information. To what extent are initiatives to improve the availability of information, especially concerning RMNCH, for mothers, complemented by a concern that the midwife, for example, is aware of what the mother may already know from social media sources? To what extent do health-care professionals pay attention to providing citizen-friendly versions of the information they use for decision-making?

As the quality and range of broadband deployments increase so too will the use of telecare and videoconference technologies, and new uses for social media will evolve, raising new challenges and opportunities for citizens and health-care professionals alike.

However, despite the increasing popularity of the Internet and social media, several countries reported using mainly traditional media, ranging from radio to billboards and from television to newspapers, to raise awareness and disseminate health information among the majority of the population.

## Enabling eHealth programmes

Underpinning all eHealth programmes, including those for women's and children's health, are "eHealth enablers" that need to be considered, such as workforce and training; privacy and compliance; and standards and interoperability. In the context of this survey, the "enabling" components for the type of eHealth programmes considered in the previous section highlighted for review included:

- Training in ICT for health for undergraduates and professionals;
- Health information quality;
- Online safety for children; and
- Privacy.

## Training

### Introduction

Ninety per cent of all maternal deaths and 80% of all stillbirths occur in 58 countries which have only 17% of the world's midwives and physicians (24). The health workforce challenges are well documented (25), including for midwifery (26), and recently a community of practice (27) has been established to focus on improving the quality of the RMNCH services by producing competent health workers in order to achieve universal coverage. The iERG has also stressed the importance of developing an expanded and skilled health workforce, especially in sub-Saharan Africa, that will serve women and children with measurable impact (27).

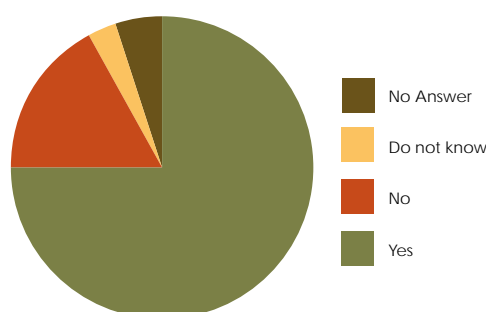
The survey explored the degree of uptake in CoIA countries of universities and technical colleges offering their health sciences students training in ICT, and assessing the state of continuing education in ICT for health professionals. Knowledge of the use of ICT and practical experience in its use in health settings is an essential prerequisite for health professionals to embrace and apply eHealth effectively after completing their training.

## Results

### *Tertiary ICT Training for health science students*

Figure 27 shows the percentage uptake of responding countries whose academic institutions offer ICT training to their health sciences students. Most countries (75%) offer these courses; only 17% do not. The survey determined the scope and depth of this training or the proportion of teaching institutions offering these courses, but the results show that these initiatives are still in their early days and will need time to develop and be fully integrated into the health sciences courses.

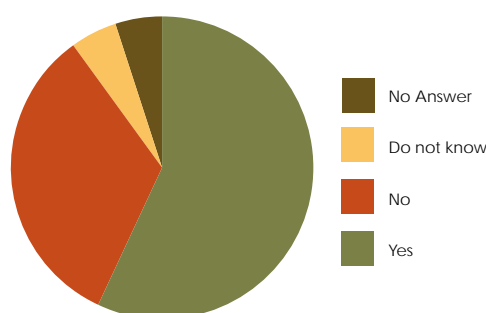
**Figure 27: ICT training offered in tertiary institutions for students of Health Sciences**



### *Continuing education in ICT for health professionals*

Continuing education is just as important as undergraduate and postgraduate education in that it keeps professionals up-to-date with the necessary knowledge or skills needed for the use of ICT in health settings. The survey results suggest that a smaller proportion of countries are offering continuing education, with 58% indicating that they do and 33% that they do not (Figure 28).

**Figure 28: Continuing education in ICT for health professionals**



A number of countries report that the courses being offered are basic and lack detail. In China it is not compulsory to attend such courses. In Kenya, most universities offer components of ICT education as mandatory modules across all faculties and not just focused on health sciences. Three Kenyan universities are now training students in health records management and at least six colleges are teaching the use of ICD-10. In Pakistan courses are specially offered for nursing students, and candidates for the Master of Public Health, but these are yet to be implemented for undergraduates. In Yemen, the University of Sana offers training courses in research through the Internet as well as data analysis. Bangladesh reports that there are a few publicly funded and private tertiary medical institutions that have started formal training in eHealth.

Swaziland is seeking to institutionalize compulsory continuing medical education as a tool to maintain high professional standards. Health workers have been trained in the last two years on health information systems; 59% are drawn from the public sector and 8% have been trained from the private sector. A training plan is in place in the Ministry of Health for health practitioners to undergo an eight-week course on basics of ICTs for all health-care professionals.



In China, professional associations such as the China Medical Informatics Society and the Chinese Health Information Standardization Society, offer ongoing education in eHealth to health professionals. Comoros uses a different approach, through scholarships granted by the Francophone University, because the country does not offer courses for ongoing education. In Malawi, public universities offer short and long-term courses to health professionals. Uzbekistan's Ministry of Health has created the "Uzmedinfo" Centre for the development of eHealth. It offers a specialized industry learning centre for training and staff development of institutions affiliated with the Ministry of Health that are involved in information and communication technologies and telemedicine, and the implementation of information systems.

## Discussion

Tertiary institutions in 75% of countries offer ICT training for students of health sciences, although many of these training programmes are just starting. Providing continuing education in ICT for health professionals is a bigger challenge. While 58% of countries say they do this, more information is needed on which types of health professionals are being trained. For example, are community midwives being kept up to date, or is it primarily hospital doctors?

The importance of engaging community-based health workers is clear. The 2013 *World Health Report* (28) describes randomised control trials in Africa, Asia and Europe. These show how the participation of outreach workers, lay health workers, community midwives, community and village health workers, and trained birth attendants has collectively reduced neonatal deaths by an average of 24%, stillbirths by 16% and perinatal mortality by 20%. Maternal illness was reduced by a quarter. The challenge is to provide community-based RMNCH workers with easy access to eSkills and ICT that enable them to get, online, the training and ongoing support that they need, with face-to-face (virtual and physical) mentoring and tuition being offered where appropriate.

For health workers in areas that are hard to reach, acquire these eSkills (as well as the infrastructure) is similar to the challenge faced by their fellow citizens in these communities. This raises a related issue: how the health sector can work with those who are addressing the uptake of basic eSkills in communities, such as initiatives underway in South Africa (29) and Kenya<sup>7</sup>, and then understand how to collaborate in delivering locally-appropriate training content and providing ongoing support. Mobile phone service providers are active in supporting initiatives in mHealth and mLearning as well as development in general and the needs of women in particular<sup>8</sup>. Gender-related perspective on issues such as phone ownership, access, privacy, and content have been reviewed, and the argument made that ICTs and broadband, as key enablers of development, can play a central role by furnishing new tools and solutions to core gender gaps (30).

<sup>7</sup> Community Knowledge Centres. Source: Cisco, 2014: <http://csr.cisco.com/casestudy/community-knowledge-centers>.

<sup>8</sup> GSMA. Source: Global System for Mobile communications, 2014: <http://www.gsma.com/aboutus/gsm-technology/gsm>.

## Online safety for children

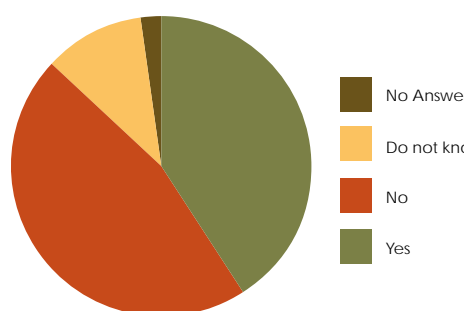
### Introduction

The online environment poses risks as well as new opportunities. For children in this networked world, these risks can include inappropriate and potentially dangerous contact with strangers such as fraudsters, criminals and predators. A range of new and risky behaviours such as ready access to pornography, and cyberbullying is emerging, as children and adolescents embrace the Internet. Many stakeholders have responsibilities for the protection of children in this domain, but the survey focused on the role of government.

### Results

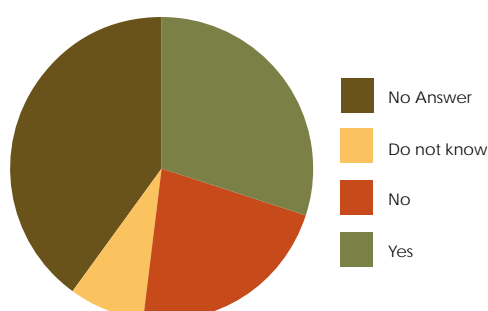
Figure 29 shows that most responding governments (47%) are not conducting initiatives to provide information and education to citizens about Internet safety and literacy, with 41% reporting that they do.

**Figure 29: Government Initiatives on internet safety and literacy**



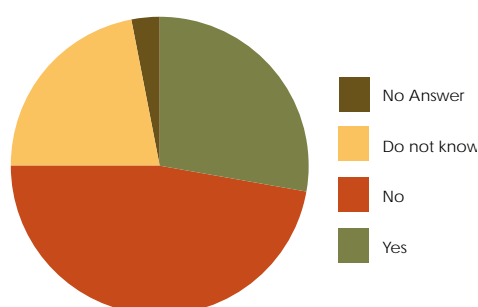
Thirty per cent of countries running these initiatives have ones specifically targeted at children and 22% do not. Many countries did not answer the question (Figure 30).

**Figure 30: Government initiatives on Internet safety and literacy, aimed specifically to protect children**



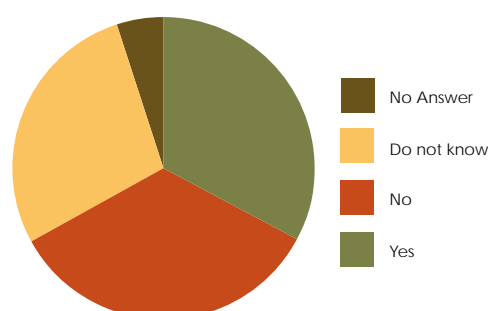
Increasingly, safety tools and security technologies (such as filters, blocks or monitors) are required by law for schools, libraries and other public places with Internet facilities used by children. Although 28% of countries report having taken these measures, the majority (47%) currently do not have such arrangements. Twenty-two per cent of responding countries did not know what the current status was (Figure 31).

**Figure 31: Law requires safety technologies to be applied to protect children's use of Internet in public places**



Internet service providers are increasingly being mandated to provide online safety tools or technologies to protect children. The survey found that 33% of responding countries are providing these tools through their service providers and 34% are not. A large proportion of countries (33%) either did not know or did not answer the question (Figure 32).

**Figure 32: Internet Service Providers legally mandated to provide online safety technologies to protect children**



## Discussion

Governments are beginning to assume the responsibility of providing information and education about Internet safety and literacy for their citizens. The ITU has provided guidelines for policy-makers for Child Online Protection (COP) (31). Developed with leading institutions active in the ICT sector and in child online safety, these guidelines enable ITU Member States to meet their obligations towards protecting and realizing the rights of children as laid out in the UN Convention on the Rights of the Child (32).

As with all baseline studies, the value increases as further work is done and progress is measured. For example, the International Centre for Missing and Exploited Children (ICMEC) first undertook a global study in 2006, finding that 51% of countries had no legislation at all to specifically address child pornography; their 2012 report shows that this has dropped to 35%. This GOe survey found that 30% of CoIA countries have initiatives targeted at children (albeit 48% did not know their country's status or did not answer). This suggests that the countries are not dissimilar from countries around the world on this particular indicator of online safety for children.

While the training of health workers may have to address their fears about Internet usage, children are adept at teaching themselves. The evolution of the “Hole in the Wall” experiments of Sugata Mitra (33) suggests that groups of children can learn from scratch how to use computers (provided in a public space) and access and benefit from Internet resources entirely on their own. It is of concern, therefore, that in only 33% of responding countries are Internet Service Providers offering online safety tools to protect children.

## Privacy

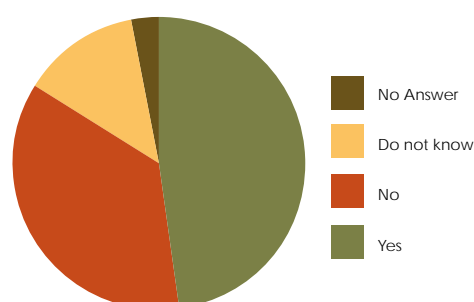
### Introduction

Privacy laws are an essential component of any policy environment that seeks to strengthen eHealth services; they enable the safe collection, manipulation, storage and retention of personally identifiable data<sup>9</sup>, whether in analogue or digital format. These laws are particularly necessary to protect health-related data<sup>10</sup> held in electronic health records (EHR) or electronic medical records (EMR). This is because they determine the rights of diverse stakeholders, from the owner of the record, to health-care providers and insurance companies, among others, to collect, access, correct, and share this sensitive information across geographical and health sector boundaries. The GOe survey asked if there was legislation to protect the privacy of personally-identifiable data, in particular that held in electronic health records, as well as legislation permitting the sharing of health-related data, and arrangements for securing consent.

### Results

As illustrated in Figure 33, CoIA countries are already making strides in protecting the privacy of personally-identifiable data, with 48% of them having passed legislation on this issue.

**Figure 33: CoIA countries with legislation that protects the privacy of personally identifiable data**

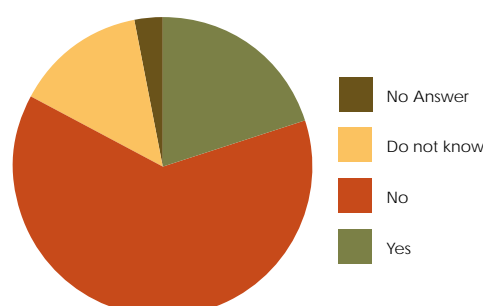


<sup>9</sup> Personal identifiable data is information that can be used on its own or in connection with other information to specifically identify an individual. This includes, but is not limited to, names, date of birth, addresses, telephone numbers, occupations, photographs and fingerprints, regardless of the format or medium in which it is held. Source: Global Observatory for eHealth, 2012: [http://whqlibdoc.who.int/publications/2012/9789241503143\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2012/9789241503143_eng.pdf?ua=1).

<sup>10</sup> Health-related data is information recorded about an individual including their illnesses and prescribed treatments. It generally includes details of prescribed medication, and any medical or surgical procedures undertaken, as well as treatments received from other health providers. Source: Global Observatory for eHealth, 2012: [http://whqlibdoc.who.int/publications/2012/9789241503143\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2012/9789241503143_eng.pdf?ua=1).

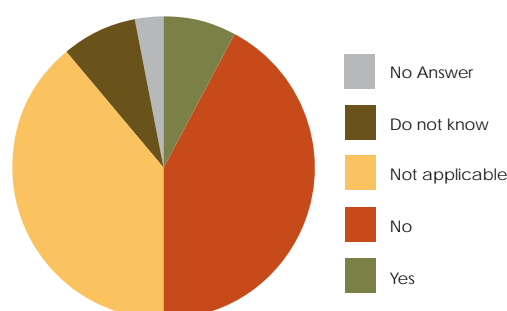
Privacy protection of digital health-related data held in EHRs or EMRs, however, is less extensive, with only 20% of the countries having specific legislation on this issue, namely Azerbaijan, Burkina Faso, Equatorial Guinea, Ethiopia, Ghana, Indonesia, Mexico, Niger, Peru, Rwanda, Togo, Uzbekistan, and Zambia (Figure 34).

**Figure 34: CoLA countries with legislation that protects the privacy of health-related data held in digitized format in an EHR or EMR**



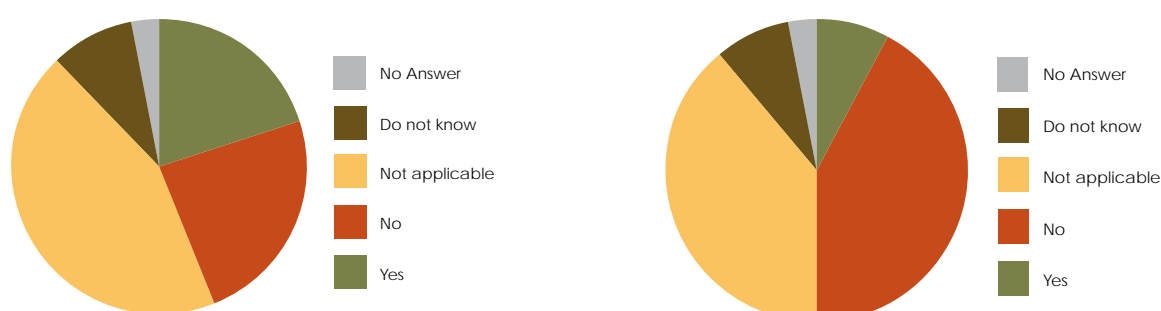
Regarding the creation of electronic health records or medical records for children, the majority (81%) of the responding countries do not require explicit parental consent to create such records or for the topic to be not applicable to their current situation (Figure 35). Only Azerbaijan, Ghana, Ethiopia, Rwanda, and Zambia (8%) have reported requiring explicit parental consent to create an electronic record belonging to a child.

**Figure 35: Countries requiring explicit parental consent to create a child's EHR or EMR**



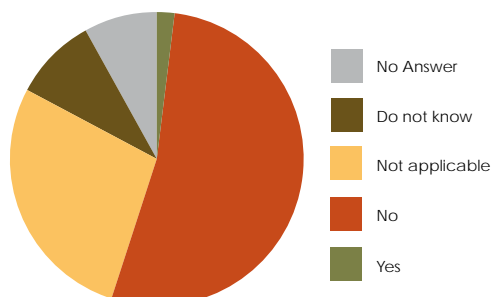
However, parents are granted access to and the right to correct any errors found in their children's EHR or EMR in a larger number of responding CoLA countries. As illustrated in Figure 36, 20% of them allow parental access and another 17% (11 countries) entitle parents to ask for corrections in their children's EHRs or EMRs, if an error is found. But a greater (24%) or identical (17%) percentage of CoLA countries reported not allowing parental access to or the right to correct their children's records, respectively. Most countries (44% and 52%, respectively) simply do not have provisions on either of these topics (e.g. "not applicable").

**Figure 36: Countries allowing parental access to and right to correct errors found in a child's EHR or EMR**



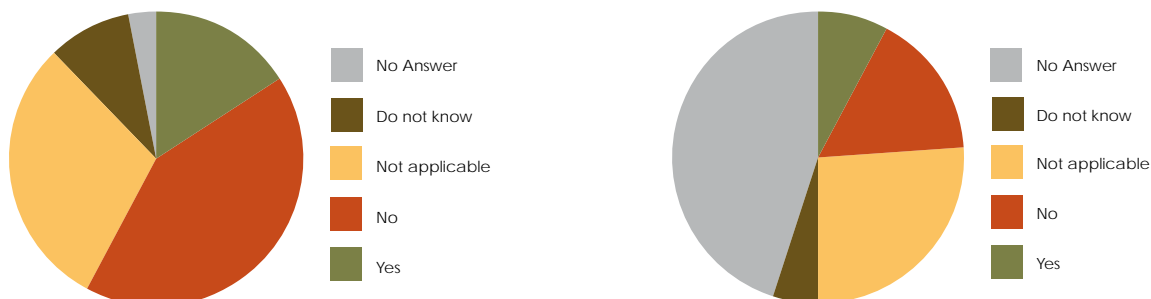
Of the 64 responding countries only Turkmenistan has passed legislation that allows children the right to control their individual electronic health record or EMR at age 16. As Figure 37 shows, this right is either not granted in 53% of the responding countries or the situation is not applicable in 28% of those countries.

**Figure 37: Countries have legislation that grants children the right to control their individual EHR or EMR**



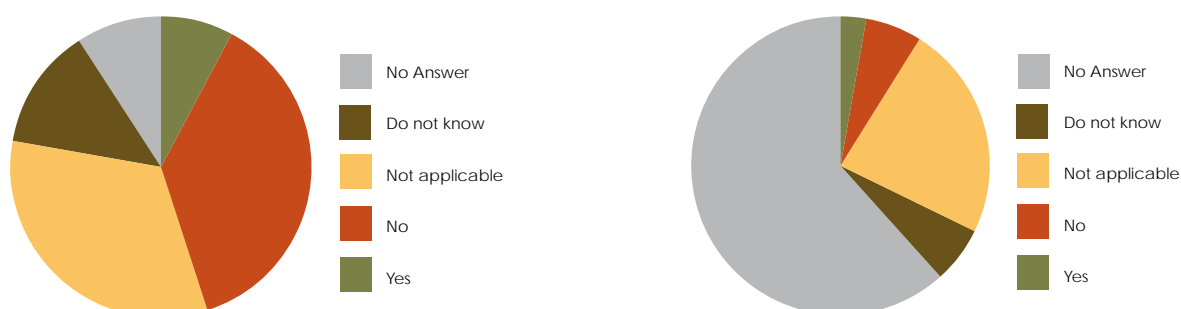
Another important aspect of privacy legislation concerns who can share health-related data across the health sector and beyond national boundaries. According to the country survey responses (Figure 38), only 16% – Azerbaijan, Burkina Faso, Ghana, Mexico, Peru, Rwanda, Turkmenistan, Uzbekistan, Yemen and Zambia – currently have legislation that enable sharing health-related data among national health-care entities through an electronic record; of those, only Ghana, Peru, Turkmenistan, Uzbekistan and Zambia (8%) require parental consent to disclose the information. Once again, most countries either lack this type of legislation (42%) or their current situation makes it not applicable (30%).

**Figure 38: Countries with legislation that enables sharing health-related data between national health-care entities through electronic records**



Similarly, only a few countries have legislation that allows the disclosure of health-related data with health-care facilities in other countries. Burkina Faso, Indonesia, Rwanda, Turkmenistan and Uzbekistan (8% of the countries) indicated doing so, and of them, only Uzbekistan and Turkmenistan (3%) require parental consent to share this information (Figure 39). As in the case of national health entities, most CoIA countries have not yet passed this type of legislation (37%) or the situation is not applicable (33%) for these countries.

**Figure 39: Countries with legislation that enables sharing health-related data with national health-care entities in other countries through electronic records**



## Discussion

The increasing ease of access to online services and applications means that it is increasingly important to find appropriate ways to ensure the privacy of personally identifiable data, and the secondary uses that can be made of it. The survey found that 48% of countries have legislation to ensure the privacy of personally identifiable data, but that only 20% (13 countries) have legislation protecting health-related data, and 16% (10) of these countries have legislation that enables the sharing of health-related data between health-care staff through an electronic health record.

Introducing appropriate privacy legislation – whether in general or for health purposes in particular – poses significant challenges. There are benefits in being able to share electronic health records to enable better informed clinical decision-making and continuity of care; there are also benefits in giving patients control of their own health records, whether these are digital or paper. For example, some research (34) in developing countries shows that mothers holding their maternal and/or child health-care records have better outcomes in health-care and preventative measures, and also suggests that providing targeted health messages to mothers regarding their own health and that of their children might best be accomplished through mobile technologies.

Privacy concerns surrounding the use of mobile technologies in general, and for mothers and health workers in particular, require ongoing attention. Another reason for privacy legislation involves the secondary uses of data. Legislation concerning privacy, where the focus is the control over information, who can access it and how it is used, needs to be distinguished from the policies of “open data”. Open data is generally defined as data made accessible, in formats that can be manipulated by computers (allowing the creation of new interfaces, mash-ups and other data analysis), and without restrictions on how the data can be re-used (35).

There are now huge flows and stores of data on the Internet, including social media, and administrative data stores in government and the private sector. Taking these, together with interactive data collection using mobile technologies, is becoming a viable way of assembling information for decision-taking. The volume of the data collected from these sources may be so large and complex that it becomes difficult to process using traditional data processing applications. Typically, then, it is known as “big data”, and there are many new data analysis and business intelligence tools emerging to use, or “mine”, it. However, there are concerns about personal privacy and private ownership of data (particularly health data), as well as accountability and transparency issues, and these may need different legislation governing private data institutions and national statistical services (36). The slow assembly of data to support CoIA Recommendations 1-4, and the delays in monitoring it, coupled with the increasingly ubiquitous use of mobile phones, social media, and the value that can be extracted from “big data”, suggests that RMNCH policy development should consider the privacy, open data and big data issues.



## Addressing the challenges of implementing eHealth services

### Introduction

Understanding the barriers to the implementation of eHealth services is key to identifying the actions and policies required to move forward. The barriers first identified in the GOe 2009/2010 survey are still relevant today.

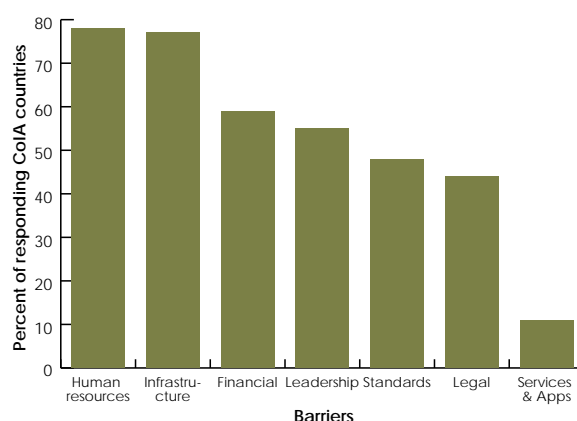
- **Leadership, governance and policy:** Country policy or strategy does not include eHealth as an approach to support women's and children's health;
- **Legal:** Absence of legal frameworks to support the implementation of eHealth services;
- **Infrastructure:** Not yet adequate, accessible, or cost-effective to support desired services;
- **Standards:** Lack of nationally-adopted standards (e.g. ICD, DICOM, HL7, SNOMED) for the systematic adoption of eHealth services or health information systems;
- **Human resources:** Not enough suitably-qualified or experienced professionals who can develop and implement eHealth projects and promote their use;
- **Services and applications:** Existing eHealth services are inaccessible, unaffordable, or not appropriate for needs; and
- **Financial:** Funding for investment of eHealth services does not match demand; business models not yet developed for broad and sustainable eHealth delivery.

Respondents were asked to select from the above list those barriers of most relevance to them.

### Results

Ninety five per cent of the countries identified at least one barrier affecting the implementation of their eHealth services (Figure 40). The lack of suitably-qualified or experienced health-care professionals (78%), and infrastructure (77%) were identified as important barriers. Other barriers reported by nearly half of the countries were financial (59%); leadership, governance and policy (55%); standards (48%); and legal (44%). The availability of services and applications themselves were not perceived as a major barrier (11%).

Figure 40: Barriers to the implementation of eHealth services, responding CoIA countries (%)



Barriers identified were not limited to the health sector. Some countries pointed out development barriers, such as the level of education and ICT literacy of the general population, as well as unreliable or non-existent electric power infrastructure, as factors that affect the availability and provision of eHealth services.

## Discussion

High-level political commitment is required to ensure that eHealth supports health priorities. This is best addressed comprehensively through eHealth strategies: assembling the stakeholders, agreeing on a strategic vision, developing an action plan, and creating a monitoring and evaluation process.

Countries are taking measures to overcome what they see as the most important barriers to eHealth implementation. For example, Turkmenistan has strengthened the legal framework for eHealth by adopting a law protecting citizens from the disclosure of confidential health information. Some, like Ghana, have started to address infrastructural barriers by conducting assessments in all districts. Others, like Gambia, have strengthened the links between the Ministries of ICT and Health through the provision of a server to support the DHIS2 system in the MoH.

To build human capacity, some countries have conducted ICT and application development training workshops in health centres and adopted university courses and advanced degrees to train health professionals on the use of ICT in the health sector. To attract investment, governments have helped establish public-private partnerships. International development partners continue to play an essential role in funding eHealth initiatives, besides supporting capacity-building and providing technical assistance. To address standardization barriers linked to coordination problems between its states, Mexico has established a health information committee, in charge of agreeing and regulating the operational rules for different HIS in the country.



## CONCLUSIONS AND RECOMMENDATIONS

The following recommendations are intended to help countries build on their achievements and support the further development of eHealth for women's and children's health.

### Use of ICT in the implementation of CoIA recommendations

**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 RMNCH.*
- **Recommendation:** *Identify and adopt ICT-enabled RMNCH resource tracking systems in alignment with other public expenditure information management systems.*

## National eHealth Strategies and eHealth programmes

### *Recommendations*

**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 web sites 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.*



## REFERENCES

1. World Health Organization (WHO). Millennium Development Goals 4 and 5 – The Partnership for Maternal, Newborn and Child Health, Geneva, World Health Organization, 2013 ([http://www.who.int/pmnch/about/about\\_mdgs/en/index.html](http://www.who.int/pmnch/about/about_mdgs/en/index.html), accessed 2 February 2014).
2. WHO. Global Strategy for Women's and Children's Health, United Nations Secretary-General – The Partnership for Maternal, Newborn and Child Health, Geneva, World Health Organization, 2010 (<http://who.int/pmnch/activities/jointactionplan/en>, accessed 2 February 2014).
3. United Nations Commission on Information and Accountability (CoIA). Keeping Promises, Measuring Results, Geneva, World Health Organization, 2011 ([http://www.who.int/topics/millennium\\_development\\_goals/accountability\\_commission/Commission\\_Report\\_advance\\_copy.pdf](http://www.who.int/topics/millennium_development_goals/accountability_commission/Commission_Report_advance_copy.pdf), accessed 2 February 2014).
4. International Telecommunication Union (ITU). ICT for improving Information and Accountability for Women's and Children's Health, Geneva, International Telecommunication Union, 2013 (<http://www.itu.int/en/ITU-D/ICT-Applications/Documents/CoIA%20Background%20ICT4RMNCH.pdf>, accessed 2 February 2014).
5. CoIA. Translating the Recommendations into Action – Workplan. Geneva, United Nations Foundation, 2011 ([http://www.everywomaneverychild.org/images/content/files/accountability\\_commission/Workplan\\_postCommission\\_final\\_20110921.pdf](http://www.everywomaneverychild.org/images/content/files/accountability_commission/Workplan_postCommission_final_20110921.pdf), accessed 2 February 2014).
6. WHO. Every woman, every child: from commitments to action: the first report of the independent Expert Review Group (IERG) on Information and Accountability for Women's and Children's Health, Geneva, World Health Organization, 2012 ([http://www.who.int/woman\\_child\\_accountability/ierg/reports/2012/IERG\\_report\\_low\\_resolution.pdf?ua=1](http://www.who.int/woman_child_accountability/ierg/reports/2012/IERG_report_low_resolution.pdf?ua=1), accessed 2 February 2014).
7. ITU. E-health Standards and Interoperability: ITU-T Technology Watch Report, Geneva, International Telecommunication Union, 2012 ([http://www.itu.int/dms\\_pub/itu-t/oth/23/01/T23010000170001PDFE.pdf](http://www.itu.int/dms_pub/itu-t/oth/23/01/T23010000170001PDFE.pdf), accessed 2 February 2014).
8. United Nations Children's Fund (UNICEF). Child Protection from Violence, Exploitation and Abuse, New York, United Nations Children's Fund, 2013 ([http://www.unicef.org/protection/57929\\_58010.html](http://www.unicef.org/protection/57929_58010.html), accessed 2 February 2014).
9. UNICEF. Implementation Handbook for the Convention on the Rights of the Child: Third Edition, New York, United Nations Children's Fund, 2007 ([http://www.unicef.org/publications/index\\_43110.html](http://www.unicef.org/publications/index_43110.html), accessed 2 February 2014).
10. WHO and UNICEF. Countdown to 2015: Maternal, Newborn & Child Survival: Building a Future for Women and Children, Geneva, World Health Organization, 2012 (<http://www.countdown2015mnch.org/documents/2012Report/2012-Complete.pdf>, accessed 2 February 2014).
11. WHO. Maternal mortality ratio (per 100 000 live births) – Health statistics and health information systems, Geneva, World Health Organization, 2014 (<http://www.who.int/healthinfo/statistics/indmaternalmortality/en>, accessed 2 February 2014).
12. WHO. Making pregnancy safer: the critical role of the skilled attendant: A joint statement by WHO, ICM and FIGO, Geneva, World Health Organization, 2004 (<http://whqlibdoc.who.int/publications/2004/9241591692.pdf>, accessed 2 February 2014).
13. WHO. Accountability for Women's and Children's Health – Second progress report on implementation of the Commission's recommendations: Translating recommendations into action. Geneva, World Health Organization, 2013 ([http://www.who.int/woman\\_child\\_accountability/about/COIA\\_Report\\_2013.pdf](http://www.who.int/woman_child_accountability/about/COIA_Report_2013.pdf), accessed 2 February 2014).

14. Organization for Economic Co-operation and Development (OECD), European Union (EU), and WHO. A System of Health Accounts, 2011 ([http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-30-11-270/EN/KS-30-11-270-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-30-11-270/EN/KS-30-11-270-EN.PDF), accessed 2 February 2014).
15. WHO. Guide to producing child health subaccounts within the national accounts framework, Geneva, World Health Organization, 2012 (<http://www.who.int/nha/chsubrcolumn.pdf>, accessed 2 February 2014).
16. WHO. Everybody's business – Strengthening health systems to improve health outcomes: WHO's framework for action, Geneva, World Health Organization, 2007 ([http://www.who.int/healthsystems/strategy/everybodys\\_business.pdf](http://www.who.int/healthsystems/strategy/everybodys_business.pdf), accessed 2 February 2014).
17. Global Observatory for eHealth (GOe). Directory of eHealth policies, Geneva, World Health Organization, 2014 (<http://www.who.int/goe/policies/countries/en/index.html>, accessed 2 February 2014).
18. WHO. World Health Assembly Resolution WHA58.28 eHealth, Geneva, World Health Organization, 2005 ([http://apps.who.int/iris/bitstream/10665/20378/1/WHA58\\_28-en.pdf](http://apps.who.int/iris/bitstream/10665/20378/1/WHA58_28-en.pdf), accessed 2 February 2014).
19. WHO. World Health Assembly A66/26 eHealth and health internet domain names, Geneva, World Health Organization, 2013 ([http://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_26-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_26-en.pdf), accessed 2 February 2014).
20. WHO. World Health Assembly EB132.RS eHealth standardization and interoperability, Geneva, World Health Organization, 2013 ([http://apps.who.int/gb/ebwha/pdf\\_files/EB132/B132\\_R8-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/EB132/B132_R8-en.pdf), accessed 2 February 2014).
21. ITU. National eHealth Strategy Toolkit, Geneva, International Telecommunication Union, 2012 ([http://www.itu.int/pub/D-STR-E\\_HEALTH.05-2012](http://www.itu.int/pub/D-STR-E_HEALTH.05-2012), accessed 2 February 2014).
22. Free C et al. The effectiveness of mobile-health technology-based health behaviour change or disease management interventions for health care consumers: A systematic review. *PLoS Medicine*. 2013, 10:e1001362 (<http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001362>, accessed 2 February 2014).
23. Rockefeller Foundation. From silos to systems: an overview of eHealth's transformative power, New York, Rockefeller Foundation, 2010 ([http://www.rockefellerfoundation.org/uploads/files/e331d255-059f-4fc6-b814-5938f8ee017e-rf.silos\\_1-13.pdf](http://www.rockefellerfoundation.org/uploads/files/e331d255-059f-4fc6-b814-5938f8ee017e-rf.silos_1-13.pdf), accessed 2 February, 2014).
24. United Nations Population Fund (UNFPA). The State of the World's Midwifery Report – Delivering Health, Saving Lives, New York, United Nations Population Fund, 2011 ([http://www.unfpa.org/sowmy/resources/docs/main\\_report/en\\_SOWMR\\_Full.pdf](http://www.unfpa.org/sowmy/resources/docs/main_report/en_SOWMR_Full.pdf), accessed 2 February 2014).
25. WHO. The World Health Report – Working together for health, Geneva, World Health Organization, 2006 (<http://www.who.int/whr/2006/en/index.html>, accessed 2 February, 2014).
26. Rosskam E, Pariyo G, Hounton S, and Aiga H. Midwifery Workforce Management and Innovation –Background document for The State of the World's Midwifery, 2011 ([http://www.who.int/workforcealliance/knowledge/resources/Alliance\\_backgrd\\_SWMR\\_june2011.pdf](http://www.who.int/workforcealliance/knowledge/resources/Alliance_backgrd_SWMR_june2011.pdf), accessed 2 February 2014).
27. Global Health Workforce Alliance. First kick-off meeting of the Community of Practice for Maternal, Newborn and Child Health Workers, Geneva, World Health Organization, 2012 (<http://www.who.int/workforcealliance/media/news/2012/copcameroon/en>, accessed 2 February 2014).
28. WHO. World Health Report – Research for universal health coverage, Geneva, World Health Organization, 2013 (<http://www.who.int/whr/2013/report/en/index.html>, accessed 2 February 2014).
29. eStrategies Africa. Workshop Report: Trust and collaboration - from strategy to implementation, 2012 ([http://www.estrategies.co.za/files/120858\\_final\\_mag\\_all\\_low\\_res.pdf](http://www.estrategies.co.za/files/120858_final_mag_all_low_res.pdf), accessed 2 February, 2014).
30. ITU and United Nations Educational, Scientific and Cultural Organization (UNESCO). Doubling digital opportunities - Enhancing the inclusion of women and girls in the information society: A report by the Broadband Commission Working Group on Broadband and Gender, 2013 (<http://www.broadbandcommission.org/documents/working-groups/bb-doubling-digital-2013.pdf>, accessed 2 February 2014).
31. ITU. Guidelines for Policy Makers on Child Online Protection, Geneva, International Telecommunication Union, 2009 ([http://www.itu.int/osg/csd/cybersecurity/gca/cop/guidelines/policy\\_makers/policy\\_makers.pdf](http://www.itu.int/osg/csd/cybersecurity/gca/cop/guidelines/policy_makers/policy_makers.pdf), accessed 2 February 2014).
32. UNICEF. Convention on the Rights of the Child, New York, United Nations Children's Fund, 2013 (<http://www.unicef.org/crc>, accessed 2 February 2014).
33. Mitra S and Dangwal R. Limits to self-organising systems of learning: the Kalikuppam experiment. *British Journal of Educational Technology*, 2010, 41(5): 672–688 (<http://www.hole-in-the-wall.com/docs/Paper13.pdf>, accessed 2 February 2014).
34. Turner K and Fuller S. Patient-Held Maternal and/or Child Health Records: Meeting the Information Needs of Patients and Health-care Providers in Developing Countries? *Online Journal of Public Health Informatics*, 2011, 3(2): 1-48 (<http://ojphi.org>, accessed 2 February 2014).
35. Open Data Research Network. Open Data & Privacy – Discussion Notes, Open Data Research Network, 201 (<http://www.opendataresearch.org/content/2013/501/open-data-privacy-discussion-notes>, accessed 2 February 2014).
36. United Nations System Task Team. Statistics and Indicators for the post-2015 Development Agenda, New York, United Nations, 2013 ([http://www.un.org/en/development/desa/policy/untaskteam\\_undf/UNTT\\_MonitoringReport\\_WEB.pdf](http://www.un.org/en/development/desa/policy/untaskteam_undf/UNTT_MonitoringReport_WEB.pdf), accessed 2 February 2014).



37. Republic of Zambia and the National AIDS Council, 2012, Zambia Country Report: Monitoring the Declaration of Commitment on HIV and AIDS and the Universal Access. Biennial Report. Submitted to the United Nations General Assembly Special Session on HIV and AIDS.
38. UNICEF. Innovate for Children Project Mwana: Overview and Project Updates, New York, United Nations Children's Fund, 2012 (<http://unicefinnovation.org/projects/project-mwana>, accessed 2 February 2014).
39. Seidenberg P et al. Early infant diagnosis of HIV infection in Zambia through mobile phone texting of blood test results. *Bulletin of the World Health Organization*, 2012, 90:349-353.
40. UNICEF. Project Mwana: System Overview and Evaluation, New York, United Nations Children's Fund, 2008 ([http://unicefinnovation.org/sites/unicef.jjcddev2.com/files/Project\\_Mwana\\_Zambia\\_Evaluation\\_0.pdf](http://unicefinnovation.org/sites/unicef.jjcddev2.com/files/Project_Mwana_Zambia_Evaluation_0.pdf), accessed 2 February 2014).
41. Beck E. Project Mwana. Change Observer, The Design Observer Group, 2011 (<http://changeobserver.designobserver.com/feature/project-mwana/27138>, accessed 2 February 2014).
42. UNICEF East and Southern Africa Regional Office (ESARO). Case Study of Narrowing the Gaps for Equity: Zambia, New York, United Nations Children's Fund, 2011 ([http://www.unicef.org/equity/files/ICON\\_Equity\\_Case\\_Study\\_Zambia\\_Final.pdf](http://www.unicef.org/equity/files/ICON_Equity_Case_Study_Zambia_Final.pdf), accessed 2 February 2014).
43. WHO, UNICEF, UNFPA, The World Bank. Trends in Maternal Mortality: 1990 to 2010 – WHO, UNICEF, UNFPA and The World Bank estimates, Geneva, World Health Organization, 2012 ([http://whqlibdoc.who.int/publications/2012/9789241503631\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2012/9789241503631_eng.pdf?ua=1), accessed 2 February 2014).
44. Save the Children. State of the World's Mothers Report, Save the Children Organization, 2013 ([http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/SOWM-FULL-REPORT\\_2013.PDF](http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/SOWM-FULL-REPORT_2013.PDF), accessed 2 February 2014).
45. Government of India. National Rural Health Mission – State Wise Progress as on 30.06.2012, New Delhi, 2013 ([http://www.mohfw.nic.in/NRHM/Documents/MIS/Statewise%20Progress%20under%20NRHM\\_Status%20as%20on%2030.06.2012.pdf](http://www.mohfw.nic.in/NRHM/Documents/MIS/Statewise%20Progress%20under%20NRHM_Status%20as%20on%2030.06.2012.pdf), accessed 2 February 2014).
46. Government of India. Office of the Registrar General and Census Commissioner. SRS Bulletin. 46(1), 2011 (<http://pib.nic.in/archieve/others/2012/feb/d201202102.pdf>, accessed 2 February 2014).
47. Government of India. Sample Registration System on Maternal Mortality in India 2007-2009. SRS Bulletin. 46(1), 2011 ([http://www.censusindia.gov.in/vital\\_statistics/SRS\\_Bulletins/Final-MMR%20Bulletin-2007-09\\_070711.pdf](http://www.censusindia.gov.in/vital_statistics/SRS_Bulletins/Final-MMR%20Bulletin-2007-09_070711.pdf), accessed 2 February 2014).
48. Government of India. Ministry of Health and Family Welfare District Level Health Survey 2007-08, Mumbai, Ministry of Health and Family Welfare, 2009 ([http://www.rchiips.org/pdf/INDIA\\_REPORT\\_DLHS-3.pdf](http://www.rchiips.org/pdf/INDIA_REPORT_DLHS-3.pdf), accessed 2 February 2014).
49. Government of India. Ministry of Health and Family Welfare – National Family Health Survey 2005-2006, Mumbai, Ministry of Health and Family Welfare, 2007 ([http://www.measuredhs.com/pubs/pdf/FRIND3/FRIND3-Vol1\[Oct-17-2008\].pdf](http://www.measuredhs.com/pubs/pdf/FRIND3/FRIND3-Vol1[Oct-17-2008].pdf), accessed 2 February 2014).
50. Government of India. Annual Report to the People on Health. New Delhi, Ministry of Health and Family Welfare, 2011 (<http://mohfw.nic.in/WriteReadData/1892s/6960144509Annual%20Report%20to%20the%20People%20on%20Health.pdf>, accessed 2 February 2014).
51. Dilip TR and Mishra US. Social Divide in Maternal Health Care Use in Rural India: The Relative Impact of Education and Economic Status. *International Union for the Scientific Study of Population (IUSSP)*, 2009 (<http://iussp2009.princeton.edu/papers/90364>, accessed 2 February 2014).
52. WHO and UNICEF. Countdown to 2015: Maternal, Newborn & Child Survival: Accountability for Maternal, Newborn and Child Survival, Geneva, World Health Organization, 2013 ([http://www.countdown2015mnch.org/documents/2013Report/Countdown\\_2013-Update\\_withprofiles.pdf](http://www.countdown2015mnch.org/documents/2013Report/Countdown_2013-Update_withprofiles.pdf), accessed 2 February 2014).
53. Ngabo F et al. Designing and implementing an innovative SMS-based alert system (RapidSMS-MCH) to monitor pregnancy and reduce maternal and child deaths in Rwanda. *The Pan African Medical Journal*, 2012, 13:31.
54. Kalach J. Saving mothers and newborn lives in the community using RapidSMS technology – Experience from Musanze District of Rwanda. Presentation at the International Conference on Community Health, Kigali, 2011 (<http://mhealthinfo.org/project/saving-mothers-and-newborns-using-rapidsms>, accessed 2 February 2014).
55. United States Agency for International Development (USAID). mHealth Compendium – Technical Report, Edition One, Integrated Health Systems Strengthening Project – IHSSP: RapidSMS, 2012 (<http://www.msh.org/sites/msh.org/files/2012-usaid-mhealth-compendium-web.pdf>, accessed 2 February 2014).
56. Holland H. Text messages save pregnant Rwandan women. *Reuters.com*, 2010 (<http://www.reuters.com/article/2010/05/28/us-rwanda-health-idUSTRE64R2CL20100528>, accessed 2 February 2014).
57. Birakwate B. South Korea and UNICEF Rwanda sign \$4.5m agreement. *AllAfrica.com*, 2013 (<http://allafrica.com/stories/201308090565.html>, accessed 2 February 2014).





# ANNEX 1: CASE STUDIES

This annex contains three national case studies of eHealth that were commissioned for this report. They illustrate some of the potential impact that eHealth projects can have when implemented on a national scale. The three studies relate to:

- Using text messaging to accelerate early infant HIV diagnosis in rural Zambia;
- Using ICT to track pregnancy, ensure proper maternal care and provide services for newborns and infants in Uttar Pradesh, India; and
- Using a text messaging alert system to improve maternal and child health in Rwanda.



# Case study

## Programme Mwana: Text messaging accelerates early infant HIV diagnosis in rural Zambia

### PROJECT AT-A-GLANCE

Start date:	2009
Objectives:	Reduce delays in early infant diagnosis for HIV and improve follow-up postnatal treatment through the use of short message service (SMS)
Technology:	Wireless cellular telephony / RapidSMS software
Partners:	Public-private partnership between the Ministry of Health (MoH) Zambia, UNICEF, the Boston University's Affiliate Zambia Centre for Applied Health Research and Development (ZCHARD), the Clinton Health Access Initiative (CHAI), the Zambia Prevention Care & Treatment Partnership (ZPCT), along with other partners with specific expertise
Status:	Ongoing and scaling-up to the national level since 2011

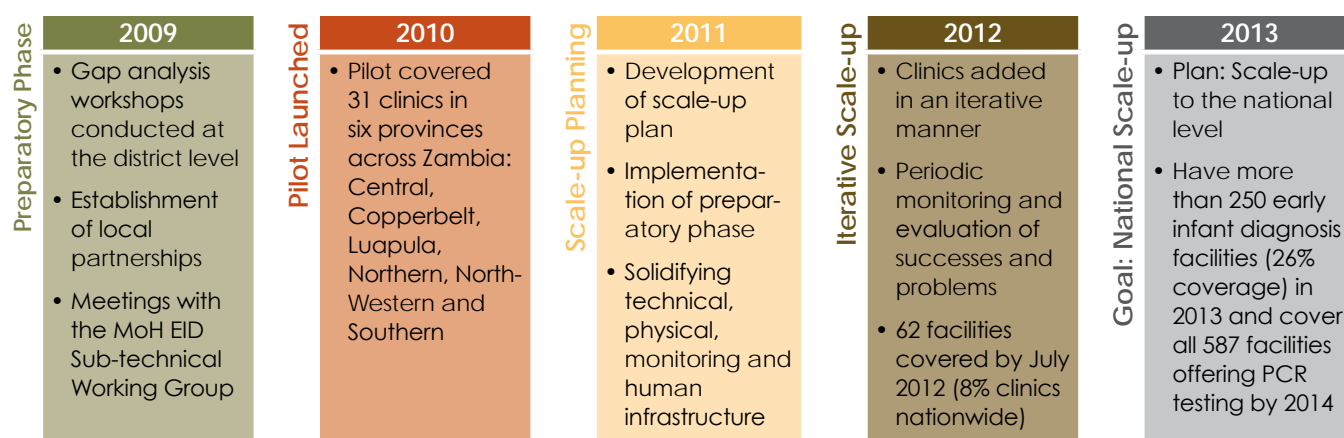
### Context

Decreasing the rate of new HIV infections, particularly among newborn babies, as well as dropping the mortality rates for infants and children under five remain challenging goals. Meeting the MDG targets by 2015 and moving forward in the fight against HIV/AIDS will require significant reforms, innovation and investment.

Zambia is demonstrating its commitment by improving the speed of early infant diagnosis (EID) for HIV. This effort targets

infants six weeks post-delivery to 12 months old. In 2011, it was estimated that only 27% of the infants born to HIV-infected women in the country received a virological test for HIV within two months of birth (37). However, evidence shows that early diagnosis of babies born to HIV-infected mothers can substantially decrease HIV-related morbidity. Most importantly, it can increase by 75% the probability of survival of the infected children, by speeding up the start of anti-retroviral treatment (ART) before the first 12 weeks of life (38). In contrast, an HIV-positive infant who does not receive ART therapy has less than a 50% chance of surviving to the age of two.

Figure 41: Project Mwana's timeline (2009 – 2013)



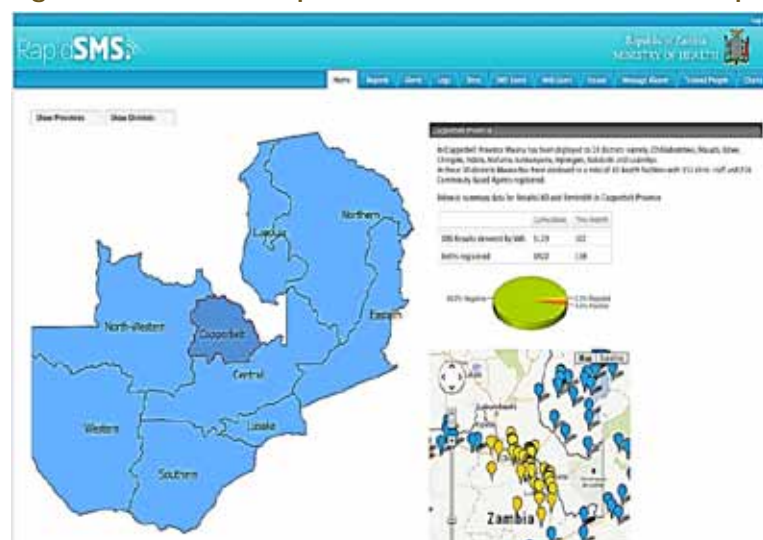
Source: UNICEF. Innovate for Children: Project Mwana; Seidenberg P et al (2012).

Just a few years ago, infant testing for HIV was almost non-existent in Africa. This was due to the need for a specialized PCR<sup>11</sup> test used in diagnosing HIV in infants, which tests directly for HIV DNA rather than for the HIV antibody used in older children and adults testing.

Zambia has only three national testing laboratories equipped to conduct the PCR test. Zambia's geography, climate, limited road infrastructure and an unreliable transport system are among other obstacles to timely testing of blood samples. Thus, there have been long turnaround times for diagnosis at the specialized laboratories (39), particularly for blood tests originating in hard-to-reach areas, such as remote and rural populations. In 2008, the time elapsed from the collection of the baby's blood sample to the delivery of the diagnosis to the baby's mother or caregiver was estimated in 2008 at a national average of 66 days or 9.5 weeks (40). This delay is problematic, considering that an HIV infection acquired perinatally tends to progress rapidly (39). Figure 43 shows how the turnaround process has been reduced from an average of 66 days to an average of 35 days.

## Programme Mwana and the role of ICT

Figure 42: Mwana's implementation results shown at the province level



Source: RapidSMS/Republic of Zambia Ministry of Health. See: <https://mwana.moh.gov.zm>

To address this critical delay in EID for HIV, the Zambian Ministry of Health and UNICEF co-funded and led the mHealth programme Mwana in 2009. This is being implemented in collaboration with Boston University's affiliate ZCHARD, CHAI, and ZPCT. Programme Mwana pursues two objectives: (1) implementing a reliable and sustainable solution to speed up the transmission of HIV test results from the regional laboratories to the local health facilities, consequently fast-tracking the ART treatment for those babies diagnosed as HIV positive, and (2) improving the rate of postnatal

<sup>11</sup> PCR refers to the Polymerase Chain Reaction (PCR) process used to amplify specific cloned or genomic DNA sequences. Source: PCR Lab, 2014: [http://faculty.unlv.edu/wmojica/PCR\\_LAB2.htm](http://faculty.unlv.edu/wmojica/PCR_LAB2.htm).



follow-up through an application that reminds mothers of critical clinical appointments for their newborn babies. The programme started with a pilot in 31 clinics across six provinces of Zambia, and in 2011, it started moving towards its national implementation (Figure 41).

Programme Mwana takes advantage of the extended mobile telephony coverage across Zambia, where three out of every four people have a mobile-cellular subscription<sup>12</sup> and text messages are well accepted and valued. Supported by a customized version of UNICEF's RapidSMS software – a free and open source code-based programming framework – the programme uses text messages (short message service or SMS) to deliver two mobile solutions:

**Results160:** This government-owned and operated software package utilises SMS services to deliver HIV test results automatically and securely directly from the laboratory to the health-care facilities through a central server located at the MoH. To respond to local needs and develop local capacity, the software was customized in part with the support of local software developers<sup>13</sup>. Using the MoH central SMS system as a hub, Results160 sends test result data to the mobile-cellular telephone operators supporting the system. They relay free SMS messages to health-care providers who have registered their personal mobile handsets onto the MoH system securely and/or to SMS printers at the health-care facility, notifying that test results are available for retrieval. To ensure security and confidentiality, registered staff are required to use a personal identification number (PIN) to retrieve the results<sup>14</sup>.

The use of PINs also increases system accountability, as the software keeps track of the member of staff who retrieved the results and notifies the worker's name to the other registered staff at the facility. In addition, Results160 enables the clinic staff to request specific results, ask for help from support staff, and exchange information with the hub about the number of dried blood spot (DBS) samples sent and received. Moreover, Results160 has a secured web interface, accessible to the government and the programme partners, able to generate aggregated online reports of DBS tests for real-time alerts, monitoring, and mapping of results (Figure 42).

**RemindMi:** The Remind Mothers and Infants or “RemindMi” application is a client tracing system that seeks to improve infant postnatal treatment through SMS reminders. The system notifies community based agents, via SMS, of upcoming appointments for all the local infants whose births have been registered into the system. The postnatal check-up reminders follow Zambia's postnatal care schedule with appointments at six-days, six-weeks, and six-months after birth, aiming to address the prevalent loss of follow-up medical care in rural areas. The community agents play the essential role of tracking the mothers and encouraging them to return to the health facility for the postnatal check-up (41).

<sup>12</sup> In 2012, Zambia reported having 75.8 mobile-cellular telephone subscriptions per 100 inhabitants. Source: ITU, 2013: <http://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

<sup>13</sup> In partnership with the UNICEF Innovation team, Caktus Group, an expert partner for the project, conducted a needs assessment and helped customized the RapidSMS software, based on feedback from local health workers. As part of the customization, the system provides information in English and Bemba. Caktus' lead developer and project mentor were paired with two ongoing local developers and one ongoing local project manager to create local capacity. Source: Caktus Group, 2014: <http://www.caktusgroup.com/case-study/project-mwana>.

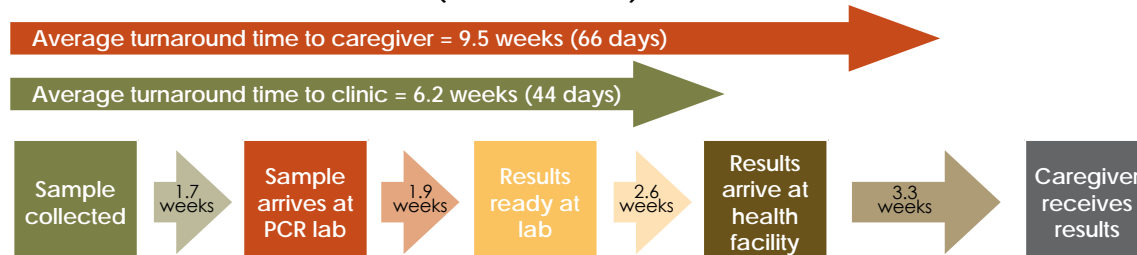
<sup>14</sup> Test results are formatted to fit in different phone screen sizes. A separate SMS reminds the user to enter the data into the clinic's DBS register and delete the results from the phone for security purposes. Source: Center for Health Market Innovations (CHMI). Source: Health Market Innovations, 2012: <http://healthmarketinnovations.org/program/project-mwana>.

## ICT impact

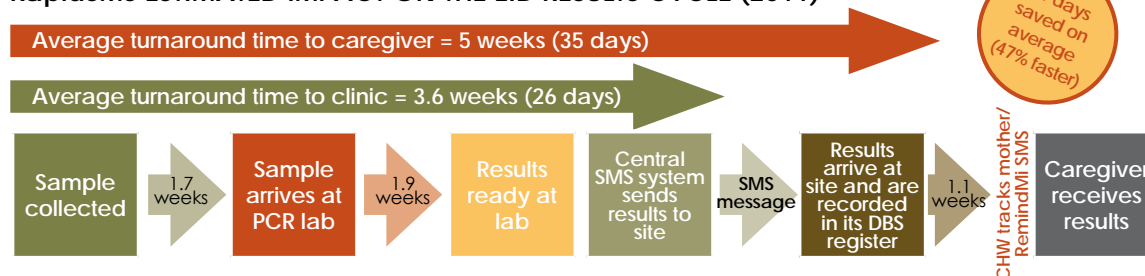
As of August 2013, Programme Mwana has been deployed to 496 health facilities in 10 Zambian provinces, supported by a clinic staff of 1,338 and 1,918 registered community based agents<sup>15</sup>. Since the inception of the programme Mwana, the use of RapidSMS has increased the average number of HIV test results received, as well as the accuracy of the results delivered, compared to those recorded on paper. As of August 2013, the Results160 system had delivered a total of 21,208 HIV test results via SMS. Of these tests, only 6% of the infants were diagnosed as HIV positive.

**Figure 43: Impact of Results160 in Zambia (as of 2011)**

### PAPER-BASED EID RESULTS CYCLE (2008 ESTIMATE)\*



### RapidSMS ESTIMATED IMPACT ON THE EID RESULTS CYCLE (2011)\*\*



\* National average of 2008, including rural and urban. Source: MoH and Clinton H/A (2008). Early Infant Diagnosis: System Summary.

\*\* Based on a sample of 10 health facilities in the Southern Province, over 19 months (hard copy) and 7.5 months (SMS). See: Siedenberg P et al (2012).

Source: Republic of Zambia, Ministry of Health (2011, April 29). Project Mwana: System Overview and M&E. PowerPoint presentation, p. 12.

A 2011 preliminary monitoring and evaluation analysis<sup>16</sup> of Mwana's pilot phase showed that the use of SMS had dramatically accelerated the transmission of HIV test results from the laboratory to the health centre by providing the results instantly, thus eliminating the 2.6 weeks lapse previously needed for the hard-copy results to reach the point-of-care (Figure 43). Consequently, the lapse between the collection of samples and the delivery of results to the baby's caregiver has decreased significantly.

On average, the national turnaround time from sample collection to the delivery of diagnosis to the caregiver went down from 66 days using paper-based reports (2008) to an average of 35 days (2011) after the SMS platform implementation. This represents an average savings of 31 days (a 47% decrease), compared to the hard-copy method. The benefits of Results160 were particularly evident in facilities located in rural areas, despite differences on mobile network coverage with respect to those located in urban settings.

15 Up-to-date data on the implementation of Programme Mwana are available. Information accessible to the general public includes the cumulative and monthly number of DBS tests delivered through Results160 and the number of births registered using RemindMi in each of the Zambian provinces covered by the programme. Source: Republic of Zambia, Ministry of Health, 2013: <https://mwana.moh.gov.zm>.

16 The assessment results are based on a sample of test results received in 10 health facilities within two districts of Zambia's Southern Province. The report compares baseline data collected over 19 months before the implementation of the SMS system (1009 hard copy DBS test results) to a sample of 406 test results transmitted via SMS during 7.5 months after implementation. Source: Siedenberg, P et al (2012).

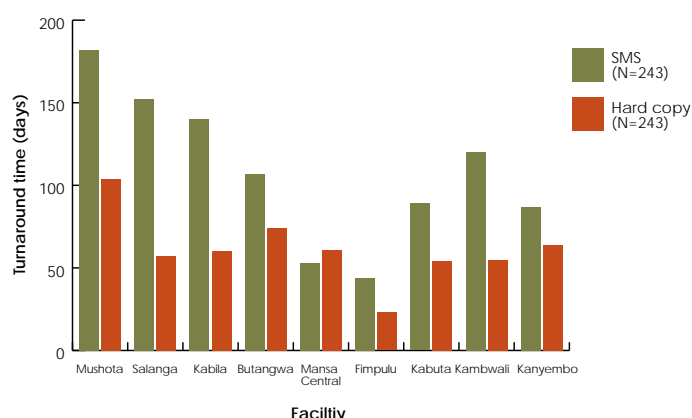
In the Luapula province, for example, rural facilities reported in 2011 a 46% decrease in turnaround time using SMS compared to hard copies (Figure 44); in contrast, the urban facilities in the province reported only a 5% decrease in turnaround time during the same period.

Similarly, since 2009, motivated community based agents have used the RemindMi application to send a cumulative 45,536 post-natal reminders and to register a total of 46,372 births in their catchment areas throughout the ten provinces as of August 2013. The agents also expressed high-levels of satisfaction regarding the ease of use of Results160, perceiving the overall SMS system as an added value to service delivery. Future evaluations expect to analyse the impact of SMS reminders on increasing adherence to post-natal appointments, as well as the relationship between faster turnaround time for results and earlier access to ART therapy among the infected infants (40).

The SMS platform has also strengthened patient tracing, coordination, and peer-to-peer learning between the clinic staff and community based agents, because of their access to free-text messages for internal communications and support<sup>17</sup>. Moreover, the initial fixed costs linked to setting up the SMS system – training and supervision, central server purchase, management and maintenance – have been partially recovered by savings in time and costs linked to travel previously needed to retrieve hard-copy results from the central laboratories. Additional investments needed for the national scale-up are expected to be relatively cost-efficient (39). UNICEF will continue its support by providing human resources and hardware technology to strengthen local capacity for software and hardware management (42).

To provide a full evaluation of the impact of Programme Mwana during its scale-up process, the Zambia Prevention Care and Treatment Partnership is undertaking a study of the SMS platform effect on infant access to antiretroviral therapy that will be released in early 2014. Concurrently, ZCHARD, the Boston University affiliate partner, is conducting a follow-up evaluation of the turnaround time impact of Results160, as well as an additional study on the use of the Programme Mwana on saving mothers giving life.

**Figure 44: Results160's impact in the Luapula Province (2011)**



Source: Rep. of Zambia, Ministry of Health (2011 April 29), p. 65.



Source: UNICEF Zambia (2012). *Partnership Profile*, p. 1.

<sup>17</sup> Source: Cactus Group, 2014: <http://www.cactusgroup.com/case-study/project-mwana>.

## Lessons learned

The platform of hardware, software and trained personnel built for programme Mwana is expected to support the implementation of future mHealth programmes in Zambia, extending the use of RapidSMS to other RMNCH areas and to other result-delivery and diagnostic mechanisms. Some of the lessons learned from Mwana's pilot and scale-up phase identified by UNICEF include (42):

- **Government leadership:** Engaging the MoH from the planning phase, increasing the value of the programme by integrating it into the country's long-term planning;
- **Partnership coordination:** Having a permanent programme manager who can coordinate the partners. It is useful to define in advance partnering principles and roles, as well as establish common goals and a joint plan for all partners, while taking advantage of the expertise of multiple partners to promote innovation;
- **Locally sourcing:** Employing a permanent local software development team and creating government-led working groups to cultivate valuable skills and local human capacity in key areas of software development;
- **Cost control:** Reducing costs by negotiating with telecom companies for the full scale programme, rather than just for the pilot; promoting usage of the beneficiaries own phones, and creating district-level training teams; and
- **Co-creation:** Following open source software and an iterative approach for developing tools and testing applications that respond to the identified needs of and feedback obtained from end users.
- **Evaluation:** Setting up a continuous and rigorous evaluation mechanism, as well as criteria that permit rapid adjustments and long term planning.

Meeting the MDG targets by 2015 and moving forward in the fight against HIV/AIDS will require significant reforms, innovation and investment. Programme Mwana shows how ICT can support Zambia in achieving promising developments in the area of RMNCH.





# Case study

## Aarogyam: Leveraging ICT tools to achieve maternal and child health goals

### PROJECT AT-A-GLANCE

Start date:	2008
Objectives:	Use ICT to track pregnancy, ensure proper maternal care, and provide child survival services to newborns and infants
Technology:	A web-based Monitoring Information System (MIS) and an Interactive Voice Response System (IVRS)
Partners:	District Administrations of Amroha and Bagpat districts in Uttar Pradesh, India
Status:	Ongoing and scaled-up to the national level in 2011

Against the backdrop of a large population affected by religious and caste differences, overburdened health-care workers, and poor public knowledge about maternal and child health the District Administrations of Amroha and Bagpat districts in Uttar Pradesh, India, launched Aarogyam to track each pregnancy in the target areas and ensure proper medical care reached every pregnant woman, new/lactating mothers and child between the age of 0-5 years. The large-scale programme introduced ICT tools to make health-care service delivery timely, efficient, effective, transparent and accountable.

Aarogyam – meaning ‘a state of disease free health’ – was started in 2008. It is an ICT-driven community approach to provide essential critical health-care services to people at their homes in order to support two out of four critical components of India’s Reproductive and Child Health (RCH) Programme – (i) maternal care that includes antenatal, delivery and postpartum services, and (ii) child survival services for newborns and infants. Thus, it directly addresses Millennium Development Goals 4 and 5 to reduce child mortality and improve maternal health respectively.

The main elements of the Aarogyam approach include a Mother and Child Tracking System (MCTS), a web-based MIS to generate periodic reports for monitoring by key health-care authorities, and an IVRS to send out timely and reliable information on vaccination/immunization schedules to target beneficiaries and address their related health-care questions. Based on the impact of Aarogyam in the districts of its operation, the MCTS was adopted nationally in January 2011 and is now part of the Indian Government's strategy to monitor and ensure delivery of the full spectrum of health-care services to all pregnant women and children of immunizable age under the National Rural Health Mission.

## Introduction

A WHO report (43) highlighted that out of the estimated 287,000 deaths of women worldwide annually, 99% take place in developing countries. India accounts for 19% of global maternal deaths, and has the world's highest number of first-day deaths, accounting for 29% of them (44). The state of Uttar Pradesh is India's most populous, with 13% of the national total, with obvious implications for maternal and child health. However, despite MDG-related government policies an analysis by the National Rural Health Mission (2012) (45) indicates Uttar Pradesh as the worst-performing state, reporting the highest Infant Mortality Rate (IMR) (61 per 1,000 live births) (46), highest Maternal Mortality Rate (MMR) (359 per 100,000 live births) (47), lowest contraceptive prevalence rate (31%) (48) and highest percentage of unmet need for family planning (21%) (49).

These results may be attributed to a combination of lack of awareness among women about the importance of PNC and ANC, inadequate infrastructure as well as medical facilities and assistance during delivery, incomplete immunization, and improper treatment for birth related problems. Particularly in the rural areas of the state, insufficient and poorly-trained human resources pose a major challenge to a health-care delivery system. A shortage of nurses and specialists adds to the workload on every Auxiliary Nurse Midwife (ANM) responsible for delivering health-care services.

## Amroha in context

With a population of over 1.8 million, Amroha has an IMR of 66<sup>18</sup> – higher than the state and national IMR at 60 and 44 respectively (46). Further, Amroha's MMR stands at 432 – higher than the state MMR of 300<sup>18</sup>. Nearly 48% of Amroha's population is female (46) and the literacy rate among women is 54% (46). The decadal population growth rate of the district is 23% (2001-2011) (46). The entire population of Amroha is served by 103 ANMs, who cater to 75% of the population (46) residing in rural areas. Low literacy levels, combined with socio-cultural factors such as women being confined mainly to working at home, has contributed to poor general awareness of health-care services for expecting and new mothers as well as newborns and immunizable children under five years old. Amroha contains two of the blocks identified under the 107 high-risk block strategy (2010) of the Indian Government's national polio eradication. Deep-seated socio-cultural factors have led many people in these blocks to refuse polio vaccination for their children.

<sup>18</sup> Source: Government of Uttar Pradesh. Annual Health Survey Bulletin, 2011.



## Project overview

### *Genesis of Aarogyam - Introducing ICT tools for transparent, accountable and effective service delivery*

At the time of project initiation, the District Administration identified two major reasons for poor maternal and child health in the district of Amroha:

- Inability of field-level health officials to keep track of pregnant women and new mothers as well as whether children in the immunization age group had started or completed the schedule. This was exacerbated by only a relatively few health-care officials were responsible for providing services to a large number of people; omissions, therefore, were all the more likely.
- Lack of timely knowledge about entitlement to health-care services and immunization/vaccination schedules, which would prevent people from holding field-level health officials accountable for failure in service delivery.

There was thus a need for a regularly-updated database of information on maternal and child health, complemented by a mechanism to reach out to target beneficiaries to inform them of the health-care services to which they were entitled. Further, a centralized database with role-based access to relevant government authorities was required to act as an effective monitoring and evaluation tool. Introduction of ICT tools and mechanisms was needed to bridge the existing institutional and administrative gaps, bring efficiency in work planning for health-care service provision, and build a culture of transparency and accountability in service delivery to every target household in the district.

## ICT tools and mechanisms used

### *Mother and Child Tracking System*

Aarogyam adopted a collaborative approach where the existing human resources have been supplemented, rather than replaced, by ICT tools to make their work easier and transparent. The primary innovative component of Aarogyam is the MCTS under which a comprehensive baseline health survey is undertaken every month by the Accredited Social Health Activist (ASHA) worker and ANM and data is collected in a standardized format on 13 predefined health indicators<sup>19</sup>. This is followed by allocation of an 8 digit unique ID to each household. The beneficiary ID constitutes of block code (first two digits), village code (second two digits) and a beneficiary code (last four digits). This unique ID number helps track the health of every mother and her child in the system. Thus, every beneficiary of the programme has a designated space in the district health-care system and can use the ID number to access health-related information or lodge a complaint through in-dial system of the IVRS. The data manually collected is uploaded in preformatted excel sheets by data entry operators at the block level. The data is further collated into Aarogyam software at the office of Chief Medical Officer (CMO) at the district level. Using the MIS, information is made available on a web-based monitoring portal that provides role-based access to relevant government authorities.

<sup>19</sup> The 13 health indicators for which data is collected during the household level baseline survey are: (i) Mothers registered in the first trimester when they were pregnant with last live birth/still birth (%), (ii) Mothers who received at least 3 ANC visits during the last pregnancy (%), (iii) Mothers who got at least one TT injection when they were pregnant with their last live birth/still birth (%), (iv) Institutional births (%), (v) Delivery at home assisted by a doctor/nurse/LHV/ANM (%), (vi) Mothers who received PNC from any health-care professional within 48 hours of delivery of their last child (%), (vii) Children (12-23 months) fully immunized (BCG, 3 doses each of DPT, and Polio and Measles) (%), (viii) Children (12-23 months) who have received BCG (%), (ix) Children (12-23 months) who have received 3 doses of Polio Vaccine (%), (x) Children (12-23 months) who have received 3 doses of DPT Vaccine (%), (xi) Children (12-23 months) who have received Measles Vaccine (%), (xii) Children (9-35 months) who have received at least one dose of Vitamin A (%), (xiii) Children (above 21 months) who have received three doses of Vitamin A (%).

## *Interactive Voice Response System*

Building on household information fed into the Aarogyam system, another key component of the programme – the IVRS is used to generate family-specific phone calls and SMS alerts on immunization details (for mothers and children) before the due dates to ensure they do not miss on dosage for want of timely information. Alerts are sent in the local language to maximize their impact. An in-dialling facility is also provided over a toll-free helpline number where people can register their grievances (such as unavailability of the ANM in their village or town) and request health-care advisory services.

## Results

Aarogyam's primary benefit has been to bridge the gap between knowledge and action for health, which is a key requirement for achievement of the MDGs 4 and 5. Its contribution has informed and guided the Government of India's current focus on tracking pregnancies across the country and providing pregnant/lactating mothers with critical health-care as per prescribed schedule. In the *Annual Report to the People on Health* (2011) (50), tracking of pregnant mothers was recognized as a priority area for provision of effective health-care services. In keeping with this, MCTS described above, was launched nationally and is implemented under the National Rural Health Mission in India.

Since its launch in Amroha in 2008, Aarogyam has resulted in clear and tangible impact on maternal and child health in the district. The Aarogyam portal indicates that a total of 11,464 mothers and 7,083 children have been registered for health care through the MCTS between April-September 2013. During the period of its operation (2010-2012), the IVRS averaged 1,545 outgoing voice calls per month to alert beneficiaries to upcoming immunization/vaccination schedules.

Aarogyam has significantly streamlined the work of field-level health-care officials and made it more efficient. Formerly, data was collected manually in pre-formatted templates. Now it is put into a centralized database accessible from any location, and using it to generate timely alerts has ensured the work of ANMs in the field is optimized (Box 1).

### **Box 1: Enhanced efficiency in work of field level health-care functionaries**

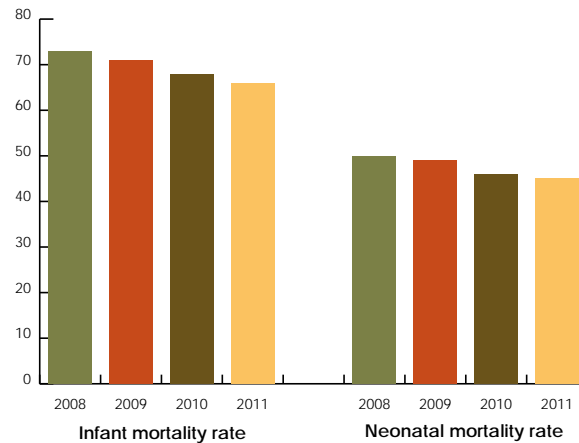
Reeta Gupta works as an Auxiliary Nurse Midwife in Karmalipur village, UP. Since the introduction of Aarogyam, she has witnessed a positive change in the responsiveness of beneficiaries, ASHAs and anganwadi officials in following the vaccination requirements of the children, and speaks highly of the overall impact of the system.

*"A lot of changes have come about since Aarogyam. We now receive regular updates on whether the doctor will be available and when the vaccines have to be administered. If our beneficiaries don't pick up the calls, it would be redirected to us, giving us an indication that vaccinations had to be followed up in that particular case. The number of beneficiaries has certainly increased because of this and the impact is visible in the increased involvement of ASHA and anganwadi officials as well. Also, now we find that beneficiaries take the initiative to come to us themselves, after receiving the calls, even if the ASHA is not available. Although one of the problems faced is that there are many women in the village who do not have their own cell phones or have to rely on their husbands' phones which results in information reaching them only late in the evenings after their husbands return from work."*

More importantly, during the period between 2008 and 2011, there has been consistent reduction in IMR, NMR and MMR as shown in the figures below.

Figure 45 shows that the IMR for the district reduced by 9%, the NMR decreased by 10%, whereas the percentage of children aged between 0-5 years who were immunized increased by 23.6 points between 2008 and 2011 (Figure 46).

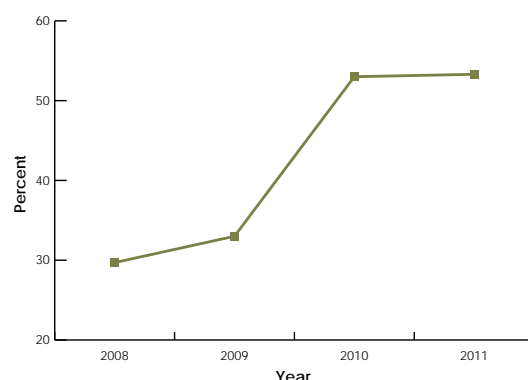
**Figure 45: Consistent reduction in the IMR and NMR and increase in child immunization coverage figures between 2008 and 2011 in Amroha**



**Note:** Infant Mortality Rate (IMR) is defined as the number of infants dying before reaching one year of age, per 1,000 live births in a given year. Neonatal Mortality Rate (NMR) is defined as the number of infants dying during the first 28 days of life (0-27 days), per 1,000 live births in a given year.

**Sources:** Government of India, Ministry of Health and Family Welfare. District Level Household and Facility Survey under Reproductive and Child Health Project (DLHS – 3). *District Fact Sheet: Uttar Pradesh, Jyotiba Phule Nagar*. 2007-08. International Institute for Population Sciences, Mumbai. Figures for 2011: Government of India. Office of the Registrar General and Census Commissioner. *Annual Health Survey*. 2010-2011.

**Figure 46: Increase in child immunization coverage figures between 2008 and 2011 in Amroha**

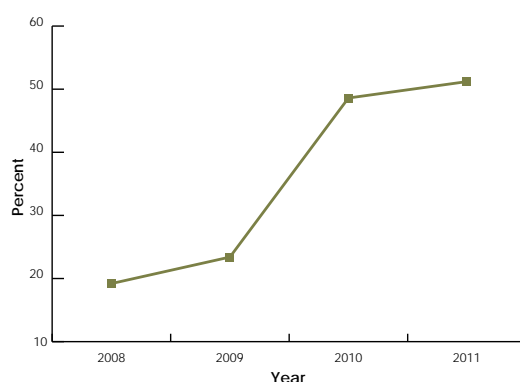


**Note:** Child immunization figures refer to children from the age group 0-5 years with vaccines for BCG, DPT, polio, measles and hepatitis.

**Source:** Aarogyam MIS data from the Chief Medical Officer, Amroha district, Uttar Pradesh.

By 2011, Aarogyam had achieved a 32% increase since 2008 in the number of women who received ANC/PNC (Figure 47). The MMR for the period showed a reduction of 16% (Figure 48).

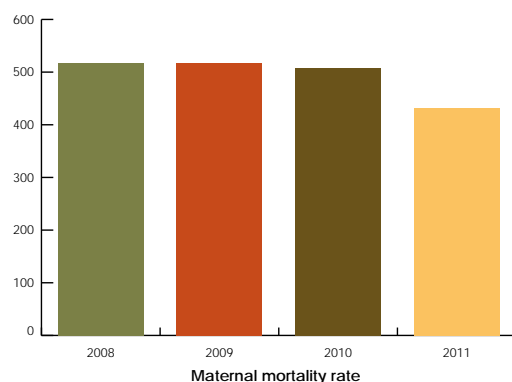
**Figure 47: Increase in percentage of women receiving ANC/PNC by 32 percentage points between 2008 and 2011 in Amroha**



**Note:** Antenatal Care (ANC) includes recording medical history, assessment of individual needs, advice and guidance on pregnancy and delivery, screening tests, education on self-care during pregnancy, identification of conditions detrimental to health during pregnancy, first-line management and referral if necessary. Postnatal Care (PNC) refers to the care provided to women and newborns for the first few months following birth.

**Sources:** Figures for 2011: Government of India. Ministry of Health and Family Welfare and Office of the Registrar General and Census Commissioner. *Annual Health Survey, 2010-2011*. Aarogyam MIS data from the Chief Medical Officer, Amroha district, Uttar Pradesh.

**Figure 48: Reduction of MMR by 16% and increase in percentage of women receiving ANC/PNC by 32 percentage points between 2008 and 2011 in Amroha**



**Note:** Maternal Mortality Rate (MMR) refers to the number of female deaths per 100,000 live births per year from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes).

**Sources:** Government of India. Ministry of Health and Family Welfare. District Level Household and Facility Survey under Reproductive and Child Health Project (DLHS – 3). *District Fact Sheet: Uttar Pradesh, Jyotiba Phule Nagar, 2007-08*. International Institute for Population Sciences. Mumbai. Figures for 2011: Government of India. Ministry of Health and Family Welfare and Office of the Registrar General and Census Commissioner. *Annual Health Survey, 2010-2011*.



Several favourable factors maximized Aarogyam's impact. Most influential was the administrative support that the project received from the district magistrate. It ensured compliance, regular monitoring, transparency, responsible reporting and accountability in health-care service delivery. Generating public awareness on a large scale resulted in people understanding the need for timely immunization/vaccination. When complemented by regular dissemination of information on health-camp schedules, more people attended the camps. Training and capacity-building of all ANMs, ASHAs and anganwadi workers at the time of project initiation was carried out to minimize resistance to change.

## Lessons learned

An initiative of this magnitude has not come without a series of challenges and regular attempts to address them in face of institutional, social, financial and technical constraints. Some health officials already in service resisted the system, as it would track their performance, requiring them to register immunization/vaccination status of eligible population. This was soon overcome with basic capacity-building and awareness generation on the manner in which use of technology would help them plan their work better, facilitate a greater turnout of beneficiaries at health camps, and keep an account of their activities so that accountability could be fixed and unbiased performance appraisals facilitated.

The patriarchal social fabric of Uttar Pradesh made it initially difficult for women from orthodox families to leave home to attend immunization/vaccination schedules. Caste deeply pervades the society here and upper-caste women often resisted having their children vaccinated in the same space and by the same person as those from the lower castes (51). These are persistent issues and preceded implementation of Aarogyam. Receiving SMS and voice alerts for information on vaccination/immunization schedules along with details on the benefits of getting these on time has gradually helped draw more women out of their homes. The project was financed with funds from various district and state level corporates. The MCTS feature of it has now been up-scaled to the national level and, therefore, is financed under the National Rural Health Mission. However, the IVRS feature stopped operations in 2012 due to a shortage of funds. Even so, the impact of a mechanism to reach out to people to help them get better health care has still rolled over to new and expectant mothers. This is because many people in the region have already benefited from it and have plenty of testimonials to share with others who could also benefit. The District Administration and the Government of Uttar Pradesh have been considering reinstating IVRS but as of September there has been no decision on this.

While it was active, the IVRS did face persistent technical challenges with network connectivity in interior and remote areas of districts. Also, to build technical capacity of a large group of people who were used to only manual ways of functioning was an initial problem. It was overcome, however, with focused training efforts and recruitment of data operators for handling the more complex technical tasks.



The principal lessons learned from Aarogyam's implementation in Amroha include the following:

- The use of ICT facilitated, in an unprecedented manner, a database of expecting and new mothers and children between 0-5 years. This has strengthened the capacity of District Administration to monitor and evaluate provision of maternal and child health-care services to its people.
- ICT tools, though perceived as requiring intensive training for use, prove to be more effective when used for supplementing rather than replacing a manual system of working. For this, gradual introduction of technology and adequate capacity-building of personnel for its use is necessary, particularly in contexts where work had traditionally been done only manually.
- Transparency and accountability in health-care service provision has made citizens more empowered and trusting of the government.
- ICT intervention comes at a high financial cost. If a major component of the programme is discontinued owing to financial constraints, it undercuts the progress already made and restricts further potential impact of the initiative. Therefore, more institutional thrust is needed to endorse and establish firmly the use of ICT tools for enhancing health-care service delivery.
- Involvement of community members in health-care provision – not only as recipients but also as *active agents who can claim* health-care services builds sustainability of an initiative. Since discontinuation of the IVRS facility under Aarogyam, the District Administration is facing persistent pressure from the community for its reinstatement. According to the CMO of Amroha district, since the discontinuation, the upward trend in the number of women and children attending the monthly health camp has stalled. While ASHAs and *anganwadi* workers are responsible for providing periodic updates to community members on vaccination, immunization and regular medical check-ups, the number of people attending the camps increased in the last year.
- Attempts to provide effective health-care services alone are not enough for achieving a substantial improvement in maternal and child health. It is equally important to use softer interventions through community development and engagement to bring about attitudinal changes among community members.
- ICT tools can, interestingly, work to change traditional social mind-set of families. Since voice and SMS alerts were sent on mobile phones, which are usually owned and used by male members of the family, husbands/fathers have become more informed and involved about the health of their wives/children. In a deeply patriarchal society, support of male members often leads to a change in conservative views of the entire household, thereby allowing women more autonomy and freedom of movement.

While the programme has run into financial constraints, the essential point is that Aarogyam has presented an ICT-enabled, community-driven approach showing sufficient impact to be adopted nationally in a country as large as India. It has provided an effective and replicable solution to address important issues. These include low awareness of health-related issues in a conservative socio-cultural context, lack of centralized, updated and reliable database on citizens' health status for monitoring and evaluation purposes, and absence of workplan support to overburdened health-care staff at the grassroots level.



# Case study

## Text messaging-based alert system helps improve maternal and child health in Rwanda

### PROJECT AT-A-GLANCE

Start date:	2010
Objectives:	Improve maternal and child health in areas with limited resources by monitoring pregnancies and reducing communication bottlenecks linked to maternal and newborn deaths, through the use of short message service (SMS)
Technology:	Wireless cellular telephony / RapidSMS software
Partners:	Partnership between the Ministry of Health Rwanda, UNICEF, and Management Sciences for Health, under the Integrated Health Systems Strengthening Project, USAID
Status:	Ongoing and scaled-up to the national level in 2011

### Context

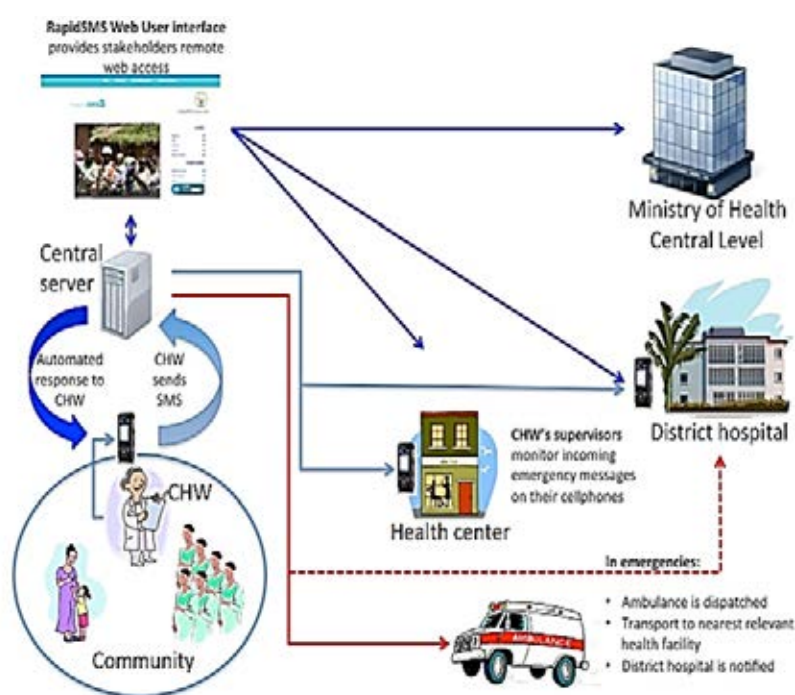
In many developing countries, pregnant women face a higher risk of dying due to delays in identifying life-threatening events during pregnancy and postpartum, as well as delays in reaching a health facility and getting effective emergency interventions. Mobile cellular telephony can help reduce these delays by improving the information flow between pregnant women, community health workers (CHW), health facilities, and emergency services. Rwanda has incorporated the use of mobile health applications to its Information Technology

Strategy Plan to take advantage of its mobile phone coverage (a penetration level of 50.5 mobile cellular subscriptions per 100 inhabitants by 2012), to improve communications between health-care providers and accelerating health decision-making for pregnant women, reducing maternal mortality as a result.

Rwanda has made significant strides in decreasing its maternal and infant mortality ratios. Between 1990 and 2010, the ratio of maternal deaths per 100,000 live births dropped from 910 to 340, a 62% decrease (52). Similarly, by 2010, Rwanda had almost reached its 2015 MDG target of 52 under-five child deaths per 1,000 live births. Further reductions in maternal and infant mortality required specific actions to enhance antenatal and emergency obstetric care in rural and remote areas, and improve access to skilled health personnel at birth.

To help Rwanda reach its MDG 5 target of 228 maternal deaths per 100,000 live births by 2015, the Ministry of Health, in collaboration with UNICEF and Management Sciences for Health, launched a pilot project to improve maternal and child health (MCH) by monitoring pregnancies and accelerating the information flow throughout the health-care system using a short message service (SMS)-based alert system called RapidSMS-MCH. The pilot phase ran from May 2010 to April 2011 in the Musanze District – Rwanda's most mountainous area, located in its Northern province (Figure 49) – covering several towns, including its capital, Ruhengeri. As of 2009, this District had the lowest percentage (49%) of assisted deliveries in health facilities in the country (53), which partly justified its selection.

**Figure 50: RapidSMS-MCH system information flow**

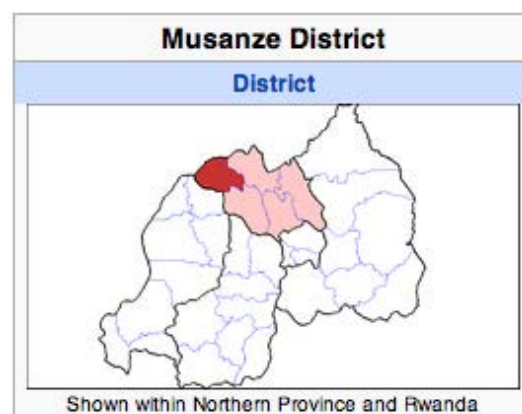


Source: Based on Ngabo et al. (2012), p.13.

## The RapidSMS-MCH system

RapidSMS is an open-source software development framework created by UNICEF. For the Rwandan RapidSMS-MCH system, the software was customized to facilitate real-time two-sided communications, via SMS, enhancing the contact of Community Health Workers (CHWs) and registered pregnant women with the health facility throughout the pregnancy. The system facilitates routine surveillance of health events, and advising women on the provision of care, particularly in high-risk situations. To increase local ownership of the project, the system was customized using an iterative approach, in which feedback from the field, the MoH staff and the Musanze District hospital was used to improve the system's functionality and adapt it to the needs of the District. To ensure technical sustainability, local programmers were trained to develop the application.

**Figure 49: Rwanda's Musanze District**



Source: Wikipedia. [http://en.wikipedia.org/wiki/Musanze\\_District](http://en.wikipedia.org/wiki/Musanze_District)

In the RapidSMS-MCH system, community health workers serving villages in the District use their mobile phones to send coded information on new pregnancies registered in their catchment area, to request referrals, and to report danger signs to health staff in their corresponding health centre (13 in the District) and in the District Hospital. In response, for normal pregnancies, the system sends to the CHW's phone automated reminders for upcoming clinical appointments at specific dates, including due date of delivery, for each of the women registered in their catchment area. In case of emergency, when a CHW reports a life-threatening event, the emergency SMS triggers an alert system that immediately advises the CHW on managing the danger sign and preparing the patient for transfer. Simultaneously, the system forwards an SMS request to the closest ambulance vehicle to transport the mother and child to the nearest health-care facility for emergency obstetric and neonatal care. The system also informs the health facility manager about the danger signs, name of the village, and telephone number of the CHW in charge, to ensure that the facility is prepared for immediate intervention once the ambulance arrives (Figure 50). An additional individual at the District health office is also informed to ensure that an ambulance will be sent, in case the original transport reached is out of service.

A national centralized database serves as a hub between the CHWs, the appropriate health-care facility, and the ambulance service. Moreover, the system supports the documentation of new pregnancies in the community and creates a database of clinical records on maternal health delivery. It also provides a web user interface where stakeholders, such as the Ministry of Health, can access individual and aggregated data entered by the CHWs on mothers and infant pairs, statistical reports, and logs on CHWs activities. In addition, error logs reporting wrong SMS formatting and logic mistakes help keep track of possible difficulties in reporting, providing useful feedback to the CHWs' supervisors.

During the 12-month pilot phase of the RapidSMS-MCH system, 432 CHWs in charge of maternal and newborn health at the village level received local-language training on the system and were provided with mobile cellular phones. These CHWs are specifically trained to be responsible for identifying pregnant women in their villages, monitoring the care of registered women during and after pregnancy, and ensuring that child deliveries take place at health facilities, with the assistance of skilled health workers. On average, each specialized CHW in Musanze was expected to identify and manage two to three pregnancies per month (53). The CHWs' performance was supervised throughout the pilot based on entered data and error logs information.

### Community Health worker in Rwanda



Source: RapidSMS.

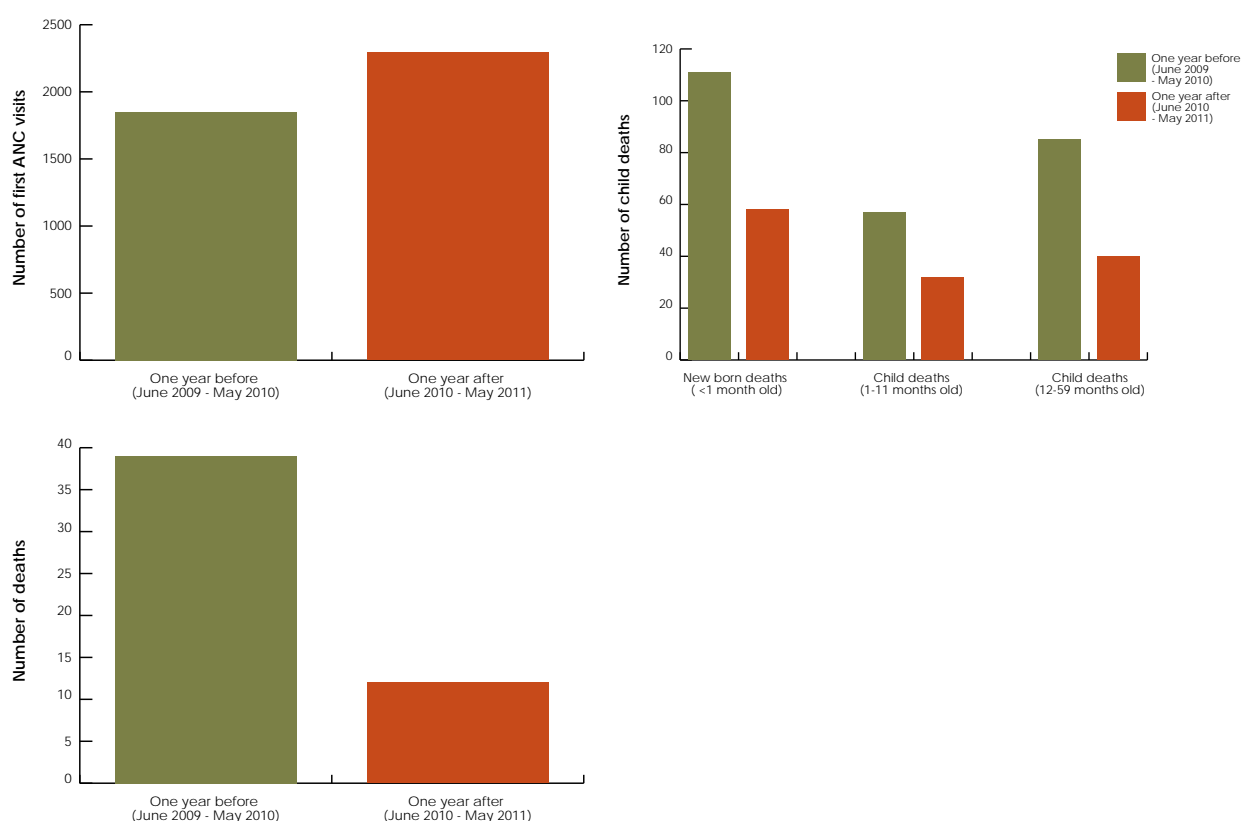
Trained CHWs can send SMS messages at no charge. The Ministry of Health, in agreement with the mobile operator MTN, covers the cost of the SMSs sent. By the end of the pilot phase, in May 2011, the trained CHWs had used the RapidSMS system to send a total of 35,734 SMS regarding child health, antenatal care, pregnancies, births, and risk events. Alerts for urgent and life threatening events referred mostly to cases of deliveries at home and serious maternal conditions, followed by reports on bleeding, miscarriages, and child deaths. These alerts (362 SMS) represented only 1% of the total number of SMS sent by CHWs during this phase (53).

## ICT impact trends

From June 2010 to May 2011, the trained CHWs specialized in maternal health in the Musanze District monitored a total of 11,502 registered pregnancies. Compared to the 12-month period preceding the pilot, the number of first antenatal care visits of registered pregnant women in the District increased by 24% by the end of the pilot phase (see Figure 51). After the implementation of RapidSMS, the system registered notable reductions in the number of newborn deaths (48% decrease), as well as in the number of deaths of children between one and 11 months old (44% decrease) and of those between 12 and 59 months old (53% decrease) by 2011. The number of deaths in utero occurring in the District showed the greatest fall, of 69% after the pilot phase, from 39 in May 2010 to only 12 after the implementation of RapidSMS. Maternal deaths fell by 25%.

The percentage of pregnant women who delivered at a health-care facility in the Musanze District rose from 68% in April 2010 to nearly 95%. These positive trends still need a more comprehensive evaluation to establish correlations between the introduction of an SMS-based alert application and improvements in maternal health and facility-based delivery.

**Figure 51: Impact of RapidSMS system on ANC first visits, infant deaths, and deaths in utero, Musanze District (2010-2011)**



Source: Ministry of Health of Rwanda (2012).

Factors contributing to the pilot phase success included the trained CHWs' commitment to the project, with a reporting compliance of 100% (53). The CHWs were highly motivated to follow up with the care of registered pregnant women thanks to the reminders the RapidSMS-MCH system sent to their mobile phones. The District health team also increased its capacity to coordinate and supervise the RapidSMS-MCH system. The feedback loop has also helped reduce data entry error rates and facilitated verification with end users (54).





Although distributing mobile cell phones to the CHWs trained in RapidSMS significantly increased the initial investment cost of the project, the Ministry of Health considered it an important incentive in motivating CHWs and enhancing their commitment. Other enabling factors included the organizational structure of community health workers in cooperatives and the performance-based financing system used in the Rwandan health system which provided monetary incentives that promoted quality outcomes.

## Lessons learned

Based on the results achieved in the Musanze District, the Ministry of Health decided in 2011 to scale up the system nationwide to cover all 30 Districts (55). By early 2012, the system had been rolled-out to 18 districts, and a total of 15,000 phones had been distributed to more than 7,000 trained CHWs within the framework of the project (53). In addition, it was integrated into the national eHealth Enterprise Architecture Framework to help exchange risk-factors data with the national shared record (55). The RapidSMS system can now provide reports at the national, district, and health-facility levels, aiding the MoH with the identification of diseases affecting women during pregnancy, key causes of child mortality, and the type of medications needed (56).

To ensure sustainability, the MoH facilitated a public-private partnership with the mobile operator, which resulted in rate reductions for the SMS messaging service from 30 Rwandan Francs (0.05 USD) to 3 Rwandan Francs (0.005 USD) (53). Moreover, in August 2013, the Korea International Cooperation Agency (KOICA) agreed to provide a new infusion of funds to the RapidSMS-MCH system through UNICEF for the amount of 4.5 million USD, to support the scaling up process in ten districts (57).

Some of the lessons learned from the Musanze pilot phase include:

- **Government commitment to innovation:** The support for innovation shown by the MoH in its Information Technology Strategy Plan has been an essential enabler for the use of mobile technology in maternal health services and facilitated the adoption of the RapidSMS-MCH initiative.
- **Public-private partnership:** Collaboration with other non-profit organizations and the private sector, in particular with the mobile operator, has helped control and even significantly reduce the costs of the project, making scalability and sustainability feasible.
- **Local sourcing:** Employing a permanent local software development team helps build local capacity.
- **Co-creation:** The adoption of open-source software and an iterative approach for developing tools helps adapt the technology to the evolving needs of end users, while increasing awareness of challenges faced by communities with limited resources, such as intermittent access to electricity.
- **Essential role of CHWs:** Community health workers are at the frontline of health-care provision in developing countries. Their committed participation in and ownership of mHealth and eHealth projects is vital for the success of initiatives seeking to improve maternal and infant health in remote and rural areas.
- **Regular feedback and evaluation:** Conducting feedback and evaluation sessions at regular intervals helps identify and address obstacles, such training gaps in a timely manner, and permits sharing best practices and lessons learned among stakeholders.



# ANNEX 2: SURVEY METHODS







## Survey development and focus

The survey instrument was developed by WHO's Global Observatory for eHealth (GOe) and the ITU with broad consultation and input from experts in eHealth and women's and children's health. As only limited primary data exist in this area, the objective was to create a survey that would provide baseline data on progress made on CoIA recommendations that relate to eHealth. This was done with the intention of conducting the survey again in 2015 so as to measure progress.

In addition to survey themes based on the first four recommendations, questions on other broader foundation elements relating to eHealth strategies were added to help contextualise the results. These complementary topics included:

- Status of national eHealth strategies
- Information access by health-care professionals
- ICT training and continuing education for health-care professionals
- Use of social media
- Internet health information quality
- eHealth legislation for the use of electronic health records (EHR)
- Barriers to eHealth implementation.

To facilitate country responses, the survey questions and communications were translated into all WHO official languages (Arabic, Chinese, English, French, Russian and Spanish) plus Portuguese.

As with all surveys conducted by the GOe, arrangements were made for countries in WHO regions to pilot the instrument. Six countries volunteered to review and pilot the survey in and provide feedback on content, logic and the wording of questions. Bangladesh made a concerted effort to pilot the survey and provided in-depth feedback on a question-by-question basis. Unfortunately the other countries were unable to fulfil the commitment they had made.

## Building support for the survey

To ensure the overall success of this survey, all regional offices assigned staff to assist in coordinating the survey process and liaise with the GOe in Geneva. At the national level, survey coordinators were appointed to manage the task and were responsible for working with the relevant ministries and academic and research

institutions to identify a core of between five and 10 national experts in the fields covered in the survey. The expert informant groups generally consisted of eHealth specialists, professionals in maternal and child health, statisticians responsible for national health data statistics, and systems engineers. Experts met for one day to work systematically through the questions and reach consensus on a single national-level response.

The survey was launched on 1 June 2013 and responses were accepted until 11 September 2013. Regional focal points encouraged Member States to participate. Some Member States could see the relevance of contributing and carried out the survey quickly. In other cases extensive discussions were required, not all of which were successful. Some countries simply had too many conflicting priorities to take on this work and others were experiencing periods of political instability.

## Online data collection

The survey was loaded onto DataCol, a web-based tool that simplifies online form creation for data collection and management and is designed, developed, and supported by WHO. The collected data were stored in an SQL database maintained by WHO database administrators, and exported as a Microsoft Excel file for statistical analysis.

Individual login names and passwords were assigned to each country to avoid multiple entries by the same country. Each participating country submitted a single national survey with input from their expert informants group. Survey coordinators were responsible for completing the forms after obtaining agreement on the responses from the experts.

## Data processing

On receipt of the completed questionnaires, all non-English responses were translated into English. Survey responses were checked for consistency and data cleansed. Data were analysed by thematic section: for closed-ended questions, percentages were computed for each response to obtain the overall results for all responding CoIA countries.

## Response rate overview

Of the 75 CoIA priority countries, 64 responded, corresponding to an 85% success rate; this is the highest response rate that has been achieved to date by the GOe. It is due to an exceptionally high level of commitment by countries to share their information and by staff in all regions to strive for the maximum response possible. Annex 4 provides a list of all CoIA countries, indicating those that responded to the survey.

## 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, WHO often provides analysis based on regional trends. A breakdown by regional responses is presented in Table 3. It shows the number of responding CoIA countries per region and the associated response rate.

**Table 3: Rate of response to the 2013 GOe survey, per WHO region**

Region	Responses	CoIA countries	% Response
AFRO	32	42	76
AMRO	5	6	83
EMRO	9	9	100
EURO	5	5	100
SEARO	6	6	100
WPRO	7	7	100
<b>TOTAL</b>	<b>64</b>	<b>75</b>	<b>85</b>

The Eastern Mediterranean, European, Western Pacific and South East Asian Regions all achieved a 100 per cent response rate of their CoIA countries. The African region should be recognized for having achieved an excellent level of participation with 32 countries (76%) completing the survey.

## Limitations

Member States were limited to one response per country; thus the expert informants were required to propose a single response for each question that was most representative of the country's situation as a whole. Coming to a consensus was difficult in cases where the situation varied widely within the country, or where there were significant differences in opinion. While survey responses were checked for consistency and accuracy during data cleaning, it was not possible to verify all responses to every question. Every effort was made to select the best national experts to complete the instrument; however, it cannot be determined whether the focus groups had the collective eHealth knowledge to answer each question.

The survey did not attempt to measure localized activity at the subnational level. While there are pragmatic reasons for this, given the timescale and resources available, it does mean that the survey did not address some of the recommendations in the CoIA report. For example, "the 11 indicators of women's and children's health should be reported for the lowest wealth quintile, gender, age, urban/rural residence, geographic location and ethnicity; [...] subnational data should also be collected as they are especially important for a complete assessment of equity and the right to health of all women and children" (3).

The analysis is based on the judgment of experts at the national level; it does not address the issues of how the information gathered is used to make decisions, either nationally or locally. Indeed, the value of data to the front-line (health or civil registration) worker who captures it – and the sorts of outcomes that they can see they have been involved in delivering – is not an area of focus in this study.

## Survey instrument

Copies of the survey instrument in all official WHO languages plus Portuguese can be found at [www.who.int/goe/data/en](http://www.who.int/goe/data/en).



# ANNEX 3: COUNTRY INSIGHTS

This Annex summarizes in part the information provided by the countries in their replies to the GOe survey, focusing on those questions that refer to the use of ICT in the monitoring of CoIA indicators under Recommendation 2, as well as to the application of ICT for recording vital events and tracking health expenditures, under Recommendations 1 and 4, respectively. The country insights also provide information on the status of national eHealth strategies development in responding countries that are currently working on a strategy or that have already adopted one, as well as on the barriers to eHealth implementation identified by the country respondents.

To contextualize the information obtained from the survey, these country insights include statistics on the penetration of mobile cellular services, wireless and fixed broadband, where existent, and the level of Internet usage at the individual and household levels. The ICT statistics were downloaded from the International Telecommunication Union World Telecommunication/ICT Indicators database.

In addition, key health statistics linked to the MDGs 4 and 5 are provided. These statistics were obtained from the World Health Organization and UNICEF (2012), Country Profiles, in *Countdown to 2015 Maternal, Newborn & Child Survival – Building a Future for Women and Children, The 2012 Report*.

The WHO GOe *Atlas of eHealth for women and children*, published to accompany this report, provides a comprehensive view of participant country responses to all the GOe survey questions.



References for Country Profile Indicators . . . . .	82	Liberia . . . . .	115
Afghanistan . . . . .	84	Madagascar . . . . .	116
Angola . . . . .	85	Malawi . . . . .	117
Azerbaijan . . . . .	86	Mauritania . . . . .	118
Bangladesh. . . . .	87	Mexico . . . . .	119
Bolivia . . . . .	88	Morocco . . . . .	120
Botswana . . . . .	89	Mozambique . . . . .	121
Burkina Faso . . . . .	90	Myanmar . . . . .	122
Burundi . . . . .	91	Nepal . . . . .	123
Cambodia . . . . .	92	Niger . . . . .	124
Central African Republic . . . . .	93	Nigeria . . . . .	125
China . . . . .	94	Pakistan. . . . .	126
Comoros . . . . .	95	Papua New Guinea . . . . .	127
Côte d'Ivoire . . . . .	96	Peru . . . . .	128
Democratic People's Republic of Korea . . . . .	97	Philippines . . . . .	129
Democratic Republic of the Congo . . . . .	98	Rwanda. . . . .	130
Djibouti . . . . .	99	Sierra Leone . . . . .	131
Egypt . . . . .	100	Solomon Islands . . . . .	132
Equatorial Guinea . . . . .	101	Somalia . . . . .	133
Ethiopia . . . . .	102	South Africa . . . . .	134
Gambia. . . . .	103	South Sudan . . . . .	135
Ghana . . . . .	104	Sudan . . . . .	136
Guatemala. . . . .	105	Swaziland. . . . .	137
Guinea . . . . .	106	Tajikistan . . . . .	138
Haiti . . . . .	107	Togo. . . . .	139
India. . . . .	108	Turkmenistan . . . . .	140
Indonesia . . . . .	109	United Republic of Tanzania . . . . .	141
Iraq . . . . .	110	Uganda. . . . .	142
Kenya . . . . .	111	Uzbekistan . . . . .	143
Kyrgyzstan . . . . .	112	Viet Nam . . . . .	144
Lao People's Democratic Republic . . . . .	113	Yemen . . . . .	145
Lesotho . . . . .	114	Zambia . . . . .	146
		Zimbabwe . . . . .	147

# References for Country Profile Indicators

The following indicators were selected for each country to complement the country profile information. Indicators and their sources are included below.

1. **Population in thousands (per 100 000 population)**. World Population Prospects. New York, United States, United Nations Population Division, 2012: <http://esa.un.org/wpp/sources/country.aspx>.
2. **Physician density (per 1 000 population)**. WHO World Health Statistics. Geneva, Switzerland, World Health Organization, 2009: [http://www.who.int/whosis/whostat/EN\\_WHS09\\_Table6.pdf](http://www.who.int/whosis/whostat/EN_WHS09_Table6.pdf).
3. **Nurse and midwife density (per 10 000 population)**. WHO World Health Statistics. Geneva, Switzerland, World Health Organization, 2009: [http://www.who.int/whosis/whostat/EN\\_WHS09\\_Table6.pdf](http://www.who.int/whosis/whostat/EN_WHS09_Table6.pdf).
4. **Hospital bed density (per 10 000 population)**.  
 EURO Region: European Health for All Database (HFA-DB). Copenhagen, Denmark, WHO Regional Office for Europe, 2013: <http://www.euro.who.int/en/data-and-evidence/databases/european-health-for-all-database-hfa-db>.  
  
 WPRO Region: Western Pacific Region Countries and Areas. Manila, Philippines, WHO Regional Office for Western Pacific, 2014: <http://www.wpro.who.int/countries/en>.  
  
 SEARO Region: South-East Asia Region Countries. New Delhi, India, WHO Regional Office for South-East Asia, 2014: <http://www.searo.who.int/countries/en>.  
  
 PAHO Region: Pan-American Health Organization Regional Core Health Data Initiative. WHO Region for Pan-America, 2013: <http://www1.paho.org/English/SHA/coredata/tabulator/newTabulator.htm>.
5. **Life expectancy at birth (years)**. WHO Mortality Database. Geneva, Switzerland, World Health Organization, 2012: <http://apps.who.int/healthinfo/statistics/mortality/whodpms>.
6. **Maternal mortality ratio (per 100 000 live births)**. Trends in maternal mortality: 1990 to 2010 – WHO, UNICEF, UNFPA and The World Bank estimates. Geneva, Switzerland, World Health Organization, 2012: [http://whqlibdoc.who.int/publications/2012/9789241503631\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2012/9789241503631_eng.pdf?ua=1).
7. **Infant mortality rate (probability of dying between birth and age 1 per 1000 live births)**. World Population Prospects. New York, United States, United Nations Population Division, 2012: <http://esa.un.org/wpp/sources/country.aspx>.

8. **Gross national income (GNI) per capita (international \$)**. PPP int. \$ = Purchasing Power Parity at international dollar rate (2013). World Development Indicators Database, 2013. Washington, DC, World Bank, 2013: <http://data.worldbank.org>.
9. **Total health expenditure (%GDP)**. World Health Statistics. Geneva, Switzerland, World Health Organization, 2010: <http://www.who.int/whosis/whostat/2010/en>.
10. **ICT Development Index Rank**. Measuring the Information Society. Geneva, Switzerland, International Telecommunication Union, 2012: [http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2012/MIS2012\\_without\\_Annex\\_4.pdf](http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2012/MIS2012_without_Annex_4.pdf).
11. **Mobile-cellular subscriptions (% inhabitants)**. ICT-Eye: Key ICT Data and Statistics. Geneva, Switzerland, International Telecommunication Union, 2014: <http://www.itu.int/ITU-D/ICTEYE/Indicators/Indicators.aspx>.
12. **Internet users (% of individuals)**. ICT-Eye: Key ICT Data and Statistics. Geneva, Switzerland, International Telecommunication Union, 2014: <http://www.itu.int/ITU-D/ICTEYE/Indicators/Indicators.aspx>.



# Afghanistan

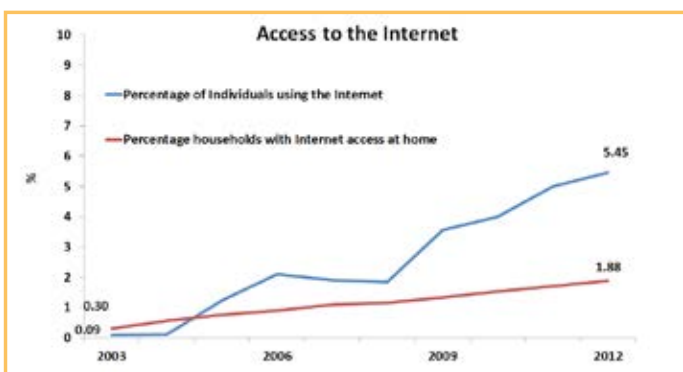
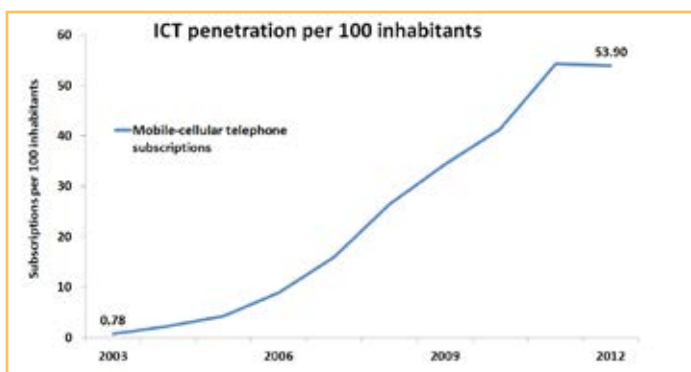


## Country health indicators\*

Population (000s)	29,825
Neonatal deaths % of all <5 deaths	36
Maternal mortality ratio (per 100 000 live births)	460
Infant mortality rate (per 100 000 live births)	71
Stillbirth rate (per 1000 total births)	29
Life expectancy at birth (years)	60

2012

A national eHealth policy has been adopted, but its implementation has been limited so far to a pilot of electronic Hospital Medical Records, conducted in three hospitals.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	Yes
Financial	Yes
Other	

## Monitoring the status of women's and children's health

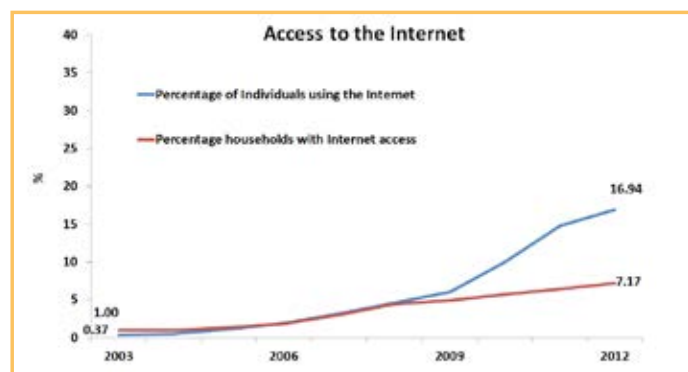
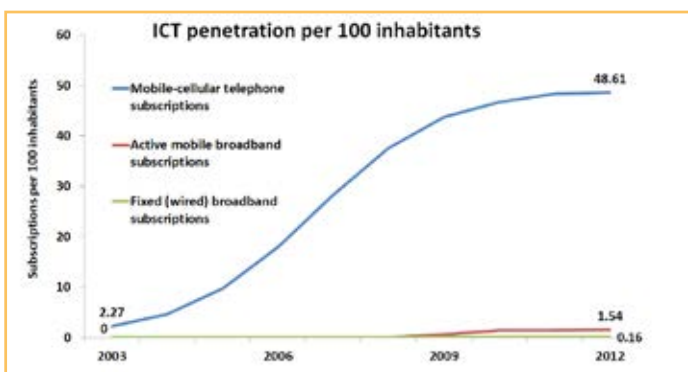
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes		Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes		Paper
Children under 5 who are stunted (%)	Yes		Paper
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	No		Paper**
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes		Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes		
Skilled attendant at birth: Live births attended by skilled health personnel (%)	No		Both**
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes		Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes		Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes		Paper
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

# Angola



## Country health indicators\*

Population (000s)	20,821
Neonatal deaths % of all <5 deaths	45
Maternal mortality ratio (per 100 000 live births)	450
Infant mortality rate (per 100 000 live births)	100
Stillbirth rate (per 1000 total births)	25
Life expectancy at birth (years)	51



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	No	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>			
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every year	Paper
<b>Children under 5 who are stunted (%)</b>	Yes	Every year	Paper
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Paper
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every year	Paper
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	No		
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Azerbaijan

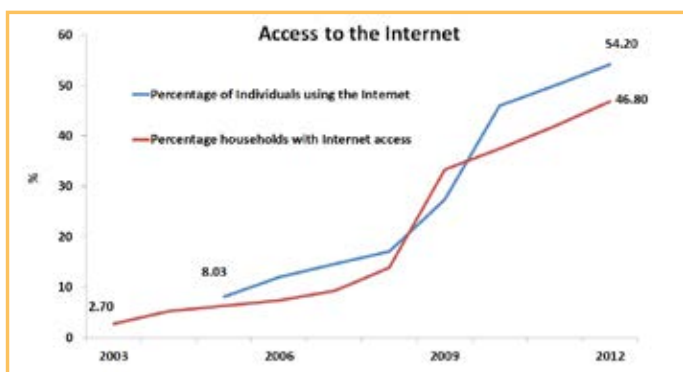
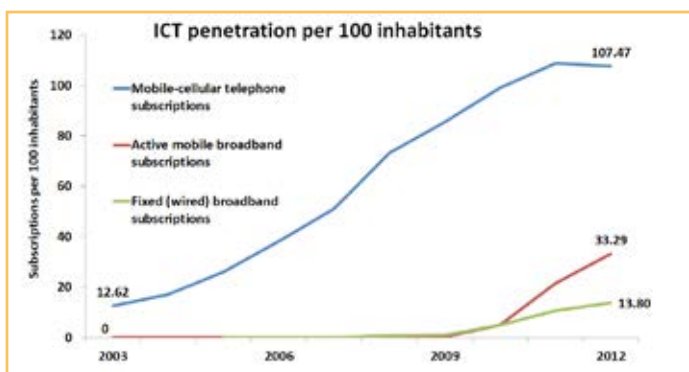


## Country health indicators\*

Population (000s)	9,309
Neonatal deaths % of all <5 deaths	15
Maternal mortality ratio (per 100 000 live births)	43
Infant mortality rate (per 100 000 live births)	31
Stillbirth rate (per 1000 total births)	12
Life expectancy at birth (years)	71

2003

The National Strategy for Information and Communication Technologies for Development of the Azerbaijan Republic (2003-2012) was adopted and has been implemented in part. Other programmes on sustainable development, eGovernment and MNCH complement the Strategy.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

# Bangladesh

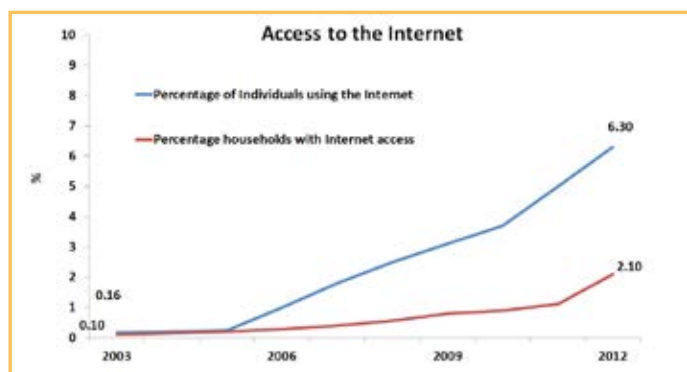
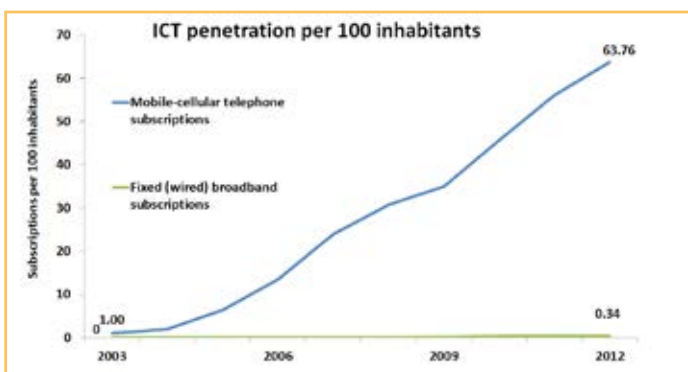


## Country health indicators\*

Population (000s)	155,000
Neonatal deaths % of all <5 deaths	24
Maternal mortality ratio (per 100 000 live births)	240
Infant mortality rate (per 100 000 live births)	33
Stillbirth rate (per 1000 total births)	36
Life expectancy at birth (years)	70

2009

A national ICT policy was adopted; eHealth is also part of the National Health Policy, adopted in 2011 and other policy documents. Implementation is ongoing.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	Paper

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 2 years	Paper
Children under 5 who are stunted (%)	Yes	Every 2 years	Paper
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 2 years	Paper
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 2 years	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 2 years	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 2 years	Paper
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 2 years	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 2 years	Paper

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

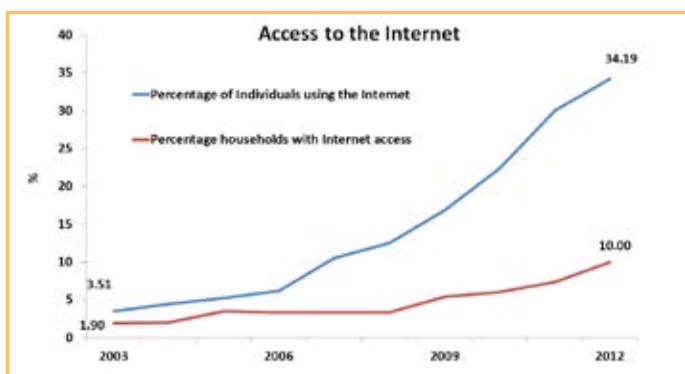
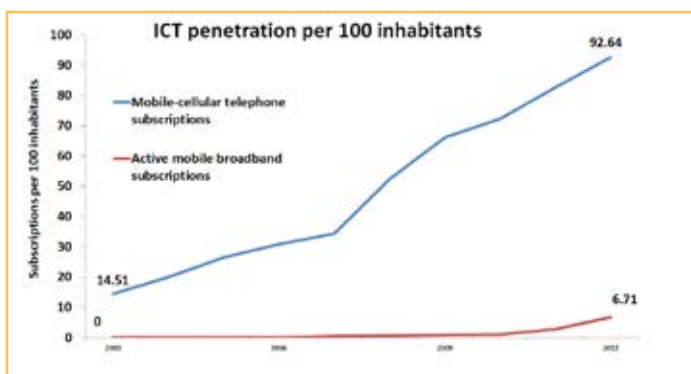


# Bolivia



## Country health indicators\*

Population (000s)	10,496
Neonatal deaths % of all <5 deaths	19
Maternal mortality ratio (per 100 000 live births)	190
Infant mortality rate (per 100 000 live births)	33
Stillbirth rate (per 1000 total births)	17
Life expectancy at birth (years)	67



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

# Botswana

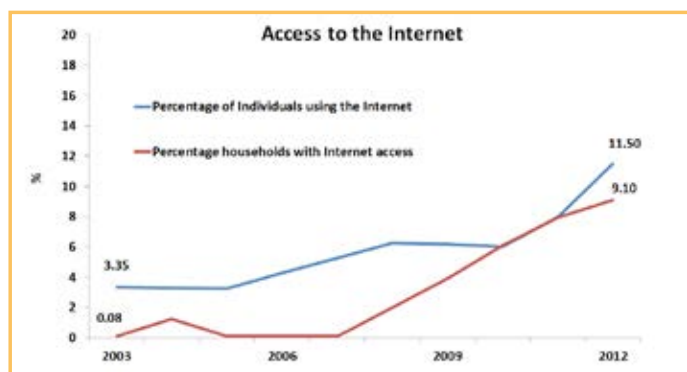
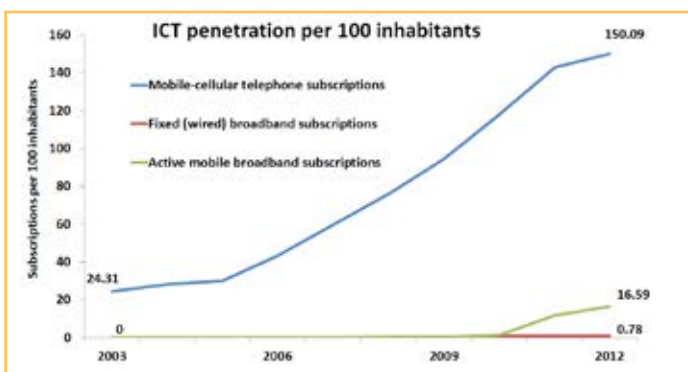


## Country health indicators\*

Population (000s)	2,004
Neonatal deaths % of all <5 deaths	29
Maternal mortality ratio (per 100 000 live births)	160
Infant mortality rate (per 100 000 live births)	41
Stillbirth rate (per 1000 total births)	16
Life expectancy at birth (years)	66

2009

A national eHealth policy has been adopted as part of the country's eGovernment strategy. Implementation is still partial.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	No		
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Burkina Faso

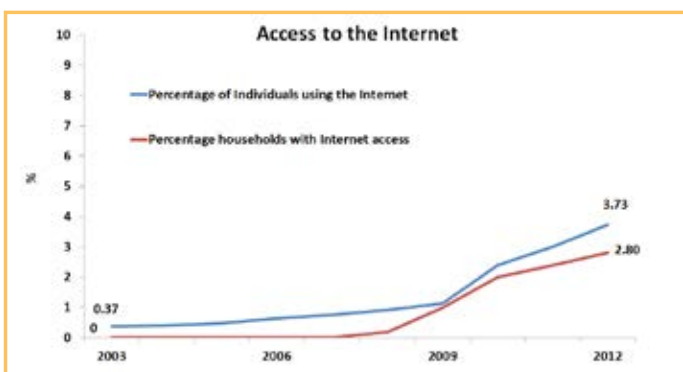
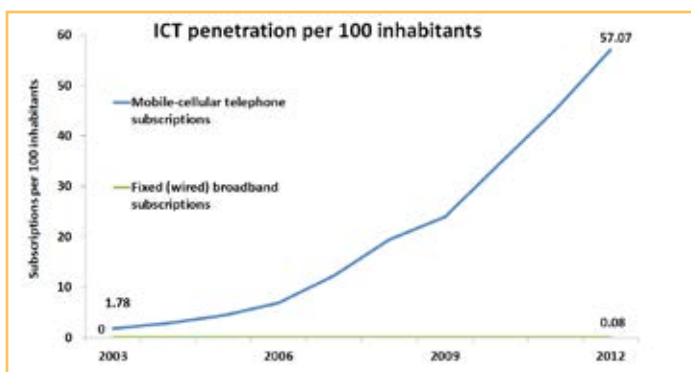


## Country health indicators\*

Population (000s)	16,460
Neonatal deaths % of all <5 deaths	28
Maternal mortality ratio (per 100 000 live births)	300
Infant mortality rate (per 100 000 live births)	66
Stillbirth rate (per 1000 total births)	26
Life expectancy at birth (years)	56

In process

The National Information, Communication and Infrastructure Plan seeks to create a Directorate General of Health Information and Statistics. This Directorate will oversee the telehealth and eHealth strategies that are in the course of being adopted.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	Yes
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

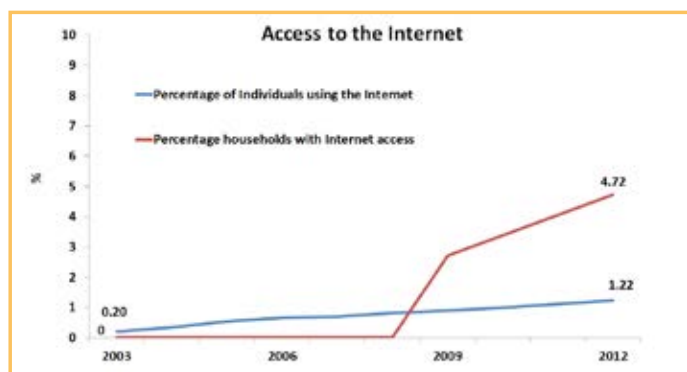
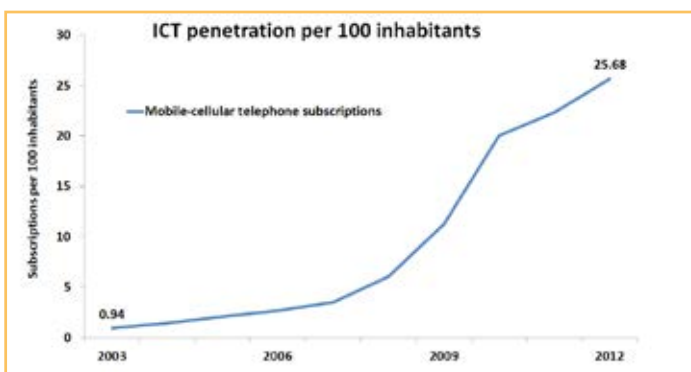


# Burundi



## Country health indicators\*

Population (000s)	9,850
Neonatal deaths % of all <5 deaths	36
Maternal mortality ratio (per 100 000 live births)	800
Infant mortality rate (per 100 000 live births)	67
Stillbirth rate (per 1000 total births)	28
Life expectancy at birth (years)	53



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Paper
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	Paper
<b>Children under 5 who are stunted (%)</b>	Yes	Every 5 years	Paper
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	No		
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every year	Paper
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Paper
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Paper

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

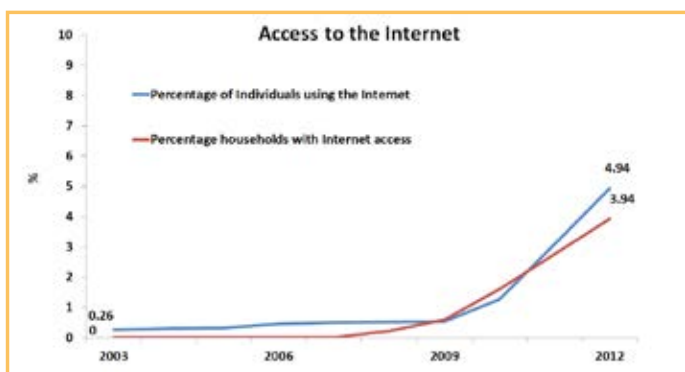
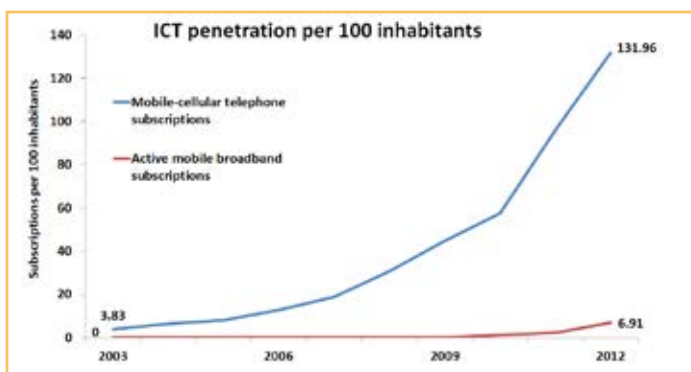
\*\* Inconsistent data

# Cambodia



## Country health indicators\*

Population (000s)	14,865
Neonatal deaths % of all <5 deaths	18
Maternal mortality ratio (per 100 000 live births)	250
Infant mortality rate (per 100 000 live births)	34
Stillbirth rate (per 1000 total births)	18
Life expectancy at birth (years)	65



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

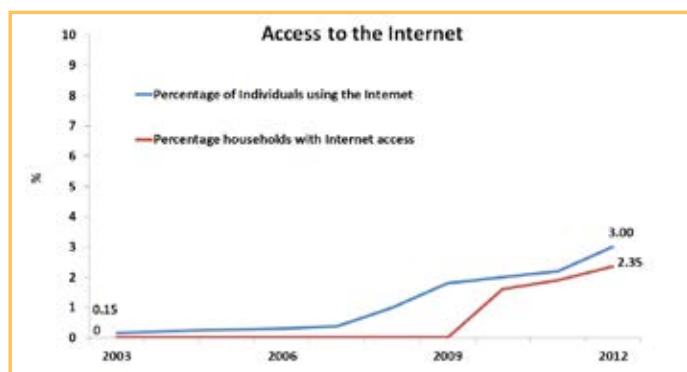
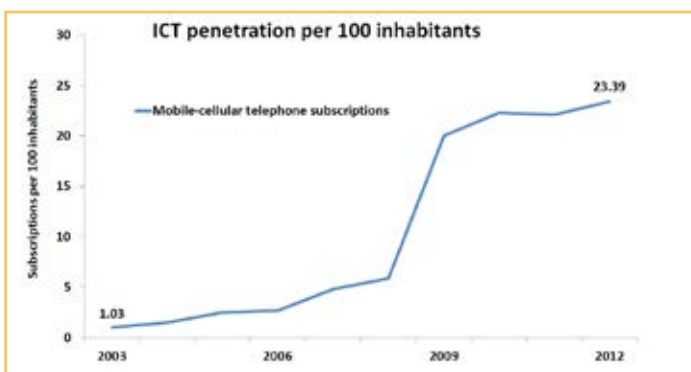
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

# Central African Republic



## Country health indicators\*

Population (000s)	4,525
Neonatal deaths % of all <5 deaths	41
Maternal mortality ratio (per 100 000 live births)	890
Infant mortality rate (per 100 000 live births)	91
Stillbirth rate (per 1000 total births)	24
Life expectancy at birth (years)	48



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	No	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	
Standards	
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 4 years	Both
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 4 years	Both
<b>Children under 5 who are stunted (%)</b>	Yes	Every year	Both
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 4 years	Both
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 4 years	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 4 years	Both
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	..	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# China

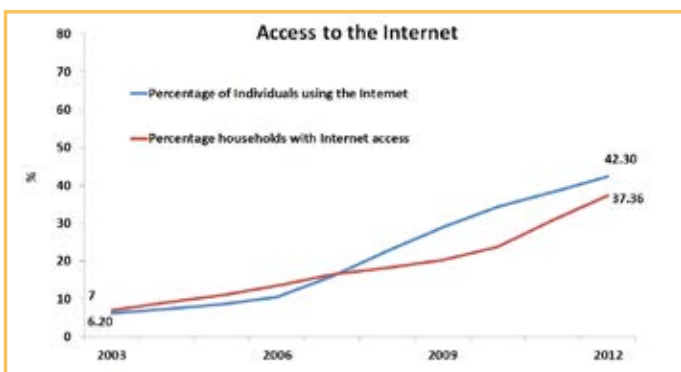
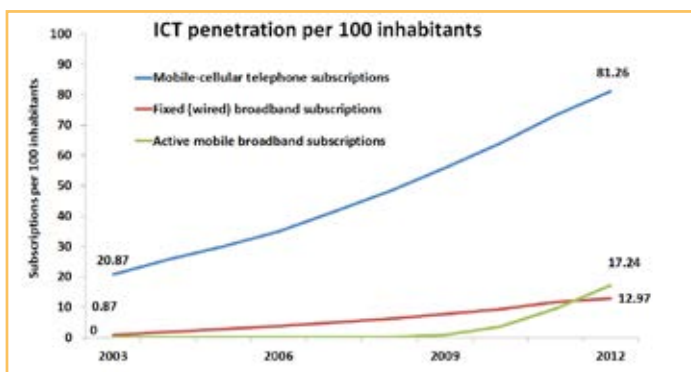


## Country health indicators\*

Population (000s)	1,390,000
Neonatal deaths % of all <5 deaths	9
Maternal mortality ratio (per 100 000 live births)	37
Infant mortality rate (per 100 000 live births)	12
Stillbirth rate (per 1000 total births)	10
Life expectancy at birth (years)	76

2012

The National Informatization Strategy, also known as "The 3-5-2-1-2 plan", has been adopted and it is partially implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Paper
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	More than every 5 years	Electronic
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	More than every 5 years	Electronic
Children under 5 who are stunted (%)	Yes	Every year	Electronic
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Electronic
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Electronic
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Electronic
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Electronic
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Electronic
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every year	Electronic
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Electronic
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	No		Electronic**



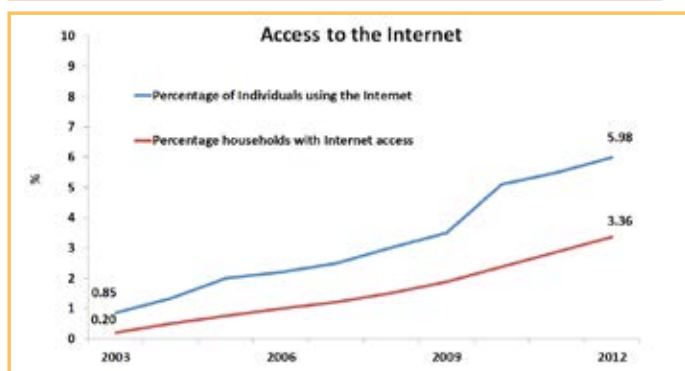
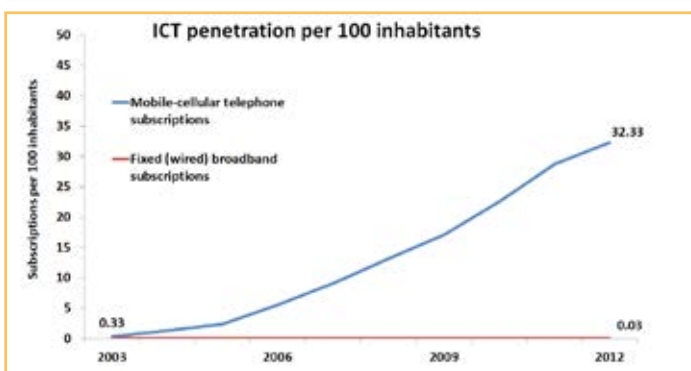
# Comoros



## Country health indicators\*

Population (000s)	718
Neonatal deaths % of all <5 deaths	31
Maternal mortality ratio (per 100 000 live births)	280
Infant mortality rate (per 100 000 live births)	58
Stillbirth rate (per 1000 total births)	27
Life expectancy at birth (years)	62

No national eHealth policy has been adopted, but the strategic plan of the National Regulatory Authority for Information Technology and Communication (ANRTIC) provides a focus for the promotion of eHealth.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	More than every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	More than every 5 years	Both
Children under 5 who are stunted (%)	Yes	More than every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	More than every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	More than every 5 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)			
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

## Côte d'Ivoire

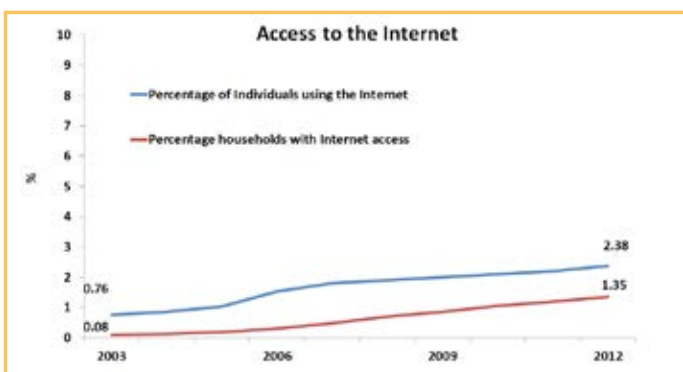
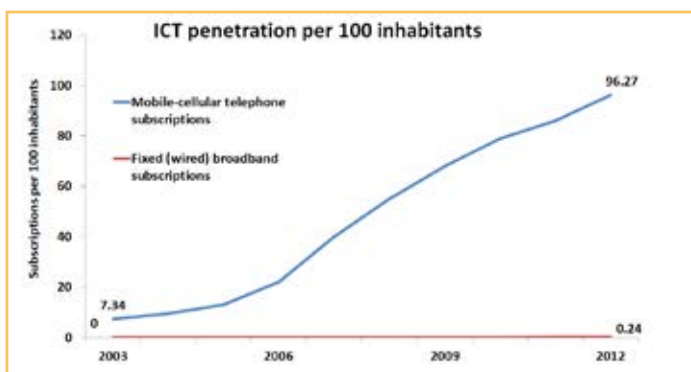


## Country health indicators\*

Population (000s)	19,840
Neonatal deaths % of all <5 deaths	40
Maternal mortality ratio (per 100 000 live births)	400
Infant mortality rate (per 100 000 live births)	76
Stillbirth rate (per 1000 total births)	3
Life expectancy at birth (years)	56

In process

The Strategic Plan was approved in 2011, but its adoption by the Council of Ministers is still in process.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	
Other	Yes

## Monitoring the status of women's and children's health

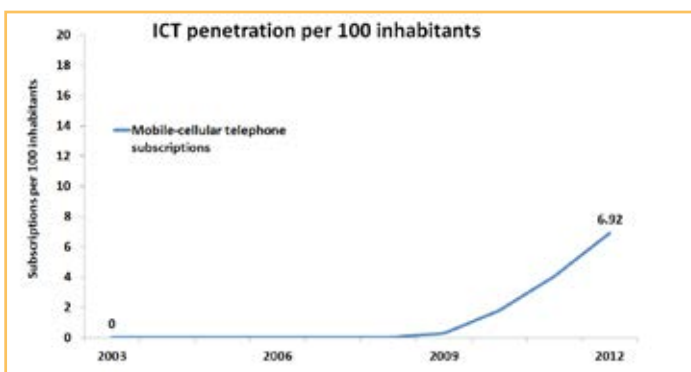
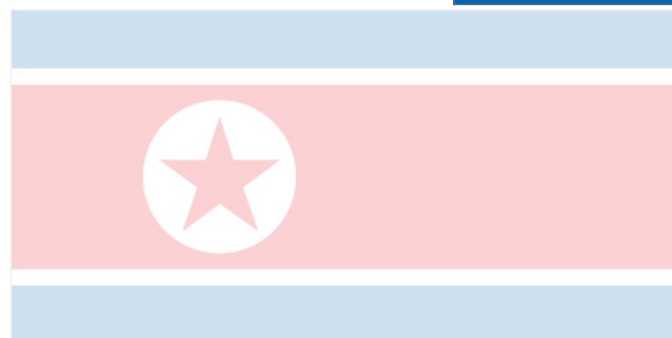
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 4 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 4 years	Both
Children under 5 who are stunted (%)	Yes	Every 4 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 4 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 4 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

## Democratic People's Republic of Korea



## Country health indicators\*

Population (000s)	24,763
Neonatal deaths % of all <5 deaths	16
Maternal mortality ratio (per 100 000 live births)	81
Infant mortality rate (per 100 000 live births)	23
Stillbirth rate (per 1000 total births)	13
Life expectancy at birth (years)	69



Although no stand-alone national eHealth policy has been adopted, the importance of having eHealth implemented in the country was documented in the Medium Term Strategic Plan (2011-2015) and the National Strategic Plan for an Integrated Health Information System (2009-2013).

## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	No	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Paper
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Paper

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 3 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Paper
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	No		
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 3 years	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

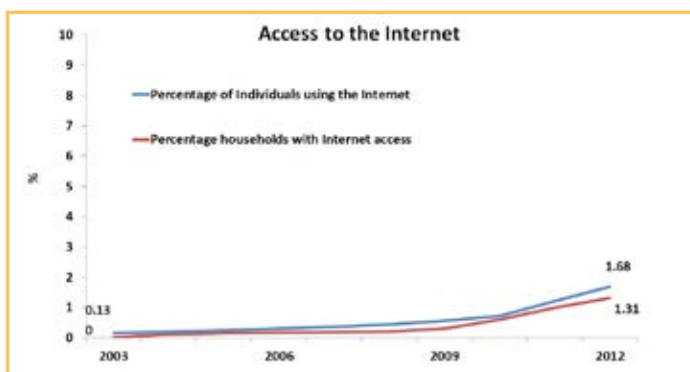
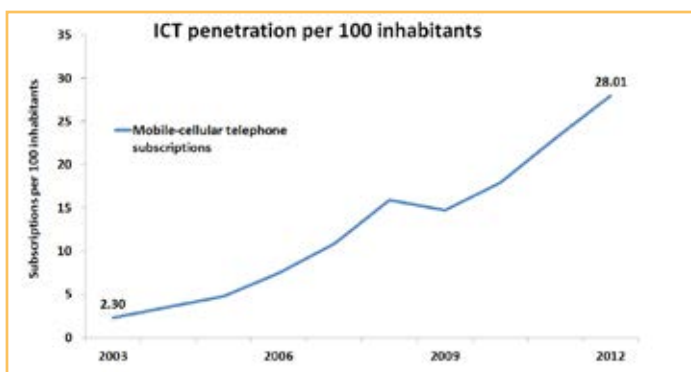


# Democratic Republic of the Congo



## Country health indicators\*

Population (000s)	65,705
Neonatal deaths % of all <5 deaths	44
Maternal mortality ratio (per 100 000 live births)	540
Infant mortality rate (per 100 000 live births)	100
Stillbirth rate (per 1000 total births)	29
Life expectancy at birth (years)	49



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Electronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	
Standards	
Human resources	
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

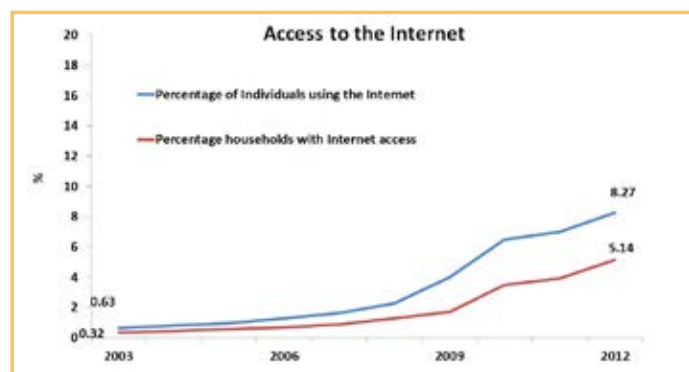
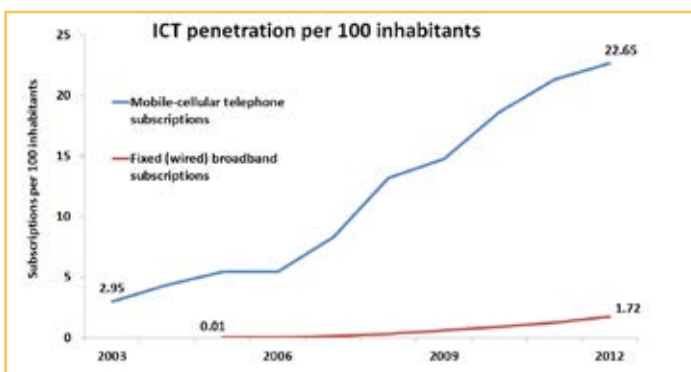
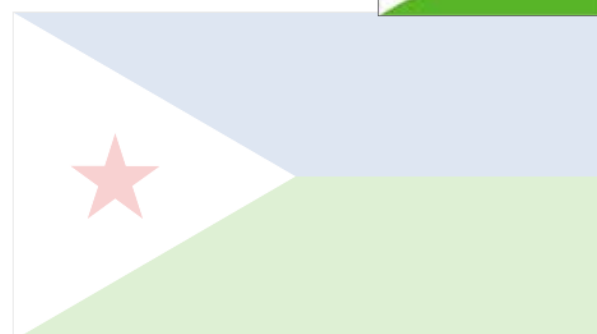
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio			
Under 5 child mortality, with the proportion of newborn deaths (%)			
Children under 5 who are stunted (%)			
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)			
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)			
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)			
Skilled attendant at birth: Live births attended by skilled health personnel (%)			
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)			
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)			
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)			
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)			

# Djibouti



## Country health indicators\*

Population (000s)	860
Neonatal deaths % of all <5 deaths	31
Maternal mortality ratio (per 100 000 live births)	200
Infant mortality rate (per 100 000 live births)	66
Stillbirth rate (per 1000 total births)	34
Life expectancy at birth (years)	58



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	No	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Paper
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	Paper
<b>Children under 5 who are stunted (%)</b>	Yes	Every 5 years	Paper
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Paper
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 5 years	Paper
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 5 years	Paper
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

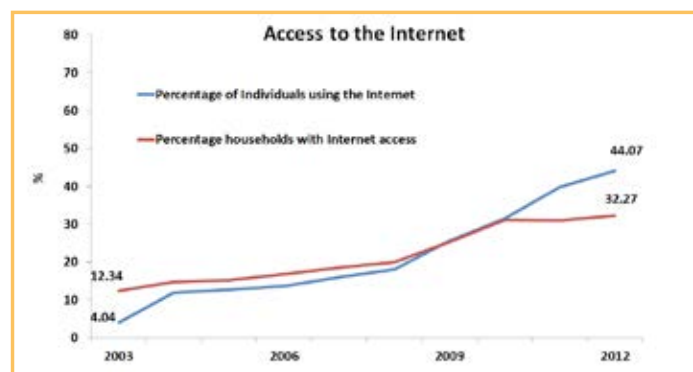
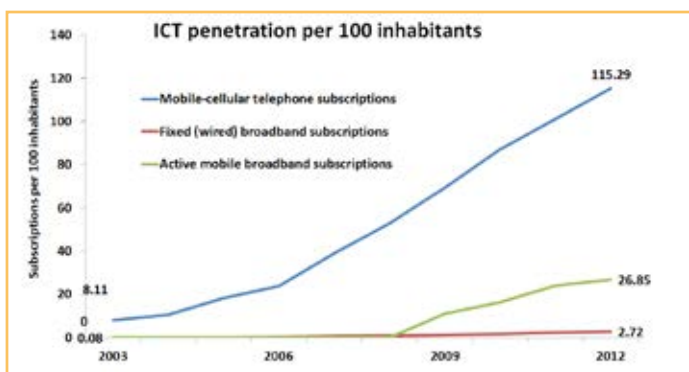
\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Egypt

## Country health indicators\*

Population (000s)	80,722
Neonatal deaths % of all <5 deaths	30
Maternal mortality ratio (per 100 000 live births)	66
Infant mortality rate (per 100 000 live births)	19
Stillbirth rate (per 1000 total births)	14
Life expectancy at birth (years)	71



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – full coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

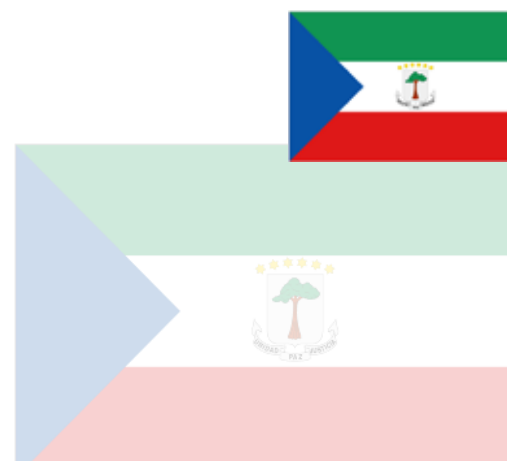
## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

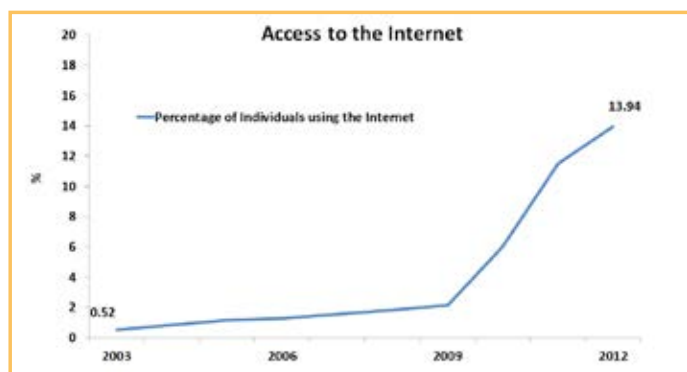
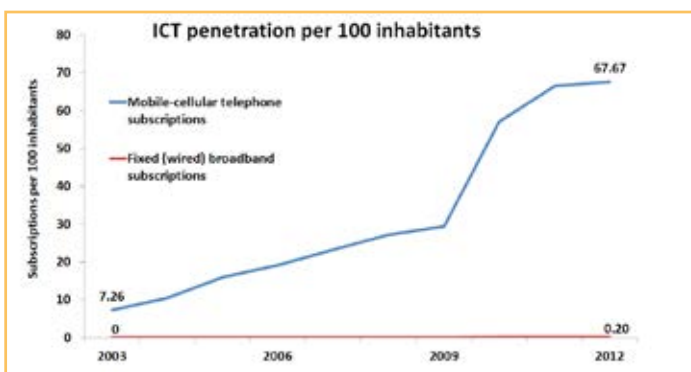
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

# Equatorial Guinea



## Country health indicators\*

Population (000s)	736
Neonatal deaths % of all <5 deaths	34
Maternal mortality ratio (per 100 000 live births)	240
Infant mortality rate (per 100 000 live births)	72
Stillbirth rate (per 1000 total births)	17
Life expectancy at birth (years)	54



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	No	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	Yes
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every year	Paper
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	No		
<b>Children under 5 who are stunted (%)</b>	No		
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	No		
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	No	Every year**	Paper**
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every year	Paper
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	No		
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	No		
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Ethiopia

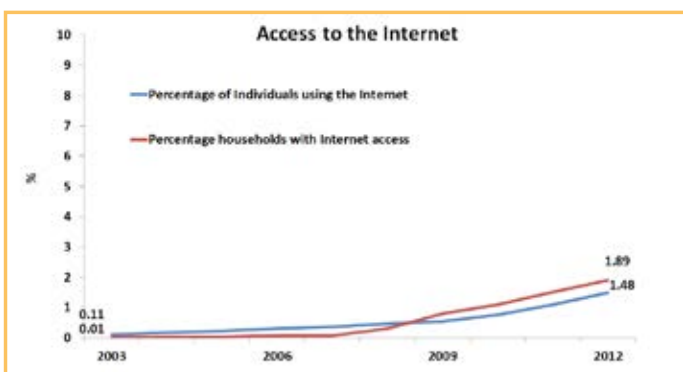
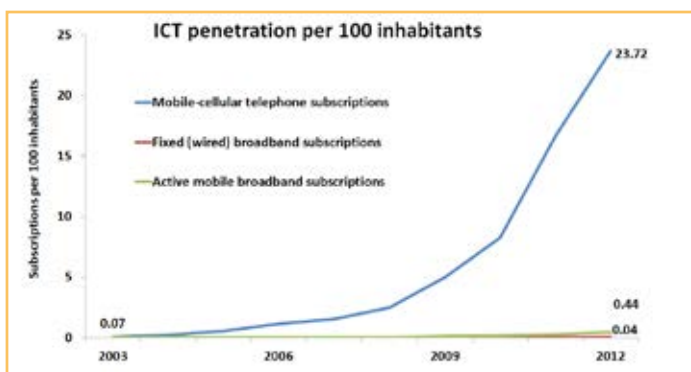


## Country health indicators\*

Population (000s)	91,729
Neonatal deaths % of all <5 deaths	29
Maternal mortality ratio (per 100 000 live births)	350
Infant mortality rate (per 100 000 live births)	47
Stillbirth rate (per 1000 total births)	26
Life expectancy at birth (years)	60

In process

Development of the eHealth strategy is underway, and it is expected to be implemented by 2014.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Electronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

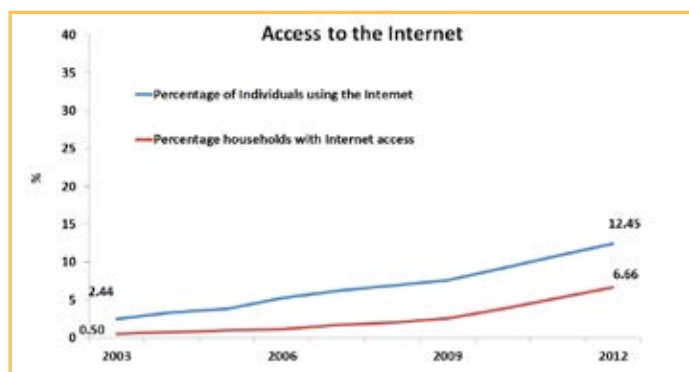
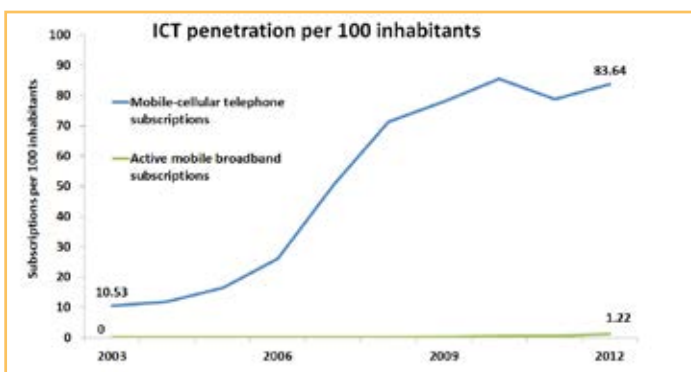


# Gambia



## Country health indicators\*

Population (000s)	1,791
Neonatal deaths % of all <5 deaths	28
Maternal mortality ratio (per 100 000 live births)	360
Infant mortality rate (per 100 000 live births)	49
Stillbirth rate (per 1000 total births)	26
Life expectancy at birth (years)	58



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	More than every 5 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Paper
Children under 5 who are stunted (%)	Yes	Every 5 years	
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	More than every 5 years	Paper
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Ghana

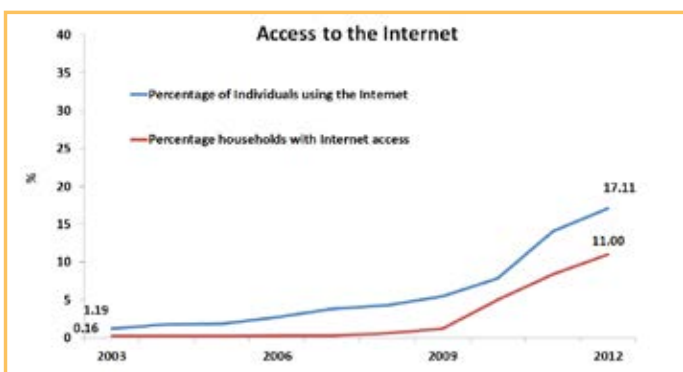
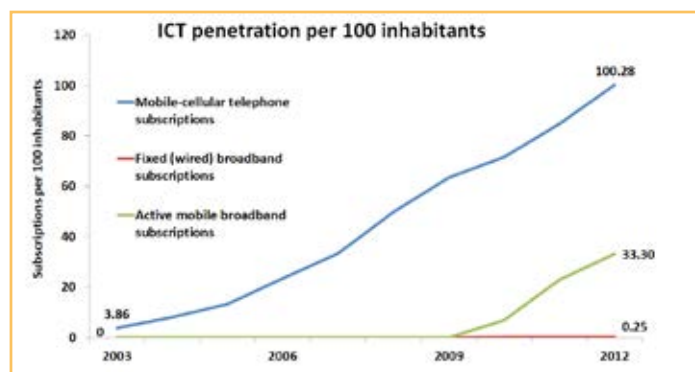


## Country health indicators\*

Population (000s)	25,366
Neonatal deaths % of all <5 deaths	28
Maternal mortality ratio (per 100 000 live births)	350
Infant mortality rate (per 100 000 live births)	49
Stillbirth rate (per 1000 total births)	22
Life expectancy at birth (years)	64

2005

The Health Sector ICT Policy and Strategy was adopted. Ghana has implemented also a health service enterprise architecture and its current National eHealth Policy and Strategy is partly implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Electronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	More than every 5 years	Both
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 3 years	Both
<b>Children under 5 who are stunted (%)</b>	Yes	Every 3 years	Both
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 3 years	Both
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Electronic
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every year	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 3 years	Both
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 3 years	Both



# Guatemala

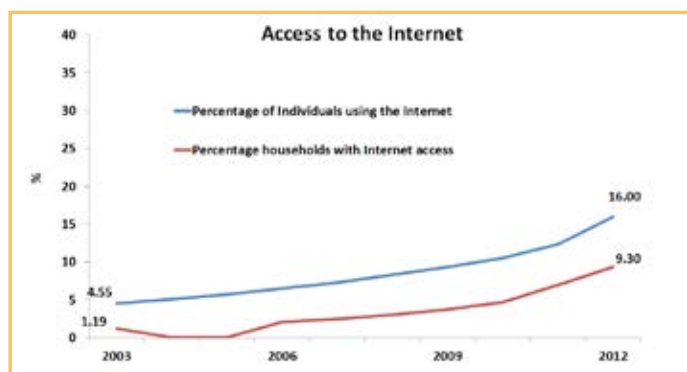
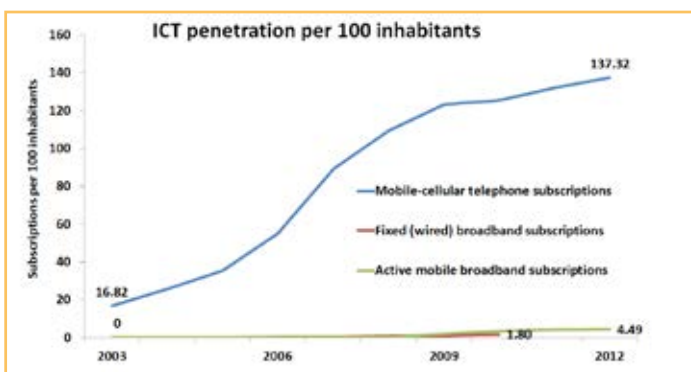


## Country health indicators\*

Population (000s)	15,083
Neonatal deaths % of all <5 deaths	15
Maternal mortality ratio (per 100 000 live births)	120
Infant mortality rate (per 100 000 live births)	27
Stillbirth rate (per 1000 total births)	10
Life expectancy at birth (years)	69

2012

A national eHealth policy has been adopted, but implementation has not started yet.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – full coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	
Services and applications	
Financial	Yes
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	No		

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

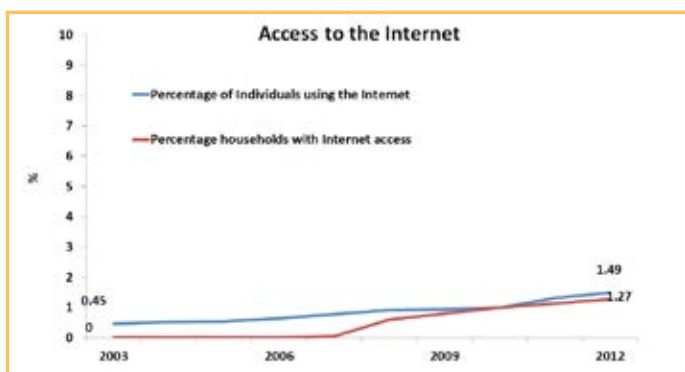
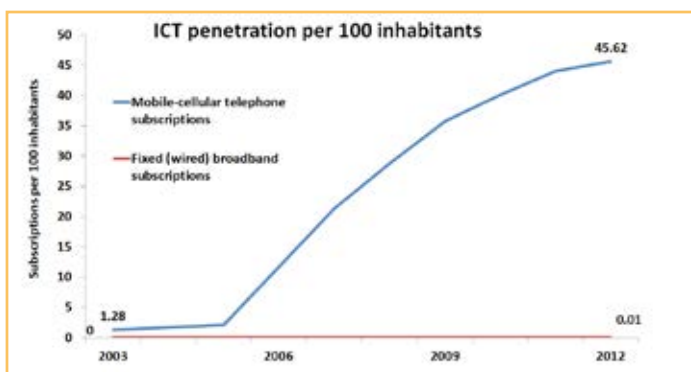
\*\* Inconsistent data

# Guinea



## Country health indicators\*

Population (000s)	11,451
Neonatal deaths % of all <5 deaths	34
Maternal mortality ratio (per 100 000 live births)	610
Infant mortality rate (per 100 000 live births)	65
Stillbirth rate (per 1000 total births)	24
Life expectancy at birth (years)	55



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Paper
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

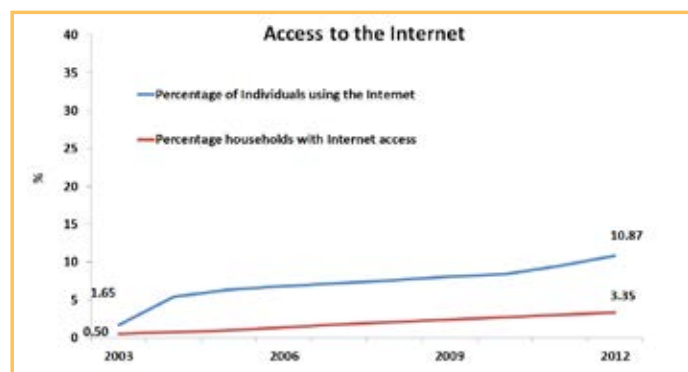
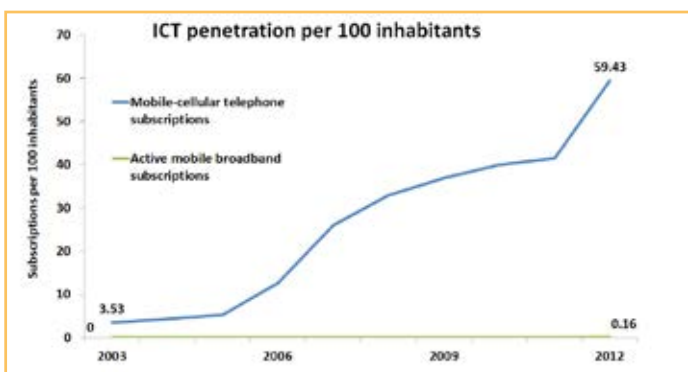
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)			Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)			
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)			
Skilled attendant at birth: Live births attended by skilled health personnel (%)			
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)			
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)			
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)			
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)			

# Haiti



## Country health indicators\*

Population (000s)	10,174
Neonatal deaths % of all <5 deaths	25
Maternal mortality ratio (per 100 000 live births)	350
Infant mortality rate (per 100 000 live births)	57
Stillbirth rate (per 1000 total births)	15
Life expectancy at birth (years)	63



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Both
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	Both
<b>Children under 5 who are stunted (%)</b>	Yes	Every 2 years	Paper
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 2 years	Paper
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

## India

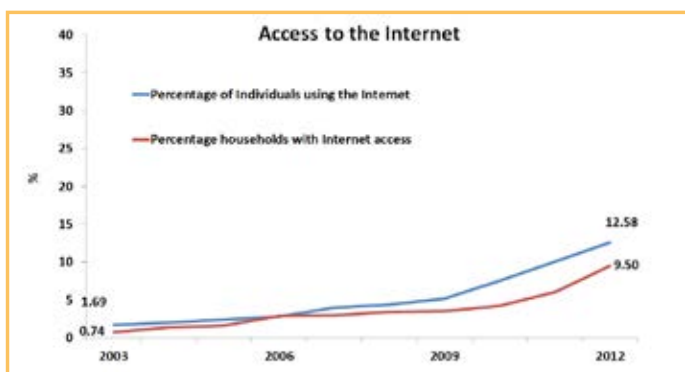
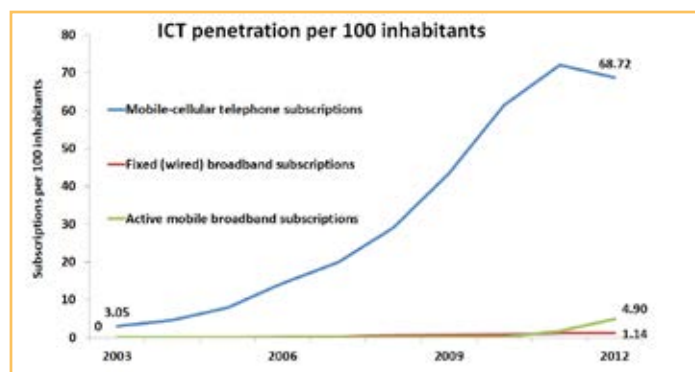


## Country health indicators\*

Population (000s)	1,240,000
Neonatal deaths % of all <5 deaths	31
Maternal mortality ratio (per 100 000 live births)	200
Infant mortality rate (per 100 000 live births)	44
Stillbirth rate (per 1000 total births)	22
Life expectancy at birth (years)	65

2006

A national eHealth policy has been adopted and it is partly implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 3 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every 3 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 3 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)			
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes		Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)			

# Indonesia

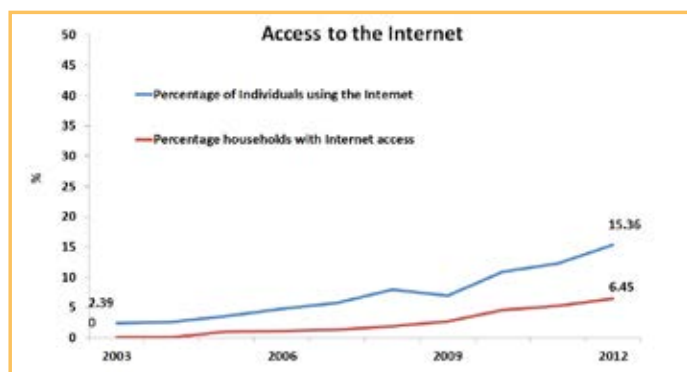
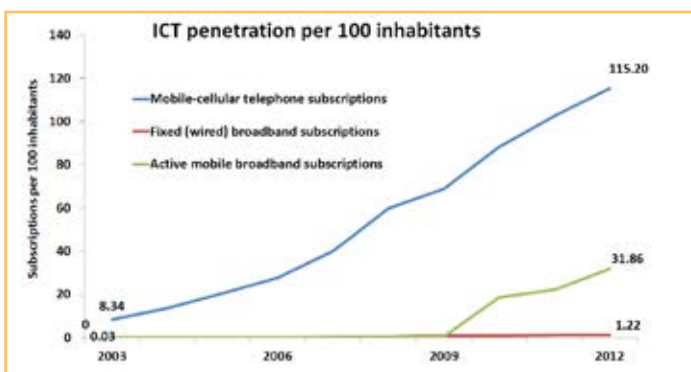


## Country health indicators\*

Population (000s)	247,000
Neonatal deaths % of all <5 deaths	15
Maternal mortality ratio (per 100 000 live births)	220
Infant mortality rate (per 100 000 live births)	26
Stillbirth rate (per 1000 total births)	15
Life expectancy at birth (years)	69

2002

The National Health Information Systems Development Regulation and Strategy was adopted and it is partly implemented. In 2012, the Health Information Systems Regulation was drafted with the goal of strengthening Indonesia's HIS. The draft is currently under inter-ministerial review.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Paper
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 4 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes		Both
Children under 5 who are stunted (%)	Yes	Every 3 years	Paper
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes		Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes		Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)			
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes		Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes		Both
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes		Paper
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

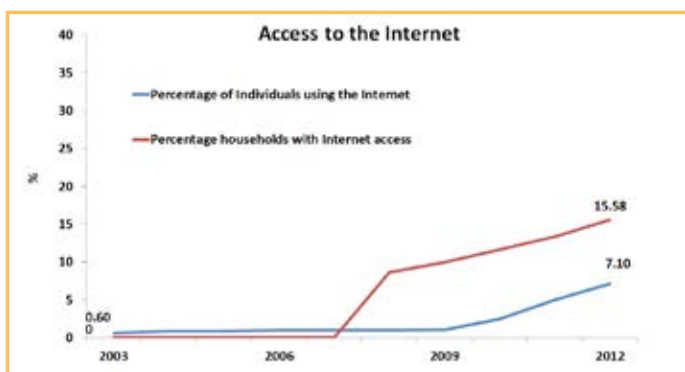
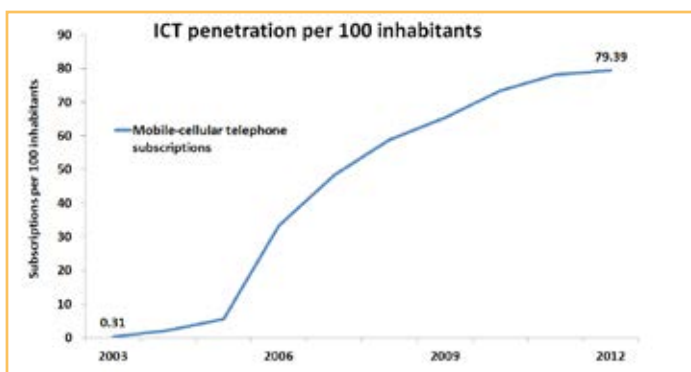


## Iraq



## Country health indicators\*

Population (000s)	32,778
Neonatal deaths % of all <5 deaths	19
Maternal mortality ratio (per 100 000 live births)	63
Infant mortality rate (per 100 000 live births)	28
Stillbirth rate (per 1000 total births)	9
Life expectancy at birth (years)	69



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Paper
Children under 5 who are stunted (%)	Yes		
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes		
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes		Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	No	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Paper
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes		
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Paper



## Kenya

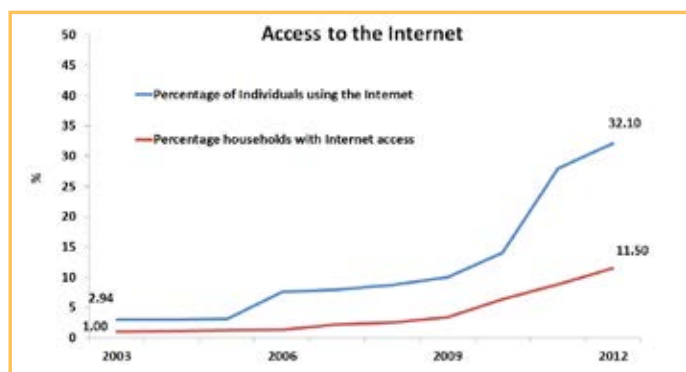
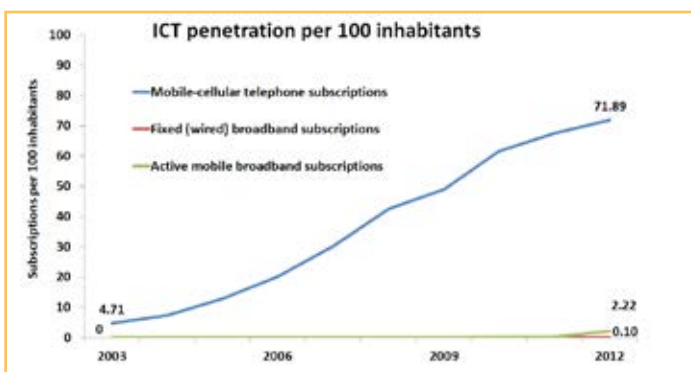


## Country health indicators\*

Population (000s)	43,178
Neonatal deaths % of all <5 deaths	27
Maternal mortality ratio (per 100 000 live births)	360
Infant mortality rate (per 100 000 live births)	49
Stillbirth rate (per 1000 total births)	22
Life expectancy at birth (years)	60

2011

National eHealth Strategy 2011-2017 was adopted and it is partly implemented. A Proposed Health Bill seeks to legalize the strategy and expand its mandate.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

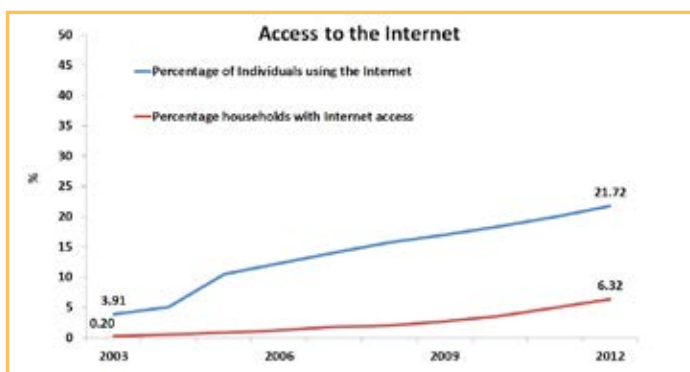
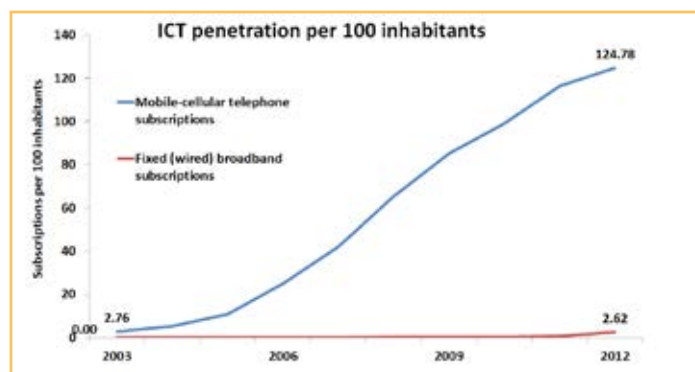
\*\* Inconsistent data

# Kyrgyzstan



## Country health indicators\*

Population (000s)	5,474
Neonatal deaths % of all <5 deaths	14
Maternal mortality ratio (per 100 000 live births)	71
Infant mortality rate (per 100 000 live births)	24
Stillbirth rate (per 1000 total births)	10
Life expectancy at birth (years)	69



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Paper
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

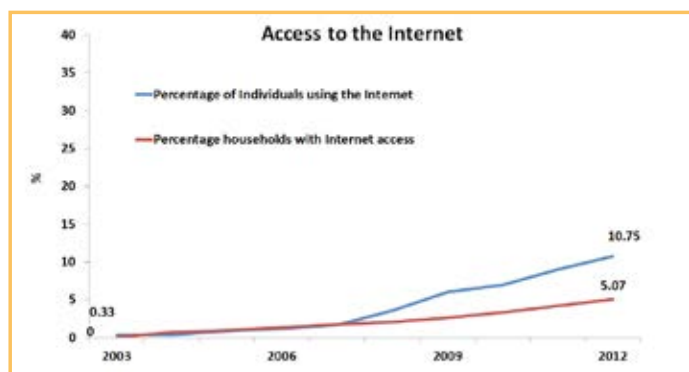
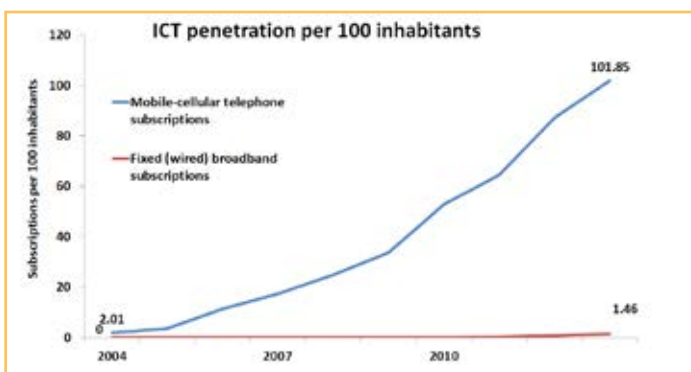
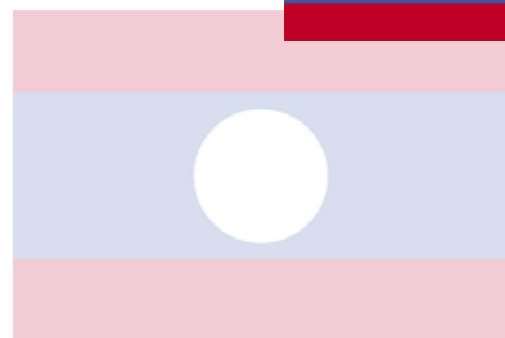
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	No		
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

# Lao People's Democratic Republic



## Country health indicators\*

Population (000s)	6,646
Neonatal deaths % of all <5 deaths	27
Maternal mortality ratio (per 100 000 live births)	470
Infant mortality rate (per 100 000 live births)	54
Stillbirth rate (per 1000 total births)	14
Life expectancy at birth (years)	68



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every year	Both
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every year	Both
<b>Children under 5 who are stunted (%)</b>	Yes	Every year	Both
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every year	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Lesotho

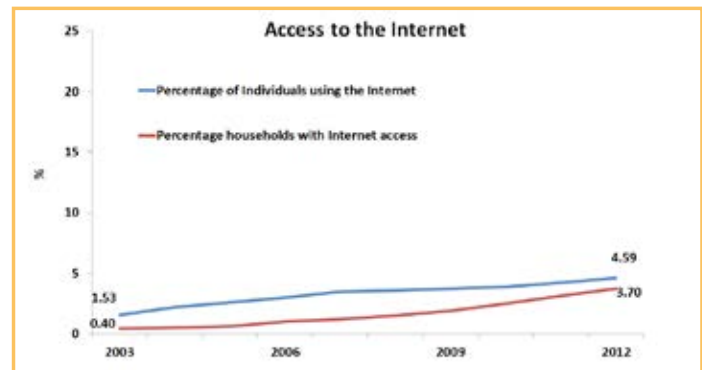
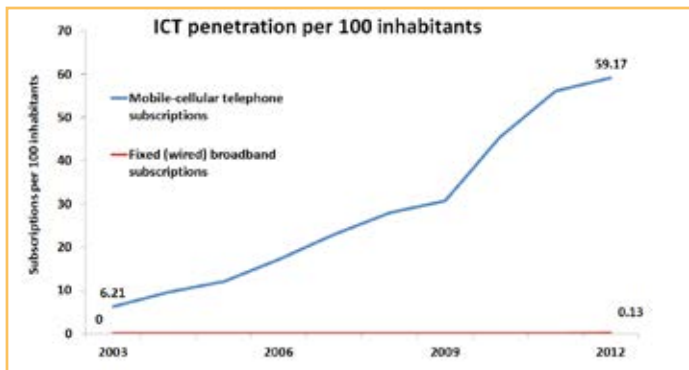


## Country health indicators\*

Population (000s)	2,052
Neonatal deaths % of all <5 deaths	45
Maternal mortality ratio (per 100 000 live births)	620
Infant mortality rate (per 100 000 live births)	74
Stillbirth rate (per 1000 total births)	25
Life expectancy at birth (years)	50

In process

Lesotho has advanced plans to review its ICT policy and develop an eHealth strategy.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system		
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

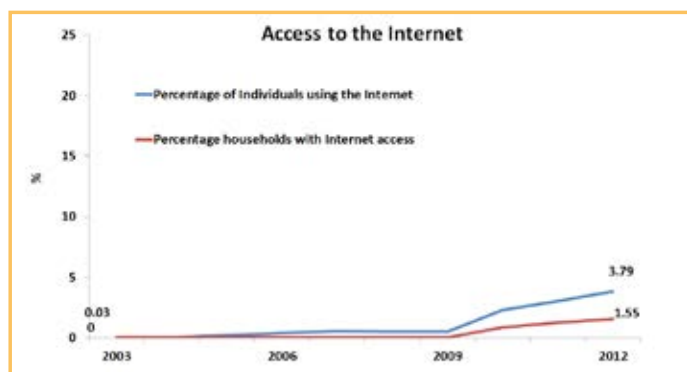
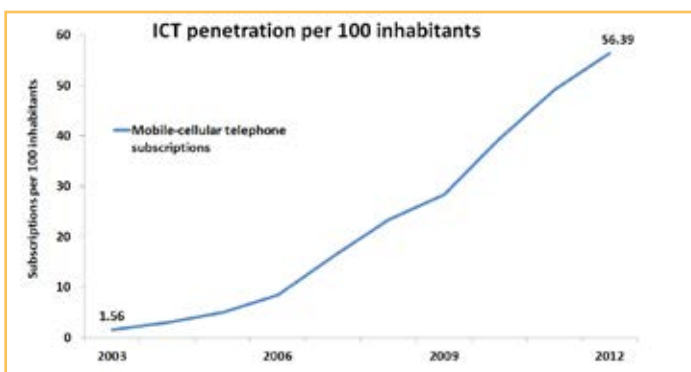
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	More than every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every 5 years	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 5 years	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Both

# Liberia



## Country health indicators\*

Population (000s)	4,190
Neonatal deaths % of all <5 deaths	27
Maternal mortality ratio (per 100 000 live births)	770
Infant mortality rate (per 100 000 live births)	56
Stillbirth rate (per 1000 total births)	27
Life expectancy at birth (years)	59



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Paper
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	Paper
<b>Children under 5 who are stunted (%)</b>	Yes	Every 2 years	Paper
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every year	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every year	Both
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

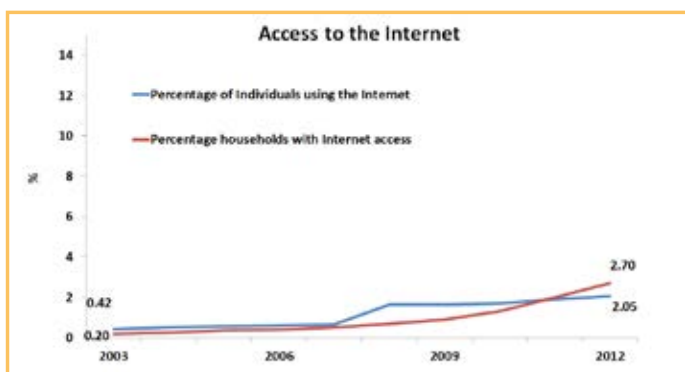
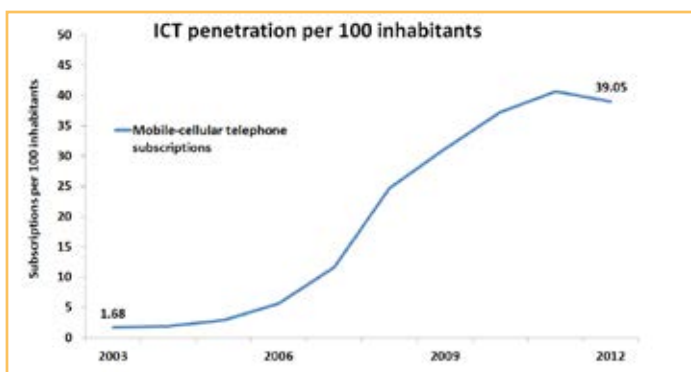


# Madagascar



## Country health indicators\*

Population (000s)	22,294
Neonatal deaths % of all <5 deaths	22
Maternal mortality ratio (per 100 000 live births)	240
Infant mortality rate (per 100 000 live births)	41
Stillbirth rate (per 1000 total births)	21
Life expectancy at birth (years)	66



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both



# Malawi

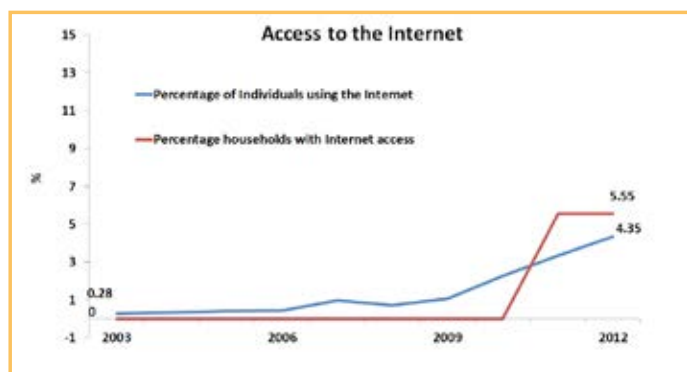
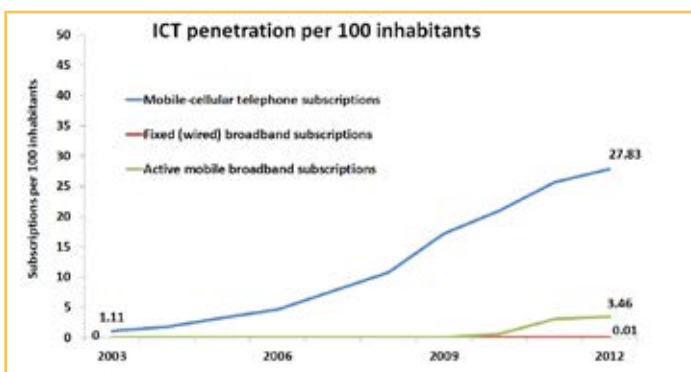


## Country health indicators\*

Population (000s)	15,906
Neonatal deaths % of all <5 deaths	24
Maternal mortality ratio (per 100 000 live births)	460
Infant mortality rate (per 100 000 live births)	46
Stillbirth rate (per 1000 total births)	24
Life expectancy at birth (years)	58

In process

The Ministry of Health has established a task force to draft the eHealth strategy. The draft will be based on findings from an eHealth situation analysis.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Paper
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Paper

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Paper
Children under 5 who are stunted (%)	Yes	Every 5 years	Paper
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Paper
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Paper

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Mauritania

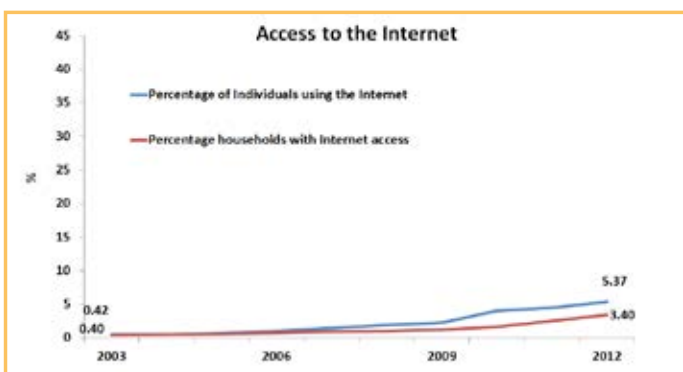
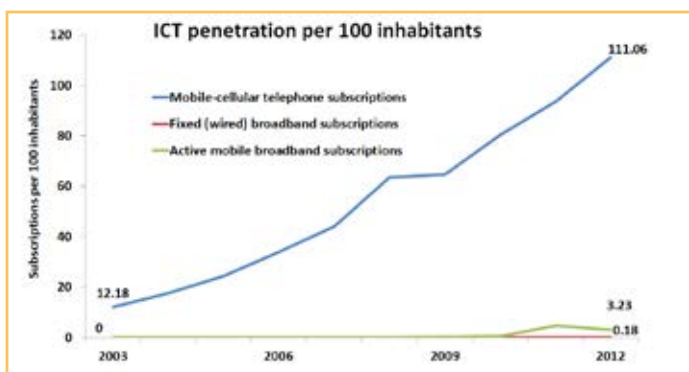


## Country health indicators\*

Population (000s)	3,796
Neonatal deaths % of all <5 deaths	34
Maternal mortality ratio (per 100 000 live births)	510
Infant mortality rate (per 100 000 live births)	65
Stillbirth rate (per 1000 total births)	27
Life expectancy at birth (years)	59

2010

A National Program for Telemedicine and eHealth has been established and it is partly implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 4 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Paper
Children under 5 who are stunted (%)	Yes	Every year	Paper
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Paper
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Paper
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

# Mexico

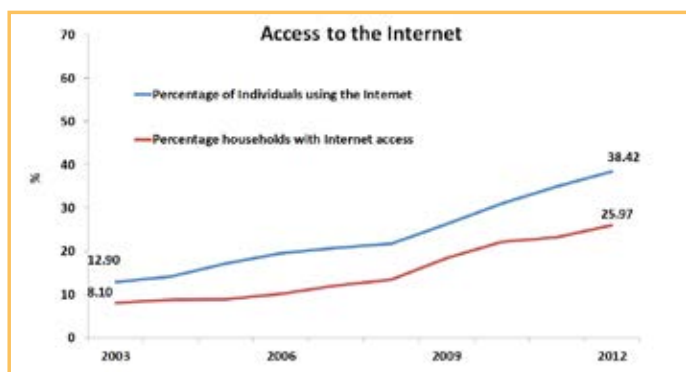
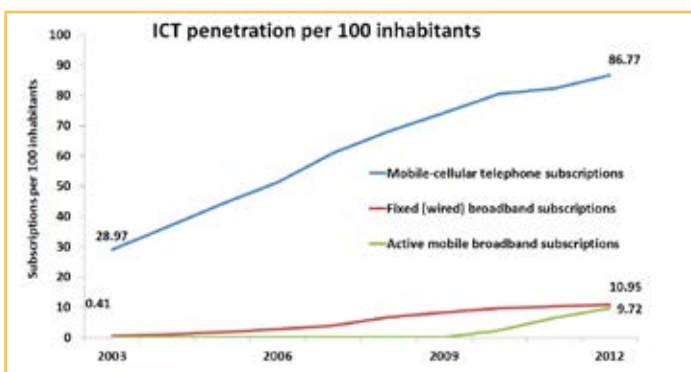


## Country health indicators\*

Population (000s)	121,000
Neonatal deaths % of all <5 deaths	7
Maternal mortality ratio (per 100 000 live births)	50
Infant mortality rate (per 100 000 live births)	14
Stillbirth rate (per 1000 total births)	5
Life expectancy at birth (years)	75

Before  
2000

A national eHealth policy was adopted and it is being implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – full coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita		Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Electronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	Yes
Human resources	
Services and applications	
Financial	Yes
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Electronic
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Electronic
Children under 5 who are stunted (%)			
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	No	Every year	Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Electronic
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes		Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	No		
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)			
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)			

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

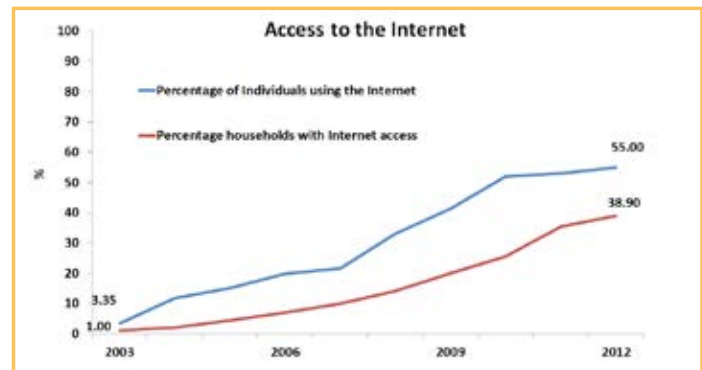
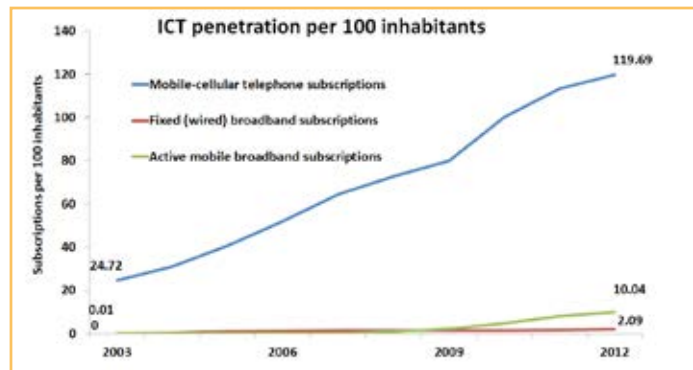
\*\* Inconsistent data

# Morocco



## Country health indicators\*

Population (000s)	32,521
Neonatal deaths % of all <5 deaths	18
Maternal mortality ratio (per 100 000 live births)	100
Infant mortality rate (per 100 000 live births)	27
Stillbirth rate (per 1000 total births)	20
Life expectancy at birth (years)	72



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	
Services and applications	Yes
Financial	
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	



# Mozambique

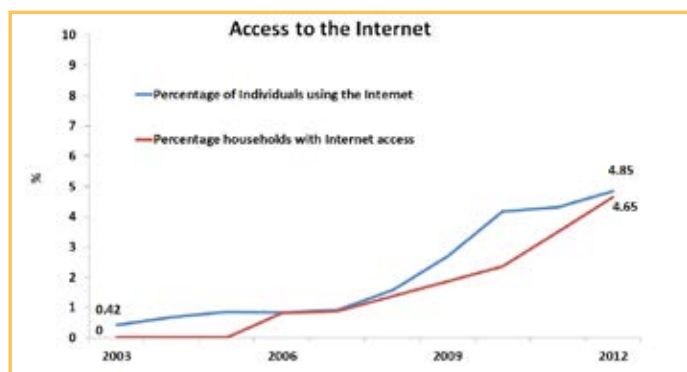
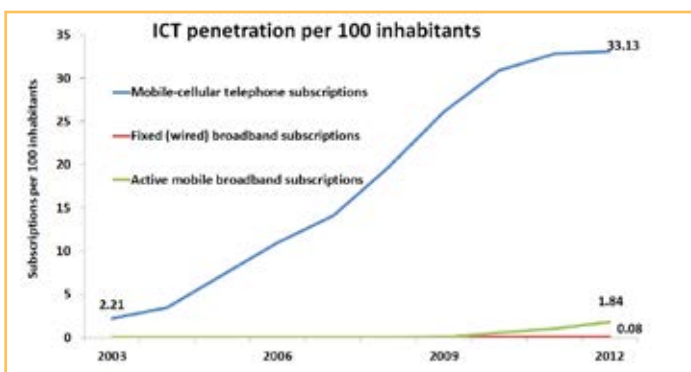


## Country health indicators\*

Population (000s)	25,203
Neonatal deaths % of all <5 deaths	30
Maternal mortality ratio (per 100 000 live births)	490
Infant mortality rate (per 100 000 live births)	63
Stillbirth rate (per 1000 total births)	28
Life expectancy at birth (years)	53

In process

The MoH has designated the National Institute of Health to draft a proposal delineating the actions needed to develop a national eHealth policy.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Paper
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	Yes
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Both
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	Both
<b>Children under 5 who are stunted (%)</b>	Yes	Every 5 years	
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every 2 years	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 5 years	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)			

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Myanmar

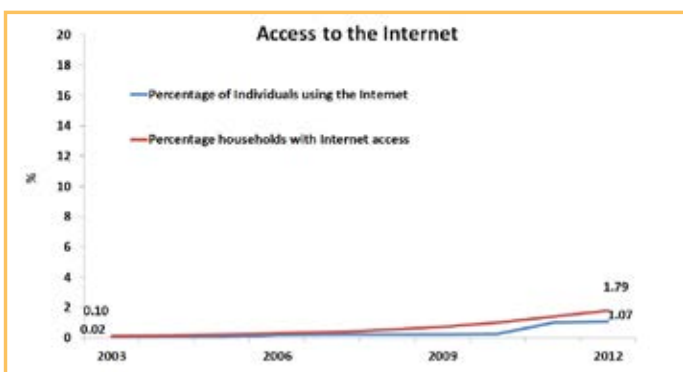
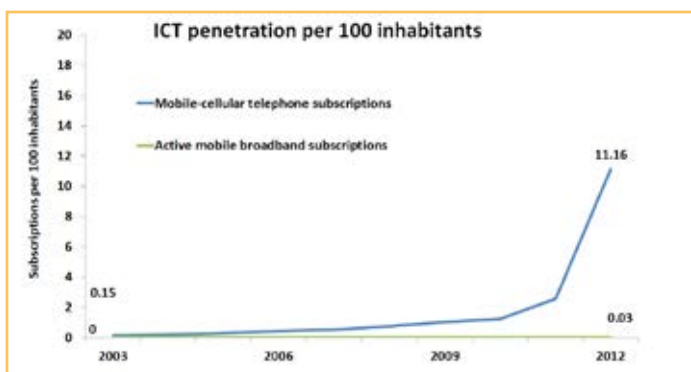


## Country health indicators\*

Population (000s)	52,797
Neonatal deaths % of all <5 deaths	26
Maternal mortality ratio (per 100 000 live births)	200
Infant mortality rate (per 100 000 live births)	41
Stillbirth rate (per 1000 total births)	20
Life expectancy at birth (years)	65

In process

A national eHealth policy is currently under development.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	No	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Do not know	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Paper
Children under 5 who are stunted (%)	Yes	Every 3 years	Paper
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	More than every 5 years	Paper
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Paper
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 3 years	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 3 years	Paper
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Paper



# Nepal

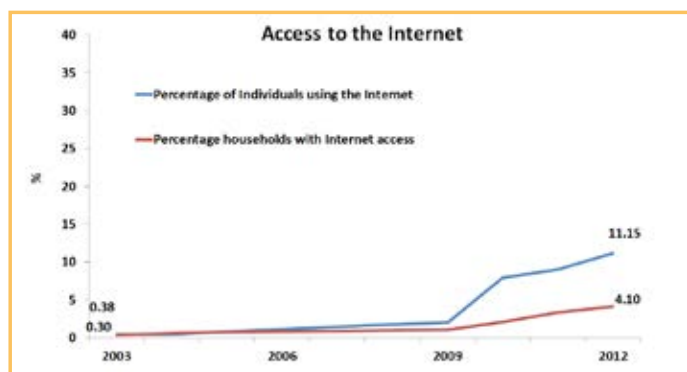
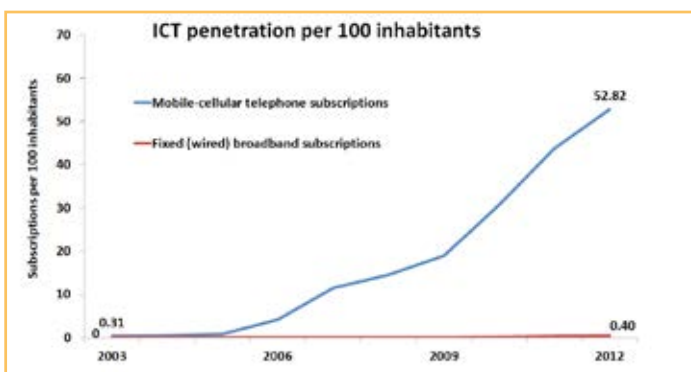


## Country health indicators\*

Population (000s)	27,474
Neonatal deaths % of all <5 deaths	24
Maternal mortality ratio (per 100 000 live births)	170
Infant mortality rate (per 100 000 live births)	34
Stillbirth rate (per 1000 total births)	23
Life expectancy at birth (years)	68

## In process

HIS development is currently guided by several national policies and specific strategies. As part of the CoIA Country Roadmap, the MoHP agreed to develop an eHealth strategy, and has established an eHealth Steering Group for this purpose.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Elec-tronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	More than every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

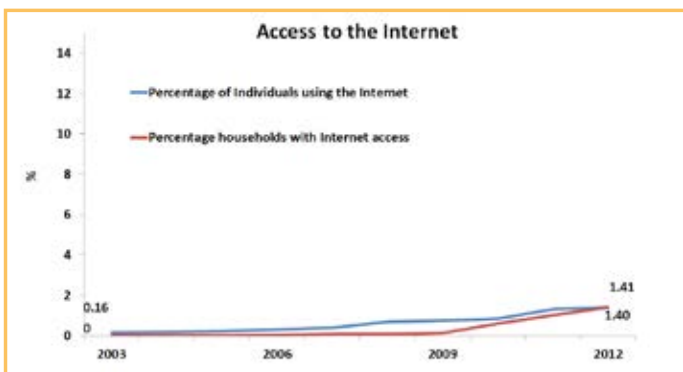
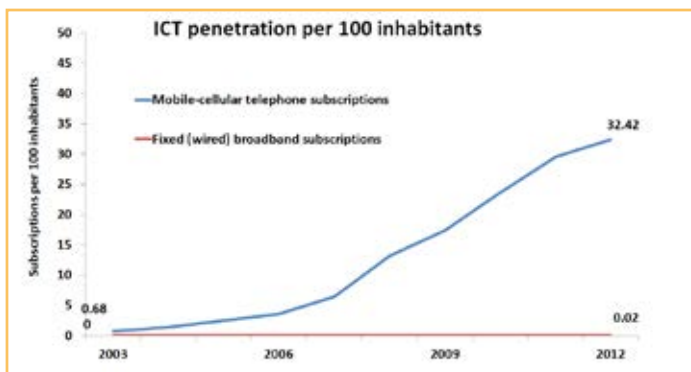
\*\* Inconsistent data

# Niger



## Country health indicators\*

Population (000s)	17,157
Neonatal deaths % of all <5 deaths	28
Maternal mortality ratio (per 100 000 live births)	590
Infant mortality rate (per 100 000 live births)	63
Stillbirth rate (per 1000 total births)	23
Life expectancy at birth (years)	56



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

# Nigeria

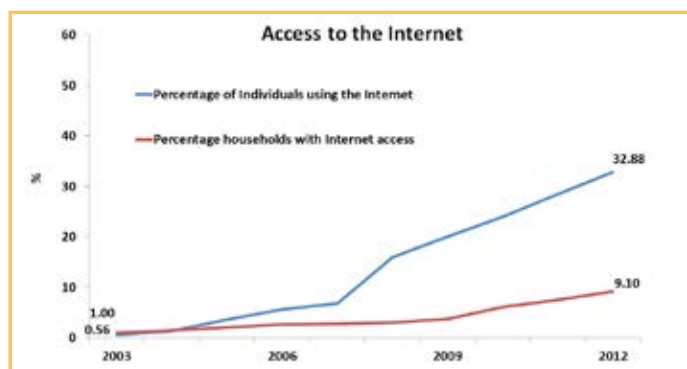
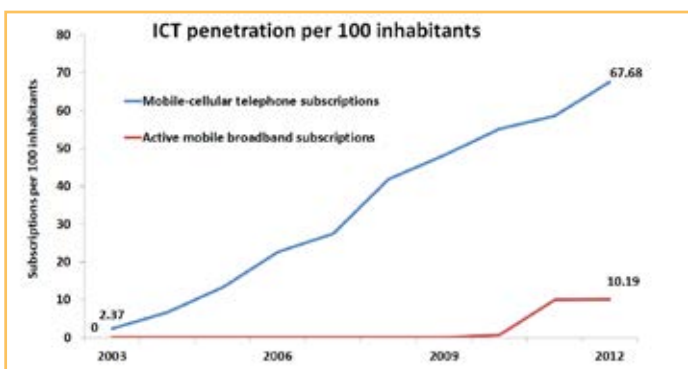


## Country health indicators\*

Population (000s)	169,000
Neonatal deaths % of all <5 deaths	39
Maternal mortality ratio (per 100 000 live births)	630
Infant mortality rate (per 100 000 live births)	78
Stillbirth rate (per 1000 total births)	42
Life expectancy at birth (years)	53

In process

A draft national eHealth policy is currently ongoing consultation among the geopolitical zones.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Both
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 2 years	Both
<b>Children under 5 who are stunted (%)</b>	Yes	Every 2 years	Both
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 2 years	Both
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 2 years	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 2 years	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 2 years	Both
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 3 years	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

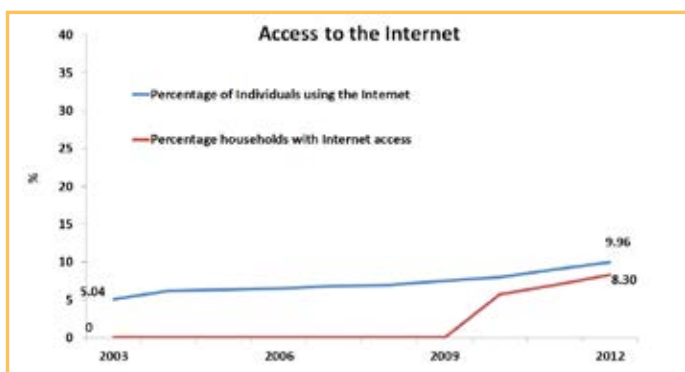
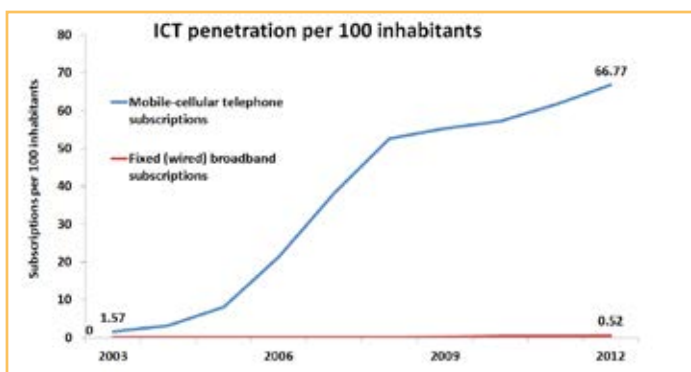
\*\* Inconsistent data

# Pakistan



## Country health indicators\*

Population (000s)	179,000
Neonatal deaths % of all <5 deaths	42
Maternal mortality ratio (per 100 000 live births)	260
Infant mortality rate (per 100 000 live births)	69
Stillbirth rate (per 1000 total births)	47
Life expectancy at birth (years)	67



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	
Services and applications	
Financial	Yes
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 3 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 3 years	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

# Papua New Guinea

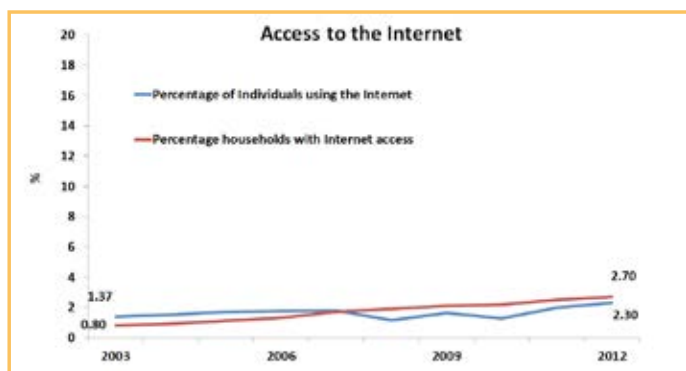
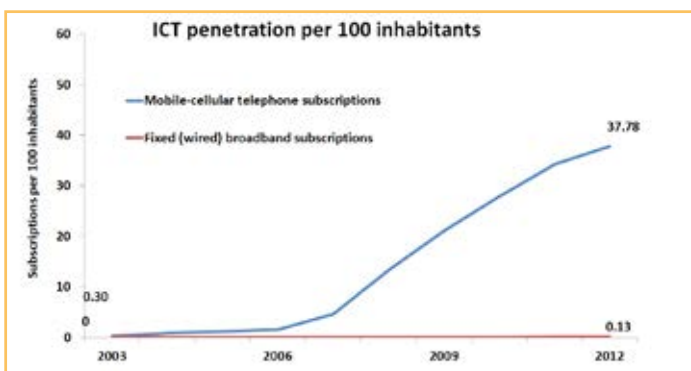


## Country health indicators\*

Population (000s)	7,167
Neonatal deaths % of all <5 deaths	24
Maternal mortality ratio (per 100 000 live births)	230
Infant mortality rate (per 100 000 live births)	48
Stillbirth rate (per 1000 total births)	15
Life expectancy at birth (years)	63

In  
process

National health sector ICT policy is currently being developed.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	More than every 5 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	More than every 5 years	Paper
Children under 5 who are stunted (%)	Yes	More than every 5 years	Paper
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data



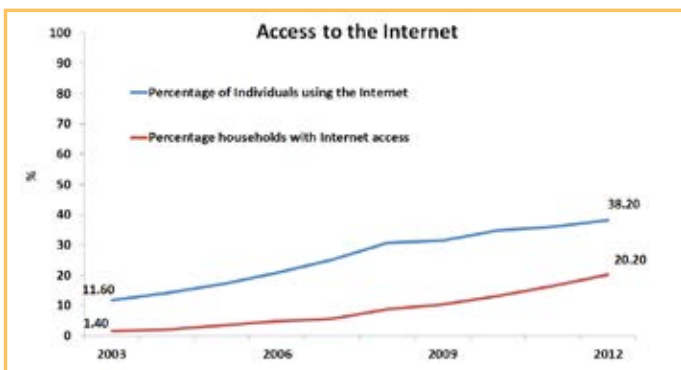
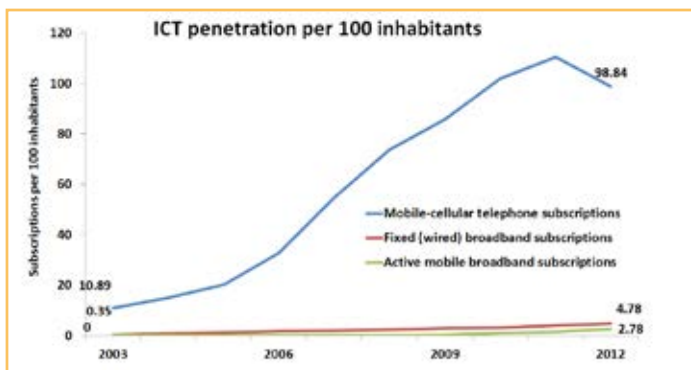
## Peru



## Country health indicators\*

Population (000s)	29,988
Neonatal deaths % of all <5 deaths	9
Maternal mortality ratio (per 100 000 live births)	67
Infant mortality rate (per 100 000 live births)	14
Stillbirth rate (per 1000 total births)	10
Life expectancy at birth (years)	77

Several decrees and plans mention aspects related to eHealth, providing guidelines towards a national eHealth policy. Peru's National Telehealth Plan was approved in the 2005 Supreme Decree No. 028-2005-MTC.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – full coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Electronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		



# Philippines

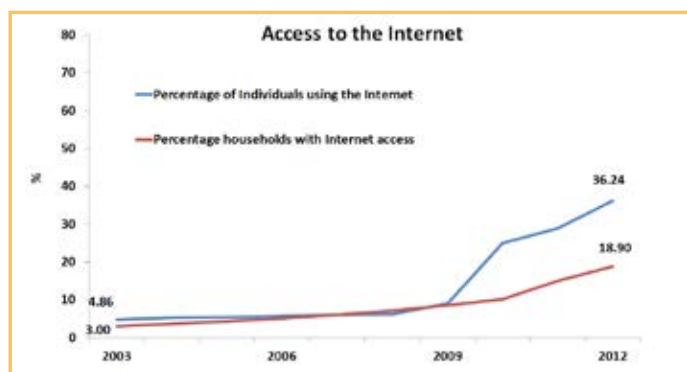
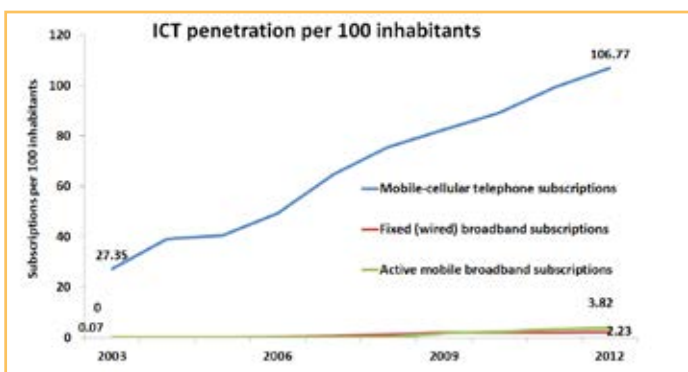


## Country health indicators\*

Population (000s)	96,707
Neonatal deaths % of all <5 deaths	14
Maternal mortality ratio (per 100 000 live births)	99
Infant mortality rate (per 100 000 live births)	24
Stillbirth rate (per 1000 total births)	16
Life expectancy at birth (years)	69

In process

The draft of the Philippines eHealth Strategic Framework and Plan 2013 – 2017 is currently under discussion.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Both
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	Paper
<b>Children under 5 who are stunted (%)</b>	Yes	Every 5 years	Paper
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every year	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Rwanda

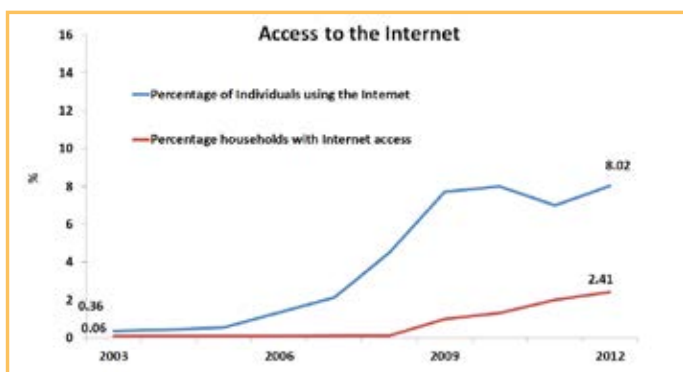
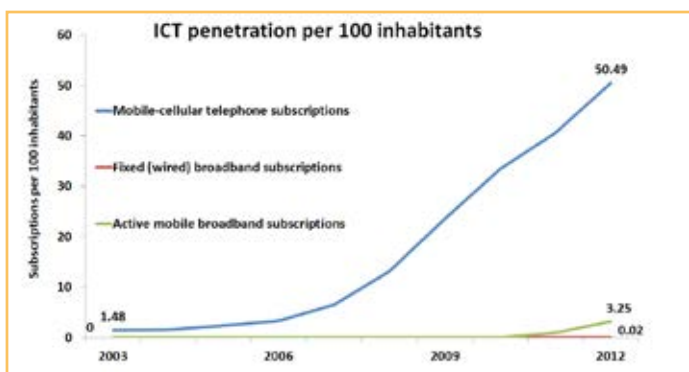


## Country health indicators\*

Population (000s)	11,458
Neonatal deaths % of all <5 deaths	21
Maternal mortality ratio (per 100 000 live births)	340
Infant mortality rate (per 100 000 live births)	39
Stillbirth rate (per 1000 total births)	23
Life expectancy at birth (years)	60

2006

A national eHealth policy has been adopted and it is partly implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – full coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita		Electronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	
Standards	
Human resources	
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	
Children under 5 who are stunted (%)	Yes	Every year	
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	No	Every year**	
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)		Every year**	
Skilled attendant at birth: Live births attended by skilled health personnel (%)	No	Every year**	
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No	Every year**	
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	No	Every year**	
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)		Every year**	
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No	Every year**	

## Sierra Leone

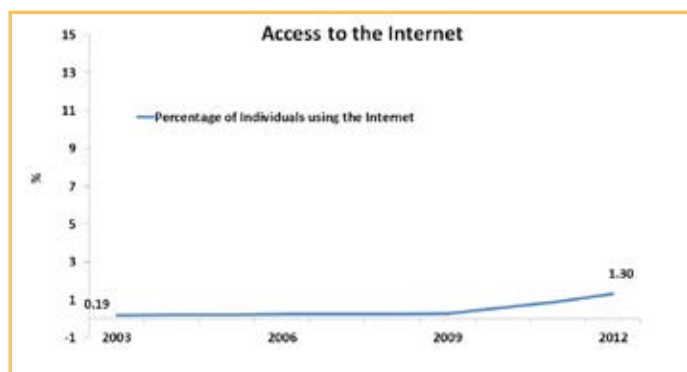
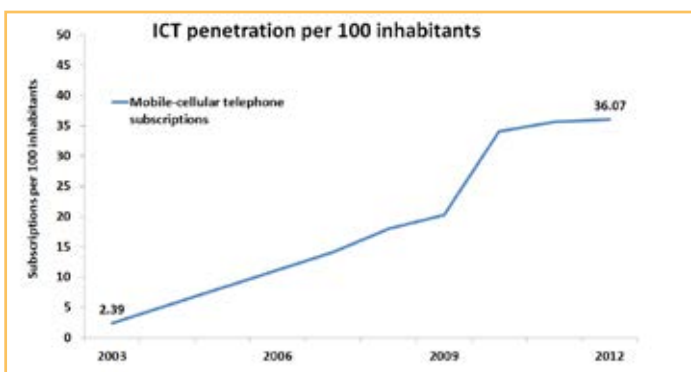


## Country health indicators\*

Population (000s)	5,979
Neonatal deaths % of all <5 deaths	50
Maternal mortality ratio (per 100 000 live births)	890
Infant mortality rate (per 100 000 live births)	117
Stillbirth rate (per 1000 total births)	30
Life expectancy at birth (years)	47

In process

The Ministry of Health and Sanitation has plans to adapt the ECOWAS eHealth policy to the country's needs in 2014. Sierra Leone's ICT policy currently addresses eHealth.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 4 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 2 years	Both
Children under 5 who are stunted (%)	Yes	Every 2 years	Both
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 2 years	Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 2 years	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every 4 years	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 2 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 2 years	Both
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 2 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 2 years	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 2 years	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

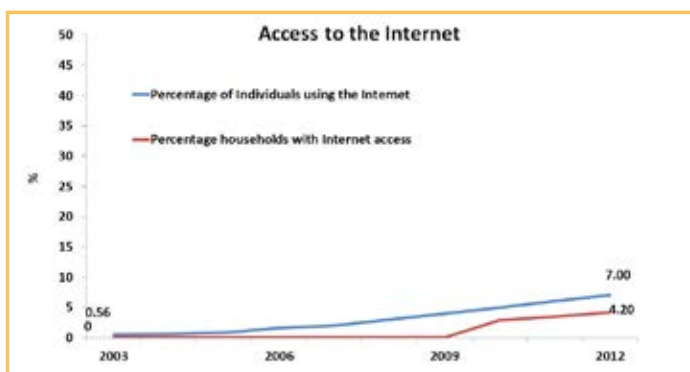
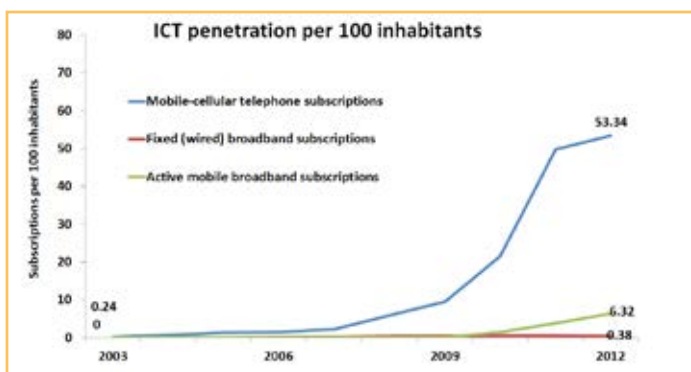
\*\* Inconsistent data

# Solomon Islands



## Country health indicators\*

Population (000s)	550
Neonatal deaths % of all <5 deaths	14
Maternal mortality ratio (per 100 000 live births)	93
Infant mortality rate (per 100 000 live births)	26
Stillbirth rate (per 1000 total births)	15
Life expectancy at birth (years)	70



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

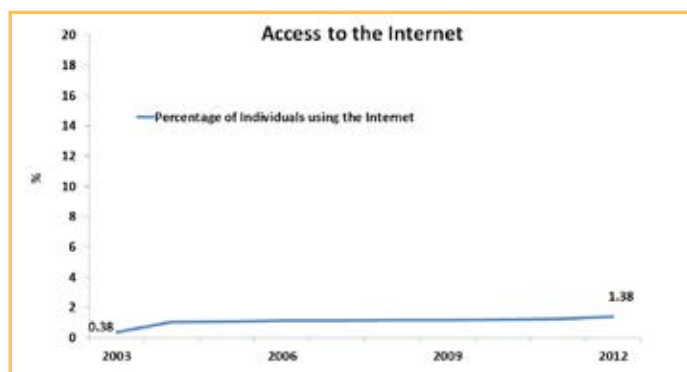
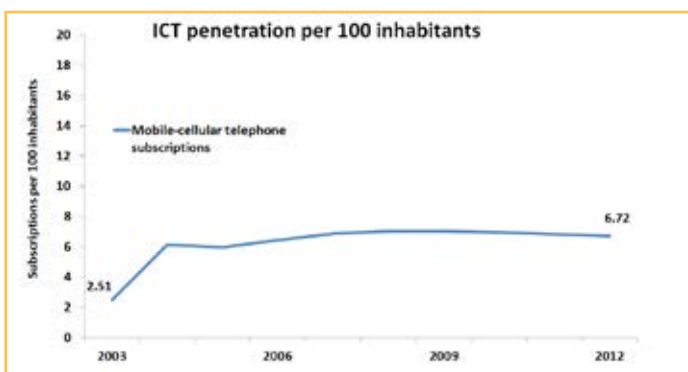
Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	No		
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	No		
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	No		
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)			
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	No		
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	No		

# Somalia



## Country health indicators\*

Population (000s)	10,195
Neonatal deaths % of all <5 deaths	46
Maternal mortality ratio (per 100 000 live births)	1,000
Infant mortality rate (per 100 000 live births)	91
Stillbirth rate (per 1000 total births)	30
Life expectancy at birth (years)	50



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Do not know	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Do not know	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Do not know	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	
Standards	
Human resources	
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>			
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes		Paper
<b>Children under 5 who are stunted (%)</b>			
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes		Paper
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes		Paper
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes		Paper
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes		Paper
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)			
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	No		
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes		Paper
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)			

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data



# South Africa

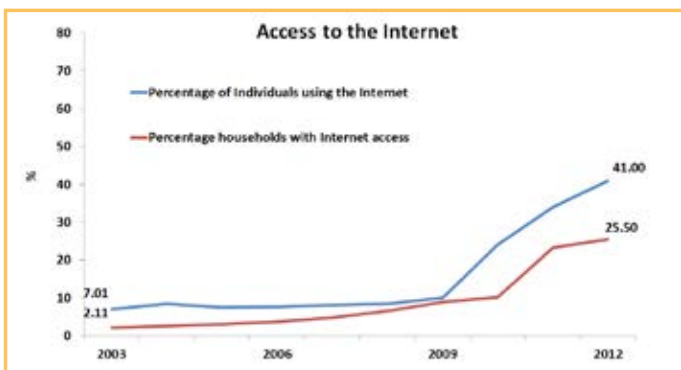
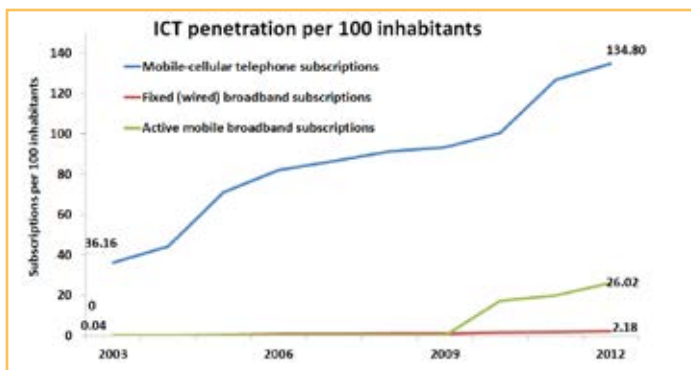


## Country health indicators\*

Population (000s)	52,386
Neonatal deaths % of all <5 deaths	15
Maternal mortality ratio (per 100 000 live births)	300
Infant mortality rate (per 100 000 live births)	33
Stillbirth rate (per 1000 total births)	20
Life expectancy at birth (years)	58

2012

A national eHealth policy has been adopted, but its implementation has not started yet.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every year	Electronic
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Electronic
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Electronic
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Electronic
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Electronic
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Electronic
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Electronic
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Electronic
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)		Every year	Electronic

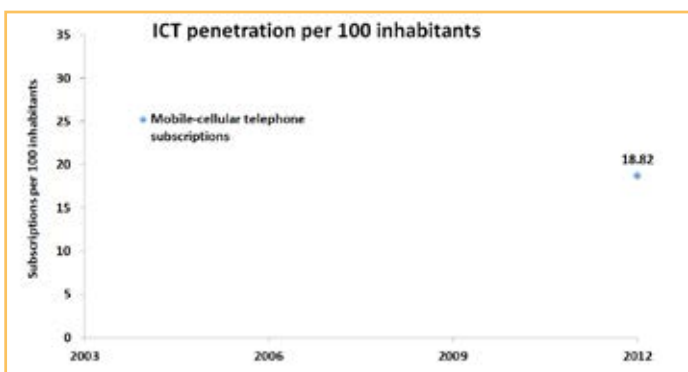


# South Sudan



## Country health indicators\*

Population (000s)	10,838
Neonatal deaths % of all <5 deaths	36
Maternal mortality ratio (per 100 000 live births)	
Infant mortality rate (per 100 000 live births)	67
Stillbirth rate (per 1000 total births)	
Life expectancy at birth (years)	54



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Do not know	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Paper
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	
<b>Children under 5 who are stunted (%)</b>	Yes	Every 5 years	Paper
<b>Met need for contraception:</b> Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
<b>Antenatal care coverage:</b> Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Paper
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	No		
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 5 years	Paper
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	
<b>Exclusive breastfeeding for six months:</b> Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 5 years	Paper
<b>Antibiotic treatment for pneumonia:</b> Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Paper

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Sudan

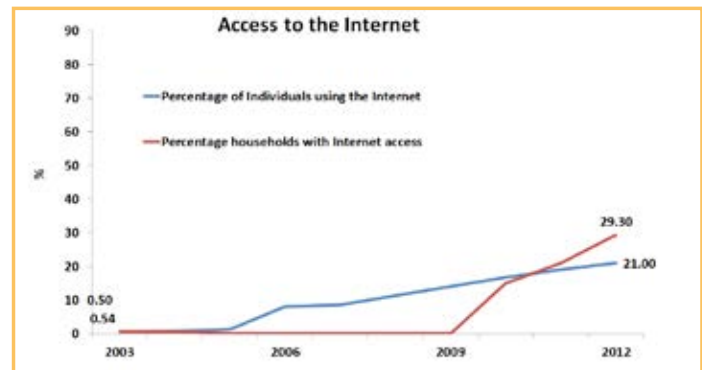
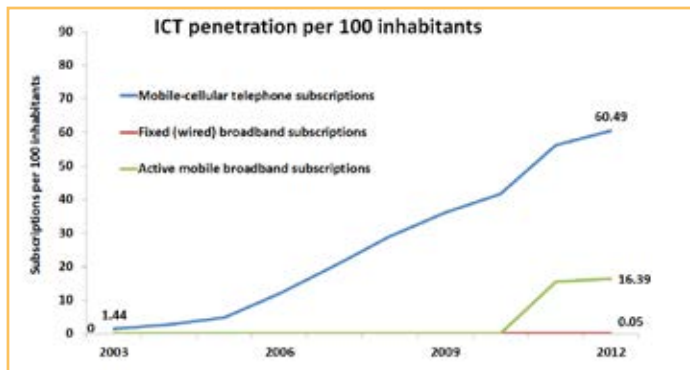


## Country health indicators\*

Population (000s)	37,195
Neonatal deaths % of all <5 deaths	29
Maternal mortality ratio (per 100 000 live births)	730
Infant mortality rate (per 100 000 live births)	49
Stillbirth rate (per 1000 total births)	
Life expectancy at birth (years)	62

2005

A national eHealth policy proposal was developed and it has been partially implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 4 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 4 years	Paper
Children under 5 who are stunted (%)	Yes	Every 4 years	Paper
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 4 years	Paper
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 4 years	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes		Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 4 years	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Paper
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 4 years	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 4 years	Paper

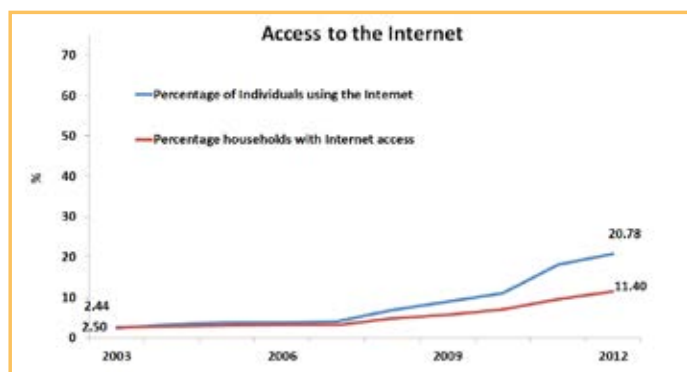
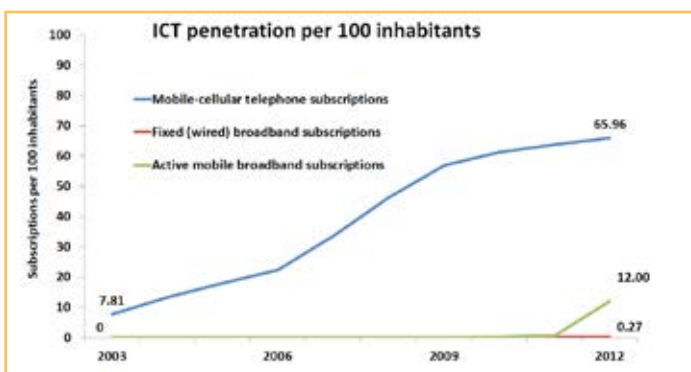
# Swaziland



## Country health indicators\*

Population (000s)	1,231
Neonatal deaths % of all <5 deaths	30
Maternal mortality ratio (per 100 000 live births)	320
Infant mortality rate (per 100 000 live births)	56
Stillbirth rate (per 1000 total births)	18
Life expectancy at birth (years)	50

Swaziland Ministry of Health and Social Welfare National Health Policy (2007) includes an eHealth policy direction under its "Resources for Health". Health promotion through ICT is also part of the e-Government Strategy for Swaziland: 2013 to 2017.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Electronic

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	Yes
Financial	Yes
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every 5 years	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Both
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 5 years	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Tajikistan

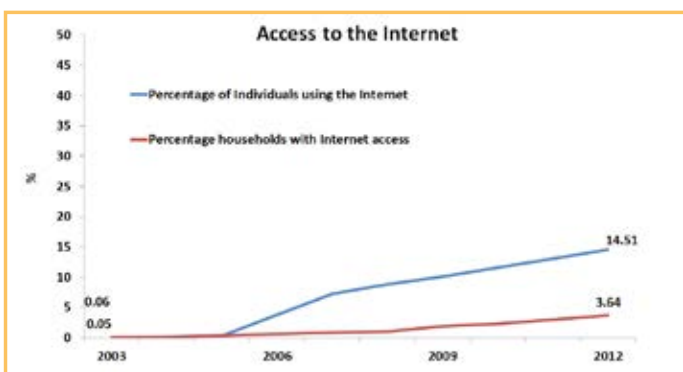
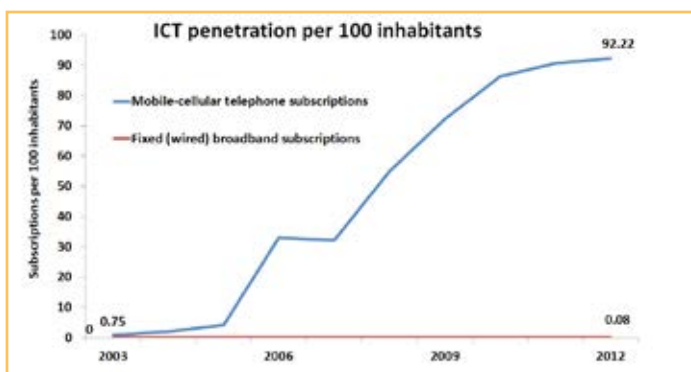


## Country health indicators\*

Population (000s)	8,009
Neonatal deaths % of all <5 deaths	23
Maternal mortality ratio (per 100 000 live births)	65
Infant mortality rate (per 100 000 live births)	49
Stillbirth rate (per 1000 total births)	12
Life expectancy at birth (years)	68

2011

A comprehensive strategic plan for the development of the health system infrastructure of Tajikistan for 2011–2015 was approved. The plan aims to support the implementation of the National Strategy for Health of the Republic of Tajikistan for 2010 – 2020.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – full coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita		

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	No		
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	No		
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

## Togo

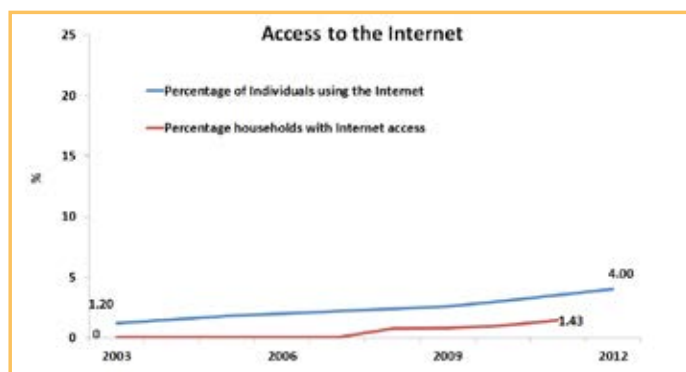
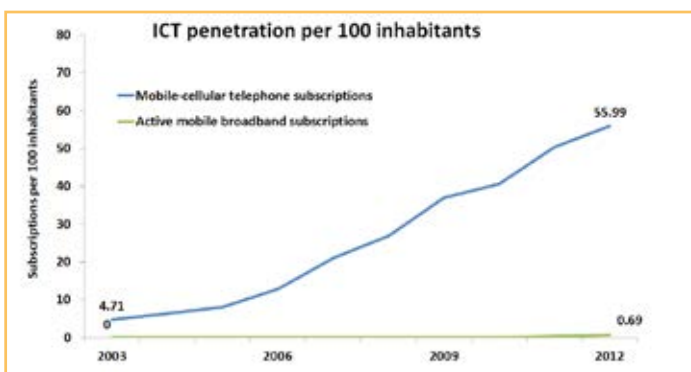


## Country health indicators\*

Population (000s)	6,643
Neonatal deaths % of all <5 deaths	33
Maternal mortality ratio (per 100 000 live births)	300
Infant mortality rate (per 100 000 live births)	62
Stillbirth rate (per 1000 total births)	25
Life expectancy at birth (years)	56

2012

The Strategic Plan for the Development of eHealth (CSDP) 2013-2015 has been approved and it is partly implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	Yes
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 4 years	
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 2 years	
<b>Children under 5 who are stunted (%)</b>	Yes	Every year	Both
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 3 years	Both
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 2 years	Both
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every 2 years	Both
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 2 years	Both
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 2 years	Both
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every year	Both
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 2 years	Both
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 2 years	

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data



# Turkmenistan

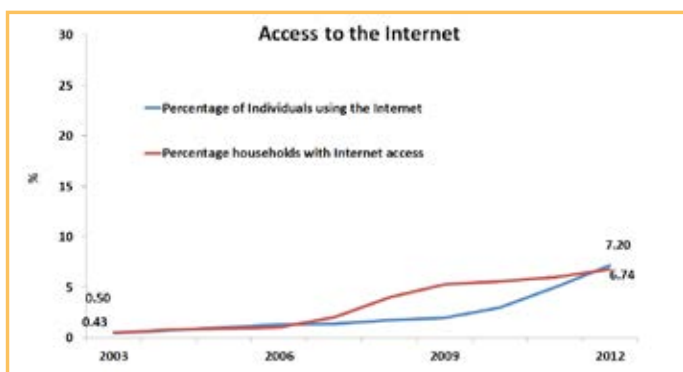
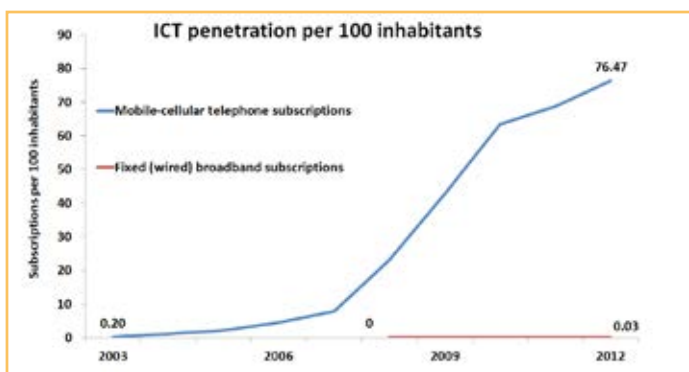


## Country health indicators\*

Population (000s)	5,173
Neonatal deaths % of all <5 deaths	64
Maternal mortality ratio (per 100 000 live births)	67
Infant mortality rate (per 100 000 live births)	47
Stillbirth rate (per 1000 total births)	13
Life expectancy at birth (years)	65

2010

Presidential Decrees "On improving information management and governance" and "On the creation and commissioning of an electronic document management system in health care institutions of Turkmenistan" have been adopted, and are partly implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – full coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Do not know	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes		Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes		Both
Children under 5 who are stunted (%)	Yes		Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes		Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes		Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	No		
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes		Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes		Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes		Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes		Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes		Both



# United Republic of Tanzania

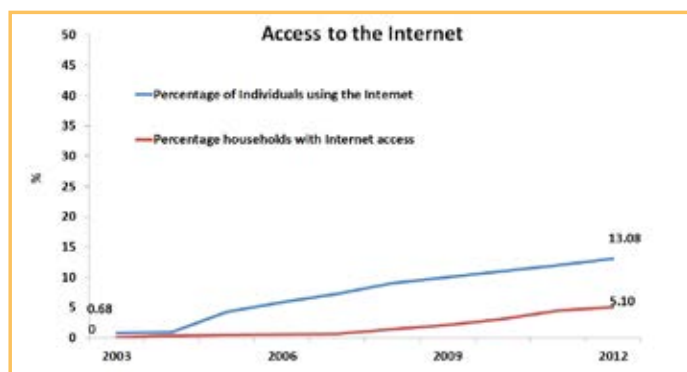
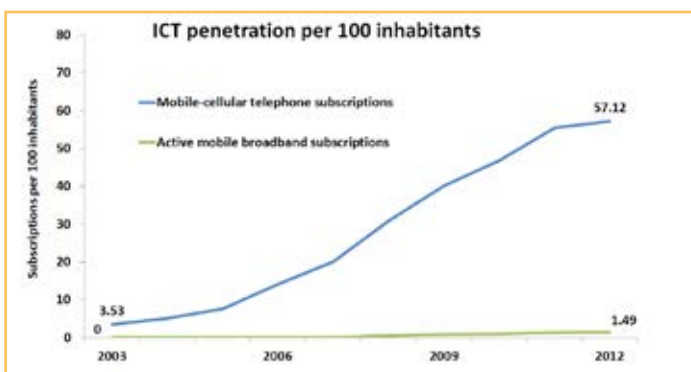


## Country health indicators\*

Population (000s)	47,783
Neonatal deaths % of all <5 deaths	21
Maternal mortality ratio (per 100 000 live births)	460
Infant mortality rate (per 100 000 live births)	38
Stillbirth rate (per 1000 total births)	26
Life expectancy at birth (years)	59

2013

A national eHealth policy has just been approved. It is currently being printed to start its dissemination process.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Paper

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	Yes
Standards	Yes
Human resources	
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Paper
Children under 5 who are stunted (%)	Yes	Every 5 years	Paper
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Paper
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 5 years	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Paper
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Paper
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Paper

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Uganda

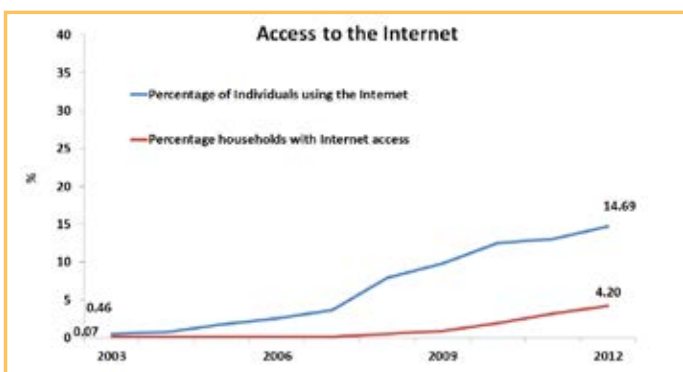
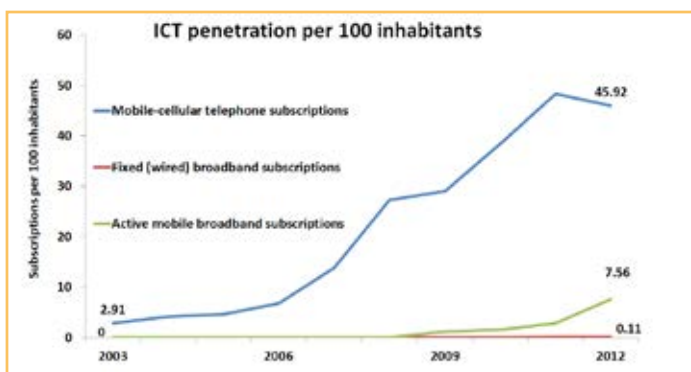


## Country health indicators\*

Population (000s)	36,346
Neonatal deaths % of all <5 deaths	23
Maternal mortality ratio (per 100 000 live births)	310
Infant mortality rate (per 100 000 live births)	45
Stillbirth rate (per 1000 total births)	25
Life expectancy at birth (years)	56

2013

The Draft National eHealth Policy and National eHealth Strategic Plan have been developed and are pending adoption by the Cabinet.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	Yes
Standards	Yes
Human resources	
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

# Uzbekistan

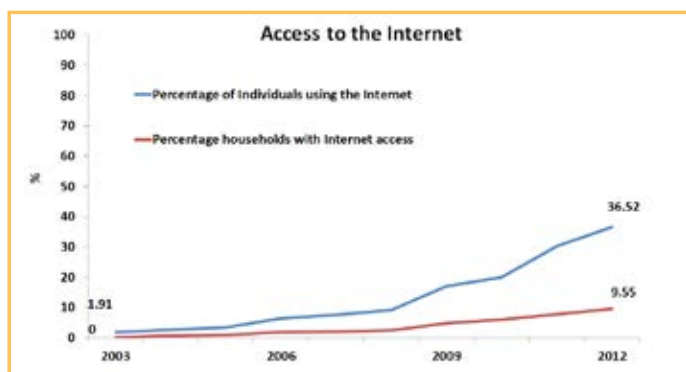
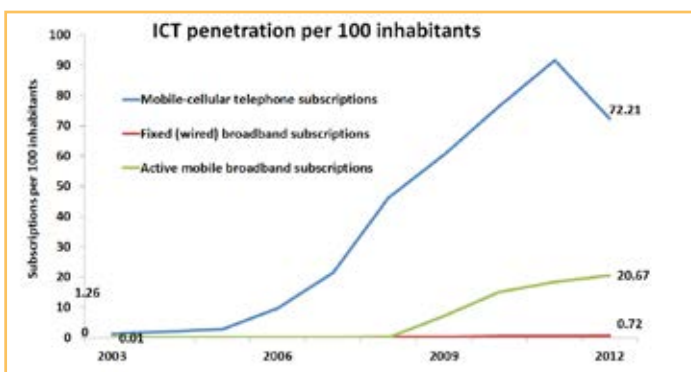


## Country health indicators\*

Population (000s)	28,541
Neonatal deaths % of all <5 deaths	14
Maternal mortality ratio (per 100 000 live births)	28
Infant mortality rate (per 100 000 live births)	34
Stillbirth rate (per 1000 total births)	6
Life expectancy at birth (years)	68

2009

The Ministry of Health adopted the National Integrated Health Information System as a basis for the development of eHealth in the country; it is partly implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	Yes	Both

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every year	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Both
Children under 5 who are stunted (%)	Yes	Every year	Both
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every year	Both
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Both
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every year	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Both
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Both

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Viet Nam

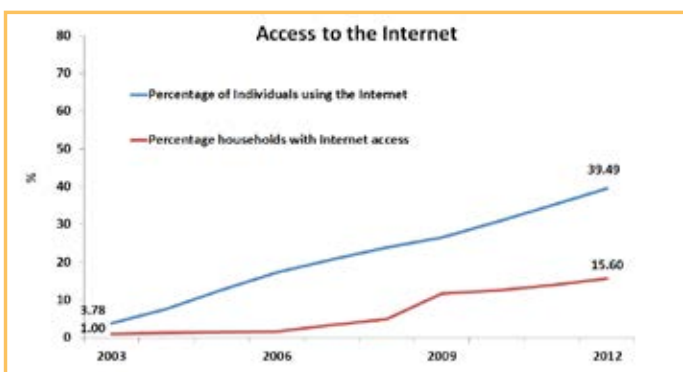
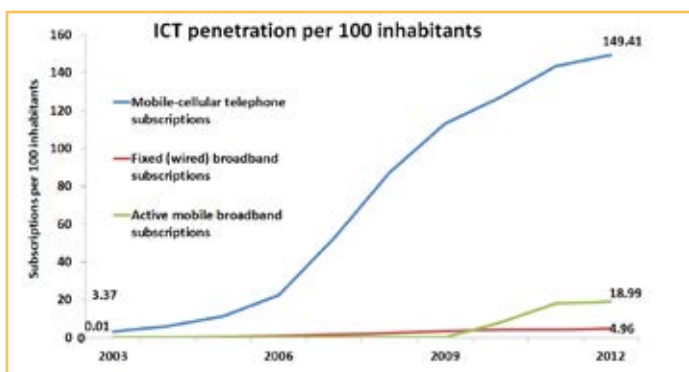


## Country health indicators\*

Population (000s)	90,796
Neonatal deaths % of all <5 deaths	12
Maternal mortality ratio (per 100 000 live births)	59
Infant mortality rate (per 100 000 live births)	18
Stillbirth rate (per 1000 total births)	13
Life expectancy at birth (years)	75

2011

The National IT Strategy and Plan encompasses eHealth, and is to be implemented in two phases. The Plan is currently partially implemented.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Both
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every year	Paper
Children under 5 who are stunted (%)	Yes	Every year	Paper
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)			
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	No		
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Paper
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Paper
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes		
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Paper

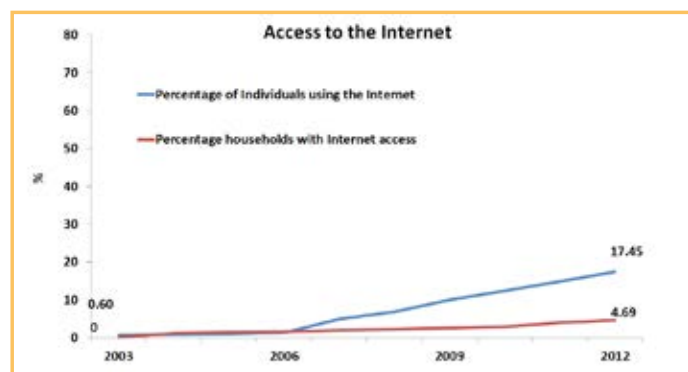
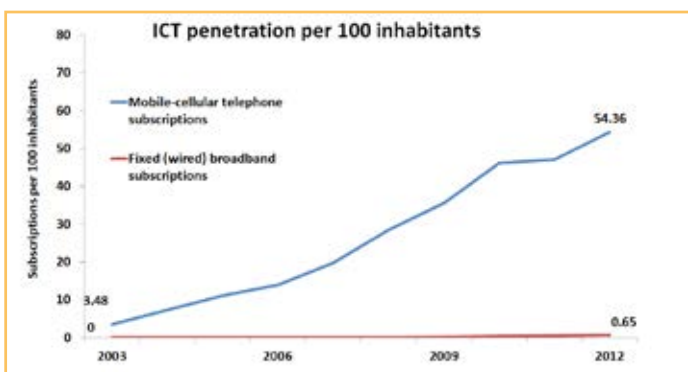


# Yemen



## Country health indicators\*

Population (000s)	23,852
Neonatal deaths % of all <5 deaths	27
Maternal mortality ratio (per 100 000 live births)	200
Infant mortality rate (per 100 000 live births)	46
Stillbirth rate (per 1000 total births)	23
Life expectancy at birth (years)	64



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	No	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	No	
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
<b>Maternal mortality ratio</b>	Yes	Every 5 years	Paper
<b>Under 5 child mortality, with the proportion of newborn deaths (%)</b>	Yes	Every 5 years	Paper
<b>Children under 5 who are stunted (%)</b>	Yes	Every 5 years	Paper
<b>Met need for contraception:</b> Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
<b>Antenatal care coverage:</b> Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Paper
<b>Antiretroviral prophylaxis:</b> HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	No		
<b>Skilled attendant at birth:</b> Live births attended by skilled health personnel (%)	Yes	Every 5 years	Paper
<b>Postnatal care:</b> Mothers and babies who received a postnatal care visit within two days of childbirth (%)		Every 5 years**	Paper**
<b>Exclusive breastfeeding for six months:</b> Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Paper
<b>Three doses of combined diphtheria, pertussis and tetanus vaccine:</b> Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Electronic
<b>Antibiotic treatment for pneumonia:</b> Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Paper

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data

# Zambia

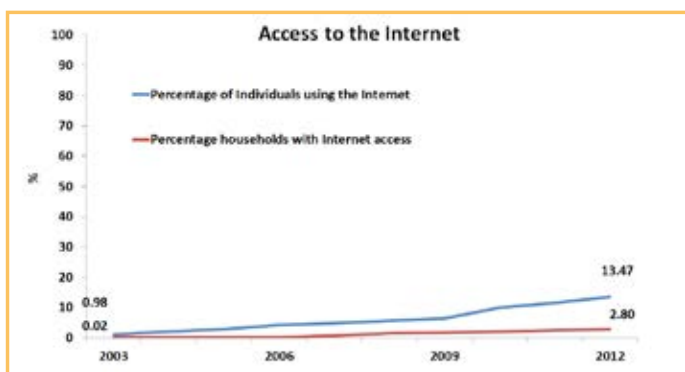
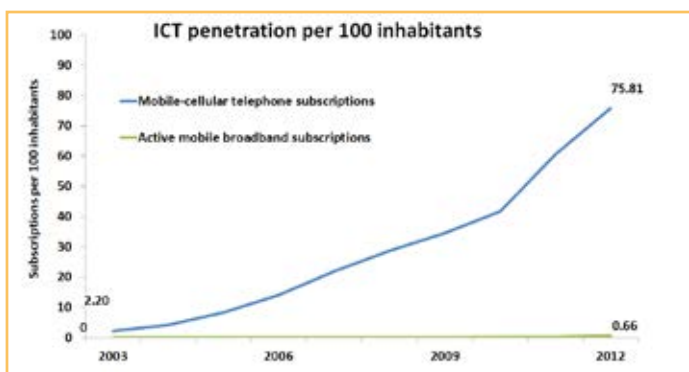


## Country health indicators\*

Population (000s)	14,075
Neonatal deaths % of all <5 deaths	29
Maternal mortality ratio (per 100 000 live births)	440
Infant mortality rate (per 100 000 live births)	56
Stillbirth rate (per 1000 total births)	26
Life expectancy at birth (years)	55

2012

The MoH's National Health Policy includes a chapter on eHealth. An eHealth Strategy is being drafted and is planned for December 2013, after conducting a stakeholder's consensus meeting.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	
Legal	
Infrastructure	Yes
Standards	
Human resources	Yes
Services and applications	
Financial	Yes
Other	Yes

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Both
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Both
Children under 5 who are stunted (%)	Yes	Every 5 years	Both
Met need for contraception: Proportion of women aged 15-49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Both
Antenatal care coverage: Women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every 5 years	Both
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every 5 years	Both
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every 5 years	Both
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every 5 years	Both
Exclusive breastfeeding for six months: Infants aged 0-5 months who are exclusively breastfed (%)	Yes	Every 5 years	Both
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12-23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every 5 years	Both
Antibiotic treatment for pneumonia: Children aged 0-59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every 5 years	Both



# Zimbabwe

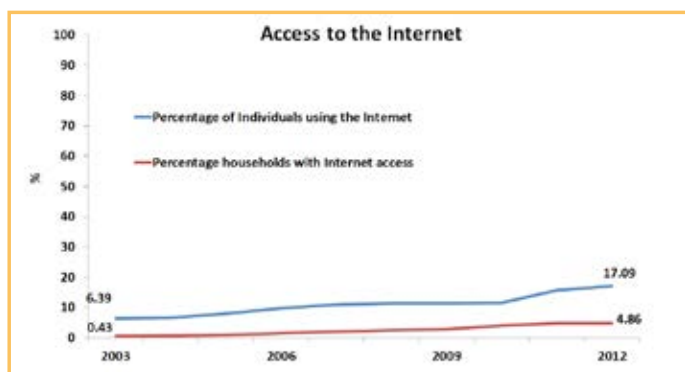
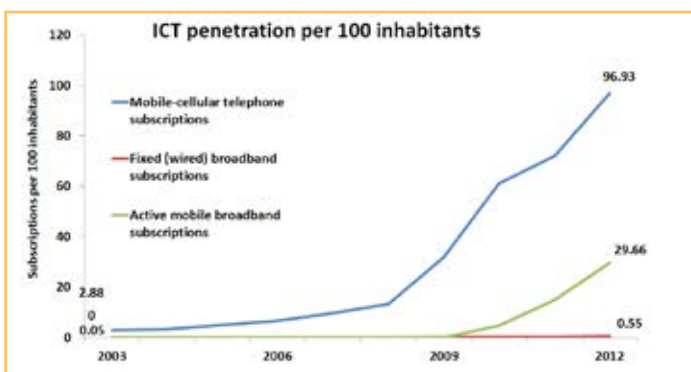


## Country health indicators\*

Population (000s)	13,724
Neonatal deaths % of all <5 deaths	39
Maternal mortality ratio (per 100 000 live births)	570
Infant mortality rate (per 100 000 live births)	56
Stillbirth rate (per 1000 total births)	20
Life expectancy at birth (years)	54

2012

A draft National eHealth Policy has been developed, but its adoption and implementation are still pending.



## eHealth systems

Activity	Country response	
Country records births, deaths, and causes of death using an electronic information system	Yes – partial coverage	
Country has at least one electronic information system in place to collect and report health data at the district level	Yes	
	Country response	Tracking method
Country has a resource tracking system in place to report total health expenditure by financing source, per capita	Yes	Electronic
Country has a resource tracking system in place to report total reproductive, maternal, newborn, and child health (RMNCH) expenditure by financing source, per capita	No	

## Perceived barriers to implementing eHealth services

Perceived barriers	Country response
Leadership, governance and policy	Yes
Legal	Yes
Infrastructure	
Standards	Yes
Human resources	Yes
Services and applications	
Financial	
Other	

## Monitoring the status of women's and children's health

Country monitors the following CoIA indicators as a measure of women's and children's health	Monitors	Frequency of monitoring	Recording format (paper, online, or both)
Maternal mortality ratio	Yes	Every 5 years	Paper
Under 5 child mortality, with the proportion of newborn deaths (%)	Yes	Every 5 years	Paper
Children under 5 who are stunted (%)	Yes	Every 5 years	Paper
Met need for contraception: Proportion of women aged 15–49 years who are married or in union and who have met their need for family planning (%)	Yes	Every 5 years	Paper
Antenatal care coverage: Women aged 15–49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy (%)	Yes	Every year	Electronic
Antiretroviral prophylaxis: HIV-positive pregnant women receiving treatment to prevent vertical transmission of HIV, and treatment-eligible women receiving antiretroviral therapy (%)	Yes	Every year	Electronic
Skilled attendant at birth: Live births attended by skilled health personnel (%)	Yes	Every year	Paper
Postnatal care: Mothers and babies who received a postnatal care visit within two days of childbirth (%)	Yes	Every year	Paper
Exclusive breastfeeding for six months: Infants aged 0–5 months who are exclusively breastfed (%)	Yes	Every year	Paper
Three doses of combined diphtheria, pertussis and tetanus vaccine: Infants aged 12–23 months who received three doses of diphtheria/pertussis/tetanus vaccine (%)	Yes	Every year	Electronic
Antibiotic treatment for pneumonia: Children aged 0–59 months with suspected pneumonia receiving antibiotics (%)	Yes	Every year	Electronic

\* Data source: [www.who.int/goe/publications/baseline\\_source2014](http://www.who.int/goe/publications/baseline_source2014)

\*\* Inconsistent data



# ANNEX 4: SUMMARY OF SURVEY RESPONSES





## A. Summary of survey responses, by region and country, concerning eHealth strategies and strategies for women's and children's health

Region	Country	Replied to survey	Does your country have a National eHealth policy or strategy?	Is special funding allocated for implementation of the eHealth strategy?	Does the eHealth strategy refer to eHealth for women's or children's health?	Is there a National Strategy for Women's or Children's health?	Does your Women's and Children's health strategy mention eHealth, mHealth or social media?
AFRO	Angola	Yes				Yes	
AFRO	Benin						
AFRO	Botswana	Yes	Yes		Yes	Yes	Do not know
AFRO	Burkina Faso	Yes			Yes	Yes	Yes
AFRO	Burundi	Yes				Yes	
AFRO	Cameroon						
AFRO	Central African Republic	Yes				Yes	
AFRO	Chad						
AFRO	Comoros	Yes				Yes	
AFRO	Congo						
AFRO	Cote d'Ivoire	Yes	Yes	Yes		Yes	Yes
AFRO	D. R. Congo	Yes				Yes	
AFRO	Equatorial Guinea	Yes					
AFRO	Eritrea						
AFRO	Ethiopia	Yes		Yes	Yes	Yes	
AFRO	Gabon						
AFRO	The Gambia	Yes				Yes	
AFRO	Ghana	Yes	Yes	Yes	Yes	Yes	Yes
AFRO	Guinea	Yes				Yes	
AFRO	Guinea-Bissau						
AFRO	Kenya	Yes	Yes			Yes	Yes
AFRO	Lesotho	Yes		Yes		Yes	Yes
AFRO	Liberia	Yes				Yes	Yes
AFRO	Madagascar	Yes				Yes	
AFRO	Malawi	Yes				Yes	
AFRO	Mali						
AFRO	Mauritania	Yes	Yes	Yes	Yes	Yes	
AFRO	Mozambique	Yes	Yes			Yes	
AFRO	Niger	Yes					
AFRO	Nigeria	Yes		Yes		Yes	Yes
AFRO	Rwanda	Yes	Yes		Yes	Yes	Yes
AFRO	Sao Tome & Principe						
AFRO	Senegal						
AFRO	Sierra Leone	Yes				Yes	Yes
AFRO	South Africa	Yes	Yes	Yes	Yes	Yes	
AFRO	South Sudan	Yes				Yes	

Region	Country	Replied to survey	Does your country have a National eHealth policy or strategy?	Is special funding allocated for implementation of the eHealth strategy?	Does the eHealth strategy refer to eHealth for women's or children's health?	Is there a National Strategy for Women's or Children's health?	Does your Women's and Children's health strategy mention eHealth, mHealth or social media?
AFRO	Swaziland	Yes		Yes		Yes	Yes
AFRO	Togo	Yes	Yes		Yes	Yes	
AFRO	Uganda	Yes	Yes	Yes		Yes	Yes
AFRO	U. Rep. Tanzania	Yes	Yes		Yes	Yes	Yes
AFRO	Zambia	Yes	Yes		Yes		
AFRO	Zimbabwe	Yes	Yes			Yes	
AMRO	Bolivia	Yes				Yes	
AMRO	Brazil						
AMRO	Guatemala	Yes	Yes			Yes	
AMRO	Haiti	Yes				Yes	
AMRO	Mexico	Yes	Yes			Yes	Yes
AMRO	Peru	Yes		Yes	Yes	Yes	
EMRO	Afghanistan	Yes	Yes		Yes	Yes	
EMRO	Djibouti	Yes				Yes	Yes
EMRO	Egypt	Yes					
EMRO	Iraq	Yes				Yes	
EMRO	Morocco	Yes				Yes	Yes
EMRO	Pakistan	Yes				Yes	
EMRO	Somalia	Yes				Yes	
EMRO	Sudan	Yes	Yes	Yes	Yes	Yes	Yes
EMRO	Yemen	Yes				Yes	
EURO	Azerbaijan	Yes	Yes	Yes	Yes	Yes	Yes
EURO	Kyrgyzstan	Yes				Yes	Yes
EURO	Tajikistan	Yes	Yes	Yes	Yes	Yes	
EURO	Turkmenistan	Yes	Yes	Yes	Yes	Yes	Yes
EURO	Uzbekistan	Yes	Yes	Yes	Yes	Yes	Yes
SEARO	Bangladesh	Yes	Yes	Yes	Yes	Yes	Yes
SEARO	D. P. R. Korea	Yes	Yes	Yes	Yes	Yes	Yes
SEARO	India	Yes	Yes	Yes	Yes	Yes	Yes
SEARO	Indonesia	Yes	Yes	Yes	Yes	Yes	Yes
SEARO	Myanmar	Yes		Yes	Yes	Yes	
SEARO	Nepal	Yes				Yes	
WPRO	Cambodia	Yes				Yes	
WPRO	China	Yes	Yes	Yes	Yes	Yes	
WPRO	Lao P. D. R.	Yes				Yes	
WPRO	Papua New Guinea	Yes				Yes	
WPRO	Philippines	Yes				Yes	Yes
WPRO	Solomon Islands	Yes				Yes	
WPRO	Viet Nam	Yes	Yes	Yes		Yes	
TOTAL		64	27	22	23	60	25

## B. Summary of survey responses, by country, concerning the use of electronic systems to monitor CoIA's indicators, record vital events, and track health expenditures

Country	RECOMMENDATION 2						
	Impact Indicators			Coverage Indicators			
	Maternal mortality ratio (MMR)	Under-five child mortality	Children under five who are stunted	Met need for contraception	Antenatal care (four or more visits)	Antiretroviral for HIV-positive pregnant women to reduce MTCT	Skilled attendant at birth
Afghanistan	Yes, paper	Yes, paper	Yes, paper	No	Yes, paper	Yes, --	No
Angola	--	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper
Azerbaijan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Bangladesh	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper
Benin	--	--	--	--	--	--	--
Bolivia	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Botswana	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Brazil	--	--	--	--	--	--	--
Burkina Faso	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Burundi	Yes, paper	Yes, paper	Yes, paper	No	Yes, paper	Yes, paper	Yes, paper
Cambodia	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Cameroon	--	--	--	--	--	--	--
Central African Rep.	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Chad	--	--	--	--	--	--	--
China	Yes, online	Yes, online	Yes, online	Yes, online	Yes, online	Yes, online	Yes, online
Comoros	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Congo	--	--	--	--	--	--	--
Côte d'Ivoire	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
D.P.R. Korea	Yes, both	Yes, paper	Yes, both	Yes, both	Yes, paper	No	Yes, both
D.R. Congo	--	--	--	--	--	--	--
Djibouti	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, both	Yes, paper
Egypt	Yes, both	Yes, --	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Equatorial Guinea	Yes, paper	No	No	No	Yes, paper	--	Yes, paper
Eritrea	--	--	--	--	--	--	--
Ethiopia	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Gabon	--	--	--	--	--	--	--
The Gambia	Yes, paper	Yes, paper	Yes, --	Yes, paper	Yes, paper	Yes, paper	Yes, both
Ghana	Yes, both	Yes, both	Yes, both	Yes, both	Yes, online	Yes, both	Yes, both
Guatemala	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both



Country	RECOMMENDATION 2						
	Impact Indicators			Coverage Indicators			
	Maternal mortality ratio (MMR)	Under-five child mortality	Children under five who are stunted	Met need for contraception	Antenatal care (four or more visits)	Antiretroviral for HIV-positive pregnant women to reduce MTCT	Skilled attendant at birth
Guinea	Yes, both	Yes, both	Yes, --	Yes, both	--	--	--
Guinea-Bissau	--	--	--	--	--	--	--
Haiti	Yes, both	Yes, both	Yes, paper	Yes, both	Yes, both	Yes, both	Yes, both
India	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	--	Yes, both
Indonesia	Yes, paper	Yes, both	Yes, paper	Yes, both	Yes, both	--	Yes, both
Iraq	Yes, paper	Yes, paper	Yes, --	Yes, --	Yes, paper	No	Yes, paper
Kenya	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Kyrgyzstan	Yes, both	Yes, both	Yes, both	No	Yes, paper	Yes, both	Yes, both
Lao P.D.R.	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Lesotho	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Liberia	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, both	Yes, both	Yes, both
Madagascar	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Malawi	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, both	Yes, both	Yes, both
Mali	--	--	--	--	--	--	--
Mauritania	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper
Mexico	Yes, online	Yes, online	--	No	Yes, both	Yes, online	Yes, both
Morocco	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, --
Mozambique	Yes, both	Yes, both	Yes, --	Yes, --	Yes, both	Yes, both	Yes, both
Myanmar	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper
Nepal	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, paper	Yes, both
Niger	Yes, both	Yes, both	Yes, both	Yes, both	Yes, paper	Yes, paper	Yes, both
Nigeria	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Pakistan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Papua New Guinea	Yes, paper	Yes, paper	Yes, paper	Yes, both	Yes, both	Yes, both	Yes, both
Peru	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Philippines	Yes, both	Yes, paper	Yes, paper	Yes, paper	Yes, both	Yes, both	Yes, both
Rwanda	Yes, --	Yes, --	Yes, --	Yes, --	No	--	No
Sao Tome & Principe	--	--	--	--	--	--	--
Senegal	--	--	--	--	--	--	--
Sierra Leone	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Solomon Islands	Yes, both	Yes, both	No	No	No	--	Yes, both
Somalia	--	Yes, paper	--	Yes, paper	Yes, paper	Yes, paper	Yes, paper
South Africa	Yes, both	Yes, both	Yes, online	Yes, online	Yes, online	Yes, online	Yes, online
South Sudan	Yes, paper	Yes, --	Yes, paper	Yes, paper	Yes, paper	No	Yes, paper
Sudan	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper

Country	RECOMMENDATION 2						
	Impact Indicators			Coverage Indicators			
	Maternal mortality ratio (MMR)	Under-five child mortality	Children under five who are stunted	Met need for contraception	Antenatal care (four or more visits)	Antiretroviral for HIV-positive pregnant women to reduce MTCT	Skilled attendant at birth
Swaziland	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Tajikistan	Yes, both	Yes, both	Yes, both	No	Yes, both	Yes, both	Yes, both
Togo	Yes, --	Yes, --	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Turkmenistan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	No	Yes, both
Uganda	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
U.R. of Tanzania	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper
Uzbekistan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Viet Nam	Yes, paper	Yes, paper	Yes, paper	--	No	Yes, paper	Yes, paper
Yemen	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, paper	No	Yes, paper
Zambia	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both	Yes, both
Zimbabwe	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, online	Yes, online	Yes, paper

Country monitors this indicator using a mix of electronic and paper-based systems

Country monitors this indicator using electronic-based systems

Country monitors this indicator but did not specify which method of tracking

Country monitors this indicator using only a paper-based system

Country does not monitor this indicator or lacks the corresponding tracking system

-- Country did not respond

\* Partial/Full refers to the system's level of coverage in the country

Country	RECOMMENDATION 2				REC. 1	RECOMMENDATION 4	
	Coverage Indicators				Resource Tracking Systems		
	Postnatal care for mothers	Exclusive breastfeeding for first six months	DTP-3 immunization among 1-year olds	Antibiotic treatment for child pneumonia	Country records births, deaths, and causes of death using an electronic information system*	Country has at least one electronic information system in place to collect and report health data at the district level	Country has a resource tracking system in place to report total RMNCH expenditure by financing source, per capita
Afghanistan	Yes, both	Yes, paper	Yes, paper	No	No	Yes	No
Angola	No	No	Yes, paper	No	No	No	No
Azerbaijan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Bangladesh	Yes, paper	Yes, paper	Yes, both	Yes, paper	Yes, partial	Yes	No
Benin	--	--	--	--	--	--	--
Bolivia	No	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Botswana	Yes, both	No	Yes, both	Yes, both	Yes, partial	Yes	No
Brazil	--	--	--	--	--	--	--
Burkina Faso	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	Yes, both
Burundi	No	Yes, paper	Yes, paper	Yes, paper	No	Yes	No
Cambodia	Yes, both	Yes, both	Yes, both	No	No	Yes	No
Cameroon	--	--	--	--	--	--	--
Central African Rep.	No	Yes, both	Yes, both	--	No	No	No
Chad	--	--	--	--	--	--	--
China	Yes, online	Yes, online	Yes, online	No	Yes, partial	Yes	No
Comoros	No	--	Yes, both	No	No	Yes	No
Congo	--	--	--	--	--	--	--
Côte d'Ivoire	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	Yes, both
D.P.R. Korea	Yes, both	Yes, both	Yes, paper	Yes, both	Yes, partial	No	Yes, paper
D.R. Congo	--	--	--	--	No	Yes	Yes, online
Djibouti	Yes, both	Yes, paper	Yes, paper	Yes, both	Yes, partial	No	No
Egypt	Yes, both	Yes, both	Yes, both	Yes, both	Yes, full	Yes	No
Equatorial Guinea	No	No	No	No	No	No	No
Eritrea	--	--	--	--	--	--	--
Ethiopia	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	Yes, online
Gabon	--	--	--	--	--	--	--
The Gambia	No	Yes, paper	Yes, both	No	No	Yes	No
Ghana	Yes, --	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	Yes, online
Guatemala	No	Yes, both	Yes, both	No	Yes, full	Yes	Yes, both
Guinea	--	--	--	--	No	Yes	Yes, both
Guinea-Bissau	--	--	--	--	--	--	--
Haiti	Yes, both	Yes, paper	Yes, paper	Yes, both	No	Yes	Yes, both
India	Yes, both	Yes, both	Yes, both	--	Yes, partial	Yes	Yes, both

Country	RECOMMENDATION 2				REC. 1	RECOMMENDATION 4	
	Coverage Indicators				Resource Tracking Systems		
	Postnatal care for mothers	Exclusive breastfeeding for first six months	DTP-3 immunization among 1-year olds	Antibiotic treatment for child pneumonia	Country records births, deaths, and causes of death using an electronic information system*	Country has at least one electronic information system in place to collect and report health data at the district level	Country has a resource tracking system in place to report total RMNCH expenditure by financing source, per capita
Indonesia	Yes, both	Yes, both	Yes, paper	Yes, --	Yes, partial	Yes	No
Iraq	Yes, paper	Yes, --	Yes, paper	Yes, paper	Yes, partial	Yes	No
Kenya	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	Yes, both
Kyrgyzstan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Lao P.D.R.	Yes, both	Yes, both	Yes, both	Yes, both	No	Yes	No
Lesotho	Yes, both	Yes, both	Yes, both	Yes, both	--	Yes	No
Liberia	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Madagascar	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Malawi	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, partial	Yes	Yes, paper
Mali	--	--	--	--	--	--	--
Mauritania	Yes, paper	Yes, paper	Yes, paper	No	Yes, partial	Yes	Yes, both
Mexico	No	No	--	--	Yes, full	Yes	Yes, online
Morocco	Yes, --	Yes, --	Yes, --	Yes, --	Yes, partial	Yes	No
Mozambique	Yes, both	Yes, both	Yes, both	--	Yes, partial	Yes	No
Myanmar	Yes, paper	Yes, paper	Yes, paper	Yes, paper	No	No	Do not know
Nepal	Yes, both	Yes, both	Yes, both	Yes, both	No	Yes	Yes, online
Niger	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Nigeria	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Pakistan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Papua New Guinea	Yes, both	Yes, both	Yes, both	Yes, both	No	Yes	No
Peru	Yes, both	Yes, both	Yes, both	No	Yes, full	Yes	Yes, online
Philippines	Yes, both	Yes, paper	Yes, both	Yes, both	Yes, partial	Yes	No
Rwanda	No	No	--	No	Yes, full	Yes	Yes, online
Sao Tome & Principe	--	--	--	--	--	--	--
Senegal	--	--	--	--	--	--	--
Sierra Leone	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Solomon Islands	No	No	Yes, both	No	Yes, partial	Yes	Yes, both
Somalia	--	No	Yes, paper	--	No	Do not know	Do not know
South Africa	Yes, online	Yes, online	Yes, online	No	Yes, partial	Yes	No
South Sudan	Yes, --	Yes, paper	Yes, paper	Yes, paper	No	Yes	No
Sudan	Yes, paper	Yes, paper	Yes, paper	Yes, paper	Yes, partial	Yes	No
Swaziland	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	Yes, online
Tajikistan	No	Yes, both	Yes, both	Yes, both	Yes, full	Yes	--

Country	RECOMMENDATION 2				REC. 1	RECOMMENDATION 4	
	Coverage Indicators				Resource Tracking Systems		
	Postnatal care for mothers	Exclusive breastfeeding for first six months	DTP-3 immunization among 1-year olds	Antibiotic treatment for child pneumonia	Country records births, deaths, and causes of death using an electronic information system*	Country has at least one electronic information system in place to collect and report health data at the district level	Country has a resource tracking system in place to report total RMNCH expenditure by financing source, per capita
Togo	Yes, both	Yes, both	Yes, both	Yes, --	Yes, partial	Yes	Yes, both
Turkmenistan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, full	Yes	Do not know
Uganda	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
U. R. of Tanzania	Yes, paper	Yes, paper	Yes, paper	Yes, paper	No	Yes	Yes, paper
Uzbekistan	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	Yes, both
Viet Nam	Yes, paper	Yes, paper	Yes, --	Yes, paper	Yes, partial	Yes	No
Yemen	--	Yes, paper	Yes, online	Yes, paper	No	Yes	No
Zambia	Yes, both	Yes, both	Yes, both	Yes, both	Yes, partial	Yes	No
Zimbabwe	Yes, paper	Yes, paper	Yes, online	Yes, online	Yes, partial	Yes	No

Country monitors this indicator using a mix of electronic and paper-based systems

Country monitors this indicator using electronic-based systems

Country monitors this indicator but did not specify which method of tracking

Country monitors this indicator using only a paper-based system

Country does not monitor this indicator or lacks the corresponding tracking system

-- Country did not respond

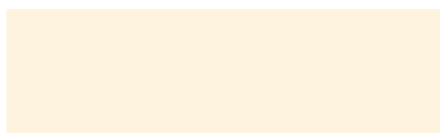
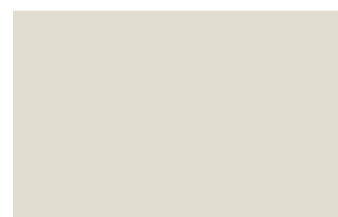
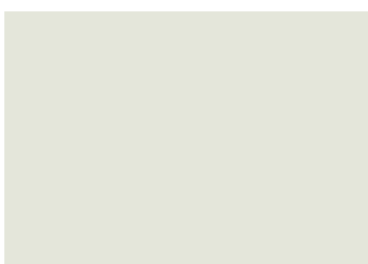
\* Partial/Full refers to the system's level of coverage in the country





# eHealth and innovation in women's and children's health: A baseline review

Based on the findings of the 2013  
survey of CoIA countries by the WHO  
Global Observatory for eHealth



ISBN 978 92 4 156472 4



9 789241 564724