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ICT for Improving Information and Accountability For Women’s and Children’s Health
Agenda

- **ICT Development & Trends**
- **ICT/ Broadband and e-health**
- **ICT for Women & Children’s Health**
- **Conclusions**
Why ICT is Important?

ICT as enabler for the information & Smart Society

- e-health
- e-governance
- e-education
- e-commerce
- Fully Networked Car
- Digital Cities
- Smart Grids
- Security in Cyberspace
- ICT and climate change
- CONVERGENCE
ICT Developments 2001-2013

Global ICT developments, 2001-2013

- Mobile-cellular telephone subscriptions
- Individuals using the Internet
- Fixed-telephone subscriptions
- Active mobile-broadband subscriptions
- Fixed (wired)-broadband subscriptions

Per 100 inhabitants

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012* 2013*

Note: * Estimate
Source: ITU World Telecommunication/ICT Indicators database

International Telecommunication Union
Committed to connecting the world
67% of people in Asia-Pacific DON’T use the Internet

Only 7.6% of households in Asia-Pacific have fixed-line broadband access
45% annually

Mobile broadband has grown 45% annually from 2010-2013

22%

But mobile broadband penetration at 22% is below world average
Digital Gap in Asia-Pacific

Active ICT/mobile-broadband subscriptions, penetration (2013)
Opportunity for Growth

More than 2 billion subscriptions worldwide by end 2013*

**Americas**
- 480 million subscriptions
- 48% penetration
- 28% CAGR (2010-2013)

**Europe**
- 422 million subscriptions
- 68% penetration
- 33% CAGR (2010-2013)

**CIS**
- 129 million subscriptions
- 46% penetration
- 27% CAGR (2010-2013)

**Arab States**
- 71 million subscriptions
- 19% penetration
- 55% CAGR (2010-2013)

**Africa**
- 93 million subscriptions
- 11% penetration
- 82% CAGR (2010-2013)

**Asia-Pacific**
- 585 million subscriptions
- 22% penetration
- 45% CAGR (2010-2013)

Source: ITU World Telecommunication ICT Indicators database
Note: # Estimate
ICT /Broadband & e-Health
“In the 21st century, affordable broadband access to the Internet is becoming as vital to social and economic development as networks like transport, water and power”

– Dr Hamadoun Touré, ITU Secretary-General
ICT for Achieving Millennium Development Goals
ITU Initiatives on Broadband : e-Health

- 6.8 billion mobile users, over 96% coverage, 1/3rd of world population on Internet and 2 billion broadband users
- ITU WHO: Commission’s on Information & Accountability for Women & Children’s Health
- ITU WHOA “National e-Health Strategy toolkit”
- ITU WHO Mobile technologies prevention cure & awareness of NCD
- Telemedicine / e Health: Nepal
- Mobile Applications : Nepal, Bhutan

A “National e-Health Strategy toolkit” was developed that consists of a methodology & set of resources to guide country decision makers to develop their national e-Health strategy and roadmap.

The toolkit published recently in 2012

The toolkit will be followed by rollout activities to disseminate it and to work with countries towards having a national approach to using ICT for Health.
The “National eHealth Strategy Toolkit” is a resource for developing or revitalizing a country’s eHealth strategy.

The Toolkit provides a **framework** and **method** for the development of a national eHealth vision, action plan and monitoring framework.

Available at: [http://www.itu.int/ITU-D/cyb/app/e-health.html](http://www.itu.int/ITU-D/cyb/app/e-health.html)
ITU’s Standardization Sector has released a Technology Watch Report that looks to the E-Health Standards and Interoperability

This report explains how rapid advancements in the development of e-health standards must accompany three trends in electronic healthcare in the coming decade:

- Advancements in healthcare delivery via mobile and wireless e-health technologies;
- Personalized medicine, including personal health records, medical diagnostic devices, and biometric records; and
- Interactive healthcare via social media and Web 2.0 applications.

Provides an introduction to some of the institutions working to develop standards in the capacious area of e-health, including CEN/TC 251, DICOM, HL7, ISO/TC 215, ISO/IEEE 11073 and, in particular, the work ITU-T is doing in e-health standards areas such as telecommunications and mobile infrastructure, multimedia e-health applications, and emergency and disaster response.

The report is available: http://www.itu.int/dms_pub/itu-t/oth/23/01/T23010000170001PDFE.pdf
ICT for Women & Children’s Health
The Commission on Information and Accountability for Women’s and Children’s Health (CoIA)– was established in January 2011 to increase the likelihood that pledges for women's and children's health are honoured and that resources are spent in the most effective way to save lives.

Ten Recommendations are set by the CoIA aim at creating a system to track whether donations for women's and children's health are made on time, resources are spent wisely and transparently, and whether the desired results are achieved.

Mobile cellular subscriptions per 100 inhabitants, CoIA countries, 2005, and 2011
Source: ITU

- China & India has over 1 billion mobile subscriptions
- Viet Nam leads with a penetration of 143.4 mobile-cellular subscriptions
- In 49 CoIA countries (65%), the penetration of mobile-cellular subscriptions grew at annual rates of at least 30 per cent during the last six years.
Rural and remote communities, wireless technologies still represent the best and most affordable option for broadband services

Mobile-broadband subscriptions have grown 45% annually in last 4 years

In Africa, the region to which most CoIA countries belong, mobile-broadband penetration has reached 4%

30 CoIA countries have reached penetration rates above 1%
Recommendation 1: Civil Registration and Vital Statistics (CRVS) and Maternal Death Surveillance and Response (MDSR)

- Registration of vital events, such as deaths and births, are still mostly paper-based systems and the reporting of these records is often delayed.
- The use of electronic systems can contribute to drastically reduce such delays, providing near real-time reporting, in addition to improving data quality.

Examples:
- Liberia Ministry of Health and Social Welfare launched the Universal Birth Registration (UBR) system, the country’s first decentralized electronic birth registration and certification system by using of mobile phones to collect birth registration information in rural areas, which is then transmitted to the main registration service.
- Punjab National Rural Health Mission has established an online Maternal Death Review Monitoring System to ensure that every death of mother and infant is recorded, so that the root cause and gaps in services are identified.
Recommendation 2: Health Indicators

• When it comes to data collection, web applications can allow health facilities to enter data directly into central servers, without the need for any software installation or database management at the local level.
• Electronic systems allow for the introduction of a range of data quality measures, and comparing related values, such as the total number of births to the number of live births.
• Data become immediately available at the district, provincial and national levels, facilitating timely decision-making and the provision of feedback.

Examples:
• mTRAC is an SMS-based reporting platform that enables health care workers (HCW) to send weekly government reports on disease surveillance, malaria case management, and stock quantities of antimalarial drugs, using mobile phones.

• Uganda adopted DHIS2, a web-based Health Information System (HIS) that aims at facilitating the management of HIS data, improving the reporting of individual facility aggregate information, and facilitating planning and delivery of quality health care nationwide.
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.

Source: ITU, ICT for improving information and accountability for Women and Children Health
A. eHealth services provided to individuals, new and expectant mothers, infants, their families and communities

<table>
<thead>
<tr>
<th>ICT innovations and services</th>
<th>Examples of what ICT services can offer along the Continuum of Care</th>
<th>Examples of eHealth projects in CoIA countries[^2]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Health Information and Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Call centres and helplines</td>
<td>- Access to reproductive health information</td>
<td>- MAMA [2]</td>
</tr>
<tr>
<td>- Local radio</td>
<td>- Reinforce positive health behaviour change, such as child spacing</td>
<td>- Medic Mobile [39]</td>
</tr>
<tr>
<td>- SMS/VR-based health education and promotion</td>
<td>- Stimulate demand on reproductive healthcare</td>
<td></td>
</tr>
<tr>
<td>- SMS and social networks for behaviour change and communication</td>
<td>- Providing tips on appropriate care and general information on pregnancy</td>
<td></td>
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<tr>
<td></td>
<td>- Support the prevention and treatment of mother-to-child transmission of HIV/AIDS and other communicable diseases</td>
<td></td>
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<tr>
<td></td>
<td>- Peer support networks of pregnant women</td>
<td></td>
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<tr>
<td></td>
<td>- Improving access and utilization of maternal health services by pregnant women</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>Emergency toll-free telephone services</strong></td>
<td>Improve transportation of pregnant and newborn with complications</td>
<td>HealthLine [31]</td>
</tr>
<tr>
<td></td>
<td>Access to skilled care at the time of birth in case of obstetric emergency care</td>
<td></td>
</tr>
<tr>
<td><strong>e-Tracking and alerts systems for expectant mothers and infants</strong></td>
<td>Providing prenatal advice at every stage of gestation</td>
<td>M-CHANIO [11]</td>
</tr>
<tr>
<td></td>
<td>Reminding pregnant women of prenatal visits, informing nurses to follow-up</td>
<td>MoTech [42]</td>
</tr>
<tr>
<td></td>
<td>Infant registry for immunization</td>
<td>UNICEF Reminder Mother System [53]</td>
</tr>
<tr>
<td></td>
<td>Reminders for mothers requiring post-natal care for themselves and for their infants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alerts for infant vaccinations</td>
<td></td>
</tr>
<tr>
<td><strong>Electronic directories for health care providers</strong></td>
<td>Improve quick access to health services across the Continuum of Care</td>
<td>Hospitalsworldwide.com [33]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M4RH [37]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Remote patient monitoring</strong></td>
<td>Detecting and monitoring warning signals and typical symptoms of high-risk pregnancies</td>
<td>Amanecer [16]</td>
</tr>
<tr>
<td></td>
<td>Home care and treatment of newborns with complications</td>
<td>Pexinet [44]</td>
</tr>
</tbody>
</table>

Source: ITU, ICT for improving information and accountability for Women and Children Health, 2013, p. 20
**B. eHealth services provided to healthcare providers, health centres, health professionals, doctors, nurses and midwives, and Community Health Workers (CHW)**

<table>
<thead>
<tr>
<th>ICT innovations and services</th>
<th>Pre-pregnancy</th>
<th>Examples of what ICT services can offer along the Continuum of Care</th>
<th>Post-natal</th>
<th>Examples of eHealth projects in CoIA countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>eFinancial services</td>
<td>• Allowing women to save toward delivery and postnatal care</td>
<td>• Payments for healthcare related to antenatal care, e.g. consultation, diagnosis, lab tests, etc.</td>
<td>• Payments related to post-natal care, e.g. child immunizations</td>
<td>• Health Systems 20/20 [32] • Chamwanka Medical Smart Card [21]</td>
</tr>
<tr>
<td>Telemedicine</td>
<td>• Audio-Video-conferencing • Tele-ultrasonography, Tele-cardiology solutions, etc. • Remote diagnostics</td>
<td>• Detecting and monitoring warning signals and typical symptoms of high-risk pregnancies • Remote obstetrical ultrasound examination</td>
<td>• Access to trained medical professionals in case of emergency • Screening/tests related to HIV, syphilis and other diseases • Speeding up sending test results for early infant diagnosis</td>
<td>• Tulasiddhu [52] • RAFT [45] • SMART [49]</td>
</tr>
<tr>
<td>eLearning</td>
<td>• Online training materials • SMS quizzes • SMS/MMS/IVR-based training</td>
<td>• CHW training on reproductive health • CHW training on healthy pregnancy and delivery</td>
<td>• Delivering education to traditional birth attendants • CHW training on newborn and early childhood care</td>
<td>• AMREF [17]</td>
</tr>
<tr>
<td>Point-of-care support</td>
<td>• Decision support systems (e.g. checklists and algorithms)</td>
<td>• Screening for pregnancy risk factors • Improve efficiency in diagnosis and treatment across the continuum of care</td>
<td>• Integrated management of childhood illness for children under 5 years old</td>
<td>• e-MCI using D-Tree [27]</td>
</tr>
<tr>
<td>Electronic patient records</td>
<td>• EMR, EMR; PHR</td>
<td>• Allowing seamless integration of patient history data across the Continuum of Care</td>
<td>• RPMS Electronic Health Record [47]</td>
<td></td>
</tr>
<tr>
<td>Community-based eHealthcare</td>
<td>• Collection of routine patient data during home and clinic visits to track health indicators at community level • Case management • Report and track expectant mothers and newborn health status and send alerts in case of abnormalities • Management of workforce and performance monitoring and incentives • Improve information flow back to the community level • Improve the communication between and medical skills of health care institutions and birth attendants</td>
<td>• Childcount [9] • CommCare [23] • Medic Mobile [39]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral systems</td>
<td>• Closed calling network • Online or SMS-based</td>
<td>• Referrals and transportation of pregnant and newborns with complications to facilities with adequate resources • Access to skilled care at the time of birth</td>
<td>• SHINE [48] • Ehealthpoint [26]</td>
<td></td>
</tr>
</tbody>
</table>

Source: ITU, ICT for improving information and accountability for Women and Children Health, 2013, p. 21
### C. **eHealth services provided to healthcare managers and administrators to strengthen health systems**

<table>
<thead>
<tr>
<th>ICT innovations and services</th>
<th>Pre-pregnancy</th>
<th>Pregnancy</th>
<th>Birth</th>
<th>Post-natal</th>
<th>Examples of eHealth projects in CoA countries*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronic health data collection and reporting</strong></td>
<td>Collect, aggregate, and analyse health data related to demand for family planning</td>
<td>Collect, aggregate, and analyse health data related to HIV-ARV distribution to pregnant women, and antenatal care visits</td>
<td>Collect, aggregate, and analyse health data related to skilled attendance at birth, as well as to postnatal care for mothers and babies 2 days after birth</td>
<td>Collect, aggregate, and analyse health data related to exclusive breastfeeding, immunization, antibiotic treatment for childhood pneumonia, and stunting prevalence</td>
<td>Online Reporting of National Rural Health Mission, Punjab, India [13]</td>
</tr>
<tr>
<td>Online Health Information System</td>
<td>Electronic birth, death and cause of death registration</td>
<td>Birth, death and cause of death registration</td>
<td>e-District Kapurthala, India [1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured SMS or mobile data collection forms</td>
<td><strong>e-Surveillance</strong></td>
<td>Maternal and infant death notification, review and surveillance</td>
<td>Maternal and child health surveillance related to meningitis, malaria, diarrhoea or nutrition</td>
<td>Online maternal death review system in Punjab, India [27] [28] [29] [30] [31] [32] [33] [34] [35] [36] [37] [38] [39] [40] [41] [42] [43] [44] [45] [46] [47] [48] [49] [50]</td>
<td></td>
</tr>
<tr>
<td><strong>Electronic Supply Chain Management</strong></td>
<td>Stock management for reproductive health products</td>
<td>Stock management for life saving commodities</td>
<td>Stock management for life saving commodities</td>
<td>Stock management for vaccines, pneumonia, diarrheal drugs, etc.</td>
<td>SMS for Life [50]</td>
</tr>
</tbody>
</table>

Source: ITU, ICT for improving information and accountability for Women and Children Health, 2013, p. 22
# mHealth for Women’s and Children’s Health

**mHealth Alliance Active Grantee Projects (2012 – 2014)**

<table>
<thead>
<tr>
<th>mHealth projects grantees</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cell-Life – MAMA, South Africa</strong></td>
<td>Cell-Life uses the MAMA SMS service to reach mothers with information on HIV testing, healthy pregnancy and infant care, and provides mothers with access to the National AIDS Helpline.</td>
</tr>
<tr>
<td><strong>Clinton Health Access Initiative (CHAI) – SMART, Nigeria</strong></td>
<td>CHAI, the Federal Ministry of Health (FMOH) of Nigeria and Hewlett Packard have partnered on the SMS Printers to Accelerate Return of Test Results for Early Infant Diagnosis of HIV/AIDS program (SMART), which reduces turnaround time of test results by approximately 15 days.</td>
</tr>
<tr>
<td><strong>Dimagi – CommCare, India</strong></td>
<td>Dimagi’s open source mobile maternal and child health case management tool is being deployed to deliver health information and services across five provinces in India. To support scale up, Dimagi is launching the Active Data Management tool to strategically use the data collected for decision-making.</td>
</tr>
<tr>
<td><strong>D-Tree International – mNUT, Zanzibar</strong></td>
<td>Alongside UNICEF and the Government of Zanzibar, D-Tree International provides rural health workers with a mobile phone-based decision support application, which gives them tools to identify, treat and care for children with severe acute malnutrition.</td>
</tr>
</tbody>
</table>

*Source: mHealth Alliance*
### mHealth for Women’s and Children’s Health

#### mHealth Alliance Active Grantee Projects (2012 – 2014)

<table>
<thead>
<tr>
<th>Grantee</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grameen Foundation – MOTECH, Ghana</strong></td>
<td>The Grameen Foundation, in partnership with the Ghana Health Service, supports poor, rural women and Community Health Nurses by delivering time-specific information to women about pregnancy, childcare practices and appointments, while supporting electronic records systems for nurses. Grameen has formed a public-private partnership with MTN Ghana to sustainably expand access to these services.</td>
</tr>
<tr>
<td><strong>IRD – Interactive Alerts for Vaccine Coverage, Pakistan</strong></td>
<td>Interactive Research and Development (IRD) is using Interactive Alerts, an electronic vaccine registry, to increase coverage of vaccines in support of Pakistan’s Expanded Program on Immunization. Interactive Alerts provides SMS reminders to patients and caregivers, radio-frequency identification tag stickers for immunization cards.</td>
</tr>
<tr>
<td><strong>MoH Rwanda RapidSMS and mUbuzima, Rwanda</strong></td>
<td>The Ministry of Health of Rwanda is training community health workers to use mHealth applications to monitor and promote maternal and neonatal health, identify potential risks, and promote antenatal care at health facilities. The mHealth applications in use are “RapidSMS,” which helps track pregnant women, and mUbuzima, which is used to collect and report MDG indicators at the community level.</td>
</tr>
<tr>
<td><strong>Novartis – SMS for Life, Cameroon, Tanzania, Ghana</strong></td>
<td>Novartis has developed the SMS for Life initiative, which tracks weekly stock levels to reduce stock-outs of key anti-malarial medicines and is being scaled to reach all health facilities in Cameroon and Tanzania. In Ghana, SMS for Life is used to reduce mortality in childbirth by bringing real-time visibility to blood supplies in all hospitals in Ghana.</td>
</tr>
</tbody>
</table>

Source: mHealth Alliance
mHealth for Women’s and Children’s Health
Tools and platforms to accelerate innovation

CommCare

CommCare is an easily customizable mobile health (mHealth) platform that allows community health workers (CHW) track and support their interactions with patients.

The CHW registers patients using customized electronic forms that are used by low-literate CHWs in multiple languages. CommCare automatically submits visit data in ‘real-time’ to a central cloud server. Data on this server is privacy-protected, backed up, and accessible to supervisors and program managers around the world.

CommCare improves the quality of and access to care through client lists on the CHWs' phones, checklists for CHWs, SMS reminders when visits are due. It also boosts the accountability of care by facilitating real-time monitoring of CHWs’ activities.

Source: http://www.commcarehq.org/home/
Medic Mobile

Medic Mobile has developed diverse low-cost tools that take advantage of SMS, email, SIM, J2ME or Android applications, as well as hosted and distributed web applications to coordinate community health workers and facility providers in remote villages. The goal is boosting the quality of maternal and neonatal health care by increasing referrals for skilled birth attendance and/or facility delivery, improving danger sign monitoring, and increasing coverage of complete antenatal and postnatal visits.

Through its SMS gateway, this web application receives and parses structured SMS messages, and stores them in a local database.

# Examples of Regulatory and Policy considerations

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Legislation        | National legislation, policy and regulatory components that govern how health information is stored, accessed and shared across geographical and health-sector boundaries. | • Unique health identifier regimes  
• Privacy, protection, storage and retention of personal health information  
• Consumer protection including in the online environment  
• Access and consent to personal health information use and disclosure, including secondary use  
• Audit and complaint procedures (e.g. such as those required for suspected breaches of privacy)  
• Licensing regimes which may be needed to ensure that private operators of components of a national eHealth environment meet required standards for privacy, integrity and security |
| Policy             | Broader public policy required to support the development of a national eHealth environment. | • Health sector policy (e.g. reform, improved access to and use of health information)  
• Non-health sector policy (e.g. broader industry and economic development, utilization of existing eGovernment infrastructure)  
• Policies to stimulate and manage innovation, risk, evaluation of feasibility and utility of services |
| eHealth-specific policy | Policies specifically governing eHealth services, including privacy of health-related data held in digitized format, its use and sharing for research and the public interest. | • Policies on medical jurisdiction, liability for eHealth services (e.g. telemedicine), safety, data integrity and quality of care  
• Policies for reimbursement for eHealth services (e.g. telemedicine), both public and private  
• Policies for managing Internet health information quality, sales of medicines and regulated health products  
• Policies to demonstrate eHealth outcomes and clinical effectiveness |
| Compliance         | Components required to support the development of eHealth products and which are compatible with the national eHealth environment. | • Development of national eHealth standards and other interoperability requirements  
• Compliance, conformance and accreditation of eHealth products and services |

Source: ITU – WHO National eHealth Strategy Toolkit
## Standardization considerations

Examples of standards applied to ICT-based interventions to measure CoIA-related RMNCH indicators at the community or facility levels

<table>
<thead>
<tr>
<th>Example of ICT-Innovation Intervention</th>
<th>Type of Data or Indicators Collected and Transmitted</th>
<th>Examples of Relevant Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>mHealth/eHealth Service: Notification System for Maternal Deaths</td>
<td>Deaths during pregnancy, childbirth and puerperium</td>
<td>Health Level Seven (HL7) Version 2.x and Version 3 for vocabulary; International Classification of Diseases (ICD10/ICD) for diagnosis</td>
</tr>
<tr>
<td>eHealth Service: Facility Data and Discharge Data Management</td>
<td>Cesarean delivery</td>
<td>Health Level Seven (HL7) Version 2.x and Version 3 for vocabulary International Classification of Diseases (ICD10/ICD) for diagnosis</td>
</tr>
<tr>
<td>eHealth Services: Facility Stocks Management Information Systems</td>
<td>Management of essential medicines and medical products available for mothers and children at care facilities such as antiretroviral prophylaxis, uterotonics, DPT vaccine, antibiotic treatment for pneumonia, and contraception; Rapid diagnostic test for malaria, Vitamin A; oral rehydration package, Insecticide Treated Bednets</td>
<td>Biomedicine, Healthcare, Drug Standards ex. UMLS RxNorm; Unified Code for Units of Measure (UCUM); Uniform Facility Codes and related Facility Registry elements; ISO/TC 215 Standards List</td>
</tr>
</tbody>
</table>

Source: WHO
Conclusions

- Accelerate the rate of mobile-cellular and broadband infrastructure deployment in CoIA countries
- Facilitate access to mobile-cellular and broadband services among low-income and rural Populations
- Develop and adopt national eHealth policies & strategies
- Ensure the inclusion of an mHealth component in eHealth policies and strategies
- Encourage the harmonization of eHealth standards
- Take security concerns into consideration
- Improve measurement of impact of eHealth applications and services, particularly at the community level
- Target financial resources specifically for eHealth services
- Develop human capacity in eHealth
No woman should pass away when giving birth because the right information did not get to her on time, when we have the ICT available.

All children, regardless of their place of birth and the socioeconomic situation of their parents, should have access to proper healthcare and education because information technology is at our fingertips.
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