Information and Communication Technology for Development (ICT4D) in Health

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1.0 CHALLENGES OF HEALTH SECTOR

- Africa and Tanzania in particular is faced with burden of disease exacerbated by poverty. Non-communicable diseases are increasing and estimated to double by 2030. On the other hand the population of Africa will more than double by 2050. Can it manage the health care of this growing population? It has few medical training centres and a big brain drain. Countries do not have effective health care system to support the growing population.

- Funding shortage - primary barrier to providing and accessing affordable healthcare. Expenditure in health is US $ 23 per capital in 2005 against the WHO recommended coverage of US $ 60 per capital. Even that, African governments are paying only 44% (US $ 10). [1]
• Equipment and supplies shortage - there is a disparity in physical access to care because of this. It is difficult for health workers to provide the care they are capable of providing. Supply shortage even lead to health centre shutdowns.

• Insufficient quantity of skilled health care workers - Africa is home to nearly 25% of the global disease burden, yet only 3% of the total global health workforce.[2 &3]. The shortage is estimated to be 1.5 million health workers, over 40% of doctors born in Africa work abroad.[4 &5]
• The population of Africa is lowly educated about prevention and treatment of preventable diseases. MDG 6 can be achieved only through a combination of medical approaches and public education campaigns.

• Lack of health systems infrastructure that enable communication between rural and urban centers - hospitals, health centers, hospitals beds, back up power, telecom networks and specialized equipment. This absence increase the possibility of patient death. Uganda has 1 hospital per 100,000 people.
1.1 SUPPORTING STORIES

- Half of the number of children born in Sengerema District in North West Tanzania are not vaccinated even though this service is offered free.

- Announcements prepared and broadcasted by the Community Radio in Sengerema in Tanzania remanding mothers to send their children for vaccination, has increased the number of vaccinated children from 50% to 100%. (Evaluation of Sengerema Telecentre, IDRC, 2004).

- A study has shown that up to 42% of children under five years of age in Manyara region of Tanzania suffer from severe malnutrition. There are fears that the rate could reach 80% by 2016. If the problem is not contained. Citizen Newspaper (Tanzania) 10th April 2012.

- 43 out of every 100 patients receiving treatment at Sengerema District Hospital in North- West Tanzania suffer from worms/hookworms.
2.0 CONTEXT

- ICT are defined as tools that facilitate communication and the processing and transmission of information by electronic means. The definition encompasses the full range of ICT’s from radio and television to telephones (fixed and mobile), computers and the Internet. Also related terms are healthcare informatics, health technologies (diagnostic & therapeutic) health telematics; e-health and health system.

- Health is seen as a complex interaction of biomedical, social, economic, and political determinant. It is placed firmly in the poverty and development debates.

- How can ICTs best be used to move towards achievements of the MDGs as part of poverty reduction strategies and in order to improve the health of the most poor and vulnerable people?

- Measuring the impact of ICT on health generally seems to be fairly difficult because there are of obviously many other factors that impact health. [6]
**Fig. 1. Digital is the “Fourth Space” in Health Care**


<table>
<thead>
<tr>
<th>Digital: the fourth space</th>
<th>Traditional spaces in healthcare</th>
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<tr>
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<td><strong>Hospitals</strong></td>
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<td><strong>Clinics</strong></td>
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<td><strong>Homes</strong></td>
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<td>Digital channel for health</td>
<td>Led by payers and providers</td>
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<td>Within traditional healthcare system</td>
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<td>Digital innovation for consumers</td>
<td>Led by new/emerging players in consumer segments</td>
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<td>Outside traditional healthcare system</td>
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<td>Digital initiatives for social impact</td>
<td>Led by NGOs, governments, and foundations</td>
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<td>Broad behavioural change agendas</td>
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Fig. 2. Profile of Selected Interventions in the Digital Channel for Health

3.0 ROLE OF ICT IN HEALTH

- Curb inefficient use of productive resources including financial, human and intellectual capital “20% to 40% of all healthy spending is currently wasted through inefficiency” [7].
- Address funding shortage - using ICT to increase fiscal efficiency.
- Issues that impede procurement and delivery of equipment and medical supplies could be improved when using mobile devices and other ICTs that improve on communication, data gathering and resource allocation.
- ICT can help populations become better educated about prevention and treatment of preventable diseases - mobile phone SMS in Tanzania.
• Use ICT to address the lack of health system infrastructure and communication between rural and urban centers – use of SMS, image delivery, telemedicine, tele-radiology.

• Use ICT to improve supply chain management and increase access to essential drugs; administer short-term and mid-term training for health workers; identify health issues including epidemics; allow cross-analysis of patient information in databases to drive evidence-based decision making at the individual, group, community and national level.

• Reduce maternal mortality by making it possible to increase pre-natal consultation with professional health care workers and delivery attended by skilled birth attendants using mobile technology (SPIDER funded project in Rufiji Tanzania.)
• ICT can be used to combat HIV/AIDS, malaria and other diseases by making education materials about prevention more readily available, faster and more frequent (*Text to change in Uganda*). Data tracking capabilities is useful in managing malaria outbreaks (*ICT use at Lugoba Health Centre in Tanzania*)
3.1 ICT must enable:-

• Health workers to make better treatments decisions

• Hospitals provide higher quality and safer care

• People make informed choice about their own health

• Governments becoming more responsive to health needs

• National and local information systems supporting the development of effective and equitable health system

• Policy makers and the public be aware of health risks

• People having better access to the information and knowledge they need for better health [8].
4.0 WHAT ICT HAS DONE.

• Improved dissemination of public health information and facilitated public discourse and dialogue around major public health threats.
• Made possible remote consultation, diagnosis and treatment through telemedicine.
• Facilitated collaboration and cooperation among health workers, including sharing of learning and training approaches.
• Supported more effective health research and the dissemination and access to research findings.
• Strengthened the ability to monitor the incidence of public health threats and respond in a more timely and effective manner.
• Improved the efficiency of administrative systems in health care facilities.
• Uganda, effective use of ICT’s prevented avoidable maternal deaths
• In South Africa, the use of mobile phones has enabled TB patients to receive timely reminders to take their medication.
• In Rwanda, multimedia communication programs are increasing awareness of how to strengthen community responses to HIV and AIDS.
• In Bangladesh, global satellite technology is helping to track out breaks of epidemics and ensure effective prevention and treatment can reach people in time.
5.0 BENEFICIARIES OF ICT IN HEALTH

Before an ICT strategy is done, the target beneficiaries need to be identified and their needs mapped using a participatory approach. Suggested beneficiaries:

- International agencies (WHO), donor agencies, international NGOs.
- Regional bodies (NEPAD, AU), regional NGOs.
- National and provincial governments and ministries, national NGOs, provincial hospitals and health departments.
- Local personnel at clinics, health workers, doctors, traditional healers, community leaders, patients and citizens.
6.0 POLICIES AND STRATEGIES IN eHEALTH

Best policies and strategies should focus on systems to be:-

- **Personalized** – individualized for patients and providers in status and treatment for care decisions.
- **Ubiquitous** - patients have access to their health information anywhere - providers or facilities
- **Interoperable** – providers and systems should be able to interact and exchange information with each other.
- **Interconnected** – stakeholders and systems should be interconnected and be able to leverage the same infrastructure.
- **Scalable** - systems should be able to expand functionally, in terms of the workers that use them and the population they serve.
• **Sustainable** – affordable without operating at a loss, result in efficiency gains to the health system.

• **Secure** – personal data secure from external and internal misappropriation.

• **Measurable** – access, quality and impact should be measurable and follow the principles of the policy and strategy.
7.0 CHALLENGES OF USING ICT IN THE SECTOR

• The health sector structure and national regulatory framework are not yet conducive to problem-oriented, interdisciplinary, collaborative technical work and implementing tasks that are multifaceted and of certain complexity.

• Vision, goals, action plans and potential outcomes and benefits have not been well defined.

• Priority ICT solutions in the health sector require links with diverse stakeholders to speed development. Yet in this action the public sector should lead. It is easy for the public sector to lead?

• Are data-related standards and regulatory and legal framework in place? How do we develop the capacity of health workers, other intermediaries and community members to make the most effective use of the ICTs available.
• Can we develop Content that is relevant, applicable and culturally appropriate? How about language?
• What would be the continuity and sustainability of ICT projects and programs in terms of finance flows, public-private partnership and building on existing information and communication channels and resources?
• Connectivity – telephone access, computer ownership and internet connectivity including speed.
• Capital
• Capacity to adopt information and capacity to use ICTs effectively to service and maintain.
### 8.1 GENERAL.

- Technology is not an end in itself, but a tool to enhance existing work, strengthen existing systems, achieve broader health and development goals.
- Successful inclusion of ICTs in a sector depends on the active involvement of beneficiaries and end users.
- Local conditions determine success.
- Simplest technology solution likely to be most appropriate, user friendly and sustainable.
- No single technology will be suitable for all solutions.
- Capacity and training needed to be included in all ICT initiatives.
• Local and international multi stakeholders partnerships supports communities to become self-sufficient.
• Regular monitoring and evaluation generated successful use of ICTs.
• Addressing needs of the poor marginalized, especially women and girls is vital.
• Clear plan of sustainability maintains the ICT programme and its impact.
8.2 SPECIFIC TO HEALTH SECTOR.

- Identify the objectives and expected results of any health information system.
- Incorporating existing technology into medical practice can make a difference.
- There is strong potential for e-learning in the sector.
- There is growing evidence that ICTs aid health information dissemination and increase effectiveness of some communication systems.
- Mass media ICTs, such as radio, remain key aspects in communicating about health.
- There are demonstrable benefits in combining technologies, particularly older with newer ICTs.
9.0 CONCLUSION

• Ensure that the use of ICTs benefits health systems, health workers, the people who make use of the health system (patients and citizens) and that their health improves.
• Keep the technology simple, relevant and local.
• Build on what is there and being used.
• Involve users in the design of ICT Projects and demonstrate on its benefit.
• Strengthen Capacity to use, work with and develop effective ICTs in the sector.
• Evaluate the impact that the use of ICT has on the sector.
• Strengthen organizational and national human resources, awareness skills and leadership to champion development of ICT use the health sector.
REFERENCE.


4. www.unep.org

5. Ibid. World Health Report 2006


7. Whqlibdoc.who.int/whr/2010


**Recommended Readings.**


AMREF: Using telemedicine to improve rural health
www.amref.org

- The African Medical and Research Foundation (AMREF) is improving its clinical outreach program with help of telemedicine.
- A number of sites have been set up to test the approach and then roll out to about 80 rural hospitals served by AMREF in East Africa.
- Goal is to improve quality of and access to specialist care and improve care through training using teleconsultation.
- Clinicians from rural hospital consult with physicians on specific cases. Clinicians forward case notes and image of patients by email. Digital images of patient and X-rays may be attached and sent via Internet to start virtual consultation.
• Consultants meet to prepare opinions and start teleconferencing connecting at a greed time with Clinicians.
• On completion of consultations, the entire record is saved on a dedicated library file on the AMREF serve to be used again in similar incidences.
• Telemedicine helps countries deal with shortages of health care professional, build links between well served and underserved areas, link health workers to latest research and information.
Maternal health Tanzania

Country of origin | Tanzania

Health problem addressed
Maternal and neonatal healthcare in Africa faces well-documented challenges, including: 1) Limited qualified health staff, 2) Ineffective referral systems for triage to urban/higher facilities, 3) Inadequate diagnostics at point of care, 4) Limited community-level data and connectivity, 5) Uninformed patients, 6) Limited Public Private Partnership (PPP) financial models.

Solution description
The platform is accessed through the Internet by a netbook computer, smartphone, or other modern web device. Users submit patient data, which is validated before being sent via encrypted connection to a central database. The platform features sending/receiving SMS to patients and clinicians, portable ultrasound integration, dynamic filter-based patient cohorts for targeted follow-up, scheduling of return visits or patient referrals in a central calendar, and recording of orders and payments made during a clinic visit. An additional continuing medical education module allows online creation and publication of multimedia courses and informal clinician accreditation.

Functionality
1) User registers mother at clinic. 2) User submits outcome of clinical examination and schedules follow-up visit. 3) Specialist conducts portable ultrasound examination and saves image to the mother’s record. 4) Upon referral, user at another facility accesses mother’s full record. 5) Mother receives targeted educational and reminder SMS.

Developer’s claims of solution benefits
Developer's claims of solution benefits

Validate data instantly and track user performance to identify areas of weakness for retraining.

Enable community-based care outside of clinic setting using networked computers.

Retain a full record of mother's information in health system.

Generate system-wide clinical and operational reports without tedious data collection/aggregation.

Enable portable obstetric-ultrasound screenings: better diagnosis, early intervention.

Browser-based platform overcomes limitations of phone-based platforms.

Future work and challenges

A large portion of active deployment costs come from the Internet usage and SMS costs for follow-up with patients. Deployment on a large scale would be greatly facilitated by partnership with mobile operators (e.g. corporate social responsibility initiative or volume-based pricing).

Emphasis on the importance of record-keeping and the power of data will help highlight the advantages of the platform’s various modules working together and motivate adoption (e.g. targeted SMS follow-up based on early identification of high-risk mothers, accreditation of health workers through online training to assess quality of human resources, detailed reports to assist management in budget allocation).

User and environment

User: physician, nurse, midwife, technician, facility or health system administrator.

Training: one week hands-on training.

Settings: rural, urban, ambulatory, primary, secondary and tertiary.
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Training: one week hands-on training.

Settings: rural, urban, ambulatory, primary, secondary and tertiary.

Solution specifications

Solution is used to support: Telemedicine; Electronic Health Record/Electronic Medical Record; eLearning; mLearning; mHealth; Reporting, portable diagnostics, facility management.

Software/Hardware requirements: The server-side component of the platform requires specific software running on a secure Internet-connected data centre. The software is being made available on an international free-for-use license. Customization of data forms for use outside Tanzania may require modest technical development investment.

Standards: Format of structured data adheres to the Tanzania Ministry of Health maternal health card.

Currently used in: Tanzania

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http://www.who.int/ehealth
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