

# Quiet Transformation

## ICT and Public Health


Ever since man struck two flints together to start a fire, technology has found an inevitable and central place in human life. Technology on its part has come a long way from those flints. Technology is now an essential component of service delivery worldwide. Information Technology is the use of computers and phones in order to store and transmit data. Communication Technology consists primarily of telecommunications software, such as telephone and wireless signals. Information Communication Technology integrates both the data transmission capabilities of Information Technology with the telecommunications network to create a unified communications system that can interact with a multitude of technological platforms in order to improve a particular function.

Public health too has used of all kinds of technologies to make progress in reducing the risk of disease and death among populations, and improvements in the quality of life. Technology has already begun to influence public health in multiple areas such as diagnostics, medicines, medical equipment, treatment techniques etc. For instance, blister-packaging in the pharmaceutical industry has improved the shelf life of our medicines. Surveillance has been piloted through social media, and diagnostic scans are being sent to specialists in distant locations in a manifestation of increasing technological use. Solar power fridges, which can function in electricity poor areas are a different kind of technological development, and non-invasive technologies such as phone applications to measure blood pressure and monitor heart rates, are recent developments.


### New uses for ICT

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An important modern technology that has found application in all fields of human endeavor is ICT. Common ICT platforms include mobile phone services, internet technology and radio. Mobile technology leverages phone calls and short message services (SMS) to provide services in more accessible ways to the population. For example, *M-Pesa*, a Kenyan and Tanzanian microfinance service, allows citizens to deposit, withdraw and transfer money via SMS. The *Virtual University Trial Project* in South Korea provides quality education to individuals who do not have access to educational institutions. And the *EVISENSE* program in Finland uses interoperability between various ICT platforms to provide predictions of pest outbreaks to farmers based on cropping patterns and weather data. Farmers are alerted through SMS to check the *EVISENSE* internet portal for information on appropriate pesticides to protect their crops.



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### ICT and a Health Functions Framework

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It is useful to think of ICT applications in health by the nature of the functions that they service, and hence, the transactions that they can be used to improve. Two aspects relating to the use of ICT are of import: (i) the functionality that ICT can improve; and (ii) the level of the health system at which the capability will be utilized.

## ICT Functions Framework



BCF	Behavior Change Function
RTF	Registration & Tracking Function
HSF	Health Worker Support Function
TPF	Training & Performance Enhancement Function
SCF	Supply Chain Monitoring Function
CRF	Compliance & Reporting Function
BSF	Beneficiary Support Function

For example, the Bill and Melinda Gates Foundation uses a Functions Framework that identifies various health systems functions and enumerates their programmatic objectives and functional requirements. Building upon this framework, Amaltas has described seven key functions in which ICT could play a constructive role.

It is important that the level at which the ICT is deployed can be managed by those who are asked to utilize it and that they benefit directly in their work performance from using it.

Benefits from ICT may manifest as improvements in system efficiency and effectiveness. For example, pregnant women are registered by *E-Mamta* mother and child-tracking program in Gujarat, India, when she visits the clinic or is visited by a health worker. This registration allows for generation of an automated work plan to identify appropriate services for pregnant women and triggers an automated SMS reminding her about approaching visits and pregnancy related information. The use of ICT improves efficiency by not only reducing paperwork and making it easier for health workers to quickly identify appropriate services, but also improves effectiveness.

*mTrac*, an ICT enabled project in Uganda enables 5000 health clinics and hospitals in the country to report stock-outs of essential medicines and other supplies directly to the government, allowing for

efficient response in the form of prompt and appropriate re-supply. It also permits people to report any outbreaks of diseases or stock-outs in their area of residence. By encouraging beneficiaries to participate in improving healthcare services, *mTrac* as successfully created a more accountable system that efficiently and effectively responds to the needs of its users.

ICT can be used to address some of the central barriers to health services like the quality of care. For example, anybody with a mobile phone can call the call centers of *GP Healthline* in Bangladesh and ask for standardized and quality health and treatment advice by trained professionals. This was unthinkable before. People had to travel long distances to access basic healthcare without guarantee of its quality. This posed a major threat to lives especially in a country where 80% of the population lives in rural areas.



WHO defines e-health as "...the cost effective and secure use of ICT in support of health and health related fields including healthcare services, health surveillance, health literature, and health education, knowledge and research..."

(Resolution 58/28, World Health Assembly 2005)



The *Sky Clinic Program*, initiated by World Health Partners, has demonstrated improved effectiveness. Over 116 telemedicine-based Sky Clinics have been set up in Uttar Pradesh, covering a population of about 6 million people across the state. This telemedicine program focuses on improving the health status of pregnant women by remotely providing antenatal care at an average cost of \$5.84 per patient. Over 288,000 women have begun to use contraception and family planning as a result of the program.

Sometimes ICT usage may have interesting cross-sector domino effects. In 2004, the Government of Bangladesh passed the Birth and Death Registration Act, making it mandatory to register all births and deaths in the country, failing which citizens are not eligible for benefits such as passport, marriage certificate, admission in educational institutions, etc. In time, all City Corporation have adopted ICT to register births and deaths in their jurisdiction with the aim of providing universal access of the database.

The online *Birth and Death Registration System* database is accessible by government officials and citizens at all times and is used by several ministries such as health, education, immigration, home, census, etc. The health ministry uses the database to track newborns and infants for immunization over a period of time. Similarly, the education department tracks children to increase enrollment in schools using the database.

ICT has proved to be of much importance in the arena of emergency services as well. A feasibility study carried out by *GVK Emergency Management Research Institute* found that 80% of emergency-related deaths occur during the first hour (also called the Golden Hour). An intervention to reduce these deaths and improve the coverage of emergency services in India was created. ICT along with geo-positioning systems has been employed to set up Emergency Response Centers, which receive calls from those in distress. The nearest ambulance equipped with trained paramedical staff and necessary devices is dispatched to the site. The ambulance staff can contact a doctor stationed at the Center regarding any complications that may arise. And while the patient is being stabilized, the nearest hospital equipped to deal with the medical emergency is located and the ambulance driver is directed to it. Forty eight hours after the delivery, the Institute follows up with the hospital and patient to check the status of the patient and request feedback from the family about areas of improvement.

## **Challenges of Using ICT**

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Despite the enormous potential of ICT to improve health services transactions, it is important to be aware of several key challenges to implementation of ICT interventions. Lack of basic infrastructure could pose hurdles in executing such interventions. For

example, places where there is no electricity or inadequate power, operating computers could be a problem. Further, for systems that utilize cellular data or internet networks, a strong data network with few interruptions is essential for maintenance of the service. Alternately, it may be necessary to circumvent interruptions to the network by saving data on the device during periods of network failure and transmitting it once the connection is fixed as is done in the *SmartCare* project in Zambia.

Another challenge is related to cost. Capital investment to implement technology and upgrade communications networks to facilitate transmission of information can demand large funds. Although running cost of operations may decrease drastically in the long term, high capital costs may prove to be an entry barrier in implementing interventions in resource limited settings.

Literacy is another obstacle to implementing successful ICT interventions. Beneficiaries and health workers who use ICT systems often need to be literate in both writing and technology. The beneficiaries in the *SkyClinic* program were initially nervous about using the technology because they had not used it earlier.

Furthermore, ICT cannot resolve every problem in the health sector. It is not a magic bullet. ICT can improve how quickly services are delivered, but it cannot encourage people to make use of them. Beneficiaries receive SMS from *E-Mamta* encouraging them to go for antenatal checkup, but that does not mean that they will. Similarly, even if *GP Healthline* exists as a way for consumers to call in to seek health information, there is no guarantee that the calls will come in. In other areas, ICT has very limited impact. In a program where health workers must deliver vitamins or other supplements to children in rural areas, there is no way that ICT can substitute for the actual health worker delivery; such supplements cannot be sent electronically. ICT can identify through tracking where the beneficiaries are located, but it cannot deliver the goods itself.

## **Conclusion**

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It is a well known fact that health systems are under enormous strain in developing countries. This is manifest both in that resources within the health system such as medical supplies, infrastructure,

