

# Digital health: The path to good health on the information superhighway

## Commonwealth Medical Association

The explosion of information and communication technology (ICT) advances over the past two decades has made a significant impact on all aspects of our lives – the way we think, the way we socialise, the way we listen to music – the way we exist. The world is at a point in time where six major digital developments – mobile phones, personal computers, the internet and social networking – are now interlocked to revolutionise our lives. According to *The Economist*, mobile phones have made a bigger difference to the lives of more people, more quickly than any other technology.

The world of health is also being impacted, but the full depth and scope of the potential of ICTs has not yet been fully explored in the field of medicine. With increasing worldwide connectivity and mobile penetration reaching even into developing countries, a

powerful tool is in the hands of medical professionals and the public. However, many countries lack a framework that governs confidentiality of information, e-health standards through appropriate legal acts. Sri Lanka has led the way by enacting many pieces of legislation governing the use of ICT with the data protection-related legislation being drafted in early 2014. In regional and global collaborations the questions multiply: who owns the data? How is anonymity of individuals and communities maintained?

E-government policies need to capture a range of interactions: government to citizen (G2C); government to business services (G2B); government to employee services (G2E); government to government (G2G); and citizens to government (C2G).



Commonwealth Secretariat / Sunday Alamba

*E-health raises ethics challenges around privacy of patient records. Pictured: a doctor takes a blood sample from a patient*

The Commonwealth Medical Association (CMA) is dedicating 2014 to empowering the national medical associations of the Commonwealth into championing ‘digital health’ in their respective countries.

## Uses of e-health

As suggested by the 2009 World Health Organization (WHO) report on e-health<sup>1</sup>, the use of e-health varies from one region to another. Some of the more established areas of telemedicine include teleradiology, teledermatology, telepathology, telepsychiatry and telecardiology. With regard to m-health, these include health call centres, toll-free emergency, appointment reminders and information-related m-health services. However, the use of m-health for patient monitoring and as a decision support system has remained weak. Many countries are now initiating e-health solutions regarding direct patient management, although the interoperability of such systems continues to be a challenge the world over.

Eysenbach (2001) has looked at various aspects of e-health:

1. **Efficiency:** one of the promises of e-health is to increase efficiency in health care, thereby decreasing costs and improving quality
2. **Enhancing quality of care**
3. **Evidence-based e-health interventions:** these should be evidence-based in the sense that their effectiveness and efficiency should be proven by rigorous scientific evaluation rather than assumed. Much work remains to be done in this area
4. **Empowerment of consumers and patients:** by making the knowledge bases of medicine and personal electronic records accessible to consumers over the internet, e-health opens new avenues for patient-centred medicine and enables evidence-based patient choice
5. **Doctor–patient relationship:** new relationships between the patient and health professional should be encouraged to grow towards a true partnership where decisions are made in a shared manner
6. **Education:** both physicians (continuing medical education) and consumers (health education, tailored preventive information for consumers) should gain further education through online sources
7. **Information exchange and communication:** this should be enabled and standardised between health care establishments
8. **Extending the scope of health care:** health care should be extended beyond its conventional boundaries, both geographical and conceptual

## Box 1 Definitions

### E-health

There are many differing definitions of e-health, however, most authors seem to agree to the following definition from Eysenbach (2001), which encompasses more than a mere technological development:

‘E-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related technologies. In a broader sense, the term characterises not only a technical development, but also a state of mind, a way of thinking, an attitude and a commitment for networked, global thinking, to improve health care locally, regionally and worldwide by using information and communication technology.’

### Types of e-health

E-Health has diverse applications including:

- **Electronic health records:** patient data stored on computers enabling the communication of patient data between different health care professionals (GPs, specialists, etc.)
- **E-prescribing:** prescription options, printed prescriptions and sometimes electronic transmission of prescriptions from doctors to pharmacists
- **Telemedicine:** physical and psychological treatments provided over networks, including telemonitoring of patients’ functions
- **Consumer health informatics:** use of electronic medical resources by healthy individuals or patients
- **Health knowledge management:** e.g. providing an overview of latest medical journals, best practice guidelines or epidemiological tracking (for example, physician resources such as Medscape and MDLinx)
- **M-health:** includes the use of mobile devices in collecting aggregate and patient-level health data; providing health care information to practitioners, researchers and patients; real-time monitoring of patient vitals; and direct provision of care via mobile telemedicine
- **Medical research using grids:** powerful computing and data management capabilities for handling large amounts of heterogeneous data
- **Health care information systems:** software solutions for appointment scheduling, patient data management, work schedule management and other administrative tasks surrounding health

## Box 2 Challenges

### Team

Lack of co-ordination  
 Lack of trainers to train  
 Fear of using technology  
 Lack of computer literacy  
 Senior staff averse to new technology  
 Users not involved

### Technology

Rapidly evolving  
 Unavailability of state network backbone  
 Lack of funds to adopt new technologies

### Tactics

Inadequate demonstration  
 Evaluation methods not carried out  
 End-user/uptake feedback not utilised  
 Technology evaluation standards not made  
 Extensive support not found  
 Financially inadequate support  
 Poor application design and navigation  
 Hybrid record maintenance

### Box 3 Digital projects in India

#### DrishtiCare

DrishtiCare is a web-based telescreening platform for the screening and medical referral of people suffering from diabetic retinopathy, the leading cause of blindness in urban populations. The platform uses a server-based prescreening system to analyse fundus images quickly, enabling large-scale screening and making the service cost-effective, easy to use and scalable.

Three local primary eye hospitals have participated and used DrishtiCare's telescreening service.

A preliminary evaluation of the proposed platform has been performed on a set of 119 patients, of which 23 per cent were identified with sight-threatening retinopathy. In 2011, an evaluation on a larger scale was undertaken with a total of 450 patients enrolled.

#### Health Management and Research Institute

The Health Management and Research Institute (HMRI) is a registered non-profit organisation based in Hyderabad, Andhra Pradesh. The organisation leverages ICTs as well as public-private partnerships to provide the highest quality care at the lowest cost to the greatest number of people. Its 104 Health Information Helpline was launched to address the medical issues of people living in tribal areas with no access to a hospital.

The HMRI believes that everyone has a right to validated health information, primary care within 3 km of home and specialist health care.

HMRI solution can be broken into three programmes: 1) Health Information Helpline provides medical advice 24 hours a day, seven days a week; 2) Mobile Health Services provides screening and follow up services for maternal and child health and chronic disease conditions; and 3) Telemedicine connects remote patients with urban doctors to deliver specialist care

#### E-Mamta

The e-Mamta project, launched under the National Rural Health Mission, is aimed at checking maternal and infant mortality rates through furnishing pregnant women with adequate health services and advising them during pregnancy. It also allows the tracking of patients' health via SMS, sending alerts to beneficiaries and service providers when services are due. The agency Saunak Films runs a call centre for the programme and compiles confidential data on registered users and infants, with no duplication of registrations. All pregnancies of a single mother are recorded together and the complete life cycle approach means that data for each individual is recorded from birth until death.

The project is integrated with the HMIS (Health Management Information System), which automatically generates various reports and registers through aggregation.

9. **Ethics:** e-health involves new forms of patient-physician interaction, and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues
10. **Equity:** to make health care more equitable is one of the promises of e-health, but at the same time there is a considerable threat that e-health may deepen the gap between the 'haves' and 'have-nots'

### Paradigm shift

The concept and practice of health and e-health rapidly changed in the last decade due to unpredictable social factors, new applications of technology and emerging business models. The global pandemic of non-communicable diseases (NCDs) that is placing a double burden of disease on developing countries is creating new health care challenges.

The International Telecommunication Union (ITU)-WHO Mobile Health for Non-Communicable Diseases Initiative<sup>2</sup> will harness the best mobile technology available and make it accessible for all countries to fight NCDs. A number of countries are already using mobile technology to deliver health promotion messages on NCD risk factors, to survey the epidemic, to persuade users, to change unhealthy behaviour and to help countries implement national laws on NCDs.

### Success stories

The Annual Health Bulletin is the main source of official health statistics from the health sector in Sri Lanka. Each bulletin, when published, is usually over five years old as the manual system of producing it is cumbersome. The eIMMR (electronic Indoor Morbidity and Mortality Register) is a system implemented to overcome this problem. Today it is the first electronic system to be implemented country wide in all health care institutions in Sri Lanka. Once the system is implemented fully in all institutions in Sri Lanka by the end of 2017, real time indoor morbidity and mortality data will be available for the entire country.

The Hospital Health Information Management System (HHIMS) is an open-source medical database software designed for use in Sri Lankan hospitals and successfully implemented in a small district hospital in Dompe, Sri Lanka. It stores clinical details of patients treated and is designed to be used by clinical staff, who can record details on the system as they examine the patient. The system also enables hospital staff to refer to previous clinical records when the patient comes in for treatment, prepare notifications of infectious diseases for the local Medical Officers of Health, and print visit slips, discharge letters and quarterly health statistics. The software is expected to significantly reduce the need for maintaining paper-based records and improve patient services.

### Future frontiers

With the world's population having recently hit the seven billion mark, digital systems are not just vital but inevitable for managing health. The International Telecommunications Union has joined hands with the World Health Organization to help governments take the first step towards e-health by formulating their own e-health strategies.<sup>3</sup>

Additionally, the partnership created by the WHO and ITU with international donor agencies, such as the Global Fund and Norad, to rollout free health information systems using free and open source software platforms, for example District Health Information System 2, will spur on e-health implementation in the future. With countries like Sri Lanka already reaping some early benefits of this, it will not be long before others come on board (Manoj et al., 2012).

In that context, it is imperative that the Commonwealth Medical Association takes steps to maintain engagement with Commonwealth member nations on e-health and to ensure that the benefits of e-health reach their citizens.

## Endnotes

- 1 WHO (World Health Organization), 2009. *Global Observatory for eHealth* [website] WHO. Available at: [www.who.int/goe/en/](http://www.who.int/goe/en/) [Accessed 14 April 14].
- 2 Information on the ITU–WHO Mobile Health for Non-Communicable Diseases (NCDs) Initiative is available at: [www.itu.int/en/ITU-D/ICT-Applications/eHEALTH/Pages/Be\\_Healthy\\_intro.aspx](http://www.itu.int/en/ITU-D/ICT-Applications/eHEALTH/Pages/Be_Healthy_intro.aspx) [Accessed 14 April 14].
- 3 Information is available at: <http://who.int/bulletin/volumes/90/5/12-030512/en/>; and: [www.itu.int/pub/D-STR-E\\_HEALTH.05-2012](http://www.itu.int/pub/D-STR-E_HEALTH.05-2012) [Accessed 14 April 14].

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