

The ehealth agenda for developing countries

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Abstract

Delivering eHealth in developing countries faces different health and socio-economic challenges to the developed one. But, if a global health infrastructure is to evolve, then developing countries need to play their part. So, whilst the context may differ, the localization-globalization of content issues needs to be jointly addressed. In providing robust and affordable connectivity, particularly to rural areas, developing countries can fully exploit the potential of handheld computers and wireless connectivity. Over such an infrastructure new ways of building capacity, both locally and globally, can be supported. Finally, an eHealth infrastructure can support the delivery of healthcare in communities, thereby supporting individuals and community development.

The World Health Organisation (WHO) is now urging all member states to draw up long-term strategic plans for developing and implementing eHealth services. It is to develop a model framework with which to describe eHealth¹, to launch a Global Observatory for eHealth in 2006, and work towards the development of a global health infrastructure. Both developed and developing countries now need to share progress on defining and meeting their eHealth agendas. This paper highlights some of the areas where developing countries are actively developing the eHealth agenda.

Background

There have been a number of papers reviewing “what is eHealth?” In summarizing their findings of an extensive review, Pagliari et al² suggest that most definitions conceptualize eHealth as a broad range of informatics applications “for facilitating the management and delivery of healthcare, including dissemination of health-related information, storage and exchange of clinical data, interprofessional communication, computer-based support of patient-provider interaction, education, health service management, health communities and telemedicine, among other functions” (Pagliari et al 2005 p11).

A recent WHO report proposes that “the use of information and communication technologies (ICT) for health, or “eHealth”, today represents one of the key instruments for healthcare delivery and public health”³. In countries with low mortalities, as the WHO report notes⁴, the historically important infectious diseases have declined to very low levels and the health threats now come from chronic and degenerative diseases of adult life, such as cancer, stroke, etc. For countries with high mortality, communicable disease incidence is high, particularly in children and there is a high

occurrence of diarrhoeal diseases, malnutrition, nutritional and vector-borne and other diseases associated with poverty, whilst chronic non-communicable disease and the AIDS pandemic will continue to threaten health in the future. The report considers the diversity and range of eHealth opportunities for addressing these challenges, using a collation of ICT statistics^{5,6}. A broad brush description of the eHealth opportunities facing the high and middle income countries (with low mortality) that is suggested by the WHO report may be presented as:

- citizen-centred health systems;
- online health services;
- smart cards;
- electronic health records;
- ICT for distance learning and education;
- home-based care supporting self-management of chronic diseases;
- public health information and communication systems.

For the low income countries (with high mortality), the WHO report suggests eHealth issues are more to do with:

- Ensuring reliable, robust communications between health centres, laboratories, clinics and district medical offices.
- More widespread telecommunications infrastructure (including wireless and satellite).
- More reliable and user-friendly access devices.
- Integration of ICT and information management skills into the training of health workers.
- Content that reflects local languages and culture.
- Surveillance systems for health risks and emergencies to be established.

For developing countries, there are great temptations to assume that it is possible to leapfrog to the eHealth agenda as

articulated by the developed countries. Why should citizen-centred services, with electronic health records not be planned for now? The simple answer is that the ICT needed to support personally identifiable health information that can be integrated between different systems is very costly (e.g. the National Health Service in England is investing over £6bn to deliver its “Connecting for Health” programme⁷ which will deliver electronic health records). The more complex answer is that the “developed” eHealth agenda also takes for granted a number of things, for example, that there is power, connectivity, and information literacy and that to improve health it does not have to align with other programmes geared to reducing poverty.

Nevertheless, in addressing their health and ICT issues developing countries may well also be at the leading edge of work towards some aspects a global eHealth infrastructure. It is these aspects of the eHealth agenda faced by developing countries that are discussed in more detail here, using a framework developed elsewhere⁸.

Context

Ten years ago it was clear that many developing countries had already developed the WHO-endorsed approach⁹ of primary care-led health services. By contrast it is only during the last 10 years that this approach has become prominent in developed countries, e.g. with the focus on a “Primary Care-led NHS” in England. However, the necessary eHealth systems to support this approach in both developed and developing countries, with a focus on preventive and promotive community-based care, have been slow to evolve. But events such as SARS, avian flu, etc have shown that there is a global interest in good quality (accurate, meaningful and fast) information from the grass-roots. Developing countries can ill afford an eHealth infrastructure to meet the reporting requirements of the International Health Regulations¹⁰ that is not designed as part of an overall eHealth strategy. Some explorations of the use of handheld computers to both deliver and gather critical health information¹¹ are showing the benefits of conceptualizing the development of eHealth information systems starting from the needs of workers based in the community.

Content

The need to ensure health content is contextually appropriate has been well articulated^{12,13}. But, some of the leading edge issues that face the development of global health infrastructure standards are now emerging. Powerful health information tools, such as SNOMED, are beginning to be adapted for use in developing countries as part of the effort to develop international standards¹⁴ and thereby progress the development of a global eHealth infrastructure. This is not a one-way process, however. For example, piloting the use care pathways knowledge support system of the Map of Medicine¹⁵ (developed for use in the NHS), in Kenya has shown that whilst it is of great utility as it stands, there are considerable adaptations to be made¹⁶. But, whilst these adaptations can be made for use in Kenya (and then fed back so that NHS can benefit from better information on tropical diseases) the

leading edge issues are how better knowledge support, and clinical information standards, can be developed and made available on both a global and a local basis. Developing countries have their part to play in developing this agenda.

Connectivity

The “digital divide” for PCs in 2003 stood at one PC for every 2.2 inhabitants in developed economies and 29 in developing¹⁷. The search is on for low cost, but rugged and user-friendly terminals. Perhaps the most interesting recent example is the US\$100 laptop that the MIT Media Lab launched in November 2005 with delivery to six countries scheduled for 2006/7¹⁸. Focused on giving schoolchildren their own laptop, this approach is combining technical innovations, e.g. the screen, with high volume production so that its features and low cost will make use of it ubiquitous. Extension of this approach to provide health education may open up significant opportunities for health workers and community development.

Connectivity within health facilities using WiFi-enabled handheld computers is now becoming an important feature of clinical knowledge support to medical staff in hospitals in developed countries. With the content suitably adapted, such WiFi enabled devices may offer the most cost-effective entry level infrastructure for health facilities in developing countries. Their potential for management information, email, etc is substantial. However, the handling of confidential data will require a more robust and infrastructure, but can deliver more benefits¹⁹. Developing countries now have the opportunity to manage the introduction of some core standard packages, whilst in the hospitals of developed countries the freedom to use personalized packages has caused problems of compatibility.²⁰

In Africa at the start of 2004 there were around 25 million fixed lines and more than 50 million mobile phones²¹. Innovative telcom providers have used CDMA technologies so that (in India), for example, (using a data cable costing about US\$2.50) users can connect a mobile phone to a computer and browse the internet at speeds up to 144Kbps, in effect using the phone as a wireless modem²². Wireless communication technologies, such as GSM, and other cellular technologies can be used in conjunction with satellite (e.g. VSAT) and point-to-multipoint radio systems to achieve coverage of isolated settlements over long distances²³. The strategic value of the real estate of health facilities (or schools) to the providers of broadband wireless services to communities (with savings on installation costs for example) may offer new models for delivering the connectivity that the health services need at low cost, and be capable of rapid deployment.

Capacity building

As is clear from many assessments of the requirements of health systems in developing countries²⁴, capacity building on a large scale is required. One innovative approach to doing this is via eLearning. For example, all 27,000 enrolled nurses in Kenya are to use an eLearning package to acquire the skills to become registered nurses – something that would not be

practicable using the existing paper-based Kenyan course material. If this CD-ROM based approach works well it can be extended to other groups and in itself will help introduce some basic IT skills to the workforce. But the possibility of having the same material on a server that can be accessed from the health worker's place of work, or even where they live, opens up the way for major steps forward in capacity development, staff retention and also the sharing of global education materials. Project Globe²⁵, for example, is seeking to develop a core curriculum for primary care physicians based on evidence-based medicine and competencies.

Community development

Whilst in the developed countries eHealth is concerned primarily with improving the delivery of health services to patients, in developing countries the eHealth infrastructure may be extended to support community development. For example, in Kenya, the work of AfriAfya²⁶ has shown that a variety of methods (e.g. paper, video, radio, CD) are needed to convey health information to communities, and this can often be effectively packaged as part of a community development programme. With the development of health facility based broadband wireless services there are some new opportunities opening up for health to support health and community development initiatives. For example, as the 802.16e standards that support mobile wireless communications up to 30km begin to stabilize in 2006/7 it will become possible to support the data communication requirements mobile health and community development workers (and at broadband rather than CDMA speeds). Particularly if large scale purchasing of handheld computers drives down the cost of terminals, it is likely that there will be more village-based

access to the internet for both data and voice over IP. In the developing world the business case for broadband wireless communications to fixed and mobile devices is likely to prove very strong.

Conclusion: a case study

In the primary care context of Ol'Jorai Health Centre (in the Great Rift Valley in Kenya and somewhere with no electricity) parents came with their 5-month old child, who had lump on his forehead that they were reassured was nothing to worry about. But the mother then complained of feeling tired and, after further questioning and a blood test, was diagnosed as being in the early stages of Type 2 Diabetes. With more patients to be seen, this lady could only have a minute or so of health education. There was no leaflet to give her and her village was two hours walk away so reattending for the several hours worth of necessary diabetes self-management education was unrealistic. From this lady's perspective, a fully developed eHealth infrastructure (as opposed to what may also be needed using other media) should enable her (or an intermediary) to connect in her home, or at least her village, with up to date diabetes-related content (in her preferred language²⁷), so as to help her understand her condition. online support (including voice over IP) would help prevent or deal with diabetic crises, enabling her time to be spent in support of her family and her community. Advances in ICT can now deliver affordable eHealth solutions to support patients and their communities, as well as capacity building for all health workers. In so doing developing countries will have a sound base for supporting the development of eHealth standards which can improve the management of health services, both nationally and internationally. □

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- Perhaps a Swahili version of the material in the NHS Direct Online Health Encyclopaedia adapted for the Kenyan context (see <http://www.nhsdirect.nhs.uk/alphaindex.asp>)