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## **Health Care and Information and Communications Technologies: Challenges and Opportunities**

### **INTRODUCTION**

Most countries are at some stage of health sector reform to try to provide expanded and equitable access to quality services while reducing or at least controlling the rising cost of healthcare. Health reform processes have many facets and there is no single model being adopted by all countries. However, ICTs have the potential to make a major contribution to improving access and quality of services while containing costs. Improving health involves improving public health and medical programs designed to provide elective, emergency and long-term clinical care, educating people, improving nutrition and hygiene, and providing more sanitary living conditions. These in turn ultimately involve massive social and economic changes, as many health challenges go well beyond the health sector.

The health sector has always relied on technologies. According to the World Health Organization,<sup>1</sup> technologies form the backbone of the services to prevent, diagnose and treat illness and disease. ICTs are only one category of the vast array of technologies that may be of use. Given the right policies, organization, resources and institutions, ICTs can be powerful tools in the hands of those working to improve health.

The methods people use to communicate with each other have also changed significantly. Mobile telephony, electronic mail and videoconferencing offer new options for sharing perspectives. Digital technologies are making visual images and the voices of people more accessible through radio, TV, video, portable disk players and the Internet, that change the opportunities for people to share opinions, experience and knowledge. This has been coupled with steps to deregulate the telecommunications and broadcast systems in many countries,

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<sup>1</sup> WHO, 2004. eHealth for Health-care Delivery: Strategy 2004-2007. Geneva: WHO [www.who.int/eht/en/EHT\\_strategy\\_2004-2007.pdf](http://www.who.int/eht/en/EHT_strategy_2004-2007.pdf).

which open up spaces and platforms, such as community radio, for increased communication,

A recent World Bank report<sup>2</sup> notes, “Reliable information and effective communication are crucial elements in public health practices. The use of appropriate technologies can increase the quality and the reach of both information and communication. On one hand, the knowledge base is about information, which enables people to produce their own health. On the other hand, social organizations help people to achieve health through health care systems and public health processes. The ability of impoverished communities to access services and engage with and demand a health sector that responds to their priorities and needs, is importantly influenced by wider information and communication processes, mediated by ICTs.”

For the purposes of this paper, it is helpful to define ICT and health care. We suggest using the following definitions:

- ICTs are defined as ***tools that facilitate communication and the processing and transmission of information and the sharing of knowledge by electronic means.*** This encompasses the full range of electronic digital and analog ICTs, from radio and television to telephones (fixed and mobile), computers, electronic-based media such as digital text and audio-video recording, and the Internet.
- E-health is an emerging field of health informatics, referring to the organization and delivery of health services and information using the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a new way of working, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.<sup>3</sup>

### ***Health Care Information Technology Opportunities***

In addition to containing costs, advanced information technologies furnish health care providers with the opportunity to improve patient care by streamlining clinical processes and creating a seamless flow of information. Currently, health care providers use paper-based records to record a patient’s receipt of health care services. Unfortunately, the use of such records leads to the inadequate documentation of the care-giving process, a severe disruption in the flow of patient related information, and a substantial delay in the delivery of health care services. Advanced information technologies - such as computer-based patient records, portable computers, and expert information systems - alter this situation by providing clinicians with real-time access to patient information at the point of care.

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<sup>2</sup> World Bank 2006. Connecting People, Improving Health: the Role of ICTs in the Health Sector of Developing Countries.

<sup>3</sup> World Bank 2006. Connecting People, Improving Health: the Role of ICTs in the Health Sector of Developing Countries, pp 5-6.

## Categories of Technological Solutions

Advanced information technologies have the ability to restructure the health care industry's data collection mode from a "collect many times, use once" system to that of a "collect once, use many times" arrangement. Some of the leading information technology developments that will assist health care organizations in achieving their objectives are in the following areas:

- **Computer-based Patient Records** – A digitized compilation of all clinical and administrative information relating to the care of a single patient. The term electronic health records (EHR) and electronic medical records (EMR) have come to be used interchangeably. While all these acronyms refer to the same concept, "EHR" implies broader functions and features, which include the "EMR" components. Such e-records are convenient for patients and doctors alike and can significantly reduce medical errors and help track public health problems.
- **Data Warehousing** – The storing of vast amounts of clinical, financial, and operational information in an integrated decision support database that provides immediate easy access to health care practitioners.
- **Document Imaging** – The process of scanning and storing images that are pictures of a paper form. The electronic image has the ability to be shared and accessed more readily by clinicians and administrators in various geographic locations.
- **Internet Solutions** – Internet and Intranet developments allow providers to integrate clinical and financial information from numerous sites without having to invest in enterprise-wide systems.
- **Expert Information Systems** – Every health care organization has a series of rules that are instrumental to the delivery of care for that particular enterprise. Clinical decision support systems apply these rules in order to assist physicians in the administration of health care services.
- **Telemedicine** – The use of information technology to deliver medical services and information from one location to another.

## ***Barriers to Implementing Health Care Related Information Technologies***

### **Technological Barriers**

- **Lack of Industry Standards**

Technological barriers, such as the health care sector's lack of general adoption of industry standards, are often cited as a significant obstacle to the widespread use of advanced information technologies. A standard is a clearly defined and agreed upon convention for the operation and behavior of specific computing functions, formats, and processes. The majority of standards developed within the health care industry are classified into two basic categories – proprietary or consensus standards. Proprietary standards are standards that emerge after a single vendor acquires a large enough share of the market for a particular product. Consensus standards, in comparison, are standards that are developed by committees including: payers, providers, employees, the medical community, and government officials.

The successful exchange of electronic information is contingent upon the use of recognized standards to ease the flow of information among various operating systems. Without industry-wide standards, advanced information technologies' ability to speed up transactions through the elimination of human involvement is lost. In the past some have suggested that the sector's failure to organize a centralized industry group to promote the use of data standards is the primary reason that the industry has been slow to invest in emerging information technologies. On the other hand, the rapid emergence of the Internet as a medium for networked communications resolves the need to agree on many types of communications protocols and allows for many types of interfaces.

- **Administrative Simplification**

Administrative simplification is the establishment of standards for the electronic transmission of certain types of information. Specifically, the adoption of standards for the identification of individuals, employers, health plans, and providers within the health care system. In addition, there is a need for standards for security, electronic signatures, and the transmission of specified financial and administrative information.

### **Human and Social Barriers**

In addition to the previously mentioned technological barriers, there also exist human and social barriers that have to be addressed prior to the health care industry's widespread adoption of information technologies. The health care industry's use of advanced information technologies to complete administrative and financial transactions meaningfully alters the institution's traditional norms

and practices. Advanced information technologies require physicians to develop a minimum level of computer proficiency. Simultaneously, the adoption of computer-related technologies asks patients to accept substantive changes in the way medical information is maintained and stored. To ensure widespread adoption, the health care information technology community will have to address both physician and patient concerns.

- **The Need to Protect the Privacy, Security, and Confidentiality of Computerized Information**

Many patients believe that the electronic transmission and storage of patient related information places the integrity and confidentiality of such information in serious jeopardy. Individuals who subscribe to this school of thought assume that the increased storage and transmission of information will encourage and create increased opportunities for the illegal interception and misuse of such information. To address these concerns, health care information technology companies will have to ensure that information networks provide the desired level of privacy, security, and confidentiality.

The protection of privacy and confidentiality interests will require IT companies and health care providers to work together to ensure that information will only be shared among authorized personnel directly associated with the delivery of patient services. Protecting security interests, on the other hand, mandates that information will be protected from unwanted loss, modification, and dissemination. Both of the above interests can be adequately addressed through the establishment of firewalls or other practices that limit a health care provider's ability to access information based upon his or her job specific responsibilities.

- **Physicians and Nurses Inexperience in Dealing with Advanced Information Technologies**

The implementation of advanced information technologies within the health care sector significantly alters the organizational culture of the industry. Advanced information technologies require physicians and other health care practitioners to move beyond an environment accustomed to documenting administrative and clinical information in a paper-based format – and into one that supports the seamless flow of information. This is a “human” transition that other industries adopting information technologies have encountered and overcome.

In order to persuade health care organizations to invest the necessary sums to establish computer networks, IT companies will have to first convince physicians and other health care practitioners that the utilization of information technologies can vastly improve the efficiency, convenience, and quality of health care services delivered. To address efficiency and convenience concerns, IT

companies will have to develop technologies that are user friendly and provide physicians with the ability to find information more quickly. In order to convince physicians that information technologies will improve the quality of services delivered, companies must convince doctors that the use of computer-related technologies will have a positive direct effect on patient care.

## **Political and Legal Barriers**

The widespread adoption of IT by the health care industry is also limited by political and legal constraints. Governments maintain a great deal of responsibility over the regulation of health care providers. Unfortunately, many of these governments use this authority to enact legislation and establish regulatory schemes that do not fully appreciate ensuing technological advances. For example, certain regulations may require health care providers to maintain patients' records in a paper-based format. Laws, such as this, retard the development of IT and thereby prevent providers from operating in a more cost-efficient and effective manner.

## **Recommendations:**

WITSA suggests that the health care community, information technology providers, and government institutions consider ways to make better use of information technology resources. In particular:

- Build on and complement information and communication technologies already being used. No single technology will be suitable for all situations. Innovative and creative combinations of old and new ICTs will provide added value and new possibilities.
- Ensure a legal and regulatory environment that allows information and communication services, innovation and entrepreneurship and free flow of information. To be effective and efficient, the health care industry must operate in a digital environment that includes connectivity, commerce, community/content and information sites.
- Work with interested stakeholders to identify and address laws that forestall the implementation and utilization of health care related information technologies such as telemedicine.
- Establish private and public sector partnerships to ensure patient privacy, security, and confidentiality concerns are addressed.
- Encourage the development of user-friendly computer-related technologies and couple these developments with training and physician

support services that help facilitate the transition from paper to computer-based systems.

- Strive to involve physicians and other health care practitioners in the development of information technologies by including them at the inception of projects and by consistently requesting physician feedback and advice.

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