

Role of modern technology in public health: opportunities and challenges

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During the past two decades, the world has seen profound changes in technology development, heralding an information age.¹ As a result of the information and communication boom, a combination of new technologies is being used to obtain, disseminate and share information as never before. Moreover, social media has also become a powerful tool to share ideas and solutions in almost all spheres of daily life. This also offers great opportunities to bring about better health to populations at large in a different way. An important question however is: how can modern technology be deployed to improve quality of health delivery at a lower cost? What are the challenges and opportunities that lie ahead?

It is due to today's internet connectivity and (smart) mobile phone penetration, more than air travel, that the world is now literally a global village. With information and communication devices available even in remote villages, there is a potential that these technologies could revolutionize health service delivery and act as a "game changer" for an efficient and people-centered health

care system in the 21st century. For example, an early warning system during emergencies via short text messaging, or even availability of mobile phones in remote villages can be used to call for help in the event of a difficult labour thereby preventing maternal or infant mortality. Mobile phones which are now virtually ubiquitous with 700 million users in India alone are being used to track distribution of bed nets by malaria programmes. In the global adult tobacco surveys, handheld devices or PDAs[#] are used by health care workers to collect and collate survey data, and to transfer data to a central location in no time; such a facility can be used in other similar field surveys without use of the printed forms. Satellite connectivity helps greatly in distance learning, and in transmission of data as well as information pertaining to early warning of unusual health events.

Similarly, text messaging information on new cases of influenza from hospital settings as a part of online surveillance or alerting patients with diabetes or stroke through messages regarding their medicine

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intake; conducting information-sharing sessions through videoconferencing and teleconferencing thereby reducing the number of face-to-face interactions/meetings; using email for fast and non-bureaucratic means of communication; risk mapping through the use of geographic information system and geographic positioning system; social networking such as Facebook and Twitter for news gathering, updating of an emergency or an outbreak; and carrying out clinical or bedside e-consultations regarding patients in remote or rural sites as a part of telemedicine are some of the applications where modern technology can modernize health care and bring in efficiency and quality. Dissemination of technical information is another example. While many scientific journals are presently facing a cost crunch in publishing hard copies, the trend is now moving towards free online or web publishing.

Given these advances, a global consultation on eHealth was organized by WHO in 2004 which recommended that WHO should support information for health promotion and awareness, health and biomedical research and e-learning; information for health information system including disease surveillance; and information for health care delivery including diagnostics, treatment and consultation². Then, in May 2005, the World Health Assembly discussed the topic in the context of health and passed a resolution on eHealth using Member States to create long-term strategies, develop necessary infrastructure and collaborate with private and non-profit sectors³. During 2005-2006, WHO undertook a global survey on e-Health to obtain baseline data on the current status of eHealth, which indicated that after a slow start in the 1990s there is growing momentum for eHealth uptake by countries which is very likely to continue, particularly in developing countries.⁴

These are just some examples where technology can be used. But technology is growing rapidly and it is often difficult to keep pace with it. Internet and social media use is growing in various countries in the South-East Asia Region.⁵ However, despite the improved access to such technologies public health and clinical health services are not dominant in their content and/or applications.

There are many barriers and challenges to the rapid use of modern technology and in the implementation of various initiatives and specific World Health Assembly resolutions. In many countries, the infrastructure or connectivity does not exist. There are also concerns that investing in the use of modern technology comes at a high initial cost compared to basic health needs and other competing priorities. Demonstrating the cost-effectiveness of modern technology in promoting health is therefore a priority. Creative ways of investing and cost sharing should be discussed so that the information highway has health as one of its main applications. Building capacity of health care workers through training is also urgently needed. There are also issues that have legal, security, accountability and ethical implications. For example, those related to the uniformity in legal standards, especially those that are in place in developing countries regarding the security and safety of medical information. There are concerns also that the rapid developments and penetration of technology is further causing a digital divide between "haves" and "have nots", causing further disparities in society and along the social gradient.

Nevertheless, technology must be used appropriately. Whether technology can be of benefit or harm will depend largely on the way it is used. The potential applications of information/communication technology for

health to strengthen health systems and improve efficiency, safety and quality of health care are truly enormous. As recognized by the World Health Assembly, all countries must use the opportunities to build or strengthen basic eHealth systems as a part of health programmes thereby improving health services. While governments have a key role in pushing the agenda, it will be important to strengthen collaboration with international and nongovernmental organizations, the private sector and other key stakeholders. Member States can also learn from success and failures of other countries and partners in order to move forward in this area. Based on evidence, it is clear that enhancing use of modern technology is an excellent investment for the future.

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