mHealth: New Horizons for Health through Mobile Technologies: Based on the Findings of the Second Global Survey on eHealth (Global Observatory for eHealth Series, Volume 3)

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The mobile phone is rising up and opening to the new world with more intelligent and versatile connectivity and communication capabilities. The unprecedented spread of mobile technologies as well as advancements in their innovative capacity to address health priorities has evolved into a new field of eHealth known as mHealth (mobile health). By the end of 2010, there were nearly 5.3 billion mobile phone subscriptions in the world, with over 85% of the world's population now within range of a commercial wireless signal [1]. There are 43.5 million Koreans, and 90% of the population had a mobile phone as of the year 2007 [2].

The World Health Organization's (WHO) Global Observatory for eHealth defined mHealth as medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices. mHealth involves the use of and capitalization on a mobile phone's core utility of voice and short messaging service as well as more complex functionalities and applications, including a general packet radio service, third- and fourth-generation mobile telecommunications (i.e., 3G and 4G systems), a global positioning system, and Bluetooth technology.

The WHO Global Observatory for eHealth also surveyed the status of mHealth in 114 member states in 2009. The survey documented for analysis four aspects of mHealth: the adoption of initiatives, the types of initiatives, the status of evaluations, and barriers to implementation. Fourteen categories of mHealth services were surveyed: health call centres, emergency toll-free telephone services, managing emer-

gencies and disasters, mobile telemedicine, appointment reminders, community mobilization and health promotions, treatment compliance, mobile patient records, information access, patient monitoring, health surveys and data collection, surveillance, raising health awareness, and decision support systems.

The major contents of the survey are as follows:

- The majority of member states (83%) reported offering at least one type of mHealth service. However, many countries offered four to six programmes. The four most frequently reported mHealth initiatives were health call centres (59%), emergency toll-free telephone services (55%), managing emergencies and disasters (54%), and mobile telemedicine (49%). With the exception of health call centres, emergency toll-free telephone services, and managing emergencies and disasters, approximately two thirds of mHealth programmes are in the pilot or informal stage.

- Higher-income countries show more mHealth activity than do lower-income countries. Countries in the European region are currently the most active, while those in the African region are the least active. mHealth is most easily incorporated into processes and services which historically use voice communication through conventional telephone networks. This would explain why the majority of countries are already offering health call centres, toll-free numbers and emergency services using mobile communications. The least frequently seen is the use of mHealth for surveillance, raising public awareness, and for decision support systems. These require enhanced capabilities and infrastructure to implement and therefore may not be a health priority in member states with financial constraints.

- Consistently rated as the greatest barrier to mHealth adoption by responding countries was the problem of competing health system priorities. Health systems worldwide are under increasing pressure to perform under multiple health challenges, chronic staff shortages, and limited budgets, all of which makes choosing interventions difficult. In order to be considered among other priorities, mHealth programmes require evaluations. This is the foundation on which mHealth (and eHealth) can be measured — solid evidence on which policymakers, administrators, and other actors can base their decisions.

- Evaluation is part of a process that can determine cost-effectiveness. It involves educating the public about the benefits of mHealth and leads to the creation of government policy, though these factors were reported as among the most persistent barriers to mHealth adoption by member states. Despite the need for evaluation, the survey found that results-based evaluations of mHealth implementations are not routinely conducted. Only 12% of member states reported evaluating mHealth services. A concerted effort needs to be made to promote the importance of evaluation and the sharing of results with all member states.

- Effective policy will become increasingly important as the field of mHealth matures. Data security is a particularly important issue to address by means of policy. There are legitimate concerns about the security of citizen information by programmes using mobile health technologies. In particular, message transmission security and data storage security can put citizen information at risk if necessary precautions are not taken. Policymakers and programme managers need to be made aware of security issues in the mHealth domain so that appropriate policies and strategies can be developed and implemented. Policies will also be vital when attempting to harmonizing eHealth and mHealth initiatives and directions over the short and long term.

- The survey results highlight that the dominant form of mHealth today is characterized by small-scale pilot projects that address single issues related to information sharing and access. There were only limited larger mHealth implementations (primarily supported by public-private partnerships). While it is anticipated that large-scale and complex programmes will become more common as mHealth matures, strategies and policies that integrate eHealth and mHealth interoperability into health services would be wise. mHealth is no different from other areas of eHealth in its need to adopt globally accepted standards and interoperable technologies, ideally using open architecture. The use of standardized information and communication technologies would enhance the efficiency and reduce the cost. To accomplish this, countries will need to collaborate in developing global best practices so that data can move more effectively between systems and applications.

- Moving towards a more strategic approach to planning, development and evaluations of mHealth activities will greatly enhance the impact of mHealth. Increased guidance and information are needed to help align mHealth with broader health priorities in countries and integrate mHealth into the overall effort to strengthen health systems. To this end, WHO will undertake several actions.
  · It will support the use of mHealth in member states to maximize its impact. This will be achieved by providing information on mHealth best practices and the types of mHealth approaches best suited to specific public health

scenarios. A series of databases need to be developed which include information on selected national and local initiatives, lessons learnt, evaluations and recommendations, best practices, and cost-effectiveness.

· In support of eHealth policy and strategy development, WHO and The International Telecommunication Union (ITU) are creating a National eHealth Roadmap Development Toolkit to support member states with the development of their own comprehensive eHealth strategies. The Global Observatory for eHealth and its partners will work to develop a framework for the evaluation of mHealth programmes, including meaningful and measurable indicators. A global database of selected evaluation research findings will be built for mHealth with a particular emphasis on developing country initiatives. Member states will have ready access to the database when planning projects and preparing project proposals.

· WHO in collaboration with the ITU will provide guidance to member states on the content and scope of data privacy and security policies for mobile telecommunications in health.

The survey report concludes that mobile health will advance by creating country-based eHealth strategies that incorporate it into the existing eHealth domain. Policies need to be complemented by standards, architectures, and solid partnerships to help pilot mHealth initiatives so that they mature and realize their full potential — utilizing mobile and wireless technologies to improve health and well-being.

mHealth based on smart information and communication technologies has the potential to solve chronic problems related to health systems. The health systems of developing and developed countries have problems pertaining to accessibility, chronic disease management, and the rising cost of health expenditures. Also, advancement to an aging or aged society will demand a new health systems framework [3].

To take the initiative and prepare for the effective use of mHealth, policymakers, health service providers and researchers can gain practical directions and much inspiration to advance mHealth from this recent survey report.

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