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eHealth in Thailand: The current status

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Abstract

The World Health Organization (WHO) defines eHealth as the use of information and communication technologies (ICT) for health. Thailand is one of the leading countries in emerging and developing economy that the use of ICT applications is pervasive including eHealth. However, the status of eHealth in Thailand hasn't been assessed. Employing the WHO Global Observatory for eHealth development model and its instrument, this study describes the uptake of eHealth foundations and the extent of eHealth applications and services implemented in the country. A group of the nation 18 eHealth experts met and evaluated country eHealth status and provided recommendations. The results show that the development of the country's eHealth foundations is inadequate and need to be the priority for national eHealth development.

Keywords: eHealth, Thailand, Evaluation study

Introduction

The World Health Organization (WHO) identifies fully functional health information system as one of the six important building blocks of high performance health system[1]. To understand a country's health information system, it is essential to understand the extent of information and telecommunication technology (ICT) use in her health system, because, in the world today, information systems and ICT are closely related and amalgamated to be an almost inseparable entity. WHO broadly defines eHealth as the use of ICT for health. eHealth has the potential to address inequities in health systems and services in countries. Its applications span across a wide range of areas such as the use of ICT to: 1) store, process and transmit patient information 2) manage the diverse clinical, administrative and financial information generated in health services facilities 3) improve quality of patient care and patient safety 4) provide mechanisms for diagnostics and treatment between health professionals separated by distance 4) build capacity by offering health sciences training and continuing education courses online to students and health professionals 5) offer innovative approaches for health care using rapid growing mobile devices 6) make highly complex biomedical research achievable[2]. Thailand is one of the countries that have achieved an elevated level of access to and use of ICTs and ICT skills (rank at the upper group countries by ICT Development Index -IDI)[3]. However, the status of eHealth hasn't been evaluated in Thailand. This study was conducted in the collaboration between Thailand's Ministry of Public Health and the WHO Thailand to analyze Thailand's eHealth current situation and identify the country's eHealth development gaps. The project aims not only to help Thailand assess her current status on practices, policies, standards, and the implementation of eHealth but also to contribute to the Global Observatory for eHealth second survey[4]. Moreover, the gaps identified from the survey will help health policy-makers at the ministerial level to plan for improving the nation's eHealth.

Methods

This study employed the WHO Global Observatory for eHealth's (GOe) development model and its second survey instrument. The GOe's questionnaire was designed to identify and analyze trends in 1) the uptake of eHealth foundations and 2) the extent of eHealth applications and services implemented. The questionnaire consisted of close end questions and open end questions asking participants to describe eHealth activities and projects in the country, including comments which participants considered relevant to the survey. We identified and invited 18 experts from both public and private sectors to participate in the survey. They are experts in health systems, health information systems, and ICT from Ministry of Public Health, public and private hospitals, National Health Security Office (the office of country's universal insurance scheme), National Statistics Office, Ministry of Information and Communication Technology (MICT), International Telecommunication Union (ITU), National Electronics and Computer Technology Center (NECTEC), medical schools, universities, health informatics professional association and health information non-government organizations (NGOs). These experts are working on various aspects of eHealth activities in the country. All experts accepted the invitation. The questionnaires were sent to the experts three weeks before a full-day discussion and consensus meeting. We asked them to study the questionnaire and be prepared for the discussion to get the country's consensus on eHealth. The

consensus and experts' recommendations are compiled to represent current Thailand eHealth.

Results

eHealth foundations

Since 2000, Thailand has a national ICT policy/strategy framework (IT 2010 framework) and two five years national ICT master plans[5][6]. The framework and plan has been implemented since 2002.The national ICT framework laid out e-strategy for eGovernment, eEducation, eCommerce, eSociety, eIndustry but not eHealth. As the results, the country has no national eHealth governing body that provides leadership and direction. Although there is no national eHealth policy/strategy, many eHealth applications and services has been developed, piloted and implemented. Major funding of the projects comes from public sector, the government. A few eHealth projects have been supported by public-private partnerships and health information NGOs. Even though, there are few public-private partnerships, the partnership between the Thai Medical Informatics Association (TMI), MOPH, public universities and NECTEC to organize annual health information and health information technology conference has been carried on almost two decades.[Table 1]

For eHealth capacity building, the human resources skills and knowledge, ICT skill and knowledge training courses have been offered for students of health sciences in more than 75% of tertiary educational institutes in Thailand (public and private). There are also institutions/organizations, such as MOPH and universities offer continuing education in ICT for health as part of the ongoing training of health and allied health professionals. Nevertheless, the short term training courses and degree training courses in biomedical/health informatics has not been instituted.

Although Thailand has enacted a legislation to ensure privacy of personally identifiable data of individuals irrespective of whether it is in analog or digital format, the country doesn't have a specific legislation to protect privacy of individuals' health-related data held in digitized format. The country doesn't have legislation which provides for the sharing of health-related data between health care staffs through an Electronic Medical Records/ Electronic Health Records (EMR/EHR) at all level of health care services. It means that there is no legislation about the data sharing 1) within the same health care entity and its associated network of care providers, 2) with different health care entities 3) with health care entities in other countries. Moreover, the country has no 1) legislation which grants the right of access by individuals of their health-related data when held in an EMR/EHR 2) legislation which allows individuals to demand the deletion of personal data and/or health-related data from their EMR/EHR 3) legislation which allows for the transmission and sharing of research data containing personal and health-related data between research entities in different countries and 4) legislation about the legal right to specify which health-related data from their EMR/EHR can be shared with health provider(s) of their choice. Regarding online pharmacies in Thailand, there is no legislation that either allows or prohibits internet pharmacy operations and no mechanism that regulates, accredits or certifies internet pharmacy sites. Furthermore, the legislation that allows or prohibits internet pharmacy sales purchased online from other countries hasn't been enacted in the country. In short, Thailand doesn't have laws to keep up with the rapid changing online pharmacy business. In terms of children protection from online risk, Thai government has sponsored websites or official initiatives to provide appropriate information and education about internet safety and literacy. These efforts aimed to protect general population and children, in particular. However, there is no safety tools and security technologies required by law for schools, libraries and other public places with internet facilities used by children.

Table 1-Summary of eHealth uptake in Thailand

eHealth Development	Uptake
I. Foundation Policies & Strategies	
1. National eGovernment policy & strategy	√ ICT2010
2. National eHealth policy & strategy	X
3. National eHealth governance body	X
3. Funding	+ Public, No Private
4. Public & Private partnership	+
5.Infrastructure	++
II. Enabling Policies & Strategies	
1. Health information security & privacy laws	X
2. Actions on Multilingualism & Multiculturalism	X
3. Capacity building	++
3.1. IT courses for health science students	+++
3.2. IT courses for health professional	+
4. National health IT standards (Interoperability)	+
4.1.Core data set standards	12 & 18 files standards
4.2.Semantic standards	ICD 10 TM, ICD 9 CM
4.3.Syntactic standards	X
4.4.Security and privacy standards	X
III. eHealth Applications	
1. mHealth	++, mostly pilot
2. Telemedicine	+, pilot
3. eLearning in health sciences	+
4. EHR/EMR (Health Information Exchange)	++
4.1 For administration, claims	+++
4.2 For clinical care	+

Note: √ = Adopted, X = No uptake, + =0-25% uptake, ++ = 26-50% uptake, +++ = 51-75% uptake, ++++ = 76-100% uptake, ICT 2010 = Thailand ICT development frame work 2000-2010, ICD 10 TM = International Classification of Disease version 10 Thai Modification, ICD 9 CM = ICD9 Clinical Modification procedure codes.

Regarding Multilingualism and multiculturalism in eHealth, the country has no national policy or strategy that promotes the production of electronic health information in a manner that is multiculturally sensitive. Although at the three southern most provinces of Thailand there is a large number of Thai Muslims. Their dialect, religion and culture are differences from the traditions and language of the majority Thais. The experts agree that this issue should not be ignored and identified this issue as one of the national eHealth priorities.

At the national level, ICD10-TM (International Classification of Diseases version 10-Thai Modification) and ICD9-CM (Clinical Modification) are used for coding diagnosis and health service intervention respectively. Thailand has developed and implemented citizen identification number for more than two decades by the Ministry of Interior. Every Thai citizen has a unique identification number, known as "13 digits number". It is also used as patient identifier. There are two national health minimal data set standards which are developed for administrative purpose. They are 1) standard data sets for health insurance, known as the "12-file data set", and 2) standards data set for health center, known as the "18-file data set".[7] They are used mainly for health insurance payment and healthcare activities reports. National drug code, national health provider identifier, medical device coding standards, survey metadata standards, indicators standards are at various stages of development. HL7 messaging and LOINC standards (Logical Observational Identifiers Names and Codes - a laboratory coding standards) are implemented in a few large hospitals. They are not the national standards. DICOM (Digital Imaging and Communication in Medicine), a standard for handling, storing, printing, and transmitting information in medical imaging, is used in many health facilities in the country usually where PACS (Picture Archiving and Communication Systems) are implemented. However, it is not instituted as a national standard.

eHealth applications and services

The mix of paper and computerized patient information (individual data and aggregated data) are being used in healthcare services. In public sector, almost all of hospitals (1,001 hospitals) and health centers/primary care units (10,068 PCUs) have implemented various degrees of capabilities of EMR/EHR. If we categorize individual patient information into administrative data (used for reimbursement, administration and reports) and clinical data (for patient care e.g. laboratory data, pharmacy data, providers' notes), these two data type are not equally developed in Thailand. Administrative data are computerized and can be transmitted and exchanged electronically in nearly all health facilities in Thailand. The clinical data are collected in both paper and computerized format but the capability to exchange electronically is very limited.[Table 1]

Thailand doesn't have a national telemedicine policy or strategy and also a national agency for the development and promotion of telemedicine and its applications. Furthermore, there is no scientific institution involved in the development of telemedicine solutions in the country. In the past decade there were many telemedicine projects and activities. Many of them were short term demonstration projects which were the works between international agencies and Thai's universities or big private hospitals [8-10]. There was only one national telemedicine project implemented by the MOPH during 1998-2003, called MOPH's telemedicine network.[11] This big project aimed to deliver medical care to people in remote rural areas where there were the shortage of doctors and other professionals. However, the project was not very successful and was abandoned in 2003. There were many factors contributing to the ending of the project, for instance, no national body to continuously provide national telemedicine policy and strategy, the lack of requisite IT skills among health professionals, the country's economic crisis, the rapid changes in technology, and the rapid social and political changes taking place in Thailand. Currently, there are private teleradiology services which provide services largely for big private hospitals in big cities. Several public telemedicine pilot projects are being piloted such as the teledermatology consultations which run by Institute of Dermatology, MOPH.

mHealth is an emerging term for medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, Personal Digital Assistants (PDAs), and other wireless devices. mHealth applications include the use of mobile devices in collecting community and clinical health data, delivery of healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vital signs, and direct provision of care. In Thailand, several mHealth initiatives are being piloted and implemented. The cross-border Mekong Basin Disease Surveillance System is an example of a piloted mHealth project which uses mobile devices for diseases surveillance and management of emergency and disaster situations. The project uses GeoChat SMS groups communication software developed by InSTEDD to report communicable diseases and emergency occurred in community in Mukdahan province (Thailand) and Suvanakhet (Laos). The public health personnel working in the sub-district level use SMS format to report cases in order to improve timeliness of report and warning for potential disease outbreak and disaster.[12]

In Thailand, eLearning program has been used to teach health sciences students and the development of continuous health professional training programs in many institutes. At the national level, the use of eLearning to teach health sciences students was estimated at medium level (more than 25% and less than 50% of institutes and/or courses). But the level of use for professional development programs in the ongoing training of health professionals was estimated at low level (less than 25%). Thailand Cyber University Project [13], operates by the Commission of Higher Education, Ministry of Education, provides supports to the eLearning programs development for students and non-students to teaching institutes in the country

including health sciences teaching institutes. A number of health sciences eLearning courses are available at its website.

Discussion and conclusions

Among developing countries, evidences show that Thailand is one of the leading countries that the use of ICT applications is pervasive including eHealth [3, 14]. However, our study reveals that the country is lag behind in laying down the eHealth foundations. The WHO GOe identifies three layers of eHealth development.[2] [Figure 1] The first layer, the foundation policies and strategy, forms the basis of country eHealth development. This includes the creation of an appropriate governing body—a multi-stakeholder, national-level, eHealth authority to provide leadership and direction, the development or adoption of eHealth policy to define the vision and action required, the development of a funding framework to support the vision, and mechanisms to develop ICT infrastructure for the provision of eHealth services. Although Thailand has national e-strategy for various sectors, but the vision and strategy for eHealth haven't been laid out. This may be both the cause and result of not having national eHealth governing body.

Figure 1-The Global Observatory for eHealth Development model (modified)

The second layer of eHealth development model, consists of enabling actions, which broadly act as a bridge between foundation policies and strategies and the planned outcome of providing eHealth services for all. The functions of enabling actions are to protect the citizen, promote access and equity, and to act on the need for multilingualism and multiculturalism in cyberspace. They include eHealth interoperability policies and strategies to ensure that systems can communicate with each other. Finally, they include a component to build the ICT capacity of health professionals and students. Consider components in this layer, Thailand doesn't take action on multilingualism and inadequately takes actions on citizen protection, eHealth capacity building and interoperability of systems.

The third layer, eHealth applications such as EMR/EHR, mHealth, telemedicine, are being implemented in Thailand, but these services are fragmented and scattered. It is known that, the success of these applications is largely dependent on the actions leading up to them, that is, services in this layer will be more effective if the actions in the first two layers have been executed well. Solid foundational layers lead to more effective eHealth systems and services. Unfortunately, Thailand is inadequately taking actions on developing these two layers.

The country's eHealth experts recommended that the country should put the development of eHealth foundations the priority. The identified foundational gaps should be closed to enable the development of sustainable and effective eHealth systems and services. The recommendations are 1) Thailand should create a multi-stakeholder, national-level, eHealth governing authority to provide leadership and direction, the development or adoption of eHealth policy to define the vision and action required 2) the country new national ICT framework, ICT 2020, should incorporate eHealth strategy into the framework along with eGovernment, eEducation, eIndustry,eSociety and eCommerce 3) legislations related to health information security, privacy and confidentiality should be enacted to protect people 4) national health information standards need to be developed to enable eHealth services interoperability and health information exchange and 5) systematic mechanism for capacity building of people who design, implement, operate and use of the eHealth systems has to be planned and implemented

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