Electronic Health In Ghana: Current Status and Future Prospects

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Abstract

The health-care system in Ghana is similar to those in other developing countries and access to health services for remote communities is extremely limited. In July, 2010, the Government of Ghana launched the national e health strategy. A number of international organizations have initiated various pilot projects, including disseminating and collecting data, education initiatives and telemedicine. In addition, several institutions and organizations are dedicated to the promotion of e-health and a range of Web-based health consultancy services have begun. The main objective of this study is to provide an overview of eHealth activities in Ghana. It was a daunting task, not least because of the need to gather information on eHealth projects and initiatives in Ghana, as there is no existing repository of such information. Through literature search in Africa journals online, Hinari, Medline, Google.com, Journal of Telemedicine and e-Health, Journal of Telemedicine and Telecare, Journal of Medical Internet Research and Interaction with eHealth experts, followed up with some of the authors' for directions to other projects, and following the references in some articles. A total of twenty-two (22) pilot projects have been identified in Ghana. Mobile devices in use range from PDAs to simple phones and smart phones. The key findings of this research are that there are about 22 eHealth project at various stages of implementation in Ghana. Some of these projects have wind up and others are still being implemented. Mobile devices in use range from PDAs to simple mobile phones and smart phones. Most of the projects have been donor initiated. Data collection started in March 2010 to June 2013. Although eHealth seems to have a limited role in Ghana at present, there is growing interest in the opportunities it may offer in terms of improving the delivery and access to services, especially in remote locations. Recommendations for further research are provided.

Keywords: eHealth, Health, Ghana, Developing Countries, Information and Communications Technology

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Introduction

Reliable information and effective communication are crucial elements in individual health institutions, disease monitoring and prevention, public health systems, and health care generally. ICTs, therefore, can in many ways be vital tools in combating disease, promoting individual health and making health systems more effective and efficient.

They can be particularly powerful in monitoring the outbreak and spread of disease, disseminating health information (including information about health-promoting and disease-preventing individual behaviour), and providing training, information and long-distance

support to health care practitioners. A particular challenge for developing countries is ensuring that ICTs are effectively mobilized to improve health outcomes and combat disease among the poorest and most remote populations. This is an area where the potential for effective use of the full range of ICTs (including radio and television) is particularly great.

In July, 2010, the Government of Ghana launched the national e health strategy. The key strategies under the national e-health strategy; Streamlining the regulatory framework for health data and information management, Building sector capacity for wider application of eHealth solutions in the health sector, Increasing access and bridging equity gap in the health sector through the use of Information and Communication Technology, and Towards a paperless records and reporting system.

eHealth is the term more commonly used in relation to ICT deployments in health care. There have been several attempts to define eHealth [1-3] there is still no universal agreement on the precise meaning of this term. According to [4], eHealth is widely used by many individuals, academic institutions, professional bodies and funding organisations. It has become an accepted neologism despite the lack of an agreed-upon clear or precise definition. Communication among the many individuals and organisations that use the term could be improved by comprehensive data about the range of meanings encompassed by the term (ibid). Fifty –one (51) unique definitions that we retrieved showed a wide range of themes, but no clear consensus about the meaning of the term eHealth. In addition, two universal themes (health and technology) and six less general (commerce, activities, stakeholders, outcomes, place, and perspectives) were identified. The widespread use of the term eHealth suggests that it is an important concept, and that there is a tacit understanding of its meaning (ibid).

However, thinks that any definition of eHealth should encompass the full spectrum of ICTs whilst appreciating the context of use and the value they bring to society [5]. One definition which they identified as taking into consideration the various facets is the one proposed by [6], who defined eHealth as:

> *''...an emerging field of medical informatics, referring to the organisation and delivery of health services and information using the internet and related technologies. In a broader sense, the term characterises not only a technical development, but also a new way of working, an attitude, and a commitment for networked, global thinking, to improve healthcare locally, regionally and worldwide by using information and communications technology. [6]''*

eHealth programs according to [7] offer the potential for enhanced reach, including traditionally underserved populations, at relatively low cost; scalability; time efficiency; and the capacity to provide tailoring and customisation for individual patients and consumers.

Despite these potential benefits, there are barriers to the full implementation of eHealth solutions, and the limitations of access, health and technology literacy, and quality measures must be addressed [8,9]. It was concluded by [5] saying that "eHealth interventions have considerable potential to transform the health sector, hopefully better. As with many intervention, however, the risk of harm exists, so policy makers, commissioners, clinicians, and patients alike need to remain aware of this possibility". It was suggested earlier by [10] that if we are to maximise the benefits associated with eHealth interventions whilst minimising risks, we must be able simultaneously to evaluate eHealth interventions while they are being designed, developed, and deployed. Solutions which are provided through

eHealth initiatives within hospitals has been identified by [11] as Hospital Information Systems (HIS), telemedicine services, Electronic health records and Internet services.

Methods

The following is not a systematic review of eHealth in Ghana, but rather an attempt to gather a diversity of perspectives on the topic from a variety of sources. Various papers were identified on these topic by searching through Medline, Google scholar, journal of health informatics for instances of "eHealth", "telehealth", "telemedicine", "store and forward", and "teleconsultation + Ghana" to name a few. Moreover, references were solicited from a variety of experts in the field, many of whom were responsible for building and deploying their own systems. Interactions with eHealth experts [12-14]. In addition, follow-up with some of the authors' for directions to other projects. Data collection started in March 2010 to June 2011. Papers were selected once they discuss an eHealth project in Ghana.

Results

Using the above criteria and personal contacts of researcher, 22 projects were identified. These projects are:

i. Sene PDA

The aim of the project is to use information technology to improve service delivery at the lowest level of service delivery – Community-based Health Planning and Services (CHPS) zones. It is one of the pioneer mobile health projects in Ghana. Objectives of the project are: to use appropriate technology to generate more accurate reports that can be used to make decisions by the Community Health Officers (CHO) and the District Health Managers; to use current technology to reduce the time CHO's spent to generate monthly report on services; improve the follow up of children/mothers registered for services and reduce the drop- out rate for immunization and safe motherhood services

ii. MOBILE TECHNOLOGY FOR COMMUNITY HEALTH (MOTECH) IN GHANA

The project aims to determine how to use mobile phones to increase the quantity and quality of prenatal and neonatal care in rural Ghana, with a goal of improving health outcomes for mothers and their newborns.

iii. MILLENNIUM VILLAGES AND MOBILE TELEMEDICINE

Millennium Village project is a new approach for fighting extreme poverty. The concept is to target the "poorest of the poor, village by village throughout Africa, in partnership with government and other committed stakeholders, providing affordable and science-based solutions to help people lift themselves out of extreme poverty."

iv. PAN AFRICAN eNETWORK

The basic objective of the project is to assist Africa in capacity building by way of imparting quality education to 10,000 students in Africa over a 5-year period in various disciplines from some of the best Indian Universities/Educational Institutions.

Besides, this would provide Tele-Medicine services by way of on line medical consultation to the medical practitioners at the Patient End Location in Africa by Indian Medical specialists in various disciplines/specialties selected by African Union for its Member States

v. ONETOUCH MEDICARELINE (ML)

- ML Phase 1 calls for free phone calls and text messages;
- The planned ML Phase 2 calls for MMS and data reports over SMS, and ML
- Phase 3 calls for free smartphones, reference tools, and custom applications.
- 1700 of 2000 enrolled
- 2 million calls made
- Ghana Medical Association & OneTouch Telecom

vi. GHANA CONSULTATION NETWORK

This is a Web-based interface consultation network. It has a network of asynchronous servers hosted at each hospital and integrated with the referral system. It has on board 125 doctors in 6 countries. The project was supported by Ghana Physicians Foundation & Ministry of Health. Other projects associated with this project are the Technology Infrastructure for Emerging Regions (TIER) and Remote Asynchronous Communication for Health care (REACH) project

vii. MOORFIELDS /KORLE BU EYE CENTRE

Moorfields Eye Hospital is using the internet to share the specialist knowledge and advice of its consultant eye specialists with hospitals in the developing world. As part of a new project, run in partnership with international telecommunications group, Cable & Wireless, eye specialists in South Africa, Tanzania, Gambia and Ghana will be able to access a dedicated internet site set up by Moorfields Eye Hospital NHS Trust

viii. MOBILE TELEDERMATOLOGY IN GHANA

Mobile teledermatology 'involves the use of mobile telecommunication technologies allowing easy submission of dermatologic cases without the use of physical internet connectivity'. Patients were randomly selected from three outpatient clinics in Accra and Kumasi Ghana. Patients underwent physical consultation by an onsite dermatologist. These patients also went through ClickDoc data collection and image capture using a Samsung U900 Soul mobile phone. Remote Ghanaian dermatologists connected to the patient database using a web-based interface (africa.telederm.org) from the phone in a remote location and viewed cases. For each case, the remote specialists made their own diagnosis on the basis of the patient data and images.

ix. PDAs IN AFRICA- SATELLIFE"S EXPERIENCE

The goal of the SATELLIFE PDA Project was to demonstrate the viability of handheld computers -- also called Personal Digital Assistants or PDAs -- for addressing the digital divide among health professionals working in Africa. In December 2001 Satellife's worked with the American Red Cross to conduct a pilot that tested the efficacy of PDAs for measles field surveys in Ghana. Thirty Ghanaian Red Cross volunteers, trained over a two-day period, had no trouble with the technology, though some of them had never before used a computer. They were able to complete over 2,400 surveys in just three days, where the traditional paper and pen survey method generally yielded about 200 finished surveys. Survey data was turned in at noon on the last day of the pilot; analysis was completed promptly after the data was hot synched into a computer; and a complete report was delivered to the Ghanaian Ministry of Health by 5pm. The entire pilot was completed in less than a week, and the speed and ease of gathering this epidemiological data was unprecedented. Community volunteers using PDAs

to collect data as part of measles vaccination program in Ghana. The project yielded compelling evidence of the value of PDAs for data collection and reporting

x. DISEASE CONTROL/WHO

The WHO–Ghana supported the disease control unit of GHS to develop and pilot a facilitative tool using EPI-Surveyor. EPI-Surveyor is a free tool to enable data collection on PDAs. There are plans to use the lessons learnt from this pilot and institutionalize the use of PDAs for integrated facilitative supervision within the service

xi. USAID-DELIVER PROJECT

The USAID Deliver Project in collaboration with the President's malaria Initiative and the National Malaria Control Program has since July 2009 promoted the use of EPI-Surveyor, mobile phone survey software for collecting data on Malaria logistics at the service points every quarter.

xii. EARLY WARNING SYSTEMS- FOCUS REGION PROJECT

The USAID sponsored project which is working in GAR, WR and CR is piloting a logistics management system using mobile phones in six districts in the target regions. The system will facilitate data collection from SDPs over SMS through facility workers" personal mobile phones. The SMSs will then be sent to a toll-free short code registered with each mobile network in Ghana.

xiii. SMS FOR LIFE LOGISTIC MANAGEMENT

This project that is yet to be implemented. It is similar to USAID Deliver project. It will be implemented as a pilot project in six districts in three regions (BA, UE, GAR).

xiv. MIMcom.NET project (http://www.nlm.nih.gov/mimcom/background.html)

The National Library of Medicine chairs the Communications Working Group of the Multilateral Initiative on Malaria (MIM), which began in 1997. The objective is to support African scientists and malaria researchers in their ability to connect with one another and sources of information through full access to the Internet and the resources of the World Wide Web, as well as create new collaborations and partnerships.

The initial meeting of the MIM CWG was held in January 1998 at the NLM/NIH in Bethesda, Maryland. In attendance were malaria research scientists, health information professionals, telecommunications experts and representatives of the major MIM funding agencies. In keeping with the underlying goal of supporting a broad spectrum of basic and operational malaria research needs, the researchers requested communications and connectivity capabilities sufficient to provide, at a minimum: robust and reliable e-mail, links to other research sites, access to full text journal articles, database searching, exchange of large files and mapping data, and timely access to electronic information resources worldwide.

In July 1999, Redwing Satellite Solutions Ltd. (based in the UK) and NLM's technical consultant Mark Bennett successfully installed Very Small Aperture Terminal (VSAT) ground stations at two malaria research sites in Kenya, at Kisian (CDC funded) and Kilifi (Wellcome Trust funded). The 64kbs dedicated bandwidth purchased was shared by the two sites. These two sites join the Malaria Research and Training Center in Mali which has full

Internet access via microwave technology, funded by NIAID and made operational in June 1998. The NLM team brought on two further sites in December 1999, in Ghana - in Legon near Accra (the Noguchi Memorial Institute for Medical Research) and in Navrongo (Navrongo Health Research Centre). The Ghanaian sites, engaged in malaria vaccine testing, are funded jointly by NIAID/NIH, the Naval Institute of Medical Research, and USAID. When these sites came on line, the overall bandwidth increased to 128kbs and monthly charges were reduced since more sites were sharing the bandwidth.

xv. TRINET PROJECT (http://www.sysmod.com/trinet.htm)

This is a project initiated by the Informatics Development Institute (IDI). Their mission is to provide cost-effective communications for remote regions of developing countries. In 1999, the IDI secured European Commission backing for a communications network project, entitled TRINET, targeted at developing countries in Africa. Partners were located in Ghana, Uganda, Zambia and Zimbabwe, and use a low-earth-orbiting satellite (LEOSAT) for store-and-forward email communications suing amateur packet radio technology, and internet email gateways in developed countries.

xvi. mPEDIGREE (http://en.wikipedia.org/wiki/Mpedigree)

mPedigree refers both to a mobile telephony shortcode platform that interconnects GSM mobile networks in the West African republic of Ghana to a central registry wherein pedigree information of product brands belonging to participant manufacturers are stored, as well as the organisation that has emerged in the country to manage and promote this registry to organisations and firms in the health sector of Ghana and Africa. The latter is named the mPedigree Network. In November 2008, the Nigerian National Agency for Drug Administration & Control (NAFDAC) reported to an industry publication that its Technical Committee was evaluating the security credentials of the mPedigree system for a possible roll-out in that country. NAFDAC and the Nigerian pharmaceutical companies formed a consortium in June 2009 to roll the service out for all medicines in Nigeria, though this has not happened as at end of 2010.

xvii. eHEALTH INITIATIVE

This is an electronic health delivery system, launched to enable doctors reach their patients online and bring health care to the door steps of the citizenry. It has a remote doctor/patient interface, which allows a patient to see a doctor without leaving his home or office. This does not seek to prevent patients from visiting hospital but to augment existing health care delivery services. In order to assess the product one has to go online to book an appointment with a doctor on www.ehealthghana.com after which an appointment coordinator will assign doctors to patient depending on the ailment.

xviii. VODAPHONE HEALTHLINE PROJECT (http://www.ghanaweb.com/GhanaHomePage/health/artikel.php?ID=274377)

Telecommunications giant, Vodafone Ghana, launched a health oriented initiative dubbed "Healthline", which aims at educating and informing millions of Ghanaians about pertinent health issues. The project, which takes the form of a Television and radio show, embarked on a research to solicit basic health questions from Ghanaians which are to be answered by medical doctors. According to Vodafone Ghana, the project will ultimately educate the public and demystify health related issues and practices. It also has the Healthline 255, the first medical phone service in Ghana powered by Vodafone. Healthline 255 guarantees accurate medical advice and provides expert medical advice and information to people in need of

quality health care from the convenience of their phones and has succeeded in revolutionalising access to health information and advice for Ghanaians as it provides important information that would help Ghanaians make the best health decisions. The Healthline call centre is an extension of Vodafone Ghana's award winning television programme, Healthline which recently won the Chartered Institute of Marketing Ghana award for the second year in a row as the 'Best Television Programme of the Year.

xix. Mahiri Mobile (http://www.telmedx.com/ghana-rural-medicine.html)

Mahiri Mobile Services of Accra has outfitted nurses in rural villages with wireless tablets that deliver high quality, live medical-grade video™ back to the doctors in Tamale and Nsawam for medical advice. A wide variety of illnesses and medical conditions are being treated that would otherwise not be cared for, ranging from skin disorders and infections to neurological conditions to maternity and pre-natal care.

Patients are seen at home, in remote clinics, in schools or in community gatherings by traveling nurses trained to use the new technology. This mobile video platform was developed by telmedx of San Diego, California, and it allows a doctor on a web browser to examine patients over the high-resolution cameras of mobile phones and tablets for live, real-time consultations. Doctors can also take high-resolution photos of patient conditions from a web browser by remotely controlling the back cameras of wireless phones and tablets. The live video and still photos appear side-by-side on a computer screen, and the photos can easily be saved into medical records by the doctors.

Systems were also identified and these are:

1. GHS IHost - http://directbusinesssolution.org/ihost
2. Health Administration Management System (HAMS) - www.infotechsystemsonline.com
3. District Health Information System (DHIS)
4. Health Information Management System (HIMS)
5. Hospital Administration Management Systems

Discussions and Conclusion

This paper sought to present an overview of eHealth projects in Ghana. ICT offer huge opportunities that should be shared with the neediest persons. However, the temptation is to transfer technology without any considerations for local needs and obstacles specific to the place concerned. This will be a great mistake, leading to a waste of money, whatever it comes from private fund or, maybe worse, from cooperation budget. A critical mass of professional and community users of ICTs in health has not yet been reached in developing countries. Many of the approaches being used are still at a relatively new stage of implementation, with insufficient studies to establish their relevance, applicability or cost effectiveness [15]. This makes it difficult for governments in developing countries to determine their investment priorities [15]. However, there are a number of pilot projects that have demonstrated improvement, such as a 50 percent reduction in mortality or 25-50 percent increases in productivity within the healthcare system [16]. The key findings of this research are that there are about 22 eHealth project at various stages of implementation in Ghana. Some of these projects have wind up and others are still being implemented. Mobile devices in use range range from PDAs to simple mobile phones and smart phones. Most of the projects have been donor initiated. Further studies should investigate factors responsible for the success or failure of some of the projects. With the passage of the eHealth Strategy document by the

Ministry of Health, the eHealth terrain will surely be regulated and investors will be protected.

Acknowledgements

Conflicts of Interest

None

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