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Patient Information Privacy and Security in Ghana:
A Review of Current Policy and Suggestions for the Future

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Acronyms

CDC (Center for Disease Control)
EHR (Electronic Health Record)
EMR (Electronic Medical Record)
GCN (Ghana Consultation Network)
GHS (Ghana Health Services)
ICT4AD (Information Communication Technologies for Accelerated Development)
Mhealth (Mobile Health)
MoH (Ministry of Health)
MOTECH (Mobile Technology for Community Health)
NHIS (National Health Insurance Scheme)

Executive Summary

In a world where the future appears ever closer, Health Information Technologies (HITs) are an example of technologies that are changing the entire way the healthcare system communicates, and collects and aggregates data. This new efficient model results in more effective treatments based on real health data. HITs have their drawbacks however. Patient's information is more available to a larger audience. This creates the need for improved policy on patient information security.

This paper specifically focuses on patient information policy in Ghana. Before effectively addressing patient information policy there is background knowledge that needs to be addressed. This paper provides background information on current implementations and research on HITs in Ghana, the inevitable implementation if HITs in Ghana, and the contradictory arguments for the availability of patient information and the need to protect patient's information. With this background knowledge we will address policy that provides a map for the implementation of HITs in Ghana and compare the future of HITs in Ghana to the policy that protects patient's information security. By addresses both policies we can identify gaps in patient information security.

Research concludes by recommending the formation of a committee comprised of government bodies as well as private organizations to create a coordinated coherent policy on patient information security. To ensure the policy stays relevant policy on HIT implementation in Ghana needs to be updated to include the innovative health technologies that are being implemented in Ghana and to create a more proactive solution to implementing HITs.

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Background Information on Electronic Medical Record Systems in Ghana

There are contrasting views on whether or not EMRs have improved public health in the resource rich world. There are even more arguments as to whether or not resource deprived areas like Ghana would benefit from such systems given the additional questions of limited technology and technologically skilled staff to implement and maintain a secure electronic health information system. Although the purpose of this paper is not to address the current challenges faced when implementing hospital information systems, some background information is needed. Accordingly, this section will define terms relating to this thesis, identify the current status of hospital information technology's implementations in Ghana, address the inevitable implementation of hospital information technologies despite any evidence against them, and then finally identify the argument for patient's information to be available to various organizations and the argument for extreme security.

With background knowledge in these areas we can assess written policy on ICT implementation in the health sector, and policy written to protect patient's information. With an understanding of the proposed programs and technologies in the health sector, gaps in current patient information security will become evident. The ultimate goal of this thesis is to identify gaps in patient information security and suggest improvements for the future, before implementation becomes widespread.

Important Definitions

While different technologies are being implemented in the health sector, this review focuses on health information technologies. According to the U.S. Department of Health and Human Services, health information technologies (HIT) are technologies that involve the exchange of health information in an electronic environment[1]. Accordingly, the term health information technology applies to all technologies like electronic medical record systems (EMR), health information systems (HIS), clinical

[1] United States. Department of Health and Human Services. "Health Information Technology." 2011. Web. 14 Feb. 2012. <http://www.hhs.gov/ocr/privacy/hipaa/understanding/special/healthit/>.

information systems (CIS), and patient data management systems (PDMS). These technologies are the focus of this paper as it is where patient information is most vulnerable. Certain case studies or research may refer to particular systems by different names, but for the purpose of this thesis I am examining patient's information security within HITs by its definition given above. Therefore this including any terms particular case studies or research might refer to within the larger definition of HITs (For Example: EMRs, HISs, CISs, etc.).

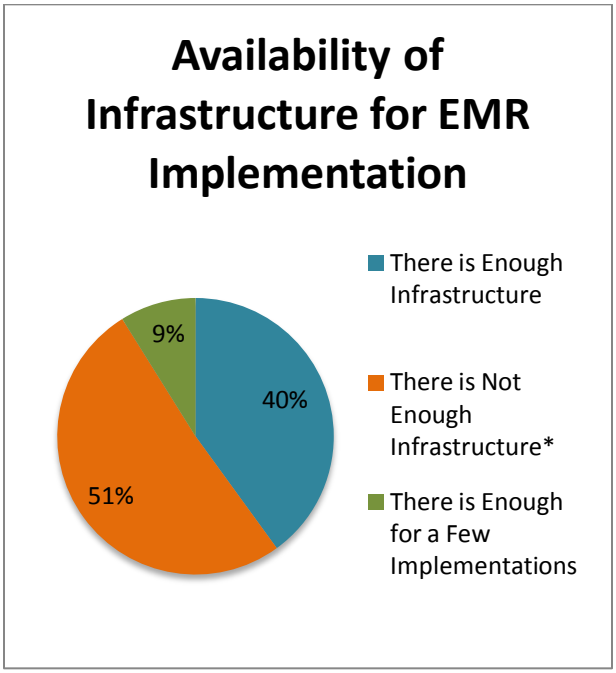
I have also stayed away from the terms developed and developing world. Without a clear definition of what indicators define developed and developing, I believe these terms have the potential to stratify the globe into classes based on indicators that some societies may find arbitrary. Instead, I have chosen to use the terms resource rich and resource deprived. This is not meant to take away from some of the areas described as resource deprived that are rich in natural resources, but instead is meant to indicate regions by their ability to utilize and gather resources to develop large infrastructure.

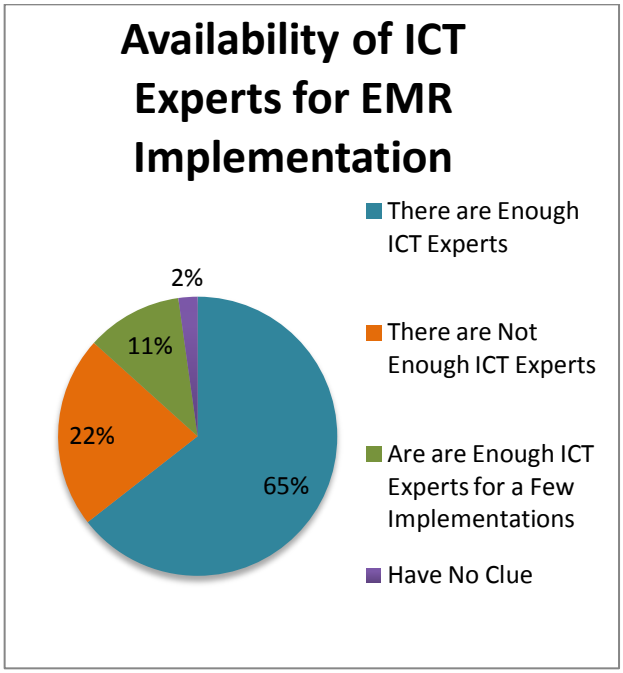
Current Implementations/Research on EMRs in Ghana

Beginning with research on EMR implementation in Ghana, one survey of 50 health professionals (45 participated) at Korle-Bu Teaching Hospital in Accra, Ghana found only 33.3 percent of surveyed staff have a full understanding of what an EMR system is. Respectively, 20 percent received half credit for their answer and 46.7 percent were reported as having a general idea[2].This shows hospital staff, at least at one of the most prestigious hospitals in Ghana, are aware of EMRs, but does the Ghanaian staff of the Korle-Bu Teaching Hospital believe Ghana is ready for EMRs? The same survey by Williams and Boren attempted to answer this question and reported the following opinions from Korle-Bu staff on EMR implementation in Ghana:

[2] Williams, Faustine. *The Role of Electronic Medical Record in Nation Care Delivery, Development: Case Study on Ghana*. Rep. University of Missouri-Columbia, May 2007. Web. 9 Mar. 2012. <https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/4919/research.pdf?sequence=3>.

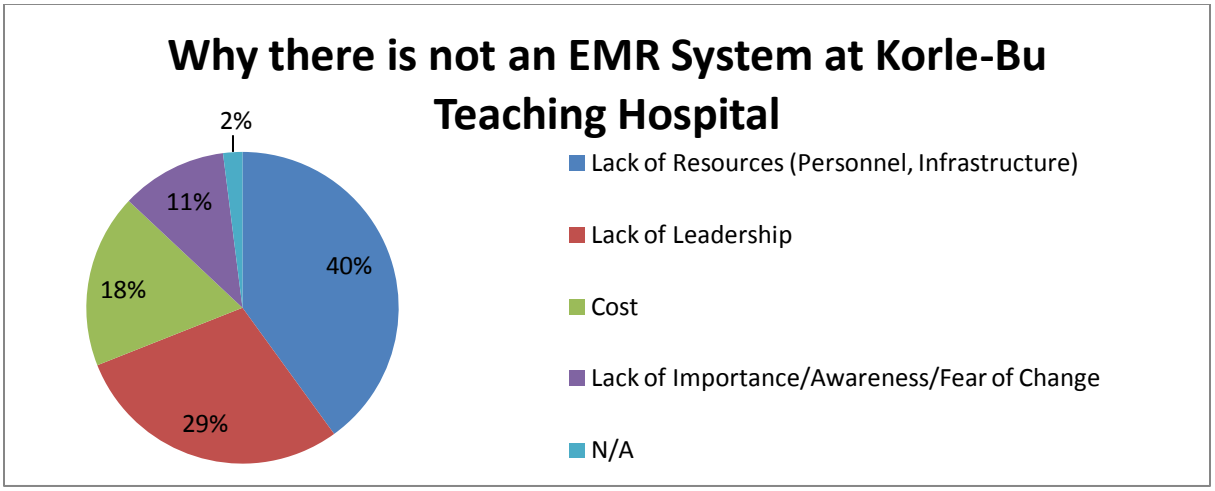
Left: Graph 1.1: Availability of Infrastructure for EMR Implementation
Right: Graph 1.2: Availability of ICT Experts for EMR Implementation





*For, "There is Not Enough Infrastructure," the report read, "more than half respondents agreed that enough infrastructures are not available in Ghana." Then it stated 18 responded there are enough and 4 said there are enough for a few (Williams, 2007, pg. 35).

Graph 1.3: Why there is not an EMR system at Korle-Bu Teaching Hospital



Source: Williams, Faustine. *The Role of Electronic Medical Record in Nation Care Delivery, Development: Case Study on Ghana*. Rep. University of Missouri-Columbia, May 2007. Web. 9 Mar. 2012. <https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/4919/research.pdf?sequence=3>.

This data shows that health professionals at Korle-Bu Teaching Hospital are generally split as to whether or not Ghana has the infrastructure and ICT skills to implement an EMR system. More believe

the issue is infrastructure, not ICT skills; however, no more than 65 percent of those surveyed think there are enough skilled ICT professionals to implement a system.

The question as to why there is not an EMR system in place at Korle-Bu sheds additional light on the question of whether or not Ghana is ready for an EMR system. While most still credited a lack of personnel and infrastructure as the reason Korle-Bu does not have an EMR system, new variables like cost, lack of leadership, and lack of importance/awareness/fear of change, also become apparent.

These findings go hand in hand with a report done at the University Hospital in Accra, Ghana. The study aimed to investigate the adaptation of IT as electronic medical records were put into place. The report identified behavioral and attitudinal change, lack of financial autonomy, and absence of an efficient support system, for the reasons IT implementation was such a slow process. The report ultimately stated the issue and gave a solution by stating, "Bureaucracy tends to be the key challenge … introduction of IT into hospitals tied to traditional bureaucratic or hierarchical structured institutions should be coupled with adequate education, awareness, and lobby for the support of top management or administrative officials[3]."

In an interview conducted with Dr. George Asante of the Kasoa Health Center, a medical facility with more autonomy than the University Hospital because it is not tied to a University, Dr. Asante stated that there was a budget for HIT, he was aware IT training was necessary, and he was willing to take the time to train staff. The issue the Kasoa Health Center identified was finding a system and getting the help needed to implement it. When I asked him what kind of system he was interested in, he identified a fully operational hospital information system at the Abura Dunkwa Government Hospital in Cape Coast, Ghana. He described the system as one where each department could look at patient's information from individual department computers and patient data could be passed on to each department in real

[3] Boateng, Richard, and Victor Mbarika. *Using Information Technology to Manage Medical Records in a University Hospital in a Resource Poor Environment*. Rep. South University, 2010. Web. 10 Mar. 2012. <http://www.ires.theafricanacademy.com/index.php?option=com_content&view=article&id=95&Itemid=114>.

time[4]. We planned to visit the hospital, but due to time constraints this never happened and I have not been able to find any information online for a hospital information system at the Abura Dunkwa Government Hospital.

Perhaps the EMR system with the most autonomy is the MoTECH Project. In 2010 the Ghana Health Service, Grameen Foundation, and Columbia University's Mailman School of Public Health, began a mobile health project funded by a grant from the Bill & Melinda Gates Foundation. MoTECH is a two part project with 1) A mobile midwife application that sends educational information, reminders, and alerts to pregnant mothers, and 2) A nurse's application that collects data on pregnant mothers and allows nurses to query the database. This data is used to ensure pregnant women are sent reminders if they miss scheduled appointments, and to provide data for project managing. All data is collected by mobile phones and sent to a central EMR system utilizing OpenMRS, an EMR software platform. While this implementation has been successful, documentation shows the Grameen Foundation has had multiple issues with using a Ghanaian software development company, and developing the local infrastructure needed[5].These issues align with other implementation's issues of inadequate ICT skills and infrastructure.

Between these research and implementation projects it becomes obvious that while possible, the development of hospital information technologies is going to be a slow process in the resource deprived world. Some challenges that have been identified in multiple implementations include a lack of infrastructure, ICT support, leadership, project funds, flexible systems, and will to change.

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[4] Healy, Lucas. VOG: A Research and Implementation Project Testing Mobile Technologies for Social Advocacy in Ghana. Rep. University of Ghana, Nov. 2011. Web. 10 Mar. 2012. <http://everythinghealy.com/the-voice-of-ghana/final-write-vog/>.

[5] Grameen Foundation. Mobile Technology for Community Health in Ghana. Mar. 2011. Web. 23 Feb. 2012. <http://www.grameenfoundation.org/sites/default/files/MOTECH-Early-Lessons-Learned-March-2011-FINAL.pdf>.

Inevitable Implementation

In the United States we are seeing the switch to electronic systems partially because of the Health Information Technology for Economic and Clinical Health (HITECH) Act that provides incentives for the adaptation of EMRs[6].Incentives created by this act may be a key contributor to the trending use of EMRs in the United States identified by the CDC. The CDC estimated in 2010 50.7 percent of U.S. office-based physicians use some kind of EMR system, and 10.1 percent use a fully functional EMR system. Compare that to 2006 when 29.2 percent reported any kind of EMR system and just 3.1 percent used a fully functional EMR system[7]. It would be naïve to imagine policy incentives are the only reason hospital information systems are becoming more widely available in the United States, but it should not be understated that the Ghanaian government has also called for the use of hospital information technologies in Ghana's healthcare system.

The Ghanaian government has written policy that identifies the use of hospital information technologies and other ICTs in the health system as a priority[8, 9]. In fact, the *Ghana ICT for Advanced Development (ICT4AD) Policy* paper identifies ICTs as essential for accelerated development in areas like education, national security, government administration and service delivery, the private sector, globally competitive services, agriculture and agro-business, community development, healthcare, physical infrastructure, and legal, regulatory, and institutional framework development.

The government is also aware of challenges they face. Although we've identified lack of infrastructure, ICT support, leadership, project funds, flexible systems, and will to change as some

[6] Hanlon, Timothy J. "The Electronic Medical Record: Diving into a Shallow Pool." Cleveland Clinic Journal of Medicine 77.7 (2010): 408-11. Web. 7 Mar. 2012. <http://www.ccjm.org/content/77/7/408.full.pdf>.

[7] Hsiao, Chun-Ju, Esther Hing, Thomas C. Socey, and Bill Cai. Electronic Medical Record/Electronic Health Record Systems of Office-based Physicians: United States, 2009 and Preliminary 2010 State Estimates. Rep. National Center for Health Statistics, Dec. 2010. Web. 7 Mar. 2012. <http://www.cdc.gov/nchs/data/hestat/emr_ehr_09/emr_ehr_09.pdf>.

[8] Republic of Ghana. The Ghana ICT for Accelerated Development (ICT4AD) Policy. 2003. <http://www.ghanahealthservice.org/includes/upload/publications/Ghana%20ICT4AD%20Policy.pdf>.

[9] Republic of Ghana. Ministry of Health. Health Sector ICT Policy and Strategy. July 2005. <http://www.ghanahealthservice.org/includes/upload/publications/Health%20Sector%20ICT%20Policy%20and%20Strategy.pdf>.

challenges, The *Health Sector ICT Policy and Strategy* specifically identifies, "weak telecommunications infrastructure, an inadequate capacity in ICT human resources, and planning and financial constraints," as challenges[10]. Despite these challenges policy states a strong desire for ICT use in public health systems in Ghana. As these challenges are addressed and HITs become more widely available, the argument of patient information security will become a pressing matter

The Contradictory Ideas on Patient Information Security

While HITs appear inevitable in Ghana's future, there is still the question of how patient's data will be used when it becomes so much more widely available through HITs. The previous arguments as to whether or not Ghana has the technological capabilities are not stopping the government from creating policy that leads to the implementation of EMR systems. The question is now, how secure should patients data be? A simple solution would be completely securing this information, but one proposed benefit of EMR systems is the data gathered could be used to analyze current trends and issues in public health, ultimately improving overall healthcare[11, 12]. Before identifying the current patient information security policy issues we have to understand the argument for the availability of patient information, and the argument for tight security.

Argument for Patient Health Information Availability

While there is no argument for open widespread availability of personal health information, there is an argument that health data can be collected and aggregated to improve public health care. Azubuike and Ehiri state the argument by saying, "An adequate health information system is vital not only for assessing the health needs of populations and groups, but also for planning and implementation

[10] Refer to page IV of the *Health Sector ICT Policy and Strategy.*

[11] Azubuike, M.C., and J.E. Ehiri. "Health information systems in developing countries: benefits, problems, and prospect " Perspectives in Public Health. 119.3 (September 1999): 180-184 Web. 11 Mar. 2012. <http://rsh.sagepub.com/content/119/3/180.full.pdf html>.

[12] Hillestad, Richard, James Bigelow, Anthony Bower, Federico Girosi, Robin Meili, Richard Scoville, and Roger Taylor. "Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, And Costs." Health Affairs 24.5 (2005): 1103-117. Sept.-Oct. 2005. Web. 11 Mar. 2012. <http://content.healthaffairs.org/content/24/5/1103.full.pdf html>.

of health interventions[13]." Specific examples include hospital information systems being used to collect and aggregate data on disease and chronic disease management. This has led to improved methods of disease intervention based on different patient's health costs, health status, and days lost in bed[14]. Evidence shows the need for health information systems to provide effective planning of primary care units like maternal and child care, family planning, and immunizations[15]. These are just a few examples of how health data has become essential in improving health care in the resource rich world. By assessing past diagnoses and treatments and measuring their outcomes we can identify the best practices and implement them. Reliable data is needed to identify the best treatments though. And in resource deprived areas data collection is not always reliable.

Data collection in the resource deprived world is often too inadequate to improve on public health systems. The Ghana Health Workforce Observatory, in partnership with the World Health Organization, European Union, and Global Health Workforce Alliance identified the following key challenges in health information systems specifically in Ghana:

- *Weak human resource and institutional capacity for information management*
- *Gaps, duplication and waste among parallel health information systems*
- *Lack of timely reporting and feedback*
- *Unstructured investments and deployment of information and communication technology*
- *Poor quality data*
- *Inadequate use of information for decision making*

Source: Ghana. Ghana Health Workforce Observatory. *Human Resources for Health Country Profile*. Feb. 2010. Web. 11 Mar. 2012. <http://www.hrh-observatory.afro.who.int/images/Document_Centre/ghana_hrh_country_profile.pdf>.

[13] Refer to page 180 of "Health information systems in developing countries: benefits, problems, and prospects."

[14] Hillestad, Richard, James Bigelow, Anthony Bower, Federico Girosi, Robin Meili, Richard Scoville, and Roger Taylor. "Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, And Costs." Health Affairs 24.5 (2005): 1103-117. Sept.-Oct. 2005. Web. 11 Mar. 2012. <http://content.healthaffairs.org/content/24/5/1103.full.pdf html>.

[15] Azubuike, M.C., and J.E. Ehiri. "Health information systems in developing countries: benefits, problems, and prospect " Perspectives in Public Health. 119.3 (September 1999): 180-184 Web. 11 Mar. 2012. <http://rsh.sagepub.com/content/119/3/180.full.pdf html>.

These issues with data collection are not unusual for resource deprived countries where data is not accurately reported or correctly used to make decisions. Most data is collected by monthly reports handwritten and delivered to various divisions and offices of ministries. Dr. George Asante of the Kasoa Health Center identified monthly hand writing and aggregating of patient information as one of the major issues at the Kasoa Health Center[16].This system is known for inadequacies and often leads to low estimates on essential health information like births, morbidity, and mortality[17]. Additionally, these handwritten reports have to be hand delivered across the country and can easily be lost.

Given the current system it becomes clear why there is not excessive concern for patient's health information security, but when EMRs become available patient's data can potentially be aggregated and public health policy can be based on actual data. The more data available the more authorities can assess the current public health structure of Ghana and improve on it. It will allow a full assessment of the public health system in Ghana for the first time in history. Health issues can be identified, different interventions assessed, and the best practices identified. Additionally, some argue third parties like insurance companies and nongovernmental organizations working in health can use the information to improve their efficiency as well. If this data is too loose however, it can be abused.

Argument for Protection of Patient Information

In the resource rich world HITs have been available for more than a decade. These implementations can give a glimpse into the future for resource deprived countries still looking to implement these systems. The case of the United States provides a grave future for patient's security in

[16] Healy, Lucas. VOG: A Research and Implementation Project Testing Mobile Technologies for Social Advocacy in Ghana. Rep. University of Ghana, Nov. 2011. Web. 10 Mar. 2012. <http://everythinghealy.com/the-voice-of-ghana/final-write-vog/>.

[17] Azubuike, M.C., and J.E. Ehiri. "Health information systems in developing countries: benefits, problems, and prospect " Perspectives in Public Health. 119.3 (September 1999): 180-184 Web. 11 Mar. 2012. <http://rsh.sagepub.com/content/119/3/180.full.pdf html>.

Ghana. Even though the United States is known for its high awareness of security[18], there have been massive abuses of patient's information.

To ensure patient's security the United States created the Health Insurance Portability and Accountability Act (HIPAA) in 1996. It was designed with the digital future in mind and was meant to improve investigating and punishing instruments in cases of wrongful health information disclosure. Even with all this preparation, the act appears to have failed. Between April and November 2003 23,896 cases of information abuse were reported, with no actions being taken against them[19]. So while the United States took precautions to prevent data being used wrongfully, they could not keep up with the overwhelming about of abuses. Essentially, instead of solving the problem the United States created a large bureaucratic system that could not address the issues.

Progress has been made since 1996 however. The failure of the HIPAA led the Institute of Medicine to release a report in 2009 addressing their concerns that privacy rules make research difficult to conduct, and inadequately protect patient's and subject's privacy. They delivered a handful of suggestions, including eliminating informed consent for health information, but failed to address the issue[20]. However, in the same year the HITECH act, mentioned earlier, strengthened HIPAA's privacy and security guidelines. It imposed more privacy obligation on covered entities, expanded on business associates requirements, added provisions to hospital information systems, and most importantly

[18] Westfall J. Privacy: Electronic information and the Individual. 2010. <http://www.scu.edu/ethics/publications/submitted/westfall/privacy.html>.

[19] Norman, Ishmael D., M. K. Aikins, and F. N. Binka. "Ethics and Electronic Health Information Technology: Challenges for Evidence-Based Medicine and the Physician-Patient Relationship." Ghana Medical Journal 45.3 (2011): 115-24. National Center for Biotechnology Information. Ghana Medical Journal, Sept. 2011. Web. 7 Feb. 2012. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3266146/pdf/GMJ4503-0115.pdf>.

[20] Rothstein, Mark A. "Improve Privacy in Research by Eliminating Informed Consent. IOM Report Misses Its Mark." Wiley Online Library. The Journal of Law, Medicine, and Ethics, 28 Aug. 2009. Web. 07 Feb. 2012. <http://onlinelibrary.wiley.com/doi/10.1111/j.1748-720X.2009.00411.x/pdf>.

increased enforcement and monetary civil penalties for failure to abide by the rules[21]. Even with the continued analysis and improvement of the original HIPPA 1996 Act, there are still gaps in the system however.

In New York for example, when patient's medical records become part of the electronic network their information is automatically added, and patient's consent is not needed. And even when providers ask for consent they have no choice of what information is added. It is either all of it, or none of it[22]. The lesson to be learned from the United States is even with this heightened awareness for security and sixteen years of working to improve patient information security in a digital age; there is yet to be a comfortable middle ground for patient information security and using health information for the benefit of public health.

In Ghana, with its limited resources, this lesson can provide an understanding for how complicated of an issue patient information security is in a digital age. The time to begin preparing for patient information security is now.

Statement of Interest in the Issue

While I am not taking sides on the question of if the resource deprived world should use hospital information systems or not, I believe we will see their attempted use in the future. Ghana's *Health Sector ICT Policy and Strategy* makes it clear the government plans to use hospital information systems in the country's future. My interest comes from making sure these implementations, successful or not, do not abuse the citizen's right to their health information being protected. My specific interest in

[21] Hiller, Janine, Matthew S. McMullen, Wade M. Chumney, and David L. Baumer. "Privacy and Security in the Implementation of Health Information Technology (Electronic Health Records): U.S. And EU Compared." Boston University School of Law Journal of Science and Technology Law 17.1 (2011). 2011. Web. 11 Mar. 2012. <http://www.bu.edu/law/central/jd/organizations/journals/scitech/volume171/documents/Hiller_Web.pdf>.

[22] Carey, Corinne A. "Marketplace." The Buffalo News. 10 Mar. 2012. Web. 11 Mar. 2012. <http://www.buffalonews.com/editorial-page/from-our-readers/another-voice/article756501.ece>.

Ghana comes from 11 months of living in Ghana as a student and traveler. I specifically conducted research on mobile technologies for social advocacy during my time there.

Pre-existing Policies

Before jumping into policy surrounding patients right's to confidentiality and information security, it is important to first look at policy that will be determining the direction of ICT use in the Ghanaian healthcare system. To do this we will, identify policy that provides the framework for the future of ICT in healthcare, build upon that by identifying detailed plans of specific technologies for HIT development within the health sector, and finally identify policy pertaining to patient's information security. With an understanding of the proposed HITs and patient information policy we can identify gaps in patient's information security based on actual HIT implementation.

Striving for ICT development and deployment

The Republic of Ghana's policy expresses a strong interest in the use of ICTs to improve health care in Ghana. This was first published as policy in 2003 when The Republic of Ghana published the, *Ghana ICT for Advanced Development (ICT4AD) Policy*. The subtitle for the paper reads:

> *A policy statement for the realization of the vision to transform Ghana into an information-rich knowledge-based society and economy through the development, deployment and exploitation of ICTs within the economy and society*[23].

The policy touches on the need to incorporate ICT into the national health care system, gives objectives, and provides strategies to reach each objective. The ICT4AD addresses ICTs for a variety of national issues however, and therefore lacks detailed health sector plans. To create a more detailed framework for the health sector specifically, the Ghana Health Services released *The Health Sector ICT Policy and Strategy* in 2005. It states:

[23] Republic of Ghana. The Ghana ICT for Accelerated Development (ICT4AD) Policy. Page 1. 2003. <http://www.ghanahealthservice.org/includes/upload/publications/Ghana%20ICT4AD%20Policy.pdf>.

> *The Government of Ghana is committed to implementing a number of initiatives aimed at facilitating the widespread deployment and utilization of ICTs to support the activities and the operations of the health delivery system throughout the country*[24].

The 2005 policy addresses the objectives and strategies of the 2003 ICT4AD, but goes into further detail on each objective by providing current and future programs, initiatives, and activities to support each objective's strategies. We will focus on the sections of *The Health Sector ICT Policy and Strategy* that involve Health Information Technologies.

Three of the four objectives identified by the GHS in the *Health Sector's ICT Policy and Strategy* relate to implementing health information technologies. Below is a table representing the three objectives, and the strategies to obtain each.

Table 1.1 Objectives Pertaining to Health Information Technologies:

Objectives	Strategies to Reach Objective
1. Improve the Information and Communications Technology Infrastructure in the health Sector	1.1 Facilitate and improve connectivity and access to communication services, including the internet, in all types of healthcare and health-related institutions and organizations. 1.2 Provide adequate ICT hardware, software and tools at all levels of the healthcare delivery system to support the collection and use of healthcare information
2. Improve Access to and Management of Health Information	2.1 Develop and deploy a system of ICT-based programs to disseminate health information 2.2 Develop and deploy a network of health information management systems
3. Improve Access to Quality Health Services	3.1 Deploy telemedicine application in the health sector 3.2 Deploy ICTs to enhance referral, emergency and disaster management systems 3.3 Deploy ICTs to support and enhance blood banking and organ donation systems

Source: Republic of Ghana. Ministry of Health. *Health Sector ICT Policy and Strategy.* July 2005.

These objectives and strategies give a glimpse into the direction Ghana is going as far as health information technologies, but does not provide specific technologies to be introduced. To be able to

[24] Republic of Ghana. Ministry of Health. Health Sector ICT Policy and Strategy. Page 16. July 2005. <http://www.ghanahealthservice.org/includes/upload/publications/Health%20Sector%20ICT%20Policy%20and%20Strategy.pdf>.

identify gaps in policy we need to know the exact health information technologies and initiatives Ghana hopes to deploy.

Health Information Technology Initiatives in Ghana

While the exact software of the technologies that will be implemented has not been decided on, there are governmental policies detailing the planned implementation of health information technologies. With an understanding of the technologies to be implemented we can then address the gaps in patient information policy.

For each objective and strategy from Table 1.1 GHS has provided programs, initiatives, and/or activities that will help the health sector achieve their objectives. Below is a table showing GHS's proposed programs, initiatives, and/or activities for each strategy. This table essentially provides an outline for health ICT implementation in Ghana.

Table 1.2 Proposed Programs, Initiatives, and/or Activities in Relation to their Objectives

Strategies to Reach Objective	Proposed Programs, initiatives, and/or Activities
1.1 Facilitate and improve connectivity and access to communication services, including the internet, in all types of healthcare and health-related institutions and organizations.	1.1.1 **Networking Program –** All existing and new healthcare institutions (national, regional, district) will be networked to provide access to the Internet and to the Health Sector's Intranet. This program presupposes that the Government of Ghana will deploy a national network infrastructure to which the health sector can utilize. 1.1.2 **Security, Privacy and Data Protection Program** – This program will formulate procedures for deployment of network management and monitoring software, firewall and anti-virus software for securing the network from internal and external threats, and the tracking of access privileges. It will also ensure the integrity and confidentiality of data, routine back up procedures and include an emergency recovery mechanism.
1.2 Provide adequate ICT hardware, software and tools at all levels of the healthcare delivery system to support the collection and use of healthcare information	1.2.1 **ICT Census –** A census will be taken to determine the scope of ICT activities in the health sector at primary, secondary and tertiary institutions; and also at the national, regional and district levels. It will capture information on: • Range of hardware and software • Network connectivity • Types of applications • Levels of ICTs utilization • Range of database management systems in use • Types of ICT programs (e.g. Telemedicine) • Number and skill set of ICT human resources

	• ICT or help desk support • ICT funding 1.2.2 **Hardware and Software Program** – The program shall include planned preventive maintenance for existing hardware, standardized specification guidelines for the procurement of new hardware, and a phased hardware replacement program. A standard platform of network application software development shall be specified. A system for reviewing and updating all software and hardware standards will be put in place and updated yearly.
2.1 Develop and deploy a system of ICT-based programs to disseminate health information	2.1.1 **Health Information Portal Project** – This project will result in the development of a public awareness system through the internet. The guidelines for the design of the portal, how and what types of information are presented, and update cycles will be developed by all the partners in the health sector. Some functionalities of the portal will be: • Personalization and notification – allowing users to select and receive information relevant to their interests and roles • Searching – the ability to search for information buried across multiple formats and sources • Unified access – organizing and disseminating information assets, whether structured (databases, spreadsheets) or unstructured (documents, web pages) 2.1.2 **Radio, Audio and Video Health Transmission Initiative** – The goal of this initiative is the dissemination of health information to the portion of the population that are illiterate, who live in rural areas, and other people who may benefit from targeted specialized health information (such PWLHA, women, the disabled). The radio, audio and video programs will be produced by all segments of the health sector and will, most importantly, benefit from the involvement of non-governmental organization and academic institutions. These programs can be broadcasted at health, education, and social facilities. 2.1.3 **Youth Information Network** – The aim of this network is to build a nationwide platform, with extensive representation at the district and community levels, through which information can be accessed and shared by the youth. Information on HIV/AIDs, teenage pregnancy and other youth- centered health challenges will be available. In addition, this network will link schools, community centers, NGOs and other you-centered organizations such as virgin clubs. Information will be available through specialized websites, online forms, radio and television programs, the arts, and through mass storage and interactive technologies.
2.2 Develop and deploy a network of health information management systems	2.2.1 **Consolidated Health Information System Initiative –** A consolidated Health Information System that consolidates existing health data that is already collected throughout the entire health sector will be developed and/or purchased and deployed across the health sector. This system will unify all the diverse public health surveillance software platforms currently in use by the parallel programs (EPI, Reproductive and Child Health, AIDs Control, Disease Surveillance, etc) in the health sector. This approach produces usable (and useful) automated support in a fairly short time frame (6-12 months). The system will include the following components: • A central repository or databank at the national level that will

provide aggregated and disaggregated data for use by all authorized persons and non-private data for the general public
- A set of agency-specific distributed and linked databases
- A system of assuring quality and validation of data in the repository
- Modules that provide for comprehensive and frequent feedback can be deployed over the internet

The consolidated Health information system must have an open architecture and be built on an open software platform to allow for modifications over time. The Ministry of Health will set the software and database management system platform in consultation with its agencies, other ministries, stakeholders and partners in the private sector.

Each agency will have its own system and data repository within the system. However, some agencies will deploy their systems across the entire nation's health sector. For instance, the hospital management information system, developed or purchased by Ghana Health Services, will be deployed in all hospitals, including the teaching hospitals. This will ensure nationwide compatibility. Private sector institutions, such as CHAG, other private hospitals and health-related NGOs can also use the system to collect, collate and analyze health data.

It is expected that the initial set of systems will include:
- Ghana Health Services Information System
- Teaching Hospitals Information System
- National Health Insurance Information System
- Food and Drugs Board Information System
- Pharmacy Information System
- Nurses and Midwives Council Information System
- Medical and Dental Council Information System
- Private Hospitals and Maternity Homes Information System
- Traditional and Alternative Medicine Information System
- National Emergency Information System
- CHAG Information System
- Private Sector Information Systems

Agencies and private sector users of the system will designate an authoritative source for all data entered into the system. The consolidated system must facilitate collaboration, information exchange and dialogue between the Ministry, its agencies, and the private sector. The Ministry of Health will provide technical and financial assistance to agencies to adapt the system to their own mandates and contexts and will facilitate the corresponding process within the private sector. The Ministry of Health will also provide technical and financial assistance to BMCs for the deployment of the system, and will also support the training of staff in maintenance and use of the network of systems.

2.2.2 **Hospital Management Information System (MIS) Project** – The deployment of a hospital MIS will be the first priority of the consolidated health systems initiative. The MIS will be chosen through competitive bidding and in full compliance with the country's procurement laws. The selected system will include but not limited to the following core modules:

	• Admissions, Discharge & Transfers • Minimum Data Set of Patient Records • Order Entry • Laboratory • Pharmacy • Patient Billing The selected MIS must also meet the information requirements of the National Health Insurance Scheme 2.2.3 **Migration to Integrated Health Information System Project** – A significant limitation of the consolidated system is the degree of integration of service information. In the consolidated system data is aggregated, usually at the facility or community level, before it enters the system. This tells us nothing about the clients, their socio-economic characteristic, or the quality and cost of services delivered, for example. This sort of analysis requires special studies such as surveys, or reconfiguration of the whole information system, including data capture forms. In theory, health sector information can also be correlated with information from other sectors such as education, agriculture, and commerce, to deal with issues such as malnutrition and to project future needs and opportunities. Such a system can also provide a foundation for countless research opportunities. An approach that integrates client information from multiple clinical encounters, and the resources used during these encounters, can capture information needed for this detailed analysis. This system requires a unique identifier per health record or data. It can be used to support regulatory functions such as licensing and accreditation, and can also form a basis for actuarial analysis leading to better estimates of the expected costs of health care. An integrated system like the one described is an evolving platform for recording and analyzing information. It should not be based on any proprietary features, and should be fully compliant with international norms and standards for data, coding schemes and software. It must be built in incremental steps using modular elements. Migration to this type of system will take several years or maybe decades. The project will begin with the planning and budgeting for the proposed migration. 2.2.4 **District Information Systems Development –** N/A
3.1 Deploy telemedicine application in the health sector	3.1.1 **Telemedicine Development Committee** – The work of this committee will be to review and recommend a telemedicine framework for the health sector. The initial work of this committee will be to identify basic healthcare needs, assess the ICT infrastructure, investigate any restraining and enabling factors, and explore and recommend any telemedicine technological solutions that will ultimately improve the delivery of health services especially in the rural areas. 3.1.2 **Telemedicine Pilot Project** – A telemedicine pilot project will be developed and launched, based on the recommendations and work of the Telemedicine Development Committee
3.2 Deploy ICTs to enhance referral, emergency and disaster management systems	3.2.1 **Radio-based Links Project** – This project will introduce radio links between district health system sites and other health sites in close proximity (approximately 10 kilometer range)
3.3 Deploy ICTs to support	N/A

and enhance blood banking and organ donation systems	

Source: Republic of Ghana. Ministry of Health. *Health Sector ICT Policy and Strategy.* July 2005.

Using these strategies and proposed programs, the future healthcare system's ICT structure becomes clear. GHS plans to utilize a national network to connect as many healthcare systems as possible through the internet, and an intranet (strategy 1.1). Additionally, a national health information system will be created where public and private parties can access a consolidated database of healthcare data (strategy 2.2). Strategy 2.2 describes a nationally standardized EMR system where data will be used to provide an array of health information through different modes of distribution to the general public (strategy 2.1). Policy states that what information will be available on this public health database will be determined by all partners in the health sector[25]. Additionally, a telemedicine pilot project is to be implemented (strategy 3.1). In short, there will be HITs with various stratifications of data availability. Data will be available to groups as select as patient's doctors, and as open as the general public.

The final technology that is rapidly evolving is the mobile health tool. One example of this is the MOTECH project mentioned earlier. At the time of writing, two of the four featured publications on the GHS's website are about the potential future of mobile health (the other two publications are the *Ghana ICT4AD Policy* and *Health Sector ICT for Policy and Strategy*). In total GHS has four publications focusing on mobile health (mhealth). The publications identify eight individual pilot projects using mhealth tools in Ghana that are already being used to collect health data, facilitate telemedicine, provide health messages to clients, follow up on women and children to reduce service dropout rates, manage logistics

[25] Refer to page 26 of the *Health Sector ICT Policy and Strategy.*

to reduce stock outs, conduct facilitative supervision, and to conduct health surveys(cite both mobile develop articles)[26, 27]. Some benefits of mhealth over traditional public health tools are identified here:

> *1. Mobile devices can be easily used at the lowest level of service delivery.*
> *2. It is easy to train health workers to use it.*
> *3. It can be a useful tool for following up clients and ensuring that drop-outs are minimized.*
> *4. It can be used to generate reports.*
> Source: Republic of Ghana. Ghana Health Services. Mobile Devices - The Essential Medical Equipment for the Future. By Anthony Ofosu. Web. 12 Mar. 2012. <http://ghanahealthservice.org/includes/upload/publications/Mobile%20Devices.pdf>.

Since mhealth is such a new phenomenon there is no policy stating the GHS plans to implement mhealth tools nationally, though the publications on the GHSs suggest mhealth be implemented into national healthcare. While mhealth is far from a fix all solution, the potential benefits are summed up well here:

> *There is the need for a clear policy direction by the Health Service on the use of mobile devices in health. There is the need to draw lessons from the various projects that are being implemented. It is envisaged that given the necessary consideration, mobile devices running relevant applications will become very important medical equipment- as important as the stethoscope.*
> Source: Republic of Ghana. Ghana Health Services. Mobile Devices - The Essential Medical Equipment for the Future. By Anthony Ofosu. Web. 12 Mar. 2012. <http://ghanahealthservice.org/includes/upload/publications/Mobile%20Devices.pdf>.

GHS have outlined a detailed plan to integrate HITs in the health sector. While the details of who will have access to what information are unclear, they have stated the need to create publicly available health portals. In addition, new mhealth tools are proving successful in addressing public health challenges. The goals outlined by the GHS and the rapidly changing mhealth field create visions of a dramatically different healthcare system in Ghana then we see today. How, how soon, and who is responsible for implementing these programs though?

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[26] Republic of Ghana. Ghana Health Services. Potential for Mobile Phones to Improve Healthcare in the Developing World. Web. 22 Feb. 2012. <http://ghanahealthservice.org/includes/upload/publications/Mobile%20health.pdf.>

[27] Republic of Ghana. Ghana Health Services. Mobile Devices - The Essential Medical Equipment for the Future. By Anthony Ofosu. Web. 12 Mar. 2012. <http://ghanahealthservice.org/includes/upload/publications/Mobile%20Devices.pdf>.

Proposed Timeline and Agencies Involved

With such an aggressive plan to incorporate ICTs to the health sector, it is important to identify real time goals and agencies responsible for completing the complicated projects planned. *The Health Sectors ICT Policy and Strategy* contains a timeline. Unfortunately, most of the proposed dates have passed without any signs of implementation. The following is the ICT Policy and Strategy's proposed timeline:

Table 1.3: GHS's Proposed Actions, Action's Priorities, and Timeline for each Action

Priority	Action	Timeline
1	Establish the health Information and Communication technology Advisory Committee	July - October 2005
1	Develop guidelines for ICT utilization and for the legislation of privacy and confidentiality issues	August - October 2006
1	Telemedicine Development Committee	July - August 2005
2	Establish ICT Task Force in each agency of MoH as needed	July - January 2006
3	ICT Census	June - August 2005
4	Implementation Plan for Health Sector ICT Policy and Strategy	June - November 2005
4	Complete Hiring or Outsourcing and Reorganization of IT Core Technical Team at the National Level	July - March 2006
4	Networking Program	July 2005 - No End Date
5	Consolidated Health Information System	July 2005 - June 2008
5	ICT Skills Set Project	July - October 2005
5	Radio-based Links Project	July - June 2007
5	Hospital Management Information System (MIS) Project	June 2005 - September 2006
6	Health Information Portal Project	July 2005 - July 2006
6	Telemedicine Pilot Project	September 2005
6	Health ICT in Educational Programs Initiative	September 2005
6	Security, Privacy and Data Protection Program	July - No End Date
6	Hardware and Software Program	July - No End Date
7	Radio, Audio and Video Health Transmission Initiative	September 2005 - March 2006
7	Youth Information Network	September 2005 - September 2007
7	Interactive Health Network	September 2005 - September 2007
8	Electronic Library Project	November 2005 - November 2007
9	Begin Planning to Migrate to Integrated Health Information System Project	September 2006

An initial search of the internet for any information regarding the first three actions, identified as first priority actions, returned no results. Policy states the, "timely implementation of these programs and initiatives are subject to the availability of funds, the rate of infrastructure development, and the availability of ICT personnel[28]." While a lack of electronic information pertaining to the proposed committees does not mean these committees have not been formed, it is discouraging.

The organizations responsible for completing the proposed objectives, or the key implementing organizations, vary from the *Ghana ICT4AD Policy* to the *Health Sector ICT Policy and Strategy*. The lists of agencies are similar, but there are a few key agencies named in one and not the other. Below is a combined list of the implementation agencies identified in either policy:

- Ministry of Health
- Agencies and governing Councils of Ministry of Health
- Health Training Institutions
- Health Research Institutions
- Ghana medical schools
- Other government health organizations
- Private sector health institutions and businesses
- Public and private teaching institutions
- Other ministries, departments, and agencies of the Government of Ghana
- District Assemblies
- CHAG and mission institutions
- Nongovernmental organizations
- Public and private broadcasting sector
- Telecommunications sector
- Armed forces

  Source: *Health Sector ICT Policy and Strategy, Ghana ICT4AD Policy*

If the list is broken down into groups the Republic of Ghana identifies various government agencies, private health agencies, school and research institutions, nongovernmental organizations, and broadcasting and telecommunication agencies. The planned implementations accordingly requires

[28] Refer to page 32 of the *Health Sector's ICT Policy and Strategy*

coordination between a broad range of agencies, but the lists lack the required details to implement the proposed projects.

At least with an understanding of the proposed health information technologies, initiatives, and key implementing agencies, we can finally address patient information security policy. This ultimately allows us to identify gaps and lapses in current patient information policy so suggestions can be made.

Existing HIT Privacy Policy

We already addressed that patient information security is inherently contradictory. While some believe private health information should remain private, there is another side of the argument that expresses a need for health information to improve public health procedures. Patient information policy follows the same trend.

Starting with universal documents, Article 3 of the Universal Declaration of Human Rights states, "Everyone has the right to life, liberty and security of person[29]." This pertains to patient's health information because patient's ability to secure their private information is the same their right to security of person. However, the same document declares, "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services[29]." This right is contradictory to the first because to improve healthcare to a standard all humans define as adequate, more public health data needs to become available so procedures can be assessed for their effectiveness.

Even within Ghana the same contradictory trend persists. The Republic of Ghana's constitution addresses patient's right to their information being protected in Article 18(2). It states, "No person shall be subjected to interference with the privacy of his home, property, correspondence or communication except in accordance with the law[30]."While the article does not directly state patient's health

[29] UDHR. *The Universal Declaration of Human Rights*. UN. Web. 06 Mar. 2012. <http://www.un.org/en/documents/udhr/>.

[30] Republic of Ghana. *The Constitution of the Republic of Ghana*. 1993.

information as subject to not being infringed on, Article 21(f) of the Constitution guarantees the right to information within the confines of the law. This right was applied to health information when the Lister Hospital refused to release Mrs. Vaah's medical records so she could seek healthcare elsewhere. When Mrs Vaah took the issue to the Human Rights Court, Judge Dery declared, "The right to medical records constitutes a right to information which is a fundamental human right. So, once the respondent refuses to give the applicant her medical records that prima facie is an infringement on the applicant's fundamental human right[31]." This ruling essentially declares patient's EMRs as their personal property and in accordance with Article 18(2), individuals property should not be infringed on. Between the constitution and the Vaah ruling no person should have their property, including their medical records, subject to interference unless in accordance with the law.

Additionally, the GHS sides with the privacy of patients. Points 7 and 8 of the GHS Patient's Charter states:

> *7. The patient has the right to privacy during consultation, examination and treatment. In cases where it is necessary to use the patient or his/her case notes for teaching and conferences, the consent of the patient must be sought.*
>
> *8. The patient is entitled to confidentiality of information obtained about him or her and such information shall not be disclosed to a third party without his/her consent or the person entitled to act on his/her behalf except where such information is required by law or is in the public interest*[32].

These two rules call for informed consent of the patient before any medical record information is released to any third party, except when the law or public interest requires it. Unfortunately, the *Health*

[31] Edwin, Ama K. "Editorial Commentary: Ethics and Electronic Health Information Technology."Ghana Medical Journal 45.3 (2011). Ghana Medical Journal, Sept. 2011. Web. 8 Feb. 2012. <http://www.ghanamedj.org/articles/September2011/Final%20Editorial%20Commentary.pdf>.

[32] Republic of Ghana. Ghana Health Services. Patient Charter. Web. 22 Feb. 2012. <http://www.ghanahealthservice.org/aboutus.php?inf=Patients>.

Sector's ICT Policy and Strategy calls for patient's information to be made available to organizations of interest, and does not mention any informed consent[33].

This is when it becomes unclear as to when patient's information can be released. Public interest is a broad subject. Such broad exceptions are dangerous, especially in Ghana where in 2010 the U.S. Department of State found instances of arbitrary privacy interference in areas like unfair arrests, denial of fair public trail, and unlawful police searches[34]. With corruption still evident in the government, broad exceptions to patient's privacy can be very dangerous to patient's rights.

Additionally, the *Ghana National Health Insurance Regulations (L.I. 1809)* of 2004 calls for patient information including health facility attendance, prescriptions, diagnostics, and domestic household information, being made available to a number of professionals including health insurance providers, managers and administrators for auditing, and others. Even with these aggressive calls for availability of patient's health information, there are no clear definitions against unwarranted disclosure of the patient's information in the document[35]. The same document gives the National Health Insurance Scheme (NHIS) the ability to discontinue service to anyone because of non-disclosure of any material information requested[36]. The *Health Sectors ICT Policy and Strategy* specifically states, "The selected [Hospital Management Information System] MIS must also meet the information requirements of the National Health Insurance Scheme[37]."

Another Act, the *National Identification Authority Act 707*, conceived in 2006, describes the need for national identity cards that will be used to create a large database of information to be used for

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[33] Refer to Table 1.2, Proposed Programs, initiatives, and/or Activities 2.2.1, 2.2.2, and 2.2.3.

[34] United States. Department of State. Bureau of Democracy, Human Rights, and Labor. 2010 Human Rights Report: Ghana. 08 Apr. 2011. Web. 12 Mar. 2012. <http://www.state.gov/j/drl/rls/hrrpt/2010/af/154349.htm>.

[35] Norman, Ishmael D., M. K. Aikins, and F. N. Binka. "Ethics and Electronic Health Information Technology: Challenges for Evidence-Based Medicine and the Physician-Patient Relationship." Ghana Medical Journal 45.3 (2011): 115-24. National Center for Biotechnology Information. Ghana Medical Journal, Sept. 2011. Web. 7 Feb. 2012. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3266146/pdf/GMJ4503-0115.pdf>.

[36] Republic of Ghana. National Health Insurance Authority. National Health Insurance Regulations (L.I. 1809). 2004. Accra.

[37] Refer to Table 1.2, Proposed Programs, initiatives, and/or Activities 2.2.2.

policy and national strategies. The information in the database would contain personal as well as family data and there is no clear plan for how the data would be used and what policy and strategies would be implemented by using the data. More importantly the act does not identify any security or anti exploitative plans for the data[38].

Relating directly back to the *Health Sector ICT Policy and Strategy*, the timeline identifies a security, privacy, and data collection program as a level six priority out of nine. Given, one of the three objectives with a level one priority is to develop guidelines for ICT utilization and for the legislation of privacy and confidentiality issues[39]. But the fact that the development of a security, privacy, and data collection program is behind in priority level to the creation of a consolidated health information system, hospital management information system, and the health information portal project that will be based on patient's data collected by the consolidated health information system and hospital management information system is worrisome because it shows the collection and public display of patient's information is a higher priority than the creation of a security, privacy, and data collection program.

There are signs that the protection of patient's information is a priority for the government. There is policy written protecting patient's information; however, there is contradictory policy that provides unclear access to patient's data. Moreover, who the data can be released to is unclear in some circumstances. With this information in hand, gaps and lapses in patient information security can be identified, and recommendations made.

[38] Norman, Ishmael D., M. K. Aikins, and F. N. Binka. "Ethics and Electronic Health Information Technology: Challenges for Evidence-Based Medicine and the Physician-Patient Relationship." Ghana Medical Journal 45.3 (2011): 115-24. National Center for Biotechnology Information. Ghana Medical Journal, Sept. 2011. Web. 7 Feb. 2012. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3266146/pdf/GMJ4503-0115.pdf>.

[39] Refer to Table 1.3

Potential Bias

It is easy for an American undergraduate to research policy and find gaps, but it is impossible to address the true complexity of creating and implementing policy in Ghana. After having spent eleven months in Ghana and traveling to Burkina Faso, Mali, Senegal, The Gambia, Guinea-Bissau, Sierra Leone, and spending two years studying West Africa, I am no more confident of the various issues African governments face. This is not to say I have not learned, but my understanding of the issues is young, as am I. I believe corruption and bureaucracy are innate challenges of any democracy, young or old. I believe innovation is essential in solving problems, and have done research on mobile technologies for social advocacy. I have the disadvantages and advantages of not being a part of Ghanaian culture. When I left Ghana my friends joked that after eleven months I could finally understood the social queues of an eight year old Ghanaian, but I recognized parts of their society that they had never seen themselves. So while at times I completely misunderstand or cannot even conceive, I also have a rare outsider's perspective. The idea of an outsider having a different perspective solidified when I returned to the United States and saw things differently after being away from them for nearly a year. In short, I am only providing humble recommendations based on my research and global sociology background. I can only hope my work improves the current situation, but I cannot say I have all the right answers. Wo bo adwuma. Nyame adom.

Policy Recommendations

Before giving recommendations it is important to identify the issues we are hoping to address. There are three key issues in the current policy that are related to patient information security. The first is the contradictions of patient information security in current policy. For example, the Ghana Health Service *Patient Charter* calls for informed consent in any collected data, however; the *Ghana National*

Health Insurance Regulations (L.I. 1809) and the *National Identification Authority Act 707* demand a collection of a variety of information and threatens to discontinue service if all the information is not provided. No where within either of the National Health Insurance Scheme documents does it mention informed consent. Secondly, there is no realistic plan of action. Even though a timeline and agencies responsible for implementation are identified, the current infrastructure and ICT skills are used as an excuse to delay implementation. This relates to patient information security because without clear plans of action proper policy on patient information cannot be created. Lastly, innovative technologies are ignored, or the policy is too outdated to address them. This relates to patient information security because with all the pilot projects using these innovative technologies, patient information security has to be accounted for.

There have been numerous mhealth projects with positive results. One example not mentioned before was invented by twenty-four year old Cameroonian, Arthur Zang. Cameroon has a population of 20 million, thirty of which are heart surgeons. Those thirty heart surgeons are only located in two cities. Zang's Cardiopad allows doctors to monitor several aspects of the heart and remotely diagnose a patient[40, 41]. There are other technologies like the Ghana Consultation Network (GCN), a disconnection-tolerate worldwide network, meant to connect Ghanaian doctors across the globe for doctor to doctor consultations[42]. In the policy available there is no mention of any innovative technologies or the patient information securities that these projects create. These technologies may be better fit for Ghana's infrastructure and ICT skills, ultimately leading to their use, so policy needs to reflect their use.

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[40] Nzouankeu, Anne M. The Cardiopad: An African Invention to Save Lives. Rep. Radio Netherlands Worldwide, 7 Feb. 2012. Web. 14 Mar. 2012. <http://www.rnw.nl/africa/article/cardiopad-african-invention-save-lives>.

[41] Johnson, Jazzi. "Zang's Cardiopad: From African to African-American History." Living Civil. 10 Feb. 2012. Web. 14 Mar. 2012. <http://livingcivil.com/zangs-cardiopad-from-african-to-african-american-history/>.

[42] Luk, Rowena, Matei Zaharia, Melissa Ho, Brian Levine, and Paul M. Aoki. ICTD for Healthcare in Ghana: Two Parallel Case Studies. Rep. International Conference on Information and Communication Technologies and Development, 18 Apr. 2009. Web. 14 Mar. 2012. <http://arxiv.org/ftp/arxiv/papers/0905/0905.0203.pdf>.

With a total of three issues identified, there will be three recommendations to address them. Each recommendation will be identified, and then the advantages and disadvantages assessed. The three recommendations are, detailing the agencies involved and coordinating between all the agencies so a single coherent patient information policy can be published, planning a budget and source of funding, and finally updating policy so innovative technologies best fit for Ghana's ICT infrastructure and skills are utilized and their patient information security risks identified.

Coordinating with all Agencies Involved to Formulate a Coherent Patient Information Policy

Identifying the necessary agencies and coordinating between them is the most complicated recommendation of the three. First, the necessary agencies need to be identified. Based on the list generated by the *Ghana ICT4AD Policy* and the *Health Sector ICT Policy and Strategy* there is already a general idea of the agencies that will be involved. With the current policy the government agencies that need to be involved are more obvious, but private and nongovernmental agencies need to be narrowed down. For example, current policy states, "Private sector health institutions and businesses," "CHAG and mission institutions," and, "Nongovernmental organizations," are key implementing agencies. This is too broad of a field. Individual private and nonprofit organizations need to be identified and partnered with to produce private information policy.

Once the involved agencies are identified, there needs to be coordination between all the agencies so a single, coherent document is produced. This document needs to address all previous policy involving patient information security, and create a document that all involved agencies are aware of. The document will be the basis for future acts and regulations concerning the collection of information, who needs to be aware of what data is collected, what data can be collected, what are the punishments for breaking the policy, and who should be informed and how should they be informed when information is unlawfully obtained or used.

Advantages

There are two advantages to be addressed. The first is the creation of a policy paper that makes clear the right of patients to their data security. By involving all necessary agents in the creation of the paper all agencies can move forward with a clear understanding of the law. This will eliminate current contradictions in policy and law. The second advantage is by utilizing individual private and nonprofit organizations the creditability of the policy will be increased because it will include a global opinion on the policy by creditable agencies outside of Ghanaian government. This is dependent on the selection of creditable, nonbiased organizations though.

Disadvantages

One disadvantage of the recommendation is the obvious bureaucratic and financial challenges that are preventing the coordination from already happening. Organizing such a large group and compromising the needs of each agency to provide a coherent policy is a complicated time consuming process. It will take administrative organization and significant amounts of money to effectively be completed.

A second disadvantage is the potential for bias selection of private and nonprofit partners. With sensitive information like patient's health information at risk the potential harm of biased and ill conceived policy is serious. If poorly chosen partners abuse the privilege to decide on national policy the document will not be effective in protecting patient's information. The private partners the Ghanaian government decides to work with could create a creditable policy or a system where private partnerships gain more than the citizens of Ghana.

Planning a Budget and Source of Funding

The current policy has a timeline, but the given dates have passed and there is no information available online that shows any of the proposed programs have been initiated. Without a creditable plan of action to implement the proposed technologies a patient information policy cannot address the

issues it needs to, ultimately becoming ineffective. To create a realistic timeline there needs to be a budget, and a source of funding. GHS already identified the telecommunication sector as a key implementation agency. By working with the telecommunication sector a realistic timeline and budget should be produced so implementation is not, "Subject to the availability of funds, the rate of infrastructure development, and the availability of ICT personnel." By working with the telecommunications sector to detail the availability of ICT infrastructure, skills, and budget, GHS can create active policy instead of the current passive policy. Using the information from the telecommunications sector GHSs and partner agencies can create a budget for the implementation of the proposed programs and projects and acknowledgment the sources of funding. This will provide a path for the implementation of the proposed HITs and make the patient information policy based on the proposed HITs effective. In addition it will prevent the stalemate that exists now where programs and projects have been proposed, but no policy moves the programs forward.

Advantages

The advantages of creating a budget and source for funding are a proactive policy that will result in action that addresses the proposed policy on patient information security. Once a budget and source of funding are identified the key implementation agencies will be responsible for obtaining funds and using the money specified in the budget to implement the programs and projects. This will shorten the implementation time frame and ensure the patient information policy will be relevant to the proposed HITs. In short, the advantage would be active policy that coordinates with patient information policy and creates a responsibility for the involved agencies to act on their policy. Currently there is a lack of proactive policy and it threatens the implementation of the proposed HITs.

Disadvantages

Again, if this were easy it would already be done. Creating a budget and source for funds will require jumping bureaucratic hurdles and financing the administrative organization necessary to

coordinate an array of governmental and private agencies. However, creating proactive policy and putting responsibility on the key implementing agencies would be a worthwhile investment given the perceived output of action.

Including Innovative Technologies Best Fit for Ghana's ICT Availability

The ICT challenges identified in Ghanaian policy and various reports make clear implementation of large scale HITs will not be easy. This combined with passive policy on the implementation of HITs threatens the implementation, and therefore the relevance of the proposed patient information policy. There are multiple case studies of technologies that adapt to the unique challenges of the available resources Ghana has to offer. I have identified a few mhealth and consultation networks in this paper, but there are innumerable case studies of successful implementation of innovative technologies specifically designed for resource deprived areas. Given the amount of pilot projects and their successes patient information policy needs to adapt to these technologies. Also given the success of the technologies, a comprehensive review of innovating pilot projects in health should be conducted and the advantages of using the innovations should be put into policy. In cases of successful implementation the agencies involved in implementation should be consulted and successful projects should be scaled up. In some cases GHS has already partnered with successful pilot projects. If technologies exist that work in the available ICT infrastructure, are designed with the available ICT skills in mind, and are low budget, there is no need to wait for better infrastructure to implement technologies that have the same output of the technologies available now. By including innovative technologies in policy patient information policy can also address the security issues.

Advantages

This creates a more proactive solution to the challenges of ICT infrastructure, ICT skills, and budgetary restrictions currently identified by the Ghanaian government and private organizations. Additionally, this goes against the cookie cutter tendencies of development by looking outside of the

current solution seen in resource rich areas, and trying to implement technologies better fit to Ghana's resources. By implementing different technologies better fit for the local environment in Ghana the challenges created by implementing technologies not fit for the environment can be ignored. Relating the advantages to patient information security, but including these innovative technologies in implementation policy patient information policy can reflect the issues they create.

Disadvantages

While known challenges can be ignored, new ones will arise. Scaling up successful projects is not always a smooth process. It is also risky to use strategies and technologies that have not been used on a large scale. All technologies existed in the pilot stage at some point however, and challenges can be overcome, but some attempts of scaling up will ultimately fail. These disadvantages are also in addition to the ever present issue of dealing with budgetary and bureaucratic issues.

Conclusions

To successfully implement patient information policy there needs to be proactive accurate policy that addresses the HITs to be implemented. While the current *Health Sector ICT Policy and Strategy* provides a solid understanding of the HITs to be implemented, it does not accurately address the future of HIT implementation given the innovative technologies that are being used. It also is passive by not providing a budget and sources for funding, ultimately leaving the organizations responsible for implementation leeway in implementing the proposed HITs. These issues threaten the effectiveness of a proposed patient information policy. The formation of a patient information policy will be time consuming and a financial burden, but the policy will provide security for every Ghanaian who uses the health care system.

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