

# A Study of the Issues of E-Health Care in Developing Countries: The Case of Ghana

*Completed Research Paper*

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## Abstract

This study explores the current situation of recently implemented e-health care system in Ghana, a developing country in West Africa. Basically, the study reports the results of a survey conducted to ascertain current issues faced by consumers (people) of the new e-health care system. Opinions of health care providers (doctors, nurses, administrators) were also captured through an interview to support findings from the survey. Among the top five issues identified, lack of (ICT) infrastructure is ranked the highest issue deemed as very dear to the heart of both consumers and providers. The remaining four issues include: lack of basic knowledge in ICT; internet; financial and sustainability issues and privacy/security. This result has wide implications as it informs all stakeholders about the grassroots problems and challenges that need to be strategically addressed first and foremost.

## Keywords (Required)

Electronic healthcare (e-health care), ICT infrastructure, consumers, providers, Ghana, developing countries.

## Introduction

The health care system of many developing countries, like the current situation in Ghana, is so plagued with several challenges and issues. The average cost of Ghana's healthcare has increased exponentially over the past few years. Percentage of health expenditure in Ghana increased from 29.54% in 2011, to 48.97% in 2012, representing about 65.8 percentage increase (Boohene et al., 2013). While Ghana's health system is relatively considered as one of the most robust and very competitive systems in West African, it lags behind other developing countries in delivering timely and effective quality care.

It is often difficult to find specialists for most medical conditions necessitating the transfer of patients from one hospital to a supposedly bigger one. Conditions of patients caught in this scenarios get complicated, with many of them dying before reaching their destination. Ambulances are only found in urban areas and national emergency telephone lines are not operating. Even though National Health Insurance Scheme is meant to provide universal basic access to health delivery, most people find it very difficult to pay the registration fee and subsequent renewals due to extreme poverty (Patrick and Laar, 2012).

The issue arising from scarcity of resources as a result of high population growth is breeding a whole lot of several social problems including poor healthcare, low family income (minimum wage: \$2.50), high labor unrest (threat of strike), corruption, and many more. Although the government is relentlessly working assiduously to fix these problems, the issue related to the healthcare of the citizens remains a topmost priority on government agenda for a long time.

In an attempt to improve the quality and standard of health delivery services provided to the citizens, Healthcare Information Technology (HIT), otherwise known as electronic healthcare (e-healthcare) system was introduced quite recently (May, 2013) in Ghana. E-healthcare is widely asserted to be one of the means for improving the quality of healthcare and potentially reducing cost (Korshy, 2005; Chaundhry et al., 2005; Dey et al., 2007). Calls for electronic health records and other forms of health IT improvement have been sounded for quite a long time in both previous and current government

manifestos. However, only recently has that call been heeded to with substantial financial incentive from current government coffers.

While calls for the use of information technology (IT) in healthcare has long been embraced in many countries, Ghana is still in its nascent stages of achieving meaningful use of the technology. This article basically focuses on two key stakeholders: the consumers (people) and providers (hospitals), and report from their perspectives key issues pertaining to the new e-healthcare system in Ghana. The conduct of this study is motivated by the following research question: *what are the current issues or challenges, regarding Ghana's new electronic healthcare system, do stakeholders (providers and consumers) consider most significant issue?*

To address this research problem, this study uses both survey and interview method with main analysis predominantly centered on consumers as they are considered the primary beneficiaries of the system. Results are analyzed by ranking top five issues based on consumers' response of survey questionnaire which is complimented by interview response from providers.

The rest of the paper is organized as follows. In section 2, the paper discusses review of related literature that motivates this study. Section 3 discusses research methodology used in executing this study. Section 4 explains the analysis of results and section 5 finally discusses our findings and concludes the paper.

## Prior Research and Related Studies

In spite of its recently achieved status as a middle-income country and a more robust health care system than many of its neighbors, Ghana is still experiencing shortage of skilled health workers, with only 1.14 nurses and 0.10 doctors per 1000 population as of 2010. This ratio is significantly below the World Health Organization (WHO) standards of 2.20 nurses and 0.20 doctors per 1000 population (GHWA 2010). Recognizing these challenges, Ghana has made notable strides to address its shortage of health personnel and improve health care delivery through the adoption and implementation of e-health systems.

A study conducted by Global Health Workforce Alliance (GHWA, 2010) presents a summary of key findings in Table 1. Basically, the study shows regional comparison of Ghana's health indicators with that of neighboring countries such as Cote D'Ivoire, Nigeria, Togo, Burkina Faso, Cameroun, and also with advanced countries such as the United Kingdom and the United States. It can be inferred from the results that Ghana as well as all the other regional neighboring countries are indeed plagued with high shortage of medical professionals (doctors and nurses) as opposed to that of the advanced countries. Consequently, there is high rate of infant and maternal mortality due to poor quality of skilled delivery.

Indicators	Ghana	Cote D'Ivoire	Nigeria	Togo	Burkina Faso	Cameroon	UK	US
Doctors/Pop (10,000)	1	1	4	1	1	2	21	27
Nurses/Pop (10,000)	10	5	16	3	7	16	63	98
Infant Mortality	76	114	186	88	169	131	6	8
Maternal Mortality	451	810	1100	510	700	1000	8	11
% Skilled Delivery	57	57	39	62	54	63	>99	>99

**Table 1: Ghana Health Indicators in Comparison to Neighboring and Target Countries**

In a study by Patrick and Laar (2012), electronic healthcare was defined as basically the application of Information and Telecommunications Technology in the health care industry with the aim of improving efficiency, access, quality of service, and training. Within this new healthcare system, citizens and patients are rather given more responsibility in the management of their own health and chronic diseases, leading to the gradual creation of a healthier nation. It was further pointed out that through e-health, patient records can be made shareable between both the patient and the doctor, compensating for the shortage of medical experts in the field. Finally, they disclosed that proper hospital administration practices, good health education, and access to low cost health care services can be realized through e-healthcare.

The advantages of these e-health tools are evident: they offer individuals the ability to obtain and utilize health information at relatively low cost, and they allow for inclusion of people with limited access to health care professionals or services, and of historically understanding population (Griffiths et. al. 2006). There is growing evidence that e-health tools have positive effect on users, in that users tend to become more knowledgeable, feel better supported, and may have improved behavioral and clinical outcomes compared to non-users (Murray and Burns, 2005). E-health care research has demonstrated health behavior changes in different fields such as the area of smoking cessation (Cobb et. al. 2006), diabetes care (Ralston et. al. 2009), physical activity (Marcus et. al. 2007), nutrition (Cullen and Thompson, 2008) and weight loss (Hunter et. al. 2008). Also, research has shown improved care of patients with chronic illness (Lorig et. al. 2006) and a more effective use of personal health records (Bourgeois et. al. 2008).

However, applications are not without potential harm. For example, concerns have been raised about the quality and effectiveness of technology-based programs (Walji et. al. 2004). Other barriers are the full implementation of e-health solutions, or the limitations of access, health and technology literacy (Hesse et. al. 2005). Therefore more research is necessary, both qualitative and quantitative, to better understand the feasibility, accessibility, and patterns of use of e-health applications in various fields. This is especially true for traditionally underserved population such as developing countries of which Ghana is one typical example.

Currently, there is limited research in e-health in many low-income countries including Ghana, and limited interoperability between medical records of different hospitals, preventing the health sector from being able to forecast future sicknesses via data mining on available record (Patrick and Laar, 2012). The new technological approach adopted by such a developing country like Ghana, lacks adequate cutting-edge research to guide decision making and policy implementation in regards to effective allocation of national resources. Hence, the objective of this study is to assess and provide a general overview of the issues associated with Ghana's new e-health care system from the perspective of consumers (people) and providers (hospitals).

## **Research Method**

This study was conducted by using both qualitative and quantitative approach which, basically comprise of the use of interviews and survey to collect data from multiple perspectives. The main objective is to gain diverse perspectives – from the healthcare providers (doctors, nurses, and other providers), and from consumers (beneficiaries of the system). The rationale behind using this approach is to reduce common method bias to the minimum and also to help compare and contrast different opinions in our analysis.

### ***Interview Data Collection***

An interview protocol was designed that comprises of a general set of questions for all participants and a secondary set of questions that addressed issues particular to each participant's organizational role (such as medical doctor, nurse, or hospital administrator). Copies of the interview guides are presented in Appendix B. The duration of each interview did not go beyond an hour, as most interview questions were answered by respondents within 30-45 minutes. All interviews were conducted using a long distance telephone discussion.

Interviews were conducted with representatives from the Ghana Health Services basically comprising of two medical doctors, four nurses, and two health service providers. Due to lack of resources to conduct a broad-scale interview with a little more participants, the study decided to limit the participants to just this few number. Moreover, this is just an exploratory case study trying to assess the impact of a newly adopted system where literature or knowledge is significantly lacking. Interview content addressed the process of learning about the new e-health system, the issues and challenges confronting the new system.

Notes taken from the interviews were reviewed during subsequent data collection to identify key themes in the textual data. All interviewed notes were thoroughly reviewed and examples that suggest processes, issues, actions, assumptions, and consequences were captured.

### **Survey Data Collection**

Survey questionnaire was developed and used to capture the views of consumers. Initially, a structured questionnaire was generated based on consultation with some citizens of Ghana. Also consulted to enrich the design of our instrument are the following academic and practitioner-oriented journals such as [Luftman and McLean, 2004; Luftman, 2005; Luftman and Kempaiah, 2008; Luftman et. al., 2009; Luftman and Ben-Zvi, 2010] and (Palvia, 2012).

The questionnaire was pretested by two faculty members of whom one is from Ghana, two medical officers residing in Ghana, two nurses in Ghana, and four citizens living in Ghana, for their comments on completeness and clarity. Each item was reviewed for content, scope, and purpose. Thus, content validity was initially carried out to ensure instrument appropriateness for this study. Based on response received from this consultation, the list was modified to develop a final list of survey questionnaire.

After pilot testing with eight Ghanaians, few minor changes regarding structure and wording of questionnaire was made for clarity and ease of understanding. A seven-point Likert scale was used to collect consumer response by rating issues they deem of highest importance based on the scale range 1-7, where 1 represents highly critical issue, 7 represents least critical issue, and the midpoint (4) representing averagely critical issue. The final questionnaire consisted of 23 fundamental issues as displayed in Table 2 below.

Lack of ICT infrastructure
Quality assurance of electronic information
Improving quality of care with IT
Time savings for providers
Time savings for consumers
User friendliness of system to consumers
Basic ICT knowledge
Internet (accessibility & reliability)
Financial and sustainability issues
Cost savings to consumers
Privacy/security of electronic record
Accessibility to doctors
Change management
Accessibility to nurses
Reducing healthcare errors with IT

Electronic medical record (EMR) implementation
Decision support system for consumers
Knowledge about the new e-health system
Managing the release of information process
Technology support for home healthcare
IT support for telemedicine (i.e. remote care and procedure)
Using IT to enable consumer empowerment in healthcare
Regional and national universal database creation

**Table 2: Issues in e-Health System in Ghana**

Consumers of the new e-health system were randomly selected through the help of hospital records obtained with permission from hospital authorities. Initial contacts were made through telephone call to ask the consent of respondents to voluntarily participate in the survey prior to administering actual survey.

Based on respondents' preference, questionnaire was sent as an email attachment to a nurse in Ghana who assisted in data collection. Hard copies of the questionnaires were printed out and distributed to respondents who took the questions home to answer them and then returned to our data collection contact. Out of a total of about 520 questionnaires that was given out, 132 were retrieved of which, only 107 were deemed complete and valid response. This yields an estimate response rate of 20.6% which, according to (Yu and Cooper, 1983) qualifies to be considered good enough response rate. While low response rate are endemic to healthcare IT research (Hikmet and Chen, 2003), we believe this response rate result is reliable, as fairly good representation of respondents from various part of Ghana participated.

## Data Analysis and Results

The average ratings of each issue by consumers of the new e-health system were computed. Top five issues based on the computed average are illustrated in Table 3. It is noteworthy to once again emphasize that the Likert scale used to measure responses range from 1 to 7 where, a lower average represents a higher ranking and vice-versa.

Rank	Issue	Average Rating
1	Lack of ICT Infrastructure	1.18
2	Basic ICT knowledge/skills	1.24
3	Internet (accessibility & reliability)	1.53
4	Financial & sustainability issues	1.71
5	Privacy/Security of electronic record	1.70

**Table 3: Consumer Ranking of Top 10 Issues with Ghana's e-Health System**

### ***Lack of ICT Infrastructure***

Lack of ICT infrastructure was rated at the top of the list of the most important e-health system issues according to consumers (#1 rank in each case). Information and Communication Technology

infrastructure, which basically comprise of computers and other communication devices (smart phones, iPad, etc.), are central to any computerized health information system. However, the acquisition of these basic electronic artifacts remain a major challenge not only to the average Ghanaian living on a low income wage, but also government and privately run institutions including hospitals. This issue was reiterated in one of the interview response with providers:

*“Infrastructure acquisition, installation, and management is a major stumbling block to effective implementation of the electronic health system because it requires so much capital investment for most hospitals as well as the government. Only a few urban hospitals in the country are moderately equipped with IT tools. It is very unfortunate to inform you that, even in these modern day and age, most of us still go by the classical manual system of delivering healthcare services to clients.”*

### **Basic ICT Knowledge/Skills**

The ranking results indicates that majority of consumers of the new e-health system lack basic ICT knowledge or skillset needed to effectively use the system. The system is not being fully exploited by the people as confirmed by interview response gathered from the healthcare professionals:

*“Majority of current generation of Ghanaians don’t have so much passion for computers simply because they did not grow up with it. They would rather prefer someone do stuff with the computer for them than doing it by themselves. This attitude of lack of enthusiasm shown by consumers has slowed down implementation efforts as it raises the debate of whether the time is right or not.”*

### **Internet**

According to Griffiths et al. (2006), one of the most common functions of internet is that it provides all sorts of health related information through the use of different websites. However, Internet services is a major challenge in Ghana as well as other developing countries in Africa. This is evident in the ranking results table (#3 rank) of the list of most important issue by consumers as well as in the interview:

*“One of the major challenges the new e-health system is currently struggling with has a lot to do with the internet – poor connectivity, low speed, and high utility cost. Even within the network areas, the service is so bad that it is often unreliable as we keep losing connection intermittently while some communities are not captured at all within the network. This challenge inhibits communication access between the providers of e-healthcare and consumers.”*

### **Financial and Sustainability Issues**

Source of funding for the new e-healthcare system is critical for its sustainability and avoidance of failures. Why consumers consider this as one of their top issues (ranked #4) was revealed from the interview with healthcare professionals.

*“Government alone cannot provide all the required funding to fully implement the system. In such non-profitable scenario, government is depending on financial support from public entities (through tax increment), Non-Governmental Organizations (NGOs) and other foreign donor agencies (WHO, UNICEF). As a result, nationwide implementation of the system is going at a slow pace. Due to lack of funds, consumers are reluctant to use the system because they think the cost of using the system outweighs the benefit they can derive from it.”*

### **Privacy and Security of Electronic Records**

Medical records can contain great amount of sensitive information, such as fertility and abortions, emotional problems, sexual behaviors and diseases, substance abuse, and physical abuse (Rindfleisch, 1997; Palvia et. al., 2012). Uncontrolled access to this kind of data can be harmful to the patient. This therefore explains, in addition to interview result with health professionals in Ghana, why this issue takes the fifth spot (#5) on consumers list.

*“Concerns of consumers regarding privacy and security of their personal records is heightened by lack of existence of laws and policies that protect their identity. With internet fraud being rampant these days, majority of consumers are not comfortable at all as they fear someone will steal their information and use it against them.”*

### **Less Important Issues**

The study also presents result of the bottom five issues that consumers did not regard as valuable or important issue to them. These issues are regarded as less important to consumers as the average rating of each issue is greater than the average of the rating scale (3.5) used. The reason why consumers apparently disregard these issues was revealed in the interview with the health providers.

*“Consumers completely disagree to the fact that the new e-health system will serve as a decision support for them, help them save their time spent in seeing a doctor or a nurse. Also, their acknowledgement about the existence of the new system does not matter to them at all as they just didn't care.”*

Table 4 shows the bottom five issues of the new e-health system according to rating by consumers on a scale of 1 to 7.

Rank	Issue	Average Rating
20	Accessibility to doctors	4.25
21	Accessibility to nurses	4.25
22	Knowledge about the new e-health system	4.92
23	Time savings for consumers	5.12
24	Decision support for consumers	6.24

**Table 4: Consumer Ranking of Bottom 5 Issues with Ghana's e-Health System**

### **Key Findings and Contributions**

Based on the above findings, it can be concluded that the new e-health system being implemented in Ghana is still at the initial stages with lots of basic challenges to be addressed. The ICT infrastructures that are currently in place are not enough to support the new system. Not all the hospitals are equipped with computers in good condition, internet services, and other relevant IT accessories that are basic element for successful implementation of the electronic system. Moreover, hospital information systems, electronic health records or telemedicine records are not yet fully implemented and so there is lack of connection between hospitals.

The level of ICT knowledge or skills among both healthcare providers and consumers is so low that it discourages these stakeholders from embracing the e-health system. Computers and other intelligent communication artifacts such as smartphones, iPads, etc. are so expensive that the average Ghanaian just can't afford. Majority of the current generation of Ghanaians grew up in the rural areas without computers or even common electricity. Such people therefore exhibit negative attitudes towards computers due to their ignorance as they rather prefer someone do their work for them with the computer than doing stuff by themselves.

Financially, the implementation of the new e-health system, according to consumers, is rather going to add to their financial woes than it is expected to reduce their burden. To these stakeholders, implementation of the new system means they must own either some high-speed laptop/desktop computer, smartphones (iPhone, Android, etc.), or iPad. In addition, it means they will have to subscribe to internet for service and pay monthly subscription fee. It also means, to them, that they will have to

purchase software and other technological supports. All these comes with huge financial responsibilities and commitments which they think is rather going to worsen their already existing financial predicament. The general opinion is that, the system is meant to better serve the need for the rich than the poor because it is cost effective.

Privacy and security issues of stakeholders’ personal records and information also surfaced as a major barrier to successful implementation of Ghana’s new e-health system. With the current rapid proliferation of cyber-fraud in the country, the people are basically uncomfortable about the high probability of their information going public. Even though there are some form of laws and policies put in place to ensure the safety and security of their information, they simply do not trust in these system because they think those laws never get enforced. Given that health records often contain highly sensitive personal information, stakeholders are still not satisfied with the measures, policies, and laws put in place to guarantee the safety of their information. As a result, they do not appear to be enthusiastic about the new e-health system.

In summary, the views of providers and consumers are largely consistent as far as findings for both perspectives are concerned. These stakeholders (providers and consumers) are mostly worried about the quality of care the new system will help provide as their concern is shown explicitly in lack of ICT infrastructure, lack of basic ICT knowledge or skills, the technical know-how required to operate this system, and inadequate measures outlined to ensure their sustainability. In addition to these issues, consumers express more concern about security and privacy issues not properly addressed so far. Key findings and contributions are summarized in Table 5 as follows.

<b>Top 5 issues</b>	<b>Implications</b>
Lack of basic ICT Infrastructure	More advance sets of ICT infrastructure will help revamp Ghana’s new e-health care system.
Lack of basic ICT knowledge/skills	Free training of basic ICT skills for both consumers and providers as well as regular organization of workshops for health care professionals are key to success implementation of the new e-health system
Internet access	High speed and reliable internet service, when provided at such an affordable cost, will motivate users and encourage their interest to use the new system.
Financial issues	By significantly reducing the cost and also providing some form of incentives such as free computers, laptops, smartphones, etc. consumers will be attracted to patronize the system.
Security and Privacy issues	Amplify public education on security measures, policies, and laws to persecute offenders must be enforced. Highly skilled computer security experts to be employed to help safeguard public records.

**Table 5: Top Five Issues and their Implication**

### ***Implication for Research and Practice***

This study has both theoretical and practical implications in relation to e-health implementation challenges in developing countries based on Ghana’s experience. Theoretically, the study has implication for (i) identifying the top ten issues of the new e-health system that is considered the most challenging issue to the successful implementation of the system, and (ii) understanding these issues from the viewpoint of healthcare providers and consumers, who are the key stakeholders the system has direct influence on. These findings will help researchers further explore the problem and come up with suggestion to help improve the system.

Practically, the findings from this study will help inform major stakeholders including government, key decision makers, and other funding agencies about potential areas that needs their immediate attention for strategic allocation of scarce resources.

### **Limitation and Suggestions for Future Research**

Although this study captures significant amount issues, it does not address cultural dimension of the people of Ghana which has the potential to impact the adoption of the new e-healthcare technology. This leaves a gap in our research which can be filled in future studies by developing multi-item scales with detailed dimensions of the broad critical issues identified in this study. Moreover, future study should consider examining the opinions of other stakeholders (healthcare vendors and government) that are not captured in this study.

### **Conclusion**

This exploratory study, through the use of interviews and surveys, basically captures general issues pertaining to the new e-healthcare system being implemented in Ghana. The study uses a total of twenty-three issues compiled based on the literature and consultation with key individuals predominantly living in Ghana. These issues were rated by a national sample of healthcare providers (doctors, nurses, and other providers) and consumers (people) of healthcare products. Among the top five issues drawn from the analysis of data collected, lack of information and technology (ICT) infrastructure is ranked the highest and most pressing issue from both the perspective of providers and consumers.

The top five list includes issues related to: lack of ICT infrastructure; lack of basic ICT knowledge/skills; internet (accessibility & reliability); financial and sustainability issues, and privacy and/or security of electronic record. While some nuances of difference may exist, results show much similarity between the views of providers and consumers of the new e-health system.

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## APPENDIX A

### Survey Questionnaire

This study explores Ghana's new e-healthcare systems to identify key issues associated with the system from consumers' viewpoint. This survey will serve as a baseline for a thorough examination of specific issues. Your contribution in filling out this survey is very important as results will serve as an input to help improve our healthcare systems. The completion of this survey should take you no longer than 15 minutes.

Please answer the survey by circling the column right numbers based on their importance to you. For instance, circle 1 if it is extremely important, 4 if it is averagely important, and 7 if it is not important at all. Please do not use last column labeled "Top 10 Rank" at this time.

Issues in e-Health System in Ghana	Rating							Top 10 Rank
	High					Low		
Lack of ICT infrastructure	1	2	3	4	5	6	7	
Quality assurance of electronic information	1	2	3	4	5	6	7	
Improving quality of care with IT	1	2	3	4	5	6	7	
Time savings for providers	1	2	3	4	5	6	7	
Time savings for consumers	1	2	3	4	5	6	7	
User friendliness of system to consumers	1	2	3	4	5	6	7	
Basic ICT knowledge	1	2	3	4	5	6	7	
Internet (accessibility & reliability)	1	2	3	4	5	6	7	
Financial and sustainability issues	1	2	3	4	5	6	7	
Cost savings to consumers	1	2	3	4	5	6	7	
Privacy/security of electronic record	1	2	3	4	5	6	7	
Security of electronic record	1	2	3	4	5	6	7	
Accessibility to doctors	1	2	3	4	5	6	7	
Change management	1	2	3	4	5	6	7	
Accessibility to nurses	1	2	3	4	5	6	7	
Reducing healthcare errors with IT	1	2	3	4	5	6	7	
Electronic medical record (EMR) implementation	1	2	3	4	5	6	7	
Decision support system for consumers	1	2	3	4	5	6	7	
Knowledge about the new e-health system	1	2	3	4	5	6	7	
Managing the release of information process	1	2	3	4	5	6	7	
Technology support for home healthcare	1	2	3	4	5	6	7	
IT support for telemedicine	1	2	3	4	5	6	7	
Using IT to enable consumer empowerment in healthcare	1	2	3	4	5	6	7	
Regional and national universal database creation	1	2	3	4	5	6	7	

## **APPENDIX B**

### ***Interview Protocol***

#### **A. Interviewee Background**

How long have you been . . .

\_\_\_\_\_ in your present position?

\_\_\_\_\_ at this institution?

What is your highest level of education? \_\_\_\_\_

What is your field of study? \_\_\_\_\_

1. Briefly describe your role (administration, physician, nurse, etc.) as it relates to any general healthcare practice.

Probes: How are you involved in providing healthcare to patients?

2. Do you think Ghana's new e-Healthcare system is very helpful in providing efficient and effective healthcare delivery to consumers?

#### **B. Institutional Perspective**

1. What is the strategy at this institution for providing effective and efficient healthcare delivery to consumers?

Probes: Is it working – why or why not?

Purpose, development, administration, recent initiatives

2. What sources are available for improving healthcare delivery techniques?
3. What is changing about the traditional approach to healthcare delivery at this institution?

Probe: what is being accomplished through hospital-based initiative?

4. Have you or your colleagues encountered resistance to any reforms in your department?

#### **C. Assessment**

1. How do you go about assessing the effectiveness and the efficiency of the new e-Healthcare system to consumers?

Probe: Do you communicate with patients through the use of the e-Healthcare system?

#### **D. Departmental Challenges**

1. What are some of the major challenges your department faces in attempting to change the traditional healthcare delivery practices? What are the major opportunities?

Probes: How can barriers be overcome? How can opportunities be maximized?

2. To what extent are the new e-healthcare system evaluated at your institution? . . . in your department?
3. To what extent is the new e-healthcare system valued within your discipline?

#### **E. e-Healthcare System**

1. Describe how the new e-healthcare system is improving the overall healthcare delivery practices

Probe: How do you know? (criteria, evidence)

2. What types of healthcare workers development opportunities do you see emerging in your institution as a result of the introduction of the new e-healthcare system?