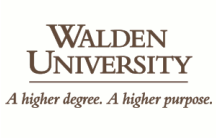

2018

Strategies Rural Hospital Leaders Use to Implement Electronic Health Record

Susan Mejia
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral study by

Susan Mejia

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Warren Lesser, Committee Chairperson, Doctor of Business Administration Faculty

Dr. David Moody, Committee Member, Doctor of Business Administration Faculty

Dr. Neil Mathur, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2018

Abstract

Strategies Rural Hospital Leaders Use to Implement Electronic Health Record

by

Susan Mariela Mejia

MPA, Walden University, 2014

BS, California State University, Fullerton, 2010

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

April 2018

Abstract

The Centers for Medicare and Medicaid Services issued over 144,000 payments totaling $7.1 billion to medical facilities that have adopted and successfully demonstrated meaningful use of certified electronic health record (EHR). Hospital organizations can increase cost savings by using the electronic components of EHRs to improve medical coding and reduce medical errors and transcription costs. Despite the incentives, some rural health care facilities are failing to progress. The purpose of this multiple case study was to explore the strategies rural hospital leaders used to implement an EHR. The target population consisted of rural hospital leaders who were involved in the successful implementation of an EHR in South Texas. The conceptual framework chosen for this study was the sociotechnical systems theory. Data were collected through telephone interviews using open-ended semistructured interviews with 5 participants from 4 rural hospitals who were involved in the EHR implementation. Data analysis occurred using Yin's 5-step process which includes compiling, disassembling, reassembling, interpreting, and concluding. Data analysis included collecting information from government websites, company documents, and open-ended information to develop recurring themes. Several themes emerged including ongoing training, provider buy-in, constant communication, use of super users, and workflow maintenance. The findings could influence social change by making the delivery of health care more efficient and improving quality, safety, and access to health care services for patients.

Strategies Rural Hospital Leaders Use to Implement Electronic Health Record

by

Susan Mariela Mejia

MPA, Walden University, 2014

BS, California State University, Fullerton, 2010

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

April 2018

Dedication

I dedicate this doctoral study to my husband who stood by me through all my frustrations and challenges. I dedicate this study to my parents, sisters, nieces, and nephews. They are a reminder that I am blessed.

Acknowledgments

First, I would like to acknowledge God because I know through him all things are possible. To my husband, Mark, I truly am thankful for your support and patience. I don't know how many times I said I was going to quit. Only for you to look at me and say, "No, you're not." I love you and I thank you for having more faith in me than I had in myself. To my parents, Rita and Rigo, I love you and if it wasn't for the discipline you instilled in me I would have never made it this far. Thank you for instilling the importance of hard work and determination. To my sisters, Michel and Amee, thanks for always sticking by me in all my craziness. To all my nieces and nephews, those present and those to come, you can do anything you put your mind to. You have a loving family that will support you and cheer you on in all your endeavors. The love I have for my family is eternal. I would like to thank each of my committee members and research participants for their support. A special acknowledgement goes to Dr. Lynn Szostek; I truly appreciate and value all the guidance and encouragement you gave me.

Table of Contents

List of Figures

Section 1: Foundation of the Study

In the United States (U.S.), health care costs continue to increase and affect the national economy. In 2014, health care expenditures reached $3 trillion, accounting for 17.5% of the nation's gross domestic product (GDP; the Centers for Medicare and Medicaid Services [CMS], 2015). In 2011, the CMS established the Medicare and Medicaid Electronic Health Record (EHR) Incentive Programs to encourage the implementation of EHRs for all eligible professionals and hospitals improving patient safety and quality of care (CMS, 2017a). In 2015, the CMS made modifications to the Medicare and Medicaid EHR Incentive Program and meaningful use (MU) by extending the reporting period (CMS, 2017a). MU refers to the minimum standards for organizations using EHRs (HealthIT, 2014). Despite the U.S. government's extensions, there continues to be a gap in the EHR implementation rate of rural hospitals as opposed to hospitals in urban areas.

Background of the Problem

The implementation of technology, such as EHRs, improves health care efficiency and clinical workflow (Schilling, 2011). Under the American Recovery and Reinvestment Act of 2009, the Health Information Technology for Economic and Clinical Health Act authorized the CMS to give financial incentive payments for achieving MU. In 2010, MU, a U.S. government program, indicated the government would allocate $30 billion to health care organizations such as hospitals and clinics. The intent of the policy was to have health care leaders implement health information technology (HIT) across the nation (Craven et al., 2013).

The purpose of using HIT is to improve patient care and safety while decreasing medical errors and cost (Charles, Cannon, Hall, & Coustasse, 2014). The CMS issued over 144,000 payments totaling $7.1 billion to medical facilities that have adopted and successfully demonstrated MU of certified EHR technology (HealthIT, 2014). Despite the incentives, some rural health care facilities are failing to progress. Medical facilities that do not implement EHRs will incur yearly increased Medicare reimbursement penalties (Barrett, 2017; HealthIT, 2016).

Problem Statement

To encourage implementation of EHRs, the 2009 HITECH Act authorized billions of dollars in incentive payments (Mennemyer, Menachemi, Rahurkar, & Ford, 2015). Medical facility leaders who delay or fail to participate in the EHR Incentive Program will experience lost financial incentives and Medicare reimbursement penalties starting at 1%, increasing each year to a maximum of 5% (HealthIT, 2016). The general business problem is despite the current incentives for adopting EHRs some medical facility leaders fail to implement an EHR system. The specific business problem is some rural hospital leaders lack the strategies to implement EHRs.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies rural hospital leaders use to successfully implement an EHR system. The target population consisted of five rural hospital leaders from four rural hospitals who have successfully implemented EHR systems in South Texas. A potential outcome leading to beneficial social change is that health care leaders who implement the EHR system can

increase communities' access to safe and efficient hospital care by improving the quality, safety, and access to health care services for patients (Alder-Milstein, Salzberg, Franz, Orav, & Bates, 2013).

Nature of the Study

I selected a qualitative exploratory case study approach to explore the strategies rural hospital leaders use to implement EHR systems. The three different methods a researcher can use when conducting a study are qualitative, quantitative, and mixed method (Turner, Kane, & Jackson, 2015). In qualitative research, researchers use interviews or observations to find patterns and interpret meanings (Denzin & Lincoln, 2011; Merriam & Tisdell, 2015). In quantitative research, the researcher uses numerical data and variables to examine the relationships or differences among variables. Mixed methods researchers blend the strengths of both qualitative and quantitative research, producing additional data and enhancing insights to provide an enhanced understanding of a phenomenon (Manojlovich et al., 2015). By using the qualitative methodology, I was able to gain insight and meaning as I explored the strategies for EHR implementation. I did not select the quantitative method because I was not comparing data in a systematic way, generalizing data, or testing hypotheses. The mixed method methodology was not appropriate because there were no variables to examine or compare. Additionally, the research question does not require both qualitative and quantitative data.

In qualitative methodology, a researcher can choose from a case study, phenomenology, ethnography, or narrative design. I selected a case study design because I used multiple sources and types of information to provide contextual depth and breadth

to the study. Using multiple sources and types of data can support the study's credibility through data and methodological triangulation (Morse, 2015). An exploratory multicase study design was suitable for this study because exploring the strategies rural hospital leaders use to implement EHRs required information from multiple sources. Also, researchers can use case studies to study business practices. A phenomenological design was not appropriate because phenomenologists focus on the meanings of interviewees' lived experiences about a phenomenon (DeFelice & Janesick, 2015). In an ethnography research design, researchers focus on an entire culture and observe participants (Crandall et al., 2016). Ethnography was not an appropriate design because I was not focusing on social interactions or perceptions that occur within a medical facility. In a narrative research design, the researcher includes the lives of individuals as told through their stories (Marshall & Rossman, 2016). I did not select a narrative design because I am not seeking to gather and explore medical facility leaders' life stories.

Research Question

What strategies do rural hospital leaders in South Texas use to implement an EHR system successfully?

Interview Questions

1. Initially, what strategies did your organization develop to implement your hospital's EHR system?
2. How have you assessed the effectiveness of the strategies for implementing the EHR system?

3. What barriers have you experienced with the implementation of the strategies for implementing the EHR system?
4. What strategies worked best to implement the EHR system?
5. What were the key lessons you learned from the implementation of the EHR system?
6. What more would you like to add that would be beneficial to my study?

Conceptual Framework

I used the sociotechnical systems theory as the conceptual framework in this study. Introduced in the 1950s, the sociotechnical system emerged from the Tavistock Institute in London (Trist & Bamforth, 1951; Whitworth, 2009). The sociotechnical systems theory reflects the idea that both social and technical components are factors for consideration in organizations (Read, Salmon, Lenné, & Stanton, 2015). Emery and Trist invented the term sociotechnical systems. According to Davis, Challenger, Jayewardene, and Clegg (2014), a variety of researchers have applied the theory in studies of organizations implementing new technology and noted the theory's relevance in the findings of their research. The theoretical basis of the sociotechnical systems theory is that managing the relationship between technology and human performance is fundamental to organizational success. Managing the interaction between people and technology in the sociotechnical system enhances an individual's ability to be self-aware and understand the benefits of working together with the technical system. For example, managing the interaction between the EHR system and the health care provider is essential for organizational success because without human interaction the EHR would be

useless software. The sociotechnical systems theory was expected to provide a potential lens for facilitating my understanding of the strategies hospital leaders use to implement a successful EHR system that balances hospital personnel needs with technology adoption and implementation.

Operational Definitions

Electronic health record (EHR): EHRs contain and share information from across more than one health care organization involved in a patient's care (HealthIT, 2016). EHRs capture clinical data and allow health care providers to search and manage it (HealthIT, 2016).

Electronic medical record (EMR): EMRs are a digital representation of a patient's medical records that were once paper charts and only pertain to information a provider collects within their clinic (HealthIT, 2016; Price, Singer, & Kim, 2013).

Health information exchange (HIE): HIE is the transfer of electronic health information across multiple facilities (Rahurkar, Vest, & Menachemi, 2015).

Health information technology (HIT): A variety of technologies used to store, share, and analyze a patient's health information (HealthIT, 2013a).

Meaningful use (MU): This defines the minimum standards for organizations using EHRs (HealthIT, 2014).

Assumptions, Limitations, and Delimitations

Assumptions

An assumption is a thought that someone accepts as the truth without proof of it being true (Hoekstra, Kiers, & Johnson, 2012). Five assumptions guided the data

collection and analysis plans for the study. The first assumption was that participants would respond to the interview questions honestly. Secondly, I also assumed that the sample is a representation of the population I wished to make conclusions for this study. Third, I assumed that the interview questions were relevant. Fourth, I assumed the participants developed strategies for successful implementation of an EHR system. The fifth assumption that was I would accurately identify key themes during recording, coding, and analysis of the data.

Limitations

Researchers can view limitations as potential weaknesses of the study (Kirkwood & Price, 2013). Limitations are elements that the researcher has no control over within their study (Kirkwood & Price, 2013). One limitation is that sample size might not be adequate to draw conclusions. The sample size included hospital leaders in South Texas; therefore, the results from this case study may not be generalizable to hospital leaders from other states. Last, due to the rural locations of the hospital leaders, I had to conduct the interviews over the phone; therefore, I was not able to observe nonverbal cues. Researchers can use nonverbal cues such as gestures and facial expressions to gather extra information during interviews.

Delimitations

Delimitations are elements of the study the researcher controls (Soilkki, Cassim, & Anis, 2014). I selected the following delimitations to ensure I could interpret the results. Delimitations were the (a) problem selected, (b) purpose of the study, (c) research design, (d) location of the study, (e) sample population, (f) participant exclusion criteria,

(g) research questions, and (h) the conceptual framework. Some researchers have studied implementation of EHRs in urban areas; however, I decided to focus on EHR implementation in rural areas. The purpose of this qualitative multiple case study was to explore the strategies rural hospital leaders use to successfully implement an EHR system in South Texas. I employed purposeful sampling to contact individuals who met the participant criteria. The study sample excluded individuals who were not involved in EHR implementation. I selected interview questions that I felt would help me gain insight into the research question. I selected the sociotechnical theory as the conceptual framework to provide a potential lens for facilitating my understanding of the strategies rural hospital leaders use to implement an EHR.

Significance of the Study

Contribution to Business Practice

In this qualitative multiple case study, I explored the strategies rural hospital leaders use to successfully implement an EHR system. The implementation of HIT such as EHRs can be expensive. Organization leaders who implemented HIT systems noted a decrease in medication errors by 30% to 80% (Bobb et al., 2011; Forrester, Hepp, Roth, Wirtz, & Devine, 2014). Providers who commit preventable medical errors cost the health care industry approximately $1 trillion annually (Andel, Davidow, Hollander, & Moreno, 2012). Health care leaders can increase profitability by implementing the EHR system to decrease medical errors while overcoming barriers to implementation and adoption, enhancing the flow of information, and increasing the effectiveness of problem solving methods (Stanberry, 2011). Typically, the per capita income in rural areas is less;

therefore, rural hospitals receive low levels of reimbursements. However, to offset low reimbursement rates, rural hospital leaders can use EHRs to reduce and control health care costs (HealthIT, 2015a).

Implications for Social Change

In this study, I explored the strategies used for successful implementation of EHRs to improve health care delivery in rural areas. There is a significant difference in access to care between urban areas and rural areas (HealthIT, 2015a). Knowing what strategies hospital leaders use to implement the EHR can provide other hospital leaders to successfully implement similar software systems within their organization. Health care leaders may use my research study outcomes to improve care coordination and implement new technological advances in which health care staff can instantly access patient information enhancing the quality of care. Ultimately, hospital leaders who make modifications can change the attitudes and behaviors within health care organizations to improve health care and enhance patient outcomes (Stanberry, 2011).

A Review of the Professional and Academic Literature

The purpose of the literature review was to analyze and synthesize various sources of literature to achieve a depth of inquiry as it relates to the research topic. The review included five subsections: sociotechnical systems theory, underlying conceptual frameworks, history of the development and use of HIT systems, defining electronic health care, and the implementation of EHR systems. I accessed research materials through the Walden University Library database, which included ProQuest Central, Emerald Management Journals, MEDLINE, EBSCOhost, and SAGE Journals.

Additionally, I used books, government websites, and Google Scholar to further support the research. The literature compiled for the review included peer-reviewed scholarly journal articles and government documents. Within this doctoral study, there are 168 sources, of which 149 (89%) were from peer-reviewed sources published between 2013 and 2018. In this literature review, I used 82 references. Out of the 82 references, 71 (86%) are peer-reviewed and have a publication date between 2013 and 2018. I used a combination of books, peer-reviewed journal articles, government websites, and journals outside of the 5-year range. Search terms for this study included *EHR, rural hospitals EHR, sociotechnical systems theory, complex adaptive systems, disruptive technology theory, technology acceptance model, benefits and challenges of EHRs, strategies,* and any combination of these words.

Sociotechnical Systems Theory

There are two main factors critical to the sociotechnical systems theory: Social and technical. In the sociotechnical systems theory, there is the idea that the interaction between social and technological factors determines the success of system's performance. Health care organizations are complex sociotechnical systems. Health care organizations are complex because they have multiple departments that must interact and depend on each other. They are sociotechnical because employees operate some form of technology which is essential to have an operational organization.

Some researchers have used the sociotechnical systems theory to analyze how factors impact EHR implementation (Irizarry & Barton, 2013). EHR implementation continues to be a challenge for organizations. Achieving joint optimization of social and

technical components can help organizational leaders enhance productivity. According to Carayon (2012), health care organizations have limited success of HIT because they fail to implement and sustain HIT systems. There needs to be a continuous interaction between humans and technology to achieve better outcomes for implementation of EHR systems (Darko-Yawson & Ellingsen, 2016). Therefore, technical systems should have interdependent parts (Baxter & Sommerville, 2011; Casella, Mills, & Usher, 2014; Darko-Yawson & Ellingsen, 2016).

Clinical and nonclinical personnel within a health care setting are the primary users of EHR systems; therefore, they are responsible for sustaining the system once their organization implements it (Darko-Yawson & Ellingsen, 2016). However, some researchers found challenges such as lack of user participation or having inadequate staff occur when organizations fail to acknowledge technological systems or try to independently find a solution without seeking guidance (Darko-Yawson & Ellingsen, 2016; Sittig & Singh, 2010). User acceptance and commitment are essential components of EHR implementation. Since EHRs are dependent on the people who use them, health care facility leaders might try encouraging their providers and staff to support EHRs.

The introduction of HIT can have implications for work performance and staff acceptance. Cresswell and Sheikh (2014) suggested the sociotechnical approach explain how the dynamics of technical systems affect the environment in which people use them. In using the sociotechnical systems approach, organizational leaders should have a multidimensional understanding of technology and think beyond the technical elements. Irizarry and Barton (2013) suggested that technology is a part of the social system within

an organization. Essentially, in an organizational system, both social and technical factors are critical components for leaders who are trying to achieve organizational goals. Hester (2014) suggested that having one relationship out of alignment within an organization can hinder operations and overall performance. Darko-Yawson and Ellingsen (2016) noted the responsibility of recording quality data has shifted from health information management to the health care professionals and administrative personnel who use EHRs.

Underlying Conceptual Frameworks

Complex adaptive system. Many researchers would argue that a health care organization is a complex adaptive system (Darko-Yawson & Ellingsen, 2016; Hempe, 2013). According to Stacey (2011), within an organization, there are many components, and each component has an impact on the other components in the system. When an organization decides to make a change in one component of the system, there are possible long term changes that can occur throughout the system (Martin et al., 2012; Phillips et al., 2017). In an organization, it is important to pay attention to the impact and degree of impact that one change can have on an entire system. Some researchers argue that the system is constantly trying to get back to a state of equilibrium. Additionally, when there is an external event, or the organization is trying to make a change, it creates disequilibrium.

Psotka (2013) noted disruptive technology as a new form of technology that disrupts the way that organizations conduct business. Disruptive technology refers to innovators who introduce technology to new markets which eventually disrupts existing markets. According to Christensen, Baumann, Ruggles, and Sadtler (2006), more people

can afford certain health care necessities because of disruptive technology. Health care technology innovation has improved patient care; however, to increase health care facility adoption of disruptive technology it needs to be affordable and convenient (Swisher-McClure, Hahn, & Bekelman, 2015). Harrison, Koppel, and Bar-Lev (2007) designed a conceptual model known as the interactive sociotechnical analysis (ISTA), which is a derivative of the traditional sociotechnical systems framework. One of the five factors of the ISTA framework is that the implementation of HIT changes the social system of an organization (Thirukumaran, Dolan, Webster, Panzer, & Friedman, 2015).

Disruptive technology theory. The disruptive technology theory emerged from the business field before health care leaders started to introduce it into the health care arena (Garrety, McLoughlin, & Zelle, 2014). Christensen in 1977 refined the concept of disruptive technology and sought to find out why organizational leaders who were trying to innovate were suffering from market bias (Corsi & Di Minin, 2014; Obal, 2017). Additionally, new entrants were pushing some organizations out of the market by introducing new products coined as disruptive technologies. New entrants refer to new competitors who enter an industry and new entrants can pose a threat to an industry.

Organizational leaders who use disruptive innovation can make a product more accessible so that larger populations can also use it. The dilemma with disruptive innovation is that organizational leaders must go to new markets interrupting the existing markets (Corsi & Di Minin, 2014; Obal, 2017). When disruptive technology is present in existing markets, it can cause big businesses to fail (Chiaroni, Chiesa, Franzò, Frattini, & Urbinati, 2016). Organizations tend to fail because of the unattractive characteristics of

disruptive innovation and technology (DIT). One characteristics include inexpensive products that some organizations introduce in small or emerging markets and existing customers do not want to purchase them (Chiaroni et al., 2016). Health care leaders can use the DIT theory to show problems emerging in the health care industry and highlight possible solutions to some problems. An EHR is a form of disruptive technology (Garrety et al., 2014). The need to use technology such as the EHR to reorganize care within the health care industry could help make health care costs sustainable (Garrety et al., 2014). Additionally, health care leaders that use DIT can try to understand the difficulties that some providers encounter to sustain and manage innovation.

Technology acceptance model. Davis (1989) introduced the technology acceptance model (TAM) and based it on Fishbein and Ajzen's theory of reasoned action (TRA). The theory it denotes the idea that if a person perceives the technology to be useful and easy, then that person might be willing to accept the technology (Wang, Xiao, Sun, & Wu, 2016). The goal of TAM is to specify the determining factors of technological acceptance (Davis, 1989). For example, computers replaced the notion of writing letters and having to mail letters. Now, people can type a letter and send it electronically via email. As organizational leaders introduce new technologies into the markets, it is the people's acceptance that determines their success.

As time progresses, some technologies will continue to be the same, but an individual's perception of it could change. An example of a technology that has not changed is a videocassette recorder (VCR). The VCR has not changed; however, people between the ages of 18 to 29 are less likely to find VCRs useful compared to people over

the age of 65 (Charness & Boot, 2016). The TAM theory notes that people plan their behavior and are rational in their actions. Additionally, the TAM theory does not provide a solution to improve usefulness or acceptance of the technology.

History of the Development and Use of HIT Systems

In 1960, Medicare and Medicaid were the two health care drivers. During the 1960s, the combination of high costs and large sizing of storage and mainframes caused hospital centers to share their accounting systems (Ginde, Suman, Chand, & Aadke, 2015). The use of technology within hospitals was the first sign of usage of HIT. In the 1970s, the creation of smaller computers came about through technological advances. Computers allowed hospital-wide communications to broaden and expand financial and administrative systems (Ginde et al., 2015). In the 1980s, health care centers started using diagnostic-related groups to receive reimbursements from government agencies. In order for health care centers to receive reimbursements, they had to use a combination of clinical and financial information, which were in two separate systems. Ultimately, there was an integration of both clinical and financial systems to make the reimbursement process more streamlined (Ginde et al., 2015). In the 1990s, health care technology became more competitive. At the start of the new century, health care centers continued to integrate and improve HIT.

Health Information Technology for Economic and Clinical Health Act. In 2009, the U.S. Congress passed the HITECH Act as part of the ARRA. One of the key concepts in the act was to provide investments for technological advances in the science and health fields. The HITECH Act includes detailed information regarding the

development of a nationwide HIT infrastructure that allows the use and exchange of electronic information (Weiss & Nunes Amaral, 2013). The HITECH Act promotes the use of the EHR to improve the quality and coordination of health care (Bufalino et al., 2014). According to the act, the HIT infrastructure ensures and protects patient information, improves health care quality, and reduces medical errors and health disparities. Additionally, there would be a reduction in health care costs due to inefficient medical practices, medical errors, and duplicative care, among other things.

The HITECH Act addresses some of the possible barriers to the implementation of the EHR. The U.S. Congress approved the CMS to providers who implemented the EHR and met MU criteria (Weiss & Nunes Amaral, 2013). Campanella et al. (2015) conducted a systematic review and meta-analysis of published studies on the impact of EHRs on health care quality. Campanella et al. (2015) showed a positive association between EHR use by health care professionals and a reduction in documentation time. Through a review of the literature, Mennemeyer, Menachemi, Rahurkar, and Ford (2015) found weak evidence to support that the MU program impacted EHR adoption regarding a reduction of physician productivity and data sharing.

Meaningful use. In 2009, the ARRA mandated the adoption of EHRs where eligible professionals and organizations needed to work toward MU of certified EHRs. EHR certification ensures the technology is functional, capable, and meets security standards approved by the CMS and the Office of National Coordinator (ONC) for HIT to achieve MU. The CMS created a timeline which contained requirements for EHR implementation. To demonstrate MU, hospital leaders have to show that they are using a

certified EHR in a meaningful manner. According to the CMS (2017a), improving quality, safety, and care coordination while maintaining privacy and security are essential to demonstrating MU.

Secondly, hospitals need to be able to use a certified EHR to exchange health information electronically (CMS, 2017a). The last step to achieving MU is to use a certified EHR to report clinical quality measures. Heisey-Grove and King (2016) identified physician and practice characteristics such as physician age, practice size, and specialty that are markers of success for MU of EHRs. They found that Medicaid physicians were progressing more slowly to achieve MU than Medicare physicians. According to HealthIT (2015), MU compliance should result in better clinical outcomes and increased efficiency.

Defining Electronic Health Care

EHRs are changing the way that providers are delivering patient care (Chaundhry et al., 2006). Health care organizations are also implementing telemedicine and other clinical documentation tools that are changing data collection processes (Chaundhry et al., 2006). HIT supports organizations to continue to provide quality clinical care improving operations processes (Chaundhry et al., 2006). Organizational leaders who implement EHRs and EMRs can do away with paper copies and have everything digitized. Additionally, systems such as the HIE enable providers to access patient records from any medical facility that also participated in the program. Providers who implement electronic technology can easily send a patient's electronic information to

other health care centers. Additionally, a patient can request their entire file and be able to receive a copy within minutes.

EHRs. Providers can use EHRs to electronically record patient information along with creating referral letters and lab reports. Health care organizations can use EHRs to connect patient information with insurance companies, hospitals, and pharmacies. There are many benefits to using systems like the EHR such as positive financial return on investment, increased communication and care coordination, and better outcomes for patient care (Gillum, 2013; Price et al., 2013). EHRs can be convenient for providers to use. Additionally, providers can keep better track of, monitor, and improve the overall quality of care (Gallego, Magrabi, Concha, Wang, & Coiera, 2015).

Benefits of EHRs. According to HealthIT (2014), EHRs can improve the quality of care and increase convenience for both providers and patients. By using EHRs, providers have quick access to patient information even if the provider is working from a remote location. Medical providers and staff using EHRs can receive clinical reminders and alerts. Additionally, providers who use EHRs are able to complete legible documentation and real-time reporting. Many providers are using EHR systems to complete tasks such as e-prescribing and electronic ordering of labs.

According to HealthIT (2014), 82% of providers reported saving time when using e-prescribing and 75% of providers reported a quick turnaround time in receiving lab results. Hospital organizational leaders can increase cost savings by using EHRs to improve medical coding and reduce medical errors and transcription costs. Campanella et al. (2015) suggested that by using an EHR the quality of health care can drastically

improve. Campanella et al. noted that individuals adhered to guidelines better when using EHRs. Additionally, they noted there was an increase in time efficiency and a reduction in medication errors and adverse drug events.

According to Graetz et al. (2013), medical facility leaders who use EHRs have better team performance and more cohesive teams; however, EHR usage among less cohesive teams did not indicate improved care coordination. Essentially, teams that are more cohesive are more likely to use EHRs and create learning opportunities (Graetz et al., 2013). King et al. (2013) found that 75% of providers reported an increase in patient care when using EHRs. Medical providers who used the EHR system for more than two years were more likely to meet the MU criteria. Additional reports regarding the benefits of EHRs included an increase in remote access to patient information, medication error alerts, and critical lab alerts (Ajami & Arab-Chadengani, 2013; King, Patel, Jamoom, & Furukawa, 2014). According to King, Patel, Jamoom, and Furukawa (2014), 78% of physicians reported that EHRs enhanced overall patient care. Additionally, 81% of physicians reported successful attempts to access a patient's chart remotely and 65% reported EHRs alerted them of medication errors (King et al., 2014). Sixty-two percent of physicians indicated EHRs alerted them of critical lab values (King et al., 2014).

A national survey reported 79% of practices that implemented the EHR functioned more efficiently (HealthIT, 2014). Adler-Milstein et al. (2015) used national data collected between 2008 through 2014 to examine EHR trends. Seventy-five percent of U.S. hospitals have adopted the EHR system, which is a 16% increase since 2013 (Adler-Milstein et al., 2015). Hirschhorn (2014) conducted a study where he compared

models of care and noted elements that made up an effective health care center. Hirschhorn (2014) stated that EHR systems are useful for delivering and providing access to specialty care.

Patients who attend health care organizations operating EHRs reported a decrease in filling out the same forms at each visit (HealthIT, 2014). Health care providers can have prescriptions sent to the pharmacy, reducing the chances of medication errors due to illegible handwriting. EHRs increase the convenience of electronic referrals to specialists increasing access to care and improving follow-up care. According to HealthIT (2014), EHRs improve information availability by allowing health care providers to access information at any time. Having reliable access to information increases the safety of care, which allows providers to give the best care possible (HealthIT, 2014). Better care may increase patient experience and outcomes.

Challenges of EHRs. Over the past years, rural hospital leaders continue to adopt EHRs; however, many of them continue to experience unique challenges (Adler-Milstein et al., 2015; DesRoches et al., 2013; Gabriel et al., 2014; HealthIT, 2011). Gabriel et al. (2014) reported that in 2012 rural hospital leaders were less likely to implement the EHR as opposed to any other hospital leader. Some rural hospitals have both resource and infrastructure concerns. The cost and workflow changes that occur with EHR implementation continue to be a significant challenge. According to Gabriel et al., they reported that there were cost-related challenges with EHR implementation which included implementation costs, availability of grants and loans, and broadband implementation costs. In addition, there are workforce and staffing challenges that rural

hospital leaders encounter. These challenges include leadership cooperation, inadequate training, workflow changes, clinical staff cooperation, and the need for more IT personnel. Furthermore, there are challenges with security, privacy, and vendor selection and support.

Many critical access hospitals (CAH) experienced significant financial hardship and did not receive federal assistance (Gabriel et al., 2014). Fifty-nine percent of CAHs reported financial challenges (HealthIT, 2011). Twenty-four percent of CAHs reported having only one internet service provider to choose from (HealthIT, 2011). Skillman, Andrilla, Patterson, Fenton, and Ostergard (2015) argued that not having the option to select from multiple internet service providers is a challenge for some rural hospitals leaders. Some internet providers have insufficient broadband to support EHRs; therefore, limiting rural hospital leaders' options.

Financial barriers. Alder-Milstein et al. (2015) conducted a study in which hospital leaders reported their most common challenges. The challenges included up-front and continuous costs with EHR implementation and investment. There are no more government incentives for EHR implementation. To avoid penalties rural hospital leaders must begin finding strategies to implement EHRs despite the financial challenges. Some rural hospitals do not have the capital to make the necessary changes, consequently creating adoption challenges (Gabriel et al., 2014; HealthIT, 2011). There are options for hospital leaders to take out loans or bonds but bank restrictions might hinder EHR investment. Hospitals with a poor credit rating might not qualify for conventional financing. Rural hospital leadership who use internal funds for EHR implementation and

maintenance sometimes experience economic fluctuations as there are changes to yearly income (HealthIT, 2011). Some hospital leaders should consider determining the cost of EHR implementation and sustainment.

There are EHR vendors who can assist hospital leadership by providing estimates; however, some hospital leaders encounter challenges with accurately estimating the cost of training staff members and interface development. According to HealthIT (2011), the average 5-year EHR cost of ownership totaled approximately $1.5 million. After EHR implementation, there are maintenance and sustainment costs which can be burdensome to small rural hospitals. Costs associated with EHR maintenance and sustainment include software, hardware, and potentially hiring additional IT personnel (HealthIT, 2011). Gabriel et al. (2014) suggested maintenance and sustainment costs put a strain on rural hospitals because they do not have the capital as those hospitals in urban areas where the population is greater.

Workforce and staffing barriers. There are challenges with staff supporting the new technology and adjusting staff workflow. Some hospital leaders encounter challenges with handling situations regarding staff frustration and acceptance of EHR implementation. Additionally, some hospital leadership have trouble communicating the purpose and benefits of EHR implementation and sustainment. Some staff members do not have the expertise or have the time in their schedules to learn a new system (Ajami & Arab-Chadengani, 2013; Skillman, Andrilla, Patterson, Fenton, & Ostergard, 2015). Esparza, Bankston, Xiao, Robinson, and Kahlon (2016) noted the difficulty in achieving high EHR adoption rates when providers oppose or are not aware about the specific

features such as patient portals that connect to EHRs. In rural areas, some hospital leaders encounter challenges with hiring and retaining IT staff personnel to help as they transition to the EHR. According to Skillman et al. (2015), rural areas experience workforce shortages as opposed to urban areas which create challenges when organizations are trying to implement and sustain HIT. DesRoches, Worzala, Joshi, Kralovec, and Jha (2012) found that small, nonteaching, and rural hospitals were slow to implement EHR systems.

Privacy and security barriers. Privacy is a major concern in EHR implementation and sustainment (Ajami & Arab-Chadengani, 2013). Patient data privacy and security is a major factor when considering Health Insurance Portability and Accountability Act (HIPAA). Ensuring that the EHR system is secure from data breaches are a critical element to enforcement. Ethics are involved when safeguarding patients' information. Every patient has the right to confidentiality. There are challenges with ensuring a secure wireless network, appropriate password strengths, and establishment of proper access-control settings.

HIPAA has severe sanctions for providers and organizations that unnecessarily access, share, or fail to protect patients' health information. There are some privacy concerns when dealing with patient confidentiality. Henriksen, Burkow, Johnsen, and Vognild (2013) noted a concern with unauthorized personnel accessing the EHR. There are potential health risks when patients do not want to disclose their health information (HealthIT, 2015b). As health care staff starts incorporating the use of smart phones and tablets in a health care setting, there is a strong need to ensure they protect patient

information (HealthIT, 2011). Ajami and Arab-Chadengani (2013) identified concerns with billing errors, software concerns, programming errors, and computer crashes which could affect patients' privacy and security. Rural hospital leaders who are not familiar with privacy and security concerns encounter challenges with creating technology usage policies.

The HIPAA Security Rule. There are national standards that protect individuals' protected health information (PHI) and the electronic form of PHIs (e-PHI). The HIPAA Security Rule mandates health care staff to protect the privacy and security of patient information. Health care staff are critical components to closing the security gap within an organization (HealthIT, 2015b). Some organizational leaders experience security breaches which can put an individual at risk for identity fraud and theft. In the case of a PHI breach, the Breach Notification Rule requires health care providers to notify all potential victims and the Secretary of the U.S. Department of Health and Human Services (HHS) (HealthIT, 2015). Additionally, if the breach affects more than 500 individuals then they are to notify the media (HealthIT, 2015b). Health care organizational leaders who do not comply with the HIPAA rules may encounter criminal and civil penalties.

Patient rights. Abbasi and Ferdosi (2013) conducted a comparative study to show how EHRs can help to organizations abide by the Patient's Bill of Rights. In a U.S. study, 68% of the population felt the EHR was not a secure system (Abbasi & Ferdosi, 2013). It is important for patients to understand how hospitals will store and protect their information when using EHRs. The Patient's Bill of Rights serves as a mandate that allows all patients to have equal rights to access health services (Pozgar, 2016). State and

federal laws protect patients' rights. The bill prohibits health care insurance carriers from denying coverage to people with pre-existing conditions. It prevents insurers from increasing premiums because of a person's age, health, or gender.

Additionally, all patients have the right to information. Patients have the right to know the cost of services and how much they need to pay for services received (Pozgar, 2016). Patients also have the right to choose providers and plans. As part of the bill, health care staff should treat patients with respect and not discriminate against them. All patients have the right to make decisions about their care and have access to emergency care (Pozgar, 2016). Patients have the responsibility to be part of their health care plan and inform medical personnel of any changes in their health. Additional patient responsibilities include keeping appointments and maintaining current medication records (Pozgar, 2016). The patient also has the right to make complaints and appeal unfair decisions from a health care insurance coverage. Lastly, all patients have the right to confidentiality of their health information.

The Implementation of EHR Systems

Despite government initiatives, some health care providers are slow to adopt EHRs. Palvia, Jacks, and Brown (2015) suggested that the MU stages each organization must meet delays the adoption of EHRs. Adler-Milstein et al. (2014) used recent data from the American Hospital Association's Annual Survey of Hospitals-IT Supplement to assess EHR progress and challenges. Adoption rates have risen across all groups of hospitals; however, progress is not the same across all groups. Rural and small hospitals

continue to lag. There continues to be a gap in EHR adoption between small, rural, and critical- access hospitals and other institutions (Adler-Milstein et al., 2014).

Mack et al. (2016) evaluated the primary care providers' EHR adoption rates and found that larger practices and community centers were 80% more likely to adopt and implement EHRs than rural health clinics. Mack et al. reported a lag in EHR adoption from some but not all providers in practices serving the underserved. Additionally, researchers found that smaller practices with less than ten providers had twice the chance of not implementing the EHR system than those in larger practices with more than ten providers (Mack et al., 2016). Similarly, Cohen (2016) suggested physicians in small physician-owned practices were slower to adopt EHRs than physicians in large practices. Furthermore, Cohen found that small, physician owned practices were more likely to adopt EHRs if there were financial incentives.

The proper implementation of EHRs is critical to the system's effectiveness. According to Lorenzi, Kouroubali, and Bloomrosen (2009) and Palvia et al. (2015), there are five phases of an EHR implementation process: decision, selection, pre-implementation, implementation, and post-implementation. Each phase requires constant communication between the EHR vendors and the medical providers (Palvia, Jacks, & Brown, 2015). Palvia et al. concluded that 77% of providers they surveyed felt that the most important phase was the pre-implementation phase. Likewise, 71% of vendors surveyed noted that the pre-implementation phase was the most important. Less than 15% of vendors and medical providers felt that the implementation or post-implementation phase was necessary (Palvia et al., 2015). Boonstra, Versluis, and Vos (2014) noted that

EHR implementation is a complex matter that involves both technical and organizational factors.

According to HealthIT (2013b), there are six rural implementation steps:

1. Assess your organization's readiness
2. Plan your approach
3. Select or upgrade to a certified EHR
4. Conduct training & implement an EHR system
5. Achieve MU
6. Continue quality improvement

The first step is to assess the organization's readiness. The assessment step is the foundation for all other EHR implementation steps. In the first step, health care leaders need to determine if their organization is ready to make a transition. HealthIT (2013b) suggested that leaders review external technical environments such as infrastructure and broadband capabilities. Leaders need to determine whether they will need increased IT support and find out if their current IT staff are knowledgeable in EHRs. Leaders should determine whether their organization is financially ready to make the needed investments (HealthIT, 2013b). Some organizations will benefit from evaluating their strengths, weaknesses, opportunities, and threats. Additionally, health care organizations should assess staff readiness (HealthIT, 2013b). Leaders can inquire about their staff members' skills and take staff members' attitudes into consideration.

The second step for health care leaders is to organize their project infrastructure. During the planning phase, health care leaders might consider developing job

descriptions and designating project leaders to fulfill those roles (HealthIT, 2013b). Leaders can create a plan that identifies how they will meet certain goals. In the second step, leaders might want to establish a communication plan. It might be beneficial for leaders to evaluate the current state of how the organization operates and create a plan for the desired future state (HealthIT, 2013b). In this phase, it might be beneficial to identify concerns and work to find solutions.

The third step involves selecting a certified EHR system (HealthIT, 2013b). There is a process for selecting an EHR vendor. Health care leaders need to consider the clinical needs and organizational objectives before selecting a vendor (HealthIT, 2013b). Leaders can send out a request for proposals to vendors to evaluate which vendors can meet the needs of the organization. The fourth step suggests organizations conduct training and implement an EHR system. Organizations can prepare for EHR implementation by pilot testing and conducting mock trials (HealthIT, 2014). During the fourth step, Health care leaders should implement any plans made during the second step. These plans might include chart migration which is the process of moving paper data to the EHR (HealthIT, 2014). Training is critical for successful EHR implementation. The HealthIT website offers educational opportunities and training tips.

The fifth step involves health care organizations successfully achieving MU. Health care leaders can achieve MU by completing stages 1 and stages 2. According to HealthIT (2014), each set of objectives belong to one of the following groups:

1. Improving quality, safety, efficiency
2. Engaging patients and families

3. Improving care coordination
4. Improving public and population health
5. Ensuring privacy and security of personal health information

In stage 1, there are a variety of objectives to improve quality, safety, and efficiency such as recording demographics, maintaining problem lists, and using e-prescribing (HealthIT, 2013b). In stage 2, the core objectives help providers engage patients and families by noting patient-specific education resources and secure electronic messaging (HealthIT, 2013b). Lastly, step 6 involves the continuation of quality improvement. Hospital leaders can continue to evaluate post EHR implementation and sustainment to ensure staff and patient satisfaction (HealthIT, 2014). Health care leaders should continue to evaluate their EHR system to improve workflows and goals (HealthIT, 2014). During this phase, leaders can assess whether their organization needs additional training or make the appropriate staff adjustments to improve efficiency.

Financial solutions. According to DeVore and Figlioli (2010) and Palvia et al. (2015), for a successful EHR implementation, it is important for health care leaders to determine the cost of implementation and how they will measure the success of the program. Health care leadership should spend time reviewing different vendors to get the best price possible. Before purchasing from a vendor, health care leaders can request to attend site visits to hospitals where the vendor has an EHR system operating (HealthIT, 2013b). Conducting site visits allow health care leaders to evaluate opinions from individuals who are currently using the EHR system (HealthIT, 2013b). Boonstra et al. (2014) noted that health care leadership select vendors based on price. Selecting an

affordable vendor can help health care leaders manage cost without increasing hardship (Bergman & Lundberg, 2013).

EHRs are a significant investment; therefore, it is important to integrate alerts and measure reporting. According to HealthIT (2013b), health care leaders should consider the current IT budget, estimate a one-time cost for new HIT, and estimate ongoing costs to maintain the EHR system. It is important for health care leaders to identify key goals and indicate how those goals will justify a return on investment (DeVore & Figlioli, 2010). Alerts and reminder reports within EHRs can assist health care leaders to ensure they are achieving the desired results. Organizational leaders should set goals to evaluate productivity value, costs savings, cost avoidance, profitability, and quality value (HealthIT, 2013b). Health care leaders should identify benefit metrics and a plan to achieve results (HealthIT, 2013b).

Health care leaders need to prepare for unexpected costs due to potential indirect costs of EHR implementation. Some of the potential costs that some health care organizations might not realize are involved include design, training, software upgrades, and increased IT support (DeVore & Figlioli, 2010). Additionally, health care leaders need to consider performance ratios such as average daily patient visits, staffing ratios, turnover rate, and personnel expenses (HealthIT, 2013b). Leaders should consider if their organization can tolerate temporary fluctuations in productivity during EHR implementation. Health care leaders might want to search for additional funding sources and determine if they have a sufficient cash flow to support EHR implementation. It might be beneficial for health care organizations to evaluate margins such as net income,

operating margins, and capital (HealthIT, 2013b). HealthIT (2013b) recommends that health care leaders conduct a thorough assessment to avoid financial losses.

Workforce and staffing solutions. Implementing HIT requires individuals to communicate, collaborate, and coordinate with providers inside and outside of their network. Creating a communication plan can help reduce the uncertainty about future changes (HealthIT, 2013b). Health care leaders can engage stakeholders at different steps of the EHR implementation phase to increase communication. Manojlovich et al. (2015) found that work relationships and communication practices influenced the use of technology like the EHR. Barrett (2017) and DeVore and Figlioli (2010) indicated that health care leaders need to learn to consider and manage the cultural changes that might affect health care staff. According to Devore and Figlioli (2010), cultural changes are more challenging than financial and technological concerns.

Devore and Figlioli (2010) recommended health care leaders slowly initiate changes within their facility to avoid frustrating some health care staff. Health care staff should have the opportunity to voice their opinions and concerns before commencing EHR implementation. When selecting a vendor, health care leaders should consider the requirements and vendor quality analysis. To support clinical staff, health care leaders should find an EHR software program that they can customize to meet the needs of their users and hospital practices (Boonstra, Versluis, & Vos, 2014). The EHR software program should be reliable, flexible, available, and quick to meet the needs of all health care staff (Boonstra et al., 2014). Boonstra et al. (2014) conducted a systematic literature review and noted specific factors for successful organizational change when

implementing the EHR. The four factors included the participation of health care staff, comprehensive implementation strategy, interdisciplinary teams, active and supportive management (Boonstra et al., 2014).

Promoting physicians' acceptance within the health care organization is critical for the acceptance and success of EHRs. Health care leaders can ask health care staff to express concerns and provide feedback to ensure that clinical staff feel supported and motivated to support implementation and sustainment. Health care leaders should consider appointing clinical champions to support EHR implementation and sustainment (DeVore & Figlioli, 2010). Clinical champions can convey messages from leadership or from staff to ensure EHR adoption. Incorporating clinical champions can help health care leaders advocate for EHR implementation. Additionally, appointing project managers can assist in ensuring readiness for EHR adoption (HealthIT, 2013b). Project managers can do an array of tasks such as coordinate vendor selection, implementation, and ongoing maintenance.

DeVore and Figlioli (2010) surveyed hospitals and found that providers and staff prefer hands-on training versus classroom-style training. From the hospitals surveyed, they suggested having a trainer shadow physicians allowing physicians to immediately address any questions or concerns. Similarly, Atwater et al. (2016) recommended a hands-on approach in teaching EHRs. On the job training is beneficial when implementing new technology because it increases staff familiarity and comfort level. Health care leaders can minimize employees' stress levels by providing proper training. Introducing training programs that target physicians can help them develop skills needed

for EHR implementation and sustainment (Pantaleoni, Stevens, Mailes, Goad, & Longhurst, 2015).

The HealthIT (2017) website recommends three types of training: super user training, role-based training, and process-based training. Super users are staff members who received vendor training and can quickly navigate EHR systems (HealthIT, 2017). Super users can use their knowledge to train and share information with other employees. In role-based training, it requires staff members to engage in training that pertains to their current role within the facility (HealthIT, 2017). Lastly, process-based training can help staff members comprehend how changes affect workflows (HealthIT, 2017). For health care leaders seeking to provide EHR training, local Regional Extension Centers can aid in implementation training and provide guidance (HealthIT, 2017). DeVore and Figlioli (2010) suggested that physicians who use the EHR are more likely to realize the benefits of the system and would promote its use.

Privacy and security solutions. Health care leaders should assess privacy and security of the EHR software system to ensure the protection of patients' privacy (HealthIT, 2014). According to a national survey, 70% of providers reported that EHR implementation improved data confidentiality (HealthIT, 2014). Barrett (2017) and Fernández-Alemán, Señor, Lozoya, & Toval, (2013) indicated the importance of health care leaders being transparent to establish trust with their patients as they transition their records online. DeVore and Figlioli (2010) recommend a rigorous security program. The security program should include policies and procedures for various events such as how to respond to security incidents and should address potential risks. Additionally, health

care leaders should conduct post-incident analysis to measure success and effectiveness of the policies in place (DeVore & Figlioli, 2010).

Health care leaders should make changes to the policies according to lessons learned from the post-incident analysis. Hospitals should have policies regarding the security of cell phones and handheld electronics. Hospital leaders can implement encryption options to minimize potential risks. Health care leaders should ensure their staff are trained to accurately document all notes and concerns within the EHR to protect patients' information (DeVore & Figlioli, 2010; Visvanathan et al., 2017). Unofficial forms of documentation such as work lists can put patients' information at risk. Policies regarding medical record documentation are essential.

Health information exchange. Medical providers and patients can use HIE to quickly exchange clinical data across different medical organizations through secure means (Massoudi, Marcial, Tant, Adler-Milstein, & West, 2016). Medical providers use the EHR and HIE simultaneously. Medical providers can use the HIE system in three different ways. They can store and transfer patient information, send queries through HIE to access EHR information, or temporarily store patient information in HIE (Massoudi et al., 2016). Due to the variety of HIT, it is possible for health care organizations to vary in the way that they process or integrate data (Wu, Rundall, Shortell, & Bloom, 2016).

Most health care providers can use EHRs to connect with other similar systems and to exchange information. Therefore, improving the delivery and efficiency of care within organizations. The use of HIE can help medical personnel make better decisions and decrease and avoid readmissions, medication errors, and duplicate testing (HealthIT,

2014). Additionally, it can aid in improving diagnoses. There are many benefits for using HIE. One of the benefits of integrating HIE is that providers can effortlessly connect and send information to the EHR improving patient safety and the quality of care.

Medical providers using HIE through the EHR can access patient information in a timely matter thereby positively enhancing the care that they provide (Everson, Kocher, & Adler-Milstein, 2016). Everson et al. (2016) suggested there was a connection between improved timeliness and decreased patient care charges. Health care leaders who use HIE can eliminate unnecessary paperwork and unnecessary testing thus improving reliability, efficiency, and care coordination within their organization. Some medical providers noted faster access to information was one of the main benefits of using HIE; however, in other studies, researchers have questioned whether using the HIE system is quicker than a traditional phone call or fax (Everson et al., 2016).

The primary goal of the program is to deliver safe and efficient care to the patient population. However, there are mixed reviews of the benefits of the HIE system indicating the need for continued study (Rahurkar et al., 2015). As of 2013, approximately more than half of U.S. hospitals and physician-led practices participated in HIE (Rahurkar et al., 2015). By 2014, there was a 76% adoption rate (Hersh et al., 2015). According to Hersh et al. (2015), evaluating HIE and other HIT systems is a challenging task. The goal of HIE is to help reduce medical errors enhancing patient safety.

Conclusion

According to Buntin, Burke, Hoaglin, and Blumenthal (2011), 62% of studies they reviewed noted that HIT systems improved the quality of care. Ajami and Arab-

Chadengani (2013) suggested that EHR implementation and sustainment could save billions of dollars in health care costs. In 2009, President Obama and Congress created the HITECH act in hopes that it would accelerate the use of HIT and help health care centers to improve patient outcomes and quality care while lowering operating cost (Buntin et al., 2011). Vice President Joe Biden announced the availability of $1.2 billion in grants funded by the ARRA for health care organizations who were willing to implement the EHR (The White House, 2009). Since the inception of the EHR, the U.S. government has urged medical centers to adopt EHRs as a form of HIT (Duke, Frankel, & Reis, 2013).

Researchers have conducted a variety of studies involving barriers to HIT adoption and cost and cost-effectiveness (Goldzweig, Towfigh, Maglione, & Shekelle, 2009; Monlague & Asan, 2014). The uses of HIT such as the EHR and computerized patient order entry systems have improved the communication between doctors and their patients (Yang & Asan, 2016). Clinicians can share information with their patients through the EHR, which supports social and organizational outcomes. Skillman et al. (2015) conducted a study of primary care practices located in rural areas and found that 77% of respondents were using EHRs or HIT systems. More than half of the 513 respondents were meeting MU requirements which included e-prescribing and electronic lab data to public health agencies (Skillman et al., 2015).

According to Texasagriculture.gov (2013), rural communities have many unique challenges regarding infrastructure needs. Access to rural health care is critical and continues to affect rural communities. Rural health care communities encounter

challenges with maintaining dependable and affordable health care (Texasagriculture, 2013). In Texas, health care professionals cannot keep up with the rapid population growth. There is an increased demand for health care providers. A 2012 report indicated that out of 26 million people living in Texas, 3 million people were living in rural areas (Texasagriculture, 2013). In comparison to other states, the total number of Texans living in rural areas is greater than the total population of 20 other states (Texasagriculture, 2013). According to the CMS (2017b), there are 305 rural health clinics in Texas. Rural Texas health care centers encounter issues with access to care, lack of health care providers, and outdated facilities and equipment. The cost to make the necessary updates to improve technology and add software systems such as the EHR are significant.

Transition

The purpose of this qualitative case study was to explore the strategies rural hospital leaders use to implement an EHR system successfully. In Section 1, I provided the basis for this study. I discussed the foundation of the problem and the purpose of the study. The conceptual framework provided an avenue to understanding the strategies hospital leaders use to implement a successful EHR system, and the significance of the study supports the purpose statement. Additionally, in Section 1, I introduced the research question for the study. In the review of the literature, I analyzed and synthesized various sources of literature to achieve a depth of inquiry as it relates to the research topic.

Section 2 will contain a restatement of the purpose of this qualitative case study which will be to explore the strategies rural hospital leaders use to successfully

implement an EHR system. This section will include a detailed description of my role as the researcher, participants, research method and design. The research method and research design subsections will contain an expanded discussion of the nature of the study from Section one. Additionally, I will explore the process for population and sampling, ethical research, and data collection instruments, organization techniques, analysis, reliability, and validity. This section also will include details of the semistructured interviews and details regarding participant confidentiality. Under reliability and validity, I will conclude with an explanation as to how the study meets criteria as a qualitative study by expanding on creditability, transferability, dependability, and conformability. In Section 3, I will present the findings and provide an application to professional practice by providing a detailed discussion on the applicability of the findings. Additionally, I will discuss implications for social change, recommendations for action and further research.

Section 2: The Project

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies rural hospital leaders use to successfully implement an EHR system. The target population consisted of five rural hospital leaders from four rural hospitals who have successfully implemented EHR systems in South Texas. A potential outcome for beneficial social change is that health care leaders who implement the EHR system can increase communities' access to safe and efficient hospital care by improving quality, safety, and access to health care services for patients (Alder-Milstein et al., 2013).

Role of the Researcher

The role of the researcher is to design, interview, transcribe, and analyze the study's data to develop themes (Male, 2016; Sanjari, Bahramnezhad, Fomani, Sho-ghi, & Cheraghi, 2014). My role as the researcher for this qualitative case study was to administer the study, conduct the interviews, transcribe and code the interviews, and present the themes. I work for the Department of Veteran Affairs (VA) in South Texas, and I am interested in how HIT affects the health care industry. I have experience in operating the VA's computerized patient record system (CPRS), which is the VA's version of an EHR. To ensure the integrity of the collected data and analysis, I identified and managed personal biases by setting preconceived notions aside. To minimize personal bias, I continually reassessed preexisting assumptions and used interview protocols, data saturation, and member checking. I used an interview protocol to serve as a guide and maintain consistency. According to Yin (2014), researchers use interview

protocols as a guide to standardizing processes ensuring reliability and validity of each interview. Some researchers use unbiased interview techniques by creating interview questions that are neutral and do not influence respondents' answers (Devotta et al., 2016).

According to Sanjari et al. (2014), ethical challenges can occur between researchers and participants. Therefore, it is important to follow ethical guidelines such as the guidelines in the Belmont Report. The Belmont Report protocol governs the protection of human subjects (Wilson et al., 2015). I did not violate the principle of autonomy by respecting each participant's decisions and protecting them from harm. I ensured the interviewees offered additional insights on EHRs. Xu and Storr (2012) explained that in qualitative studies, researchers should learn how to be an effective research instrument who can collect data and interpret the data. I continued to develop myself as the research instrument by reading and reviewing qualitative studies regarding the implementation of EHRs.

Participants

The study participants included five hospital leaders from four different hospitals in South Texas who were knowledgeable regarding the implementation of EHRs within their facility. I employed purposeful sampling to select interviewees for the study. In qualitative research, it is common for researchers to use purposeful sampling to identify and select participants who are most appropriate for a study (DeFeo, 2013; Suri, 2011; Yin, 2014). Purposeful sampling was appropriate for this study because I could select participants who have knowledge regarding EHR implementation. According to Palinkas

et al. (2013), there are different types of purposeful sampling strategies; however, researchers most commonly use criterion sampling. Only rural hospital leaders who have knowledge regarding the implementation of the EHRs are eligible to participate in this study. By following eligibility criteria, researchers can strive to achieve accurate and meaningful results.

I obtained approval from the Institutional Review Board (IRB) before I invited rural hospital leaders to participate in the study. I identified participants and located their contact information using hospital websites or by calling the facility. Once I identified each participant's contact information, I sent out email letters or called them over the phone to describe the objectives and intent of the study. The email letter indicated that their participation in the research was strictly voluntary, there were no incentives for participating in the study, he or she should could withdraw from the study at any time. The email letter stated that if the participant is interested in taking part in the study to respond with possible dates and times that they would be willing to participate in the interview. Once a participant responded indicating interest, I ensured they received an informed consent form to review and sign. Obtaining informed consent is critical in research where human subjects are involved (Knepp, 2014; Nishimura et al., 2013; Sonne et al., 2013). I required all study participants to provide written informed consent.

With the interviewee's permission, I audio recorded each interview. I transcribed each interview for analysis and coded it to reveal themes and meet data saturation. Researchers should strive to reach data saturation to increase the quality and validity of the study (Fusch & Ness, 2015; Roy, Zvonkovic, Goldberg, Sharp, & LaRossa, 2015;

Yin, 2014). In qualitative case studies, researchers should attempt to establish a working relationship with the participants (Johnson, 2014; Yin, 2014). Researchers should strive to build trust because a lack of trust can be a barrier within the study (Johnson, 2014; Reybold, Lammert, & Stribling, 2013; Yin, 2014). To establish a working relationship with participants, I asked open-ended semistructured interview questions to encourage them to describe the strategies used in implementing EHRs. I also encouraged the participants to share additional information that may enhance the study.

Research Method and Design

Research Method

I used a qualitative research method with a case study design to explore the strategies rural hospital leaders use to implement EHR systems. The qualitative method was appropriate for this study because I was able to describe the complexity of how rural hospital leaders implement EHR systems. Some researchers use qualitative methods to seek an in-depth understanding of something where they do not need to use numerical data to answer the research question (Bevan, 2014; Patton, 2015). While using qualitative methods, researchers aim to understand individuals' experiences (Miner-Romanoff, 2012; Yavuz, 2012; Yin, 2014). As opposed to quantitative methods, researchers who use qualitative methods aim to answer questions about the why, what, and how of a phenomenon (Yin, 2014). To answer the research question, I had to gain a better understanding of the phenomenon through semistructured interviews.

According to McCusker and Gunaydin (2015), with quantitative methods, the researcher collects and analyzes numerical data to explain a phenomenon. The

quantitative method was not suitable for this study because the quantitative approach involved collecting and analyzing statistical data. Additionally, the purpose of this study was not to test a hypothesis but to focus on the strategies rural hospital leaders use to implement EHRs. Qualitative research methods do not include hypotheses (Marshall & Rossman, 2016; Yin, 2014). Furthermore, I did not select the mixed methods research design because I did not need both qualitative and quantitative research methods. Using the mixed methods research design, the researcher can enhance the strengths of a single design. Additionally, using mixed methods, researchers can employ statistical analysis to add precision to the research (Halcomb & Hickman, 2015). According to Sale, Lohfeld, and Brazil (2002), some researchers use both quantitative and qualitative techniques; however, just because a researcher combines the two does not mean that it is always appropriate to do so. By using a qualitative methodology, I was able to effectively address the research question.

Research Design

I proposed an exploratory multiple case study design because it allows for an exploration of the strategies that rural hospital leaders use to implement EHRs. Researchers using case studies can either select exploratory, explanatory, or descriptive methods (Yin, 2014). In case studies, researchers select the design that associates best with the research question (Gaya & Smith, 2016; Hyett, Kenny, & Dickson-Swift, 2014; Yin, 2014). Researchers can discover new ideas by using exploratory case study designs (Hyett et al., 2014). When researchers reach data saturation, they have enough information to replicate the study and have no new reoccurring themes that add to the

overall purpose (Fusch & Ness, 2015; Walker, 2012). To ensure I reached data saturation, I collected data until there was no new additional information. Researchers who do not reach data saturation risk affecting the quality and validity of the study.

I had the option of selecting a variety of research designs such as phenomenology, ethnography, or narrative methods; however, these other qualitative research designs did not support the study's research question. Researchers selecting a phenomenological design only collect data from a single source like interviews (DeFelice & Janesick, 2015; Marshall & Rossman, 2016; Tomkins & Eatough, 2013). A phenomenological design was not appropriate because I was not focusing on the meanings of interviewees' lived experiences about a specific phenomenon and was not using other forms of data collection techniques besides interviews. In ethnography design, researchers focus on groups that share a common culture over an extensive period (Crandall et al., 2016; Small, Maher, & Kerr, 2014). The ethnographic design was not appropriate for the study because I was not studying cultures. In a narrative design, researchers gather information from journals, stories, and life experiences of individuals (Korach, 2012; Marshall & Rossman, 2016). A narrative design was not appropriate for this study since I was not gathering information from journals, stories, or life experiences.

Population and Sampling

The population sample for this research study included five hospital leaders from at four hospitals in South Texas who have experience with EHR implementation. Only rural hospital leaders who have knowledge and experience with implementing the EHR were eligible to participate in this study. According to Crouch and McKenzie (2006),

researchers can be more involved in building trust and communication when their sample size is small. Furthermore, in qualitative case studies reaching data saturation is more important than focusing on the number of participants (Guetterman, 2015; Stake, 2013; Yin, 2014).

I used a purposeful non-random sampling method to interview individuals who aligned with and met the criteria to answer the research question. Purposeful sampling involves selecting participants who can respond to the research question providing the researcher with maximum knowledge (Leedy & Ormrod, 2013; Patton, 2015; Robinson, 2014). I interviewed participants until I reached data saturation. Researchers who successfully reach data saturation determine no additional interviews would produce any more new information than their previous interviews (Dworkin, 2012; Kolb, 2012; Marshall & Rossman, 2016). I reached data saturation once I started viewing recurring themes and no new themes emerged.

Ethical Research

I sent participants an informed consent letter via email explaining the purpose of the study and indicating that participation is voluntary. The informed consent letter indicated there were no incentives for participating, participation was voluntary, and required a signature (Appendix A). Regardless of the field of study, informed consent is a fundamental part of ethics (Sanjari, Bahramnezhad, Fomani, Sho-ghi, & Cheraghi, 2014). Prior to the study beginning, I required each participant to read, agree, and sign a consent form (Appendix A). In qualitative research, the researcher should specify the purpose of the data collected (Sanjari et al., 2014). The risk involved in participating in the study

was minimal. I followed Walden University's IRB guidelines for conducting ethical research. Walden University's approval number for this study is 12-04-17-0337977 and the approval expires on December 3, 2018. The university's IRB's purpose is to ensure the protection of rights and welfare of human subjects in research (Allen, 2015; Aluwihare-Samaranayake, 2012). I completed the National Institutes of Health (NIH) web-based training course for the protection of human subjects before conducting the study. I assured the ethical protection of participants by reporting accurate information, respecting, and causing no harm to all participants.

Before proceeding in the data collection process, I waited to receive approval to conduct the study from Walden University's IRB. According to Lauckner, Paterson, and Krupa (2012), before conducting research, it is critical for the researcher to obtain approval from an IRB. Prior to starting each interview, I informed the participants that any information they provided in the interview was confidential, and I would not use personal identifiers such as their names or facilities names in my final report. I let the participants know they have the right to refuse to answer questions or withdraw from the study at any time. Participants had the option to withdraw from the study by informing me via email, telephone, mail, or in person. If a participant decided to withdraw from the study, I would exclude and destroy the data collected. I used codes to ensure confidentiality (e.g., P1, P2, P3). The use of pseudonyms adds to increased confidentiality (Bell, 2013; Mattson & Haas, 2014). I will maintain all electronic and hard copy data in a secure area for 5 years to protect the confidentiality of participants. I

am keeping all hard copy data in a locked cabinet and electronic data on a password-protected universal serial bus (USB) drive. After 5 years, I will destroy all data collected.

Data Collection Instruments

In qualitative studies, researchers are the primary instruments for data collection (Denzin, 2013; Haahr, Norlyk, & Hall, 2014; Marbach, 2013). I was the primary data collection instrument and conducted open-ended semistructured interviews to gather information. The data collection strategy included six interview questions (Appendix B). Open-ended semistructured questions can aid researchers in collecting in-depth replies (Anyan, 2013; Jerbrant, 2013; Yin, 2014). I used an interview protocol to serve as a guide and maintain consistency (Appendix C). Jacob and Furgerson (2012) suggested researchers who are new to qualitative research use interview protocols to assist them to stay on task during the interview process. Interview protocols can help the researcher direct the conversation toward the topic surrounding the research question (Bolderston, 2012; Marshall & Rossman, 2016). During the interviews, I used the interview protocol to ensure I asked participants the same questions in the same order to maintain consistency.

Once I obtained IRB approval, I contacted the participants, collected consent forms, scheduled interviews, conducted interviews, and analyzed the data. To ensure quality and reliability of the data, I documented the procedures and checked transcripts making sure they did not contain mistakes made during transcription. I implemented member checking to strengthen the creditability and accuracy of the information collected. Member checking involves interviewees to review transcripts of their

interviews strengthening the precision of the information (Erlingsson & Brysiewicz, 2013; Marshall & Rossman, 2016; Reilly, 2013). In addition to semistructured interviews, I collected information from public and government websites and reviewed hospital polices to gather information regarding EHRs. I used websites such as healthit.gov and ruralhealthinfo.org to gather information on EHR policies. Yin (2014) suggested case study researchers use more than one data collection method.

Data Collection Technique

The data collection process consisted of a review of government websites and information obtained from semistructured interviews conducted over the telephone. I used an iPhone 6 smartphone application called Pio Recorder to record the interview. Qualitative researchers using a case study design are responsible for selecting the most appropriate techniques to gather information from the participants (Leedy & Ormrod, 2013). There are some advantages to conducting interviews. Interviews are an effective data collection technique in qualitative research (Campbell, Quincy, Osserman, & Pedersen, 2013; Leedy & Ormrod, 2013; Rubin & Rubin, 2013). According to Redlich-Amirav and Higginbottom (2014) using telephone interviews can provide the participants more privacy and flexibility. By conducting telephone interviews, interviewees can participate from any location and might experience minimal inconveniences. Irvine, Drew, and Sainsbury (2013) suggested a disadvantage of telephone interviews are that they are not as effective as face-to-face interviews because it can hinder rapport building between the interviewee and researcher. Additionally, telephone interviews limit the researcher from observing the interviewee's body language and use of non-verbal cues.

However, Holt (2010) emphasized another advantage in that telephone interviews can reduce the discomfort that some researchers and interviewees experience during the interview process. Moreover, researchers who use telephone interviews can have access to people in hard to reach populations. Schulz and Ruddat (2012) suggested telephone interviews are an acceptable alternative when face-to-face interviews are not possible.

I used an interview protocol as a guide during the interview process (Appendix C). An advantage of an interview protocol is that it enables researchers to organize their methods and procedures, maintain consistency, and limit research bias. By using an interview protocol a researcher can maintain consistency and reliability of each interview (Foley & O'Conner, 2013; Franz, 2011). Additionally, interview protocols can help a researcher limit research bias (Chenail, 2011; Leedy & Ormrod, 2013). Once I completed the interviews, I transcribed the data and conducted member checking to enhance their credibility. I e-mailed the transcription and asked the participants to review and validate content for accuracy. Koelsch (2013) recommended researchers offer a copy of the interview transcription for review and validation. In qualitative research, member checking helps improves the reliability of the content (Marshall & Rossman, 2016; Morse, 2015). By using member checking, I ensured the accuracy of the collected data.

Data Organization Technique

In qualitative research, data organization is vital. Hancock and Algozzine (2015) advised researchers conducting case studies to organize and examine the collected data continuously. I used codes to ensure confidentiality (e.g., P1, P2, P3). The use of pseudonyms adds to increased privacy (Bell, 2013; Gibson, Benson, & Brand, 2013;

Mattson & Haas, 2014). After transcribing the interviews, I used a color coding process to categorize and describe collected data. Researchers can use color coding or highlight key themes within a spreadsheet to keep the data organized (Chenail, 2012; Constantine, 2013; Olsen, McAllister, Grinnell, Walters, & Appunn, 2016). I kept each interview transcript in a separate folder on a password-protected USB drive. I will maintain all electronic and hard copy data in a secure area for five years to protect the confidentiality of participants. I am keeping all hard copy information in a locked cabinet, and electronic data on a password-protected USB drive. After five years, I will to destroy all data collected. Gibson, Benson, and Brand (2013) advised storing all confidential data properly.

Data Analysis

I explored the strategies rural hospital leaders in South Texas used to implement an EHR system. Yin (2014) described the data analysis process as a way for researchers to arrange, filter, and evaluate the information collected. In qualitative data analysis, Yin (2014) suggested a five-step process that includes compiling, disassembling, reassembling, interpreting, and concluding. I used Yin's (2014) five-step process to analyze the data I collected. To compile the information, I followed the interview protocol (Appendix C) with the six interview questions (Appendix B) I asked the interviewees. Data analysis included collecting open-ended information, based on asking general questions and developing an analysis of the participant's answers. Additionally, I used other data sources such as company documents and information from government websites to achieve data source triangulation.

Once I gathered the information for the study, I disassembled the information into manageable components. I then reassembled the information according to themes. Percy, Kostere, and Kostere (2015) noted analyzing themes as part of the qualitative data analysis process. Baškarada (2014) and Yin (2014) suggested researchers rely on theoretical propositions in qualitative analysis. The purpose of analyzing the data was to uncover themes to answer the central research question. I used Microsoft Word to manually highlight themes. In conjunction with manual analysis, I used NVivo for Mac computers to assist me in categorizing and coding the information. NVivo is a software program that aids researchers in managing and analyzing data from a variety of formats including audio and spreadsheets.

The data collection methods are consistent with methods used in existing research (Niazkhani, Pirnejad, DeBont, & Aarts, 2010; Simon et al., 2013). After I assembled the information according to themes, I interpreted the data. Finally, I used all the information I collected and interpreted to make conclusions. The data analysis process for this multiple case study was data source triangulation which included interviews, public records, and documents. Triangulation is the use of multiple sources to increase researchers' confidence in the validity of the information (De Massis & Kotlar, 2014; Marshall & Rossman, 2016). Researchers can use data source triangulation when they have multiple methods for collecting data to increase validity of a study (Bekhet & Zauszniewski, 2012; Hyett et al., 2014; Miles, Huberman, & Saldaña, 2014; Yin, 2014). Using multiple sources of data can support the study's construct credibility through data triangulation (Morse, 2015). To ensure quality and reliability of the data, I documented

the procedures and checked transcripts making sure that they did not contain mistakes made during transcription. I analyzed the information through the lens of the sociotechnical systems theory. I used the conceptual framework to interpret the meaning of the information. I will use the study outcomes to inform rural hospital leaders of the strategies used to implement an EHR system.

Reliability and Validity

Researchers determine the quality of the research by testing the reliability and validity of the information (Anney, 2014; Noble & Smith, 2015; Yin, 2014). Researchers should strive to achieve credibility, transferability, dependability, and confirmability (Miles et al., 2014). In the following subsections, I described how I achieved reliability and validity.

Reliability

In qualitative studies, researchers use the term dependability rather than reliability (Elo et al., 2014). To increase reliability, researchers document their processes so other researchers can replicate the study (Allen, 2015; Street & Ward, 2012). In qualitative research, researchers achieve reliability of a study when the same procedures achieve the same results (Marshal & Rossman, 2016; Yin, 2014). Researchers establish reliability by accurately recording data and demonstrating consistency. To ensure quality and dependability of the data, I used an interview protocol (Appendix C) for interview administration consistency and to mitigate bias. Researchers can increase reliability and provide consistency when they use interview protocols (Chen et al., 2014; Chetty, Partanen, Rasmussen, & Servais, 2014). With the participants' permission, I recoded the

interviews enhancing reliability by recording the conversation. After each interview, I transcribed the interview recordings verbatim onto a Word document.

I ensured accuracy of the data by listening to the recordings and reviewing the transcriptions multiple times. After I completed the transcriptions, I conducted member checking. Researchers can implement member checking of data information to ensure reliability (Harvey, 2015; Hlady-Rispal & Jouison-Laffitte, 2014; Polit, 2014). I e-mailed the transcripts to the participants offering them the opportunity to review the data for errors and to ensure my interpretation reflected their experiences. I used manual analysis and NVivo for Mac computers to improve accuracy and dependability of the generated themes. Lastly, I achieved data saturation enhancing the dependability of the study.

Validity

To increase the validity of the study, researchers should ensure data accuracy (Elo et al., 2014; Noble & Smith, 2015; Yin, 2014). To ensure the validity of the study, I addressed creditability, confirmability, and transferability. Researchers can implement member checking to strengthen the creditability and accuracy of the information collected (Erlingsson & Brysiewicz, 2013; Marshall & Rossman, 2016; Morse, 2015; Reilly, 2013). Once I completed the interviews, I transcribed the interview recordings and conducted member checking to enhance their credibility. I e-mailed the transcription to the participants and asked the participants to review and validate for accuracy. Koelsch (2013) recommended researchers offer a copy of the interview transcription for review and validation. Respondent validation can ensure the creditability of the study findings (Cridland, Jones, Caputi, & Magee, 2015; Noble & Smith, 2015).

In qualitative research, researchers attain confirmability when other researchers confirm the data (Cope, 2014; Elo et al., 2014; Yin, 2014). To establish confirmability, I disclosed researcher bias and minimized bias by conducting member checking of the interviews. Additionally, I deployed the use of triangulation. I used data triangulation to validate the data I collected by cross verifying the collected information. By using data triangulation, I increased the credibility and validity of the data. Researchers can use data triangulation when they have multiple methods for collecting data to increase the validity of a study (Hyett et al., 2014; Miles et al., 2014; Morse, 2015; Yin, 2014).

To ensure I reached data saturation, I collected data until there was no new additional information, no new themes emerged through coding, and other researchers could replicate the study. When researchers reach data saturation, they have enough information to replicate the study and have no new reoccurring themes that add to the overall purpose (Fusch & Ness, 2015; Walker, 2012). Researchers should strive to reach data saturation to increase the quality and validity of the study (Fusch & Ness, 2015; Roy et al., 2015; Yin, 2014). In qualitative research, transferability refers to the research findings applying to other individuals who are not part of the study or in other contexts (Cope, 2014; Elo et al., 2014; Houghton, Casey, Shaw, & Murphy, 2013; Noble & Smith, 2015). To ensure transferability, I provided the geographical location, industry information, participant criteria, data collection techniques, and organization. Future researchers may be able to use the outcomes from this study to further explore strategies and themes.

Transition and Summary

In Section 2, I began with a restatement of the purpose of this qualitative multiple case study which was to explore the strategies rural hospital leaders use to implement an EHR system. I provided a detailed description of the role of the researcher, participants, research method and design. In the research method and research design subsections, I expanded on the nature of the study discussion from Section 1. Additionally, I explored the process for population and sampling, ethical research, and data collection instruments, organization techniques, analysis, reliability, and validity. Furthermore, in Section 2, I included details of the semistructured interviews and details regarding participant confidentiality. Under reliability and validity, I concluded with an explanation as to how the study meets criteria as a qualitative study by expanding on creditability, transferability, dependability, and conformability.

To start, in Section 3, I include the purpose of the study and presentation of the findings. I provide an application to professional practice by providing a detailed discussion on the applicability of the findings. Additionally, I discuss implications for social change, recommendations for action and further research. I identify themes and provide analysis and discussion of the findings. Lastly, in Section 3, I conclude with a reflection of my experiences and a conclusion statement.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative multiple case study was to explore the strategies rural hospital leaders use to implement an EHR system. I collected data using semistructured open-ended questions from five rural hospital leaders in South Texas who shared their experiences with implementing EHRs. I analyzed the data from the interviews and identified the emergent themes. The findings of the study centered on five themes. The themes were ongoing training, provider buy-in, constant communication, use of super users, and workflow maintenance.

Presentation of the Findings

The sociotechnical systems theory provided a lens for facilitating my understanding of the strategies hospital leaders use to implement a successful EHR system that balances hospital personnel needs with technology adoption and implementation. Hospital leaders who implement technology can help their organizations be more productive. Hospital leaders can use social and technical aspects of technology to achieve an operational organization. The overarching research question for this study was as follows: What strategies do rural hospital leaders in South Texas use to implement an EHR system successfully? The findings are a result of public government documents and semistructured interview responses from five participants within four rural hospitals in South Texas. Each participant reviewed and signed an informed consent form where they agreed to be audio recorded. After transcribing the interviews and reviewing transcripts for accuracy, I used manual analysis to analyze the data. In conjunction with

manual analysis, I used NVivo for Mac computers to assist me in categorizing and coding the information. Figure 1 is a word cloud from NVivo depicting words that frequently appear in the interviews. From the information the participants provided during the interviews and the word cloud from NVivo, I was able to develop common themes.

Figure1. Word cloud from NVivo depicting words that frequently appeared within the semistructured interviews

Emergent Theme 1: Ongoing Training

Training is a critical component of any organization to ensure EHR implementation success. One hundred percent (5) of the participants indicated that training was an important aspect of EHR implementation. He, Marquard, and Henneman (2016) noted that EHR training continues to be a challenge for many organizations;

however, training is critical. He et al. (2016) indicated that success and failures with EHR implementation often depend on how the organization developed the training. Similarly, Otto and Nevo (2013) noted training to be an obstacle that delays providers' adoption of the EHR affecting successful implementation. P3 stated, "Training the staff on the software before we implemented was key." Introducing training programs that target physicians can help organizations develop skills needed for EHR implementation and sustainment (Pantaleoni et al., 2015). HealthIT (2014) recommended that hospitals that are implementing the EHR should conduct various forms of training to ensure end users understand the full potential of the system.

Mohan et al. (2016) indicated that training staff with EHR simulations of real world clinical scenarios would optimize its use in a clinical setting. All interviewed participants indicated that providers who participated in EHR practice workflows felt more comfortable using the EHR software in their clinics. Additionally, hospital leaders who implement EHR simulation training offer providers the opportunity to practice and familiarize themselves with the EHR. Lastly, hospital leaders can use EHR simulations to assess whether their organization needs more training. P2 stated, "They [vendors] do come in and present on their [EHR] functionality. So, they'll come, and they came two weeks ago and they presented the EHR as it stands, and they do a workflow through it. So, if you had a patient come in, say it's for an outpatient radiology order, you would follow that outpatient radiology order and you would try to track it all the way to where you have them refer to it to see if you have those good technical EHR types of connections between the two."

DeVore and Figlioli (2010) surveyed nonprofit U.S. hospitals and found that providers and staff prefer hands-on training versus classroom-style training. Similarly, Atwater et al. (2016) recommended a hands-on approach such as one-on-one training in teaching EHRs. Interview participants also indicated that hands-on training that included one-on-one training was beneficial in preparing their staff. By using one-on-one training, the staff had the opportunity to ask questions privately. Some participants noted that they had trainers in different clinical departments allowing providers to ask questions as issues occurred. P3 noted, "To have somebody there on site in their department to answer questions they needed was probably the biggest helpful thing that we did to make it successful." The following are statements from the participants as they pertain to training:

- "Training is a major part of the implementation process."
- "Obviously, training is important. So training the staff on the software before we implemented was key."
- "You can never have too much training because the ultimate thing is: Were they comfortable doing it from the get go and discussing workflow too?"
- "Ongoing training is key."
- "Um eventually, when the vendor left then you got to have people that know the software pretty well that can then do the ongoing training for new employees as they come in."
- "To a certain extent, we did a lot of lead in training before we went 'live'. We spent a lot of time doing a lot of one-on-one training with some of our folks."

Emergent Theme 2: Provider Buy-In

Sixty percent (3) of the participants encountered challenges with handling situations regarding provider acceptance and buy-in of EHRs. User acceptance and commitment are essential components of EHR implementation to be successful (Mason, Mayer, Chein, & Monestime, 2017). Promoting physicians' acceptance within the health care organization is critical for the success of EHR implementation. Petrides et al. (2017) noted that a common challenge is user acceptance, but having users' acceptance of EHRs is essential to successful EHR implementation. Health care leaders can ask their staff to express concerns and provide feedback to ensure that clinical staff felt supported and motivated to support implementation and sustainment. P1stated, "We know that in the EHR, any sort of implementation and communication would not be successful if we did not have the buy-in and the input of our providers." Additionally, P1 noted, "In order to make any new EHR system work, we are going to have to have complete 100% physician buy-in and compliance."

Health care leaders should consider appointing clinical champions to support EHR implementation and sustainment (DeVore & Figlioli, 2010). P3 noted, "What you have to do is really find kind of a champion in that group." Clinical champions can convey messages from leadership or from staff to ensure EHR adoption. Incorporating clinical champions can help health care leaders advocate for EHR implementation. P2 indicated that "It was more of getting the personnel in front of the right people to get the buy-in, so we had the CIO [chief information officer] meet with the physicians and talk to

them about the difficulties coming forth." The following are statements from the participants as they pertain to provider buy-in:

- "Any sort of implementation and communication would not be successful if we did not have the buy-in and the input of our providers."
- "So I know that one thing that we really we are going to have to in order to make any new EHR system work we are going to have to have complete 100% physician buy-in and compliance."
- "I think you know the hardest part is getting the buy-in of the doctors but you know from conversations I've had with other IT people or other hospital personnel it's like that everywhere."
- "You know if they can do it on paper all these years they are reluctant to try something different and um you just got to have their buy-in."

Emergent Theme 3: Constant Communication

Sixty percent (3) of the participants encountered challenges and recommended open lines of communication during implementation. Increased communication is one of the benefits of using systems like the EHR (Gillum, 2013; Price et al., 2013). Each phase requires constant communication between the EHR vendors and the medical providers (Palvia et al., 2015). HealthIT officials (2013b) recommend leaders establish a communication plan. P2 noted, "We had multiple site visits and the director speaking to them for the staff to finally see how moving forward we couldn't really operate with our current EHR system." Creating a communication plan can help reduce the uncertainty

about future changes (HealthIT, 2013b). Some hospital leaders have trouble communicating the purpose and benefits of EHR implementation and sustainment.

Health care leaders can engage stakeholders in different steps of EHR implementation to increase communication. Manojlovich et al. (2015) found that work relationships and communication practices influenced the use of technology like the EHR. P1 stated, "Communication is key, but it's not always easy." P1 also noted the importance of communication with the end users. P1 stated, "Just making sure that we are able to speak with our end users and making sure that the implementation is going as planned and to their liking." When there are many providers, it can be challenging to communicate effectively (Petrides et al., 2017). Effective communication is essential to foster a positive environment and to ensure the accuracy of information (Gross et al., 2016). The following includes statements from the participants as it pertains to communication:

- "To have somebody there um on site in their department to answer questions they needed was probably the biggest helpful thing that we did to make it successful."
- "We constantly do upgrades and in those upgrades prior to doing them we get the release notes on what changes. So it's key to give to departments prior to us doing the upgrades. And to get them up to speed on any changes to their job functions in the software so that they're not surprised when we do do the upgrade."
- "So um got quite a few questions from the staff saying that we needed to communicate the 'why' behind the search [for a new EHR]."

- "Got a few people who really understood it [EHR] to just kind of float around in the different areas that we knew people were struggling and just to help them along. To have somebody there um on site and in their department to answer questions they needed was probably the biggest helpful thing that we did to make it successful."

Emergent Theme 4: Use of Super Users

Eighty percent (4) of the participants recommended the use of super users during EHR implementation. The HealthIT (2017) website recommends the use of super users. Super users are staff members who received vendor training and can quickly navigate EHR systems (HealthIT, 2017). P4 noted, "The vendor provided the training, it was all part of the package. It was a train the trainer where they train super users to be able to train our employees and that varied by department." Super user staff members can use their knowledge to train and share information with other employees.

Shea, Reiter, Weaver, and Albritton (2016) noted that having super users are important for successful EHR implementation. Bullard (2016) noted that super users could positively influence attitudes of end users. P5 noted how their super users aided them, "Representatives from various departments and services that were going to be needing who would be using the EHR and each one of them basically made a list of what their priorities were." Super users who communicate and maintain a positive outlook can increase co-workers' proficiency in operating the EHR (Yuan, Bradley, & Nembhard, 2015). Super users are essential in providing peer support and as primary points of contacts. Additionally, Bullard (2016) expressed the importance of having super users for

an effective EHR implementation. The following includes statements from the participants as it pertains to the use of super users:

- "We were able to further identify those super users in our facility who really are going to have the answers to this is a good EHR system or not. That's when we engaged those people to start doing an evaluation on it."
- "If you do have um a super user group like we have that does an evaluation that they know about any kind of commitments well beforehand. And they do commit to everything at the time."
- "Having even a selection committee is very helpful, and interdisciplinary team of folks that can come together and really hash out the details of this project."
- "It was a train the trainer where they train super users to be able to train our employees and that varied by department. Some of the super user training was 8 to 12 hours some of it was you know 30 hours depending upon the department, but they actually came down here and it was one-on-one face-to-face training."
- "You might have a little bit of administrative representation but you really have a lot of informatics, IT, nursing, physicians, a lot of different groups you know outpatient and inpatient, ED, at least a representative from each area coming together to um you know in one room to really talk through all of your options. So that we know that you know we are getting input from all areas of the hospital because it's so important."

Emergent Theme 5: Workflow Maintenance

Eighty percent (4) of the participants recommended analyzing and communicating workflow during EHR implementation. Workflow changes that occur with EHR implementation continue to be a significant challenge. According to Gabriel et al. (2014), they reported that some rural hospitals encounter challenges with adjusting to workflow changes. P3 noted, "There's a different workflow when you have paper charts then there is in EHRs. We had to understand what the workflow was for these people prior to us going live." Some hospital leaders encounter challenges with handling situations regarding staff frustration and acceptance of the EHRs. Some staff members do not have the expertise or have the time in their schedules to learn a new system (Ajami & Arab-Chadengani, 2013; Skillman et al., 2015). Implementing an EHR can affect how an organization conducts exams, prescribes and processes medications, and schedules patients. Hospital leaders can ensure they appropriately communicate any new workflow functions within the organization.

Ser, Robertson, and Sheikh (2014) noted that complex workflows could deter providers from implementing an EHR. According to Holman et al. (2015), disruptions in the workflow can lead to inadequate patient care. P4 indicated that it was important for the vendor to understand the current workflow of the organization as well. P4 stated, "So ideas they [vendors] were pitching at us would not necessarily work because they didn't understand the workflow." After implementation, health care leaders should continue to evaluate their EHR system to improve workflows and goals (HealthIT, 2014). Leaders should continue to assess whether their organization needs additional training or make the

appropriate staff adjustments to improve efficiency. HealthIT (2017) recommends process-based training which can help staff members comprehend how changes can affect workflows. The following includes statements from the participants as it pertains to workflow maintenance:

- "So we went over that in meetings you know walk us through how you bring a patient in, put them in the doctor's room, in the exam room or whatever? What all do you do? Do you do the vitals? And what order do you do them? And so you got to understand the workflow and make sure that um you translate that paperwork flow over into the computer workflow."
- "They [vendors] do come in present on their functionality so they'll come and they came 2 weeks ago and they presented the EHR as it stands and they do a workflow through it."

Each of the themes discussed in the findings involves both social and technical aspects of effective EHR implementation. User acceptance and commitment are essential components in EHR implementation. Since EHRs are dependent on the people who use them, hospital leaders might try encouraging the support from their staff. In using the sociotechnical systems approach, organizations should have a multidimensional understanding of technology and think beyond the technical elements.

Applications to Professional Practice

The application of rural hospital leaders' use of training, provider buy-in, communication, super users, and workflow to implement an EHR are relevant to the professional practice of business. Rural hospital leaders may use the results of the study

to improve workflow, profitability and increase EHR implementation. Health care leaders can increase profitability by implementing the EHR system to decrease medical errors while overcoming the barriers to implementation and adoption and enhancing the flow of information (Stanberry, 2011). Hospital leaders who implement an EHR and participate in the EHR Incentive Program will stop experiencing lost financial incentives and Medicare reimbursement penalties (Barrett, 2017; HealthIT, 2016). Additionally, rural hospitals receive low levels of reimbursements due to the lower than average income; however, to offset low reimbursement rates, rural hospital leaders can utilize EHRs to reduce and control health care costs (HealthIT, 2015a). Rural hospital leaders might use the findings of the study to adopt similar strategies when implementing an EHR.

Implications for Social Change

The implications for positive social change include providing new knowledge to hospital leaders on available strategies to implement an EHR to enhance patient and organizational performance and health care outcomes. Hospital leaders can use the results from this study to increase efficiency and improve the quality, safety, and patients' access to health care services. Hospital leaders who implement EHRs can enhance the quality of care by increasing a provider's access to patient information. The HealthIT (2014) website suggested that by using an EHR the quality of health care for patients in rural communities can drastically improve. Patients and their families can benefit from reduced health care costs, improved health care services and care coordination.

Recommendations for Action

The strategies I identified in this study might be able to improve health care delivery in rural areas. Based on the research findings, I recommend hospital leaders take the following actions when implementing an EHR:

1. Create an interdisciplinary team of champions who can provide guidance and recommendations regarding EHR functions.
2. Develop project objectives that describe workflow plans and necessary timelines.
3. Find a vendor that will provide most of the EHR software build and have an option for customization.
4. Find a vendor who will provide onsite training and education to all employees to increase provider buy-in and compliance.
5. Keep all lines of communication open so that the employees feel heard.

The hospital leaders who participated in this study shared their strategies for implementing EHRs. Hospital leaders can disseminate the results of this study via literature, conferences, and training. Hospital leaders can send this study report to members of their organization via email or meetings. The dissemination of the results of the study could help hospital leaders and other members of their organization to implement EHRs successfully.

Recommendations for Further Research

Based upon the results of this study, some hospital leaders across the U.S. might conduct further research regarding strategies for successful EHR implementation. Two of

the limitations noted in this study were the sample size might not be adequate to draw conclusions, and the study pertains only to one geographical region. Some researchers could replicate the study involving more than one state and include a larger sample size to make it more generalizable. I would recommend further research on the impact and effects of EHRs on the learning environment of rural hospital staff. Lastly, I recommend further research examining the effects of EHR implementation on patient safety.

Reflections

My doctoral journey with Walden University has been a unique and challenging experience. I had the opportunity to learn and gain a deeper insight into rural hospital leaders' strategies for implementing EHRs in South Texas. I did experience some challenges in recruiting interested participants for the research study. Through consistent communication with the participants, I gained their trust and support. I have worked in the federal health administration for approximately three years and have experience operating CPRS. I had some concerns that my experience in health care would influence my perspective; however, I was not involved and do not know anyone who was involved in the implementation of CPRS.

Conclusion

The focus of this study was to explore the strategies rural hospital leaders used to implement EHRs. The findings support the application of the sociotechnical systems theory indicating that both social and technical aspects are critical for EHR implementation. There were five emergent themes that hospital leaders used to implement the EHR, which were: (a) ongoing training, (b) provider buy-in, (c) constant

communication, (d) use of super users, and (e) workflow maintenance. Hospital leaders can use the findings to successfully implement an EHR. Hospital leaders could use the results of this research study to enhance the quality of care by increasing better care coordination and improving access to patient information.

References

Abbasi, S., & Ferdosi, M. (2013). Do electronic health records standards help implementing patient bill of rights in hospitals? *Acta Informatica Medica, 21*(1), 20-22. doi:10.5455/aim.2012.21.20-22

Adler-Milstein, J., DesRoches, C. M., Furukawa, M. F., Worzala, C., Charles, D., Kralovec, P., ... Jha, A. K. (2014). More than half of US hospitals have at least a basic EHR, but stage 2 criteria remain challenging for most. *Health Affairs*, *33*, 1664-1671. doi:10.1377/hlthaff.2014.0453

Adler-Milstein, J., DesRoches, C. M., Kralovec, P., Foster, G., Worzala, C., Charles, D., . . . Jha, A. K. (2015). Electronic health record adoption in US hospitals: Progress continues, but challenges persist. *Health Affairs, 34*, 2174-2180. doi:10.1377/hlthaff.2015.0992

Adler-Milstein, J., Salzberg, C., Franz, C., Orav, E. J., & Bates, D. W. (2013). The impact of electronic health records on ambulatory costs among Medicaid beneficiaries. *Medicare & Medicaid Research Review*, *3*(2), 1-16. doi:10.105600/mmrr.003.02a03

Ajami, S., & Arab-Chadegani, R. (2013). Barriers to implement electronic health records (EHRs). *Materia Socio-Medica, 25*, 213–215. doi:10.5455/msm.2013.25.213-215

Allen, D. C. (2015). Research, when you know what you are doing: A review of essentials of qualitative inquiry. *Qualitative Report, 20*, 451-453. Retrieved from http://nsuworks.nova.edu/tqr/vol20/iss4/6

Aluwihare-Samaranayake, D. (2012). Ethics in qualitative research: A view of the participants and researchers' word from a critical standpoint. *International Journal of Qualitative Methods, 11*, 64-81. doi:10.1177/160940691201100208

Andel, C., Davidow, S. L., Hollander, M., & Moreno, D. A. (2012). The economics of healthcare quality and medical errors. *Journal of Health Care Finance*, *39*(1), 39-50. Retrieved from http://www.aspenpublishers.com

Anyan, F. (2013). The influence of power shifts in data collection and analysis stages: A focus on qualitative research interview. *Qualitative Report, 18*, 1-9. Retrieved from http://www.nova.edu/sss/QR/index.html

Atwater, A. R., Rudd, M., Brown, A., Wiener, J. S., Benjamin, R., Lee, W. R., & Rosdahl, J. A. (2016). Developing teaching strategies in the EHR era: A survey of GME experts. *Journal of Graduate Medical Education, 8*, 581–586. doi:10.4300/jgme-d-15-00788.1

Barrett, A. K. (2017). Electronic health record (EHR) organizational change: Explaining resistance through profession, organizational experience, and EHR communication quality. *Journal of Health Communication, 32*, 1-11. doi:10.1080/10410236.2016.1278506

Baškarada, S. (2014). Qualitative case study guidelines. *The Qualitative Report, 19*, 1-18. Retrieved from http://nsuworks.nova.edu/tqr/vol19/iss40/3

Baxter, G., & Sommerville, I. (2011). Socio-technical systems: From design methods to systems engineering. *Interacting with Computers*, *23*, 4-17. doi:10.1016/j.intcom.2010.07.003

Bekhet, A. K., & Zauszniewski, J. A. (2012). Methodological triangulation: An approach to understanding data. *Nurse Researcher, 20*, 40-43. doi:10.7748/nr2012.11.20.2.40.c9442

Bell, K. (2013). Participants' motivations and co-construction of the qualitative research process. *Qualitative Social Work, 12*, 523-539. doi:10.1177/1473325011429020

Bergman, M. A., & Lundberg, S. (2013). Tender evaluation and supplier selection methods in public procurement. *Journal of Purchasing and Supply Management, 19*, 73-83. doi:10.1016/j.pursup.2013.02.003

Bevan, M. (2014). A method of phenomenological interviewing. *Qualitative Health Research, 24*, 136-144. doi:10.1177/1049732313519710

Bobb, A. M., Boehne, J., Ethridge, W. L., Hardy, C., Herring, R., Jacobs, R. S., … & Wright, L. (2011). ASHP guidelines on pharmacy planning for implementation of computerized provider-order-entry systems in hospitals and health systems. *American Journal of Health-System Pharmacy*, *68*, 9-31. doi:10.2146/sp100011

Bolderston, A. (2012). Conducting a research interview. *Journal of Medical Imaging and Radiation Sciences, 43*, 66–76. doi:10.1016/j.jmir.2011.12.002

Boonstra, A., Versluis, A., & Vos, J. F. J. (2014). Implementing electronic health records in hospitals: A systematic literature review. *BMC Health Services Research, 14*, 370-394. doi:10.1186/1472-6963-14-370

Bullard, K. L. (2016). Cost-effective staffing for an EHR implementation. *Nursing Economic$, 34*, 72-76. Retrieved from http://www.nursingeconomics.net

Campanella, P., Lovato, E., Marone, C., Fallacara, L., Mancuso, A., Ricciardi, W., & Specchia, M. L. (2015). The impact of electronic health records on healthcare quality: A systematic review and meta-analysis. *The European Journal of Public Health, 26*, 60-64. doi:10.1093/eurpub/ckv122

Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research, 42*, 294-320. doi:10.1177/0049124113500475

Carayon, P. (2012). Sociotechnical systems approach to healthcare quality and patient safety. *Work, 41,* 3850-3854. doi:10.3233/WOR-2012-0091-3850

Casella, E., Mills, J., & Usher, K. (2014). Social media and nursing practice: Changing the balance between the social and technical aspects of work. *Collegian, 21*, 121-126. doi:10.1016/j.colegn.2014.03.005

Centers for Medicare & Medicaid Services. (2017a). *Electronic health records (EHR) incentive programs.* Retrieved from https://www.cms.gov

Centers for Medicare & Medicaid Services. (2017b). *Outreach and education.* Retrieved from https://www.cms.gov

Charles, K., Cannon, M., Hall, R., & Coustasse, A. (2014). Can utilizing a computerized provider order entry (CPOE) system prevent hospital medical errors and adverse drug events? *Perspectives in Health Information Management, 11*, 1-16. Retrieved from http://perspectives.ahima.org

Chen, E. K., Riffin, C., Reid, M. C., Adelman, R., Warmington, M., Mehta, S. S., & Pillemer, K. (2014). Why is high-quality research on palliative care so hard to do? Barriers to improved research from a survey of palliative care researchers. *Journal of Palliative Medicine, 17*, 782-787. doi:10.1089/jpm.2013.0589

Chenail, R. J. (2011). Interviewing the investigator: Strategies for addressing instrumentation and researcher bias concerns in qualitative research. *The Qualitative Report, 16*, 255-262. Retrieved from www.nsuworks.nova.edu/tqr

Chenail, R. J. (2012). Conducting qualitative data analysis: Qualitative data analysis as metaphoric process. *The Qualitative Report, 17*, 248-253. Retrieved from http://www.nova.edu/ssss/QR/

Chetty, S. K., Partanen, J., Rasmussen, E. S., & Servais, P. (2014). Contextualising case studies in entrepreneurship: A tandem approach to conducting a longitudinal cross-country case study. *International Small Business Journal, 32*, 818-829. doi:10.1177/0266242612471962

Chiaroni, D., Chiesa, V., Franzo, S., Frattini, F., Urbinati, A. (2016). How incumbents manage waves of disruptive innovation: An empirical analysis. *Proceedings of the XXVII ISPIM, Portugal,* 1-18. Retrieved from http://www.ispim.org

Cohen, M. F. (2016). Impact of the HITECH financial incentives on EHR adoption in small, physician-owned practices. *International Journal of Medical Informatics*, *94*, 143-154. doi:10.1016/j.jmedinf.2016.06.017

Constantine, L. S. (2013). Strategies for data gathering and reporting voices from the field: A review of applied ethnography: Guidelines for field research. *The*

Qualitative Report, 18, 1-7. Retrieved from http://www.nova.edu/ssss/QR/QR18/constantine22.pdf

Cope, D. G. (2014). Methods and meanings: Credibility and trustworthiness of qualitative research. *Oncology Nursing Forum*, *41*(1), 89-91. doi:10.1188/14.ONF.89-91

Crandall, P. G., O'Bryan, C. A., Grinstead, D. A., Das, K., Rose, C., & Shabatura, J. J. (2016). Role of ethnographic research for assessing behavior of employees during cleaning and sanitation in food preparation areas. *Food Control, 59*, 849-853. doi:10.1016/j.foodcont.2015.07.008

Cresswell, K. M., & Sheikh, A. (2014). Undertaking sociotechnical evaluations of health information technologies. *Journal of Innovation in Health Informatics, 21*, 78-83. doi:10.14236/jhi.v21i2.54

Cridland, E. K., Jones, S. C., Caputi, P., & Magee, C. A. (2015). Qualitative research with families living with autism spectrum disorder: Recommendations for conducting semistructured interviews. *Journal of Intellectual and Developmental Disability, 40*, 78-91. Retrieved from http://aaiddjournals.org/

Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social Science Information, 45*, 18-19. doi:10.1177/0539018406069584

Darko-Yawson, S., & Ellingsen, G. (2016). Assessing and improving EHRs data quality through a socio-technical approach. *Procedia Computer Science, 98*, 243-250. doi:10.1016/j.procs.2016.09.039

Davis, M. C., Challenger, R., Jayewardene, N. W., & Clegg, C. W. (2014). Advancing socio-technical systems thinking: A call for bravery. *Applied Ergonomics, 45*, 171-180. doi:10.1016/j.apergo.2013.02.009

DeFelice, D., & Janesick, V. J. (2015). Understanding the marriage of technology and phenomenological research: From design to analysis. *The Qualitative Report, 20*, 1576-1593. Retrieved from http://tqr.nova.edu

De Massis, A., & Kotlar, J. (2014). The case study method in family business research: Guidelines for qualitative scholarship. *Journal of Family Business Strategy, 5*, 15-29. doi:10.1016/j.jfbs.2014.01.007

Denzin, N. K. (2013). Performing methodologies. *Qualitative Social Work, 12*, 389-394. doi:10.1177/1473325013493533

Denzin, N. K., & Lincoln, Y. S. (2011). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (4th ed.) [Kindle version]. Retrieved from http://www.amazon.com

DesRoches, C. M., Charles, D., Furukawa, M. F., Joshi, M. S., Kralovec, P., Mostashari, F., ... Jha, A. K. (2013). Adoption of electronic health records grows rapidly, but fewer than half of US hospitals had at least a basic system in 2012. *Health Affairs, 32*, 1369-1377. doi:10.1377/hlthaff.2013.0308

DesRoches, C. M., Worzala, C., Joshi, M. S., Kralovec, P. D., & Jha, A. K. (2012). Small, nonteaching, and rural hospitals continue to be slow in adopting electronic

health record systems. *Health Affairs, 31*, 1092-1099. doi:10.1377/hlthaff.2012.0153

DeVore, S. D., & Figlioli, K. (2010). Lessons premier hospitals learned about implementing electronic health records. *Health Affairs, 29*, 664-667. doi:10.1377/hlthaff.2010.0250

Devotta, K., Woodhall-Melnik, J., Pedersen, C., Wendaferew, A., Dowbor, T. P., Guilcher, S. J., ... Matheson, F. I. (2016). Enriching qualitative research by engaging peer interviewers: A case study. *Qualitative Research, 16*, 661-680. doi:10.1177/1468794115626244

Dworkin, S. L. (2012). Sample size policy for qualitative studies using in-depth interviews. *Archives of Sexual Behavior, 41*, 1319-1320. doi:10.1007/s105080120016-6

Elo, S., Kaariainen, M., Kanste, O., Polkki, T., Utriainen, K., & Kyngas, H. (2014). Qualitative content analysis a focus on trustworthiness. *SAGE Open, 4*,1-10. doi:10.1177/2158244014522633

Erlingsson, C., & Brysiewicz, P. (2013). Orientation among multiple truths: An introduction to qualitative research. *African Journal of Emergency Medicine, 3*, 92-99. doi:10.1016/j.afjem.2012.04.005

Esparza, J. M., Bankston, M., Xiao, A., Robinson, D., & Kahlon, G. (2016). Physician and resident promotion of patient portals: Earning incentives and preventing penalties. *Journal of Hospital Librarianship, 16*, 240–249. doi:10.1080/15323269.2016.1188040

Everson, J., Kocher, K. E., & Adler-Milstein, J. (2016). Health information exchange associated with improved emergency department care through faster accessing of patient information from outside organizations. *Journal of the American Medical Informatics Association, 23,* 111-116. doi:10.1093/jamia/ocw116

Fernández-Alemán, J. L., Señor, I. C., Lozoya, P. A. O., & Toval, A. (2013). Security and privacy in electronic health records: A systematic literature review. *Journal of Biomedical Informatics*, 46, 541-562. doi:10.1016/j.jbi.2012.12.003

Foley, D., & O'Connor, A. J. (2013). Social capital and networking practices of indigenous entrepreneurs. *Journal of Small Business Management, 51,* 276-296. doi:10.1111/jsbm.12017

Forrester, S. H., Hepp, Z., Roth, J. A., Wirtz, H. S., & Devine, E. B. (2014). Cost-effectiveness of a computerized provider order entry system in improving medication safety ambulatory care. *Value in Health, 17,* 340-349. doi:10.1016/j.jval.2014.01.009

Franz, N. K. (2011). The unfocused group: Benefit or bane? *The Qualitative Report, 16,* 1380 -1388. Retrieved from www.nsuworks.nova.edu/tqr

Fusch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *The Qualitative Report, 20,* 1408-1416. Retrieved from http://nsuworks.nova.edu/tqr/

Gaya, H. J., & Smith, E. E. (2016). Developing a qualitative single case study in the strategic management realm: An appropriate research design. *International*

Journal of Business and Economic Research, 7, 529-538. Retrieved from http://www.ijbmer.com

Gabriel, M. H., Jones, E. B., Samy, L., & King, J. (2014). Progress and challenges: Implementation and use of health information technology among critical-access hospitals. *Health Affairs, 33,* 1262-70. doi:10.1377/hlthaff.2014.0279

Gibson, S., Benson, O., & Brand, S. L. (2013). Talking about suicide: Confidentiality and anonymity in qualitative research. *Nursing Ethics, 20,* 18-29. doi:10.1177/0969733012452684

Ginde, N., Suman, S., Chand, A., & Aadke, H. (2015). Healthcare systems the journey. *International Journal for Technological Research in Engineering, 3,* 479-483. Retrieved from www.ijtre.com

Graetz, I., Reed, M., Shortell, S. M., Rundall, T. G., Bellows, J., & Hsu, J. (2014). The association between EHRs and care coordination varies by team cohesion. *Health Services Research, 49,* 438-452. doi:10.1111/1475-6773.12136

Gross, A. H., Leib, R. K., Tonachel, A., Tonachel, R., Bowers, D. M., Burnard, R. A., ... & Bunnell, C. A. (2016). Teamwork and electronic health record implementation: A case study of preserving effective communication and mutual trust in a changing environment. *Journal of Oncology Practice, 12,* 1075-1083. doi:10.1200/jop.2016.013649

Guetterman, T. C. (2015). Descriptions of sampling practices within five approaches to qualitative research in education and the health sciences. *Qualitative Social Research, 16,* 1-23. Retrieved from http://www.qualitative-research.net

Haahr, A., Norlyk, A., & Hall, E. O. (2014). Ethical challenges embedded in qualitative research interviews with close relatives. *Nursing Ethics, 21*, 6-15. doi:10.1177/0969733013486370

Halcomb, E., & Hickman, L. (2015). Mixed methods research. *Nursing Standard*, *29*(32), 41-47. doi:10.7748/ns.29.32.41.e8858

Hancock, D. R., & Algozzine, R. F. (2015). *Doing case study research: A practical guide for beginning researchers* (3rd ed.). New York, NY: Teachers College Press.

Harvey, L. (2015). Beyond member checking: A dialogic approach to the research interview. *International Journal of Research & Method in Education, 38*, 23-38. doi:10.1080/1743727X.2014.914487

HealthIT. (2011). Overcoming challenges to health IT adoption in small, rural hospitals. Retrieved from https://www.healthit.gov

HealthIT. (2013a). *Basics of health IT.* Retrieved from https://www.healthit.gov

HealthIT. (2013b). *Rural implementation steps.* Retrieved from https://www.healthit.gov

HealthIT. (2014). *Benefits of EHRs.* Retrieved from https://www.healthit.gov

HealthIT. (2015a). *Benefits for critical access hospitals and other small rural hospitals.* Retrieved from https://www.healthit.gov

HealthIT. (2015b). *Privacy and security*. Retrieved from https://www.healthit.gov

HealthIT. (2016). *Medicare and Medicaid EHR incentive program basics*. Retrieved from https://www.healthit.gov

Heisey-Grove, D. & King, J. A. (2016). Physician and practice-level drivers and disparities around meaningful use progress. *Health Services Research, 1*, 1-24. doi:10.1111/1475-6773.12481

Henriksen, E., Burkow, T. M., Johnsen, E., & Vognild, L. K. (2013). Privacy and information security risks in a technology platform for home-based chronic disease rehabilitation and education. B*MC Medical Informatics & Decision Making, 13*, 1-13. doi:10.1186/1472-6947-13-85

Hester, A. J. (2014). Socio-technical systems theory as a diagnostic tool for examining underutilization of Wiki technology. *The Learning Organization, 21*, 48-68. doi:10.1108/TLO-10-2012-0065

He, Z., Marquard, J., & Henneman, E. (2016). Model guided design and development process for an electronic health record training program. *AMIA Annual Symposium Proceedings, 2016*, 1814-1821. Retrieved from https://www.amia.org

Hirschhorn, L. (2014). Interdisciplinary HIV care in a changing healthcare environment in the USA. *AIDS Care, 26*, 731-735. doi:10.1080/09540121.2013.855299

Hlady-Rispal, M., & Jouison-Laffitte, E. (2014). Qualitative research methods and epistemological frameworks: A review of publication trends in entrepreneurship. *Journal of Small Business Management, 52*, 594-614. doi:10.1111/jsbm.12123

Hoekstra, R., Kiers, H. A. L., & Johnson, A. (2012). Are assumptions of well-known statistical techniques checked, and why (not)? *Frontiers in Psychology, 3*, 1-9. doi:10.3389/fpsyg.2012.00137

Holman, G. T., Beasley, J. W., Karsh, B.-T., Stone, J. A., Smith, P. D., & Wetterneck, T. B. (2015). The myth of standardized workflow in primary care. *Journal of the American Medical Informatics Association, 23*, 29–37. doi:10.1093/jamia/ocv107

Holt, A. (2010). Using the telephone for narrative interviewing: A research note. *Qualitative Research, 10,* 113-121. doi:10.1177/1468794109348686

Houghton, C., Casey, D., Shaw, D., & Murphy, K. (2013). Rigour in qualitative case study research. *Nurse Researcher, 20,* 12-17. doi:10.7748/nr2013.03.20.4.12.e326

Hyett, N., Kenny, A., & Dickson-Swift, V. (2014). Methodology or method? A critical review of qualitative case study reports. *International Journal of Qualitative Studies on Health and Well-Being, 9*, 23606-23618. doi:10.3402/qhw.v9.23606

Irizarry, T., & Barton, A. J. (2013). A sociotechnical approach to successful electronic health record implementation: Five best practices for clinical nurse specialists. *Clinical Nurse Specialist, 27*, 283-285. doi:10.1097/NUR.0b013e3182a872e3

Irvine, A., Drew, P., & Sainsbury, R. (2013). 'Am I not answering your questions properly?' Clarification, adequacy and responsiveness in semi-structured telephone and face-to-face interviews. *Qualitative Research, 13*, 87-106. doi:10.1177/1468794112439086

Jacob, S. A., & Furgerson, S. P. (2012). Writing interview protocols and conducting interviews: Tips for students new to the field of qualitative research. *The Qualitative Report, 17*, 1-10. Retrieved from http://nsuworks.nova.edu/tqr/vol17/iss42/3

Jerbrant, A. (2013). Organizing project-based companies. *International Journal of Managing Projects in Business, 6*, 365-378. doi:10.1108/17538371311319070

Johnson, B. (2014). Ethical issues in shadowing research. *Qualitative Research in Organizations and Management, 9*, 21-40. doi:10.1108/QROM-09-2012-1099

King, J., Patel, V., Jamoom, E. W., & Furukawa, M. F. (2014). Clinical benefits of electronic health record use: National findings. *Health Services Research, 49*, 392-404. doi:10.1111/1475-6773.12135

Kirkwood, A., & Price, L. (2013). Examining some assumptions and limitations of research on the effects of emerging technologies for teaching and learning in higher education: Examining assumptions and limitations of research. *British Journal of Educational Technology, 44*, 536-543. doi:10.1111/bjet.12049

Knepp, M. M. (2014). Personality, sex of participant, and face-to-face interaction affect reading of informed consent forms. *Psychological Reports, 114*, 297-313. doi:10.2466/17.07.PR0.114k13w1

Koelsch, L. E. (2013). Reconceptualizing the member check interview. *International Journal of Qualitative Methods, 12*, 168-179. Retrieved from https://www.ualberta.ca/international-institute-for-qualitative-methodology/

Kolb, S. M. (2012). Grounded theory and the constant comparative method: Valid research strategies for educators. *Journal of Emerging Trends in Educational Research and Policy Studies, 3*, 83-86. Retrieved from http://jeteraps.scholarlinkresearch.com

Korach, S. (2012). You are the curriculum: Participant identification of experience and practice with impact. *Planning and Changing, 43,* 149-160. Retrieved from https://education.illinoisstate.edu/planning/

Lauckner, H., Paterson, T., & Krupa, T. (2012). Using constructivist case study methodology to understand community development processes: Proposed methodological questions to guide the research process. *The Qualitative Report, 17,* 1-22. Retrieved from http://nsuworks.nova.edu/tqr/

Leedy, P. D., & Ormrod, J. E. (2013). *Practical research: Planning and design* (10th ed.). Upper Saddle River, NJ: Pearson Education.

Lorenzi, N., Kouroubali, A., Detmer, D., & Bloomrosen, M. (2009). How to successfully select and implement electronic health records (EHR) in small ambulatory practice settings. *BMC Medical Informatics & Decision Making, 9,* 1-13. doi:10.1186/1472-6947-9-15

Mack, D., Zhang, S., Douglas, M., Sow, C., Strothers, H., & Rust, G. (2016). Disparities in primary care EHR adoption rates. *Journal of Health Care for the Poor and Underserved, 27,* 327-338. doi:10.1353/hpu.2016.0016

Male, T. (2016). *Doing research in education: Theory and practice*. London: Sage.

Manojlovich, M., Adler-Milstein, J., Harrod, M., Sales, A., Hofer, T. P., Saint, S., & Krein, S. L. (2015). The effect of health information technology on health care provider communication: A mixed-method protocol. *JMIR Research Protocols, 4*(2), 72-80. doi:10.2196/resprot.4463

Marbach, E. (2013). Towards a phenomenological analysis of fictional intentionality and reference. *International Journal of Philosophical Studies, 21*, 428-447. doi:10.1080/09672559.2013.801631

Marshall, C., & Rossman, G. B. (2016). *Designing qualitative research* (6th ed.). Thousand Oaks, CA: Sage.

Mason, P., Mayer, R., Chien, W., & Monestime, J. P. (2017). Overcoming barriers to implementing electronic health records in rural primary care clinics. *The Qualitative Report, 22*, 2943-2955. Retrieved from http://nsuworks.nova.edu/tqr/vol22/iss11/7/

Massoudi, B. L., Marcial, L. H., Tant, E., Adler-Milstein, J., & West, S. L. (2016). Using health information exchanges to calculate clinical quality measures: A study of barriers and facilitators. *Healthcare, 4*, 104-108. doi:10.1016/j.hjdsi.2016.04.003

Mattson, M., & Haas, E. (2014). Integrating metatheory to enhance qualitative interviewing: A safety campaign exemplar. *International Journal of Qualitative Methods, 13*, 53-70. doi:10.1177/160940691401300129

McCusker, K., & Gunaydin, S. (2015). Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion, 30*, 537-542. doi:10.1177/0267659114559116

Mennemeyer, S. T., Menachemi, N., Rahurkar, S., & Ford, E. W. (2015). Impact of the HITECH act on physicians' adoption of electronic health records. *Journal of the American Medical Informatics Association, 23*, 375-379. doi:10.1093/jamia/ocv103

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. San Francisco, CA: John Wiley & Sons.

Metcalf, L., Hess, J. S., Danes, J. E., & Singh, J. (2012). A mixed-methods approach for designing market-driven packaging. *Qualitative Market Research, 15*, 268–289. doi:10.1108/13522751211231987

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Thousand Oaks, CA: Sage.

Miner-Romanoff, K. (2012). Interpretive and critical phenomenological crime studies: A model design. *The Qualitative Report, 17,* 1-32. Retrieved from http://www.nova.edu/ssss/QR/index.html

Mohan, V., Woodcock, D., McGrath, K., Scholl, G., Pranaat, R., Doberne, J. W., … Ash, J. S. (2016). Using simulations to improve electronic health record use, clinician training and patient safety: Recommendations from a consensus conference. *AMIA Annual Symposium Proceedings*, *2016*, 904-913. Retrieved from https://www.amia.org

Morse, J. M. (2015). Critical analysis of strategies for determining rigor in qualitative inquiry. *Qualitative Health Research, 25*, 1212-1222. doi:10.1177/1049732315588501

Niazkhani, Z., Pirnejad, H., DeBont, A., & Aarts, J. (2010). CPOE in non-surgical versus surgical specialties: A qualitative comparison of clinical contexts in the medication process. *The Open Medical Informatics Journal, 4*, 206-213. doi:10.2174/1874431101004010206

Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. *Evidence Based Nursing, 18,* 34-35. doi:10.1136/eb-2015-102054

Obal, M. (2017). What drives post-adoption usage? Investigating the negative and positive antecedents of disruptive technology continuous adoption intentions. *Industrial Marketing Management, 63,* 42-52. doi:10.1016/j.indmarman.2017.01.003

Olsen, J. D., McAllister, C., Grinnell, L. D., Walters, K. G., Appunn, F. (2016). Applying constant comparative method with multiple investigators and inter-coder reliability. *The Qualitative Report, 21,* 26-42. Retrieved from http://nsuworks.nova.edu/tqr/vol21/iss1/3

Onwuegbuzie, A. J., Frels, R. K., Collins, K. M. T., Leech, N. L. (2013). Conclusion: A four-phase model for teaching and learning mixed research. *International Journal of Multiple Research Approaches, 7,* 133-156. doi:10.5172/mra.2013.7.1.133

Otto, P., & Nevo, D. (2013). Electronic health records: A simulation model to measure the adoption rate from policy interventions. *Journal of Enterprise Information Management, 26,* 165-182. doi:10.1108/17410391311289613

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2013). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research, 42,* 533-544. doi:10.1007/s10488-013-0528-y

Palvia, P., Jacks, T., & Brown, W. (2015). Critical issues in EHR implementation: provider and vendor perspectives. *Communications of the Association for Information Systems, 36*, 707-725. Retrieved from http://aisel.aisnet.org/cais/

Pantaleoni, J., Stevens, L., Mailes, E., Goad, B., & Longhurst, C. (2015). Successful physician training program for large scale EMR implementation. *Applied Clinical Informatics, 6*, 80-95. doi:10.4338/ACI-2014-09-CR-0076

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). Thousand Oaks, CA: Sage.

Percy, W. H., Kostere, K., & Kostere, S. (2015). Generic qualitative research in psychology. *The Qualitative Report, 20*, 76-85. Retrieved from http://www.nova.edu/ssss/QR/QR20/2/percy5.pdf

Peterson, J. C., Czajkowski, S., Charlson, M. E., Link, A. R., Wells, M. T., Isen, A. M., ... Jobe, J. B. (2013). Translating basic behavioral and social science research to clinical application: The evolve mixed methods approach. *Journal of Consulting and Clinical Psychology, 81*, 217-230. doi:10.1037/a0029909

Petrides, A. K., Tanasijevic, M. J., Goonan, E. M., Landman, A. B., Kantartjis, M., Bates, D. W., & Melanson, S. E. F. (2017). Top ten challenges when interfacing a laboratory information system to an electronic health record: Experience at a large academic medical center. *International Journal of Medical Informatics, 106*, 9-16. doi:10.1016/j.ijmedinf.2017.06.008

Phillips, C., Phillips, C., Hall, S., Hall, S., Elmitt, N., Elmitt, N., ... & Douglas, K. (2017). People-centred integration in a refugee primary care service: A complex adaptive

systems perspective. *Journal of Integrated Care, 25*, 26-38. doi:10.1108/JICA-10-2016-0040

Polit, D. F. (2014). Getting serious about test-retest reliability: A critique of retest research and some recommendations. *Quality of Life Research, 23*, 1713-1720. doi:10.1007/s11136-014-0632-9

Pozgar, G. D. (2016). Legal and ethical issues for health professionals (4thed.). Burlington, MA: Jones & Bartlett Learning.

Price, M., Singer, A., & Kim, J. (2013). Adopting electronic medical records: Are they just electronic paper records? *Canadian Family Physician, 59*, 322-329. Retrieved from http://www.cfp.ca

Rahurkar, S., Vest, J. R., & Menachemi, N. (2015). Despite the spread of health information exchange, there is little evidence of its impact on cost, use, and quality of care. *Health Affairs, 34*, 477-483. doi:10.1377/hlthaff.2014.0729

Read, G. J., Salmon, P. M., Lenné, M. G., & Stanton, N. A. (2015). Designing sociotechnical systems with cognitive work analysis: Putting theory back into practice. *Ergonomics, 58*, 822-851. doi:10.1080/00140139.2014.980335

Redlich-Amirav, D., & Higginbottom, G. (2014). New emerging technologies in qualitative research. *The Qualitative Report, 19*, 1-14. Retrieved from http://www.nova.edu/ssss/QR/

Reilly, R. C. (2013). Found poems, member checking and crises of representation. *The Qualitative Report, 18*, 1-18. Retrieved from http://tqr.nova.edu/

Reybold, L. E., Lammert, J. D., & Stribling, S. M. (2013). Participant selection as a

conscious research method: Thinking forward and the deliberation of "emergent" findings. *Qualitative Research, 13*, 699-716. doi:10.1177/1468794112465634

Robinson, O. C. (2014). Sampling in interview–based qualitative research: A theoretical and practical guide. *Qualitative Research in Psychology*, *11*, 25-41. doi:10.1080/14780887.2013.801543

Roy, K., Zvonkovic, A., Goldberg, A., Sharp, E., & LaRossa, R. (2015). Sampling richness and qualitative integrity: Challenges for research with families. *Journal of Marriage and Family, 77*, 243-260. doi:10.1111/jomf.12147

Sale, J. E., Lohfeld, L. H., & Brazil, K. (2002). Revisiting the quantitative-qualitative debate: Implications for mixed-methods research. *Quality & Quantity, 36*, 43-53. doi:10.1023/A:1014301607592

Sanjari, M., Bahramnezhad, F., Fomani, F., Sho-ghi, M., & Cheraghi, M. (2014). Ethical challenges of researchers in qualitative studies: The necessity to develop a specific guideline. *Journal of Medical Ethics and History of Medicine, 7*, 2-6. Retrieved from http://jmehm.tums.ac.ir

Schulz, M., & Ruddat, M. (2012). "Let's talk about sex!" On the applicability of telephone interviews in qualitative social research. *Forum Qualitative Social Research, 13*, 11-30. Retrieved from http://www.qualitative-research.net/

Ser, G., Robertson, A., & Sheikh, A. (2014). A qualitative exploration of workarounds related to the implementation of national electronic health records in early adopter mental health hospitals. *PLoS ONE, 9*, 45-59. doi:10.1371/journal.pone.0077669

Shea, C. M., Reiter, K. L., Weaver, M. A., & Albritton, J. (2016). Quality improvement teams, super-users, and nurse champions: A recipe for meaningful use? *Journal of the American Medical Informatics Association, 23*, 1195–1198. doi:10.1093/jamia/ocw029

Simon, S. R., Keohane, C. A., Amato, M., Coffey, M., Cadet, B., Zimlichman, E., & Bates, D. W. (2013). Lessons learned from implementation of computerized provider order entry in 5 community hospitals: A qualitative study. *BMC Medical Informatics and Decision Making, 13*, 67-77. doi:10.1186/1472-6947-13-67

Sittig, D. F., & Singh, H. (2010). A new socio-technical model for studying health information technology in complex adaptive healthcare systems. *Quality & Safety in Health Care, 19*, 68-74. doi:10.1136/qshc.2010.042085

Skillman, S. M., Andrilla, C. A., Patterson, D. G., Fenton, S. H., & Ostergard, S. J. (2015). Health information technology workforce needs of rural primary care practices. *The Journal of Rural Health, 31*, 58-66. doi:10.1111/jrh.12081

Small, W., Maher, L., & Kerr, T. (2014). Institutional ethical review and ethnographic research involving injection drug users: A case study. *Social Science & Medicine, 104*, 157-162. doi:10.1016/j.socscimed.2013.12.010

Soilkki, K. K., Cassim, N., & Anis, M. K. (2014). An evaluation of the factors influencing the performance of registered nurses at the national referral hospital in Namibia. *Australian Journal of Business and Management Research, 4*(2), 47-60. Retrieved from http://www.ajbmr.com

Sonne, C. S., Andrews, O. J., Gentilin, M. S., Oppenheimer, S., Obeid, J., Brady, K., & Magruder, K. (2013). Development and pilot testing of a video-assisted informed consent process. *Contemporary Clinical Trials, 36*(1), 25-31. doi:10.1016/j.cct.2013.05.011

Stake, R. E. (2013). ***Multiple case study analysis.*** New York, NY: The Guilford Press.

Stanberry, K. (2011). US and global efforts to expand the use of electronic health records. *Records Management Journal, 21,* 214-224. doi:10.1108/09565691111186885

Street, C. T., & Ward, K. W. (2012). Improving validity and reliability in longitudinal case study timelines. *European Journal of Information Systems, 21*, 160-175. doi:10.1057/ejis.2011.53

Suri, H. (2011). Purposive sampling in qualitative research synthesis. *Qualitative Research Journal, 11*, 63-75. doi:10.3316/QRJ1102063

Texasagriculture.gov. (2013). *Texas rural impact report 2013.* Retrieved from https://texasagriculture.gov

Thirukumaran, C. P., Dolan, J. G., Webster, P. R., Panzer, R. J., & Friedman, B. (2015). The Impact of electronic health record implementation and use on performance of the surgical care improvement project measures. *Health Services Research, 50,* 273-289. doi:10.1111/1475-6773.12191

Trist, E. L., & Bamforth, K. W. (1951). Some social and psychological consequences of the longwall method of coal-getting: An examination of the psychological situation and defenses of a work group in relation to the social structure and

technological content of the work system. *Human Relations, 4,* 3-38. doi:10.1177/001872675100400101

Turner, P., Kane, R., & Jackson, C. (2015). Combining methods to research an emergency department: A case study. *British Journal of Healthcare Management, 21*, 81-85. doi:10.12968/bihc.2015.21.2.81

Visvanathan, K., Levit, L. A., Raghavan, D., Hudis, C. A., Wong, S., Dueck, A., & Lyman, G. H. (2017). Untapped potential of observational research to inform clinical decision making: American society of clinical oncology research statement. *Journal of Clinical Oncology, 35,* 1845–1854. doi:10.1200/jco.2017.72.6414

Walker, J. L. (2012). The use of saturation in qualitative research. *Canadian Journal of Cardiovascular Nursing, 22*, 37-46. Retrieved from http://www.cccn.ca

Whitworth, B. (2009). A brief introduction to sociotechnical systems. *Encyclopedia of Information Science and Technology*, *2*, 394-400. doi:10.4018/978-1-60566-026-4.ch066

Wilson, R., Wood, N., Kong, L., Shulters, M., Richards, K., Dunbar, P., ... & Young, E. (2015). A protocol for coordinating post-tsunami field reconnaissance efforts in the USA. *Natural Hazards, 75,* 2153-2165. doi:10.1007/s11069-014-1418-7

Wu, F. M., Rundall, T. G., Shortell, S. M., & Bloom, J.R., (2016). Using health information technology to manage a patient population in accountable care organizations. *Journal of Health Organization and Management, 30*, 581-596. doi:10.1108/JHOM-01-2015-0003

Xu, M. A., & Storr, G. B. (2012). Learning the concept of researcher as instrument in qualitative research. *The Qualitative Report, 17*, 1-18. Retrieved from http://nsuworks.nova.edu/tqr/vol17/iss21/2

Yavuz, A. (2012). Competing paradigms: The dilemmas and insights of an ELT teacher educator. *International Education Studies, 5*, 57-66. doi:10.5539/ies.v5n1p57

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Thousand Oaks, CA: Sage Publications, Inc.

Yuan, C. T., Bradley, E. H., & Nembhard, I. M. (2015). A mixed methods study of how clinician "super users" influence others during the implementation of electronic health records. *BMC Medical Informatics and Decision Making, 15*, 6-16. doi:10.1186/s12911-015-0154-6

Appendix A: Interview Questions List

1. Initially, what strategies did your organization develop to implement your hospital's EHR system?
2. How have you assessed the effectiveness of the strategies for implementing the EHR system?
3. What barriers have you experienced with the implementation of the strategies for implementing the EHR system?
4. What strategies worked best to implement the EHR system?
5. What were the key lessons you learned from the implementation of the EHR system?
6. What more would you like to add that would be beneficial to my study?

Appendix B: Interview Protocol

Date:

Institution: Walden University

Interviewer: Susan Mejia

Participant:

Assigned number:

Instructions

1. Welcome the participant
2. Explain the purpose of the study
3. Remind participant of confidentiality and assign participant a number
4. Ensure consent form is signed
5. Start phone/tape recording
6. Ask open-ended semistructured interview questions (see Appendix B)
7. If conducting a face-to-face interview, I will watch for non-verbal cues such as eye contact, facial expressions, gestures, and tone of voice.
8. If conducting a telephone interview, I will listen for variations in tone of voice.
9. Paraphrase statements as needed
10. Thank the interviewee and remind interviewee that they will have the opportunity to review the transcripts of the conversation for accuracy. Provide email address and telephone number: 714-673-xxxx.
11. Schedule follow-up for member checking