2016

Adoption of Electronic Health Record Systems Within Primary Care Practices

Marvin Leon Reid, Jr.
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral study by

Marvin Reid

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. Yvette Ghormley, Committee Chairperson, Doctor of Business Administration Faculty

Dr. Kevin Davies, Committee Member, Doctor of Business Administration Faculty

Dr. Diane Dusick, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2016

Abstract

Adoption of Electronic Health Record Systems Within Primary Care Practices

by

Marvin Leon Reid Jr.

MSIT, Florida Institute of Technology, 2008

MBA, Indiana Wesleyan University, 2007

BS, Wilberforce University, 2004

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

April 2016

Abstract

Primary care physicians (PCPPs) have been slow to implement electronic health records (EHRs), even though there is a U.S. federal requirement to implement EHRs. The purpose of this phenomenological study was to determine why PCPPs have been slow to adopt electronic health record (EHR) systems despite the potential to increase efficiency and quality of health care. The complex adaptive systems theory (CAS) served as the conceptual framework for this study. Twenty-six PCPPs were interviewed from primary care practices (PCPs) based in southwestern Ohio. The data were collected through a semistructured interview format and analyzed using a modified van Kaam method. Several themes emerged as barriers to EHR implementation, including staff training on the new EHR system, the decrease in productivity experienced by primary care practice (PCP) staff adapting to the new EHR system, and system usability and technical support after adoption. The findings may contribute to the body of knowledge regarding EHR system implementation and assist healthcare providers who are slow to adopt EHRs. Additionally, findings could contribute to social change by reducing healthcare costs, increasing patient access to care, and improving the efficacy of patient diagnosis and treatment.

Adoption of Electronic Health Record Systems Within Primary Care Practices

by

Marvin Leon Reid, Jr.

MSIT, Florida Institute of Technology, 2008

MBA, Indiana Wesleyan University, 2007

BS, Wilberforce University, 2004

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

April 2016

Dedication

First, I want to give all praises to my Lord and Savior for providing me with a way to complete my doctoral degree. I dedicate this study to my parents. While completing this doctoral research, I lost my dad. Chubby, I miss you so much and I know you are looking down on me from Heaven and smiling. Thank you for giving me the strength to continue working on my degree. I especially want to thank my mother for being strong after my dad passed and continuing to motivate me to complete my doctoral degree. Mom, without you this would not be possible. I cannot thank you enough for raising me and giving me the best life possible. In addition, I dedicate this study to my brothers. You have given me wonderful support as I completed this study. My entire family has supported me through this process. I want to thank my fiancée Deborah for your love and support.

Acknowledgments

First, I want to thank Dr. Yvette Ghormley for all the support and guidance you gave me throughout this journey, especially for the words of encouragement when I was at my lowest points during this process. You were kind and helpful and I cannot begin to express how grateful I am to have you as a friend and scholarly mentor. Second, I want to thank Dr. Freda Turner for all the support and advice. In addition, I want to thank you for placing my chair, Dr. Yvette Ghormley in my life. I am so glad to have had the honor to be a student in the DBA program under your supervision. I would also like to acknowledge my committee members, Dr. Kevin Davies and Dr. Diane Dusick, for your wisdom and feedback. Finally, I want to thank all of the participants in this study for taking time out of their busy schedules to assist me in addressing this gap in business practice.

Table of Contents

List of Tables

Section 1: Foundation of the Study

For the majority of the 20th century, medical professionals used paper charts to document patient medical information (Kuhn, Basch, Barr, & Yackel, 2015). Since the early 1990s, however, technological achievements enabled medical professionals to maintain patient records through the implementation of computer-automated systems (Han & Lopp, 2013). Computer-automated systems have the potential to affect substantial improvements in the quality of patient care and the efficiency of business processes (Biruk, Yilma, Andualem, & Tilahun, 2014). In the early 1990s, the Institute of Medicine (IOM) and National Committee on Quality Assurance recommended the development of EHRs (Krist et al., 2014). In 2007, the goal of the U.S. government was to have universal adoption of EHRs by 2015 (Ben-Zion, Pliskin, & Fink, 2014). However, many primary care physicians (PCPPs) were not able to meet the goal. Adoption of EHRs among PCPPs was low in the United States. McGuire et al. (2013) maintained only 17-25% of office-based physicians used EHR systems in the United States. In 2012, McAlearney, Hefner, Sieck, and Huerta (2015) identified only 40% of U.S. PCPPs as using an EHR system.

The potential barriers PCPPs faced during the process of implementation of EHRs were the focus of this study. Specifically, the focus was PCPP perception regarding impediments to the adoption of the EHR system. This phenomenological study involved an attempt to understand the lived experiences of PCPPs who had implemented an EHR system within their primary care practice (Rose, Richter, & Kapustin, 2014).

Background of the Problem

Previous researchers have established the advantages of EHRs (Lenert & Sundwall, 2012; Savage, 2012). Benefits included improved clinical practice strategies, decreased medication errors (providing the wrong drug, unfavorable drug interactions, or handwriting error), and improved distribution of preventative health services (King, Patel, Jamoom, & Furukawa, 2014). Patient safety, enhanced quality of care, reduced duplicate medical tests, and health promotion, were additional benefits medical professionals had received by implementing EHRs into their PCPP business workflow (Cucciniello, Lapsley, Nasi, & Pagliari, 2015). Implementation of EHRs resulted in significant savings of cost and time for healthcare providers (Lim et al., 2015). However, implementation of EHRs posed potential barriers to PCPPs (Ben-Zion, Pliskin, & Fink, 2014).

The possible barriers associated with the implementation of EHRs included financial obstacles, concerns about privacy and security, and challenges related to the technological exchange of electronic information (Kruse, Kelley, Linder, Park, & Rigotti, 2012). Financial obstacles included both initial and ongoing equipment costs and nonmonetary expenditures of adapting office workflow to new technology (Kapu, Wheeler, & Lee, 2014). Moreover, privacy and security concerns consisted of ensuring patient confidentiality and preventing access to records by unauthorized persons (Henriksen, Burkow, Johnsen, & Vognild, 2013). Technological barriers to PCPPs implementing EHRs included deciding which data to exchange among healthcare

providers and resolving issues of compatibility among different EHR systems (Ozair, Jamshed, Sharma, & Aggarwal, 2015).

The purpose of the Health Information Technology for Economic and Clinical Health (HITECH) Act was to allow increased funding for PCPPs to implement an EHR system and provide incentive payments through U.S. federal government to physicians who adopted EHRS (Hecker & Edwards, 2014). Through sizeable investment by the U.S. federal government in health information technology, the principle of the HITECH Act was to improve U.S. health care delivery and patient care (Simpao, Ahumada, Gálvez, & Rehman, 2014). However, the U.S. federal government will impose penalties through the HITECH Act on physicians not using EHR by the end of 2015, with harsher penalties in 2016 and 2017 (Goldberg, 2012).

Interest in the ability to exchange data among clinicians, laboratories, hospitals, pharmacies, X-ray facilities, and other healthcare providers through a national Health Information Exchange (HIE) has gradually increased (Lenert & Sundwall, 2012). The potential benefits to healthcare providers from having nationwide access to patient health information may result in concerted efforts to establish a national HIE that would allow for secured and protected exchange of health information (Ozair, Jamshed, Sharma, & Aggarwal, 2015). For this to occur, U.S. federal and state governments entered into public-private partnerships with information technology (IT) firms to research and establish standards for the interoperability of HIE (Foldy, Grannis, Ross, & Smith, 2014). While there has been progress towards a national HIE system, 100% of healthcare providers must implement an EHR system for the HIE to be effective (Strauss et al.,

2015). Therefore, PCPPs need assistance with overcoming barriers to implementation (Yuan, Bradley, & Nembhard, 2015).

Problem Statement

Primary care physicians who do not adopt a certified EHR system by the end of 2015 are subject to financial penalties under the Medicare Incentive Program (Wright, Feblowitz, Samal, McCoy, & Sittig, 2014). Primary care physicians will be penalized 1% of Medicare payments, increasing to 3% over a 3-year period for not adopting an EHR system (Mennemyer, Menachemi, Rahurkar, & Ford, 2015). Primary care practices with at least $500,000 of annual income failing to meet the EHR system mandate will lose $1000 in Medicare payments in 2015, $2000 in 2016, and $3000 in 2017 (Goodwin, Jinhyung, & Yong-Fang, 2013). The general business problem was the need for understanding PCPP perceptions regarding the adoption of an EHR system. The specific business problem was some PCPP have been slow to adopt EHR despite the potential to increase efficiency and quality of health care.

Purpose Statement

The purpose of this qualitative phenomenological study was to determine why some PCPP were slow to adopt an EHR system despite the potential to increase efficiency and quality of health care. The targeted population comprised of PCPPs in the southwestern region of Ohio who experienced EHR system implementation. The implications for positive social change include the potential to (a) reduce healthcare costs; (b) increase patient access to care; and (c) improve the diagnosis, treatment, and outcome of patient care.

Nature of the Study

I utilized the qualitative method for this study. Bernard (2013) defined qualitative research as a method to understand the meaning individuals or groups attribute to a social or human problem. Thus, the qualitative method was appropriate for this study because my intent was to investigate the lived experiences of the research participants. The quantitative method is suitable when the researcher intends to obtain statistical data for hypothesis testing (Scrutton & Beames, 2015). A quantitative method was not appropriate for this study since I did not seek to test a hypothesis. The mixed methods approach is suitable when the researcher's purpose is to use both qualitative and quantitative approaches (Siddiqui & Fitzgerald, 2014). Because a combination of participants' natural experiences and numerical testing to explore the phenomenon did not occur within the scope of my study, a mixed methods approach was not suitable.

I used a phenomenological design for this study. Researchers use a phenomenological design to derive new knowledge from participants' perceptions of their lived experiences (Moustakas, 1994). A case study approach requires multiple sources of data collection such as archival records, direct observations, interviews, and physical artifacts (Yin, 2014). I used only one source of data for this phenomenological study. Ethnographic researchers immerse themselves in the culture of the sample as active participants (Samnani & Singh, 2013). An ethnographic design was not appropriate for this study because I did not immerse myself within the PCP culture. Lowe, Milligan, Watanabe, and Brearley (2015) stated researchers use the grounded theory design for concurrent collection, coding, and analysis of social research data for

the primary purpose of generating new theory. The grounded theory approach was unsuitable because I did not seek to formulate a theory in this study. Narrative researchers tell the story of individuals and ask one or more individuals to provide stories about their lives. (Hennings, Froggatt, & Payne, 2013). The narrative design was not appropriate, as I did not focus on telling the story of PCPPs regarding EHR implementation.

Research Question

The focus of this qualitative phenomenological study is to explore why PCPPs were slow to adopt an EHR system despite the potential to increase efficiency and quality of health care. The results of this study might provide further insights in business practice regarding potential barriers to implementation of an EHR system within PCPs. The central research question was: Why are PCPPs slow to adopt EHR systems?

Interview Questions

1. What are your experiences with the implementation of an EHR system within your practice?
2. What were your major barriers to implementing an EHR system?
3. How did you address the major barriers as you implemented the EHR system?
4. What effect has the EHR system had on your practice?
5. How effective is the EHR system in your practice?
6. What incentives were the most effective for obtaining your use of the EHR system on the local level?
7. How has your daily workflow processes changed since transitioning to EHR?

8. What is the comparison of time spent with patients before and after EHR implementation?
9. What business processes did you eliminate or create when you implemented the EHR system?
10. What advice can you offer other primary care physicians who are considering implementing an EHR system?
11. In terms of overall office and physician productivity time and cost, what is the comparison of the physician typing or office staff scanning information into an EHR system versus dictating a record for electronic transcription into an EHR?
12. How do you view possible consequences of non-compliance by not adopting an EHR system?
13. What more would you like to add that would be beneficial to this study?

Conceptual Framework

I used the complex adaptive systems (CAS) theory as the key component of the conceptual framework. CAS theory consists of large number of entities, called *agents,* each behaving according to a particular set of rules (Giacomoni, Kanta, & Zechman, 2013). These rules require agents to adjust their actions to those of other agents (Vakili, Tabtabaee, & Khorsandi, 2013). Edson (2012) defined CAS theory as agents (people) who explore, experiment, self-organize, learn, and adapt to changes in the environment. These agents form a system analogous to a population-wide pattern (Edson, 2012). The human body, brain, stock market, ecosystem, manufacturing businesses, and a flock of

birds are examples of CAS (Vakili et al., 2013). In addition, PCPP are CAS (Sturmberg, Martin, & Katerndahl, 2014). Patients, physicians, and health practitioners consistently interact and adapt to changes in the healthcare environment (Green, Dasso, Ho, & Genaidy, 2014).

Vakili et al. (2013) acknowledged the term CAS theory in 1984. However, Hearn (2015) noted the difficulty in attempting to determine the exact date that the CAS theory first appeared in society and organizations, pointing out that literature on complexity systems within social science dates back to 1776 in Smith's *The Wealth of Nations*. The purpose of complexity science is to identify features of the dynamics of such complex systems (Vakili et al., 2013). CAS theory is complex when looking at dynamic networks of relationships and interactions, not aggregations of unchanging entities (Green et al., 2014). In addition, CAS is adaptive in that the individual and collective behaviors mutate and self-organize corresponding to the change-initiating micro-event or collection of events (Green et al., 2014). Developing protocols, automating processes, or developing prediction models are ways physicians change their behavior in order to deal with complexity (Green et al., 2014).

CAS theory was relevant to this study because of the complexity of EHR implementation. Changes in the healthcare environment and government regulations are forcing healthcare organizations to implement EHR by 2015 (Nakamura, Harper, Castro, Yu, & Jha, 2015). Healthcare organizations must learn to adapt to the changes regarding how health medical records are maintain in order to meet federal regulations.

I identified relevant barriers of EHR implementation by analyzing data provided by PCPP as CAS. CAS theory researchers have begun to understand the complexity in natural systems as a phenomenon that emerges from the interaction of simple, multiple, but adaptive, agents (Polacek, Gianetto, Khashanah, & Verma, 2012). Healthcare organization and PCPP are CAS with nonlinear relationships among diverse learning agents (Kramer et al., 2015). I explored the study findings through the lens of the CAS conceptual framework.

Operational Definitions

Electronic health record (EHR): An EHR is a longitudinal record of patient health information stored in electronic form generated by one or more encounters in any healthcare delivery setting (Muhammad Zia, Telang, & Marella, 2015).

Electronic medical record (EMR): An EMR is an electronic version of a patient's medical record, which allows for easy access to patient data and information (Struik et al., 2014).

Electronic patient record (EPR): An EPR is a record containing a patient's personal details (name, date of birth, etc.), their diagnosis, condition, and details regarding treatment and assessments undertaken by a clinician (Carter & Potts, 2014).

Health information exchange (HIE): The HIE is an electronic movement of health information amongst organizations according to nationally recognized standards (Audet, Squires, & Doty, 2014).

Healthcare information system (HIS): A HIS is a system that provides practitioners timely and efficient access to a patient's completed health history (Liu, Chung, Chen, & Wang, 2012).

Health information technology (HIT): HIT is a method of information processing using both computer hardware and software for the entry, storage, retrieval, sharing, and use of healthcare information; two components of which are EMRs and CPOEs (Lyles, Schillinger, & Sarkar 2015).

Health Insurance Portability and Accountability Act (HIPAA): HIPPA is a federal privacy rule enforced by The Office for Civil Rights to protect individual identifiable health information. This includes confidentiality provisions of the Patient Safety Rule, which protect identifiable information used to analyze patient safety events and improve patient safety (Agris, 2014).

Primary care practice (PCP): A PCP is the patient's first point of entry into the healthcare system and the continuing focal point for all needed healthcare services. The PCP provides ready access to the patient's own personal physician or to an established back-up physician when the primary physician is not available (Peikes et al., 2014).

Assumptions, Limitations, and Delimitations

Assumptions

Martin and Parmar (2013) described assumptions as what the researcher takes for granted pertaining to a study. The first assumption was participants understood the significance of confidentiality in this study in order to obtain accurate research information. The second assumption was participants answered the interview questions

honestly, without bias or social pressure, providing their personal perspectives on implementation of EHR systems. The third assumption was PCPP interviewed had experience with EHRs adoption that was sufficient to address the research question.

Limitations

Kirkwood and Price (2013) defined research limitations as potential influences, which investigator cannot control. The limitations of this qualitative phenomenological study related to practical constraints. The first limitation was the sample size did not include every PCPP in southwestern Ohio. Second, I restricted the population to PCPPs in the same geographical area. Therefore, the results may not be generalizable to PCPPs outside of this area. Third, the design did not include an opportunity to probe further with follow-up questions. Fifth, I conducted the interviews via phone, not allowing for observation of nonverbal cues.

Delimitations

Svensson and Doumas (2013) defined delimitations as rules set by the researcher for a study. The first delimitation of this study was the criteria for participation included only 26 PCPP Southwestern Ohio who been in practice for 10 years. The second delimitation was the focus of the research questions. The research only focused on the lived experiences of PCPPs faced with implementation of EHRs. The third delimitation was PCPPs must have implemented a basic EHR system and have used the system within their workflow processes for at least six months. The fourth delimitation was each PCPP must qualify as a small contract provider with fewer than 10 full-time equivalent employees. The fifth delimitation was PCPPs must be willing to participate in a telephone

interview that required approximately 45 minutes. The sixth delimitation was each PCPP must have an interest in the topic and firsthand experience in execution of the strategy to implement an EHR system. The final delimitation required each PCPP to agree on the publication of the research data.

Significance of the Study

Contribution to Business Practice

The purpose of this study was to explore why PCPPs are slow to adopt EHR. This study may significantly address gaps in business practice regarding EHR adoption by PCPPs. With an analysis of factors that influence physicians' decision-making, the study results may assist healthcare providers in fostering collaboration toward the successful implementation of EHRs. Electronic health record systems may reduce healthcare cost by increasing accuracy and information access while providing appropriate security provisions (McAlearney et al., 2015).

The purpose of this research was to understand the lived experience of a purposive sample of PCPPs regarding potential barriers to implementation of an EHR system within their practice. Through the documentation of actual PCPPs' experiences with EHR adoption, the results of this study may provide unique qualitative contributions to the gap in business practice regarding EHR implementation and HIE expansion. Finally, any recommendations based on the findings of the study might support the initiatives of the American Health Information Community (AHIC) to promote the adoption of EHR and accelerate the development and adoption of HIT.

Implications for Social Change

The findings from this qualitative phenomenological study may advance the knowledge base concerning implementation of EHRs in the healthcare industry. Social changes that drove the need for EHR adoption included an increasingly mobile society in which patients move and change doctors more frequently than in the past (Kuang-Ming, Chung-Feng, & Chen-Chung, 2013). In addition, patients see various specialists for healthcare. Thus, patient medical records no longer reside with a single general practitioner who provides a patient's complete care (Nakamura et al., 2015). Electronic health record adoption affects society by allowing physicians the ability to access patient medical records easier in order to make informed decisions regarding the treatment of patients. Patients may also have the ability to access their medical records to assist in medical treatment decision-making processes and report any potential charting errors. Ben-Zion et al. (2014) stated the ability to share a patient's medical history and test results is imperative to the continuity of patient care, chart accuracy, and may save the patient's life. The results of this study might contribute to positive social change by improving quality, safety, and efficiency of health care and could offer information to other PCPPs who are reluctant to transition to EHR.

A Review of the Professional and Academic Literature

The purpose of this literature review was to explore the (a) history of the development and use of EHR systems, (b) underlying theoretical framework, (c) current literature on the adoption of EHRs and e-prescribing, (d) potential barriers and solutions to the challenges for the adoption of EHRs, and (e) recent initiatives to encourage greater

use of EHRs. The objective of this literature review was to offer background concerning the possible barriers to implementation of EHR systems within PCPs' offices. I accessed research materials through the Florida Institute of Technology and Walden University Library databases. My literature review contains key words from peer reviewed journal articles relating to *complex adaptive systems theory, electronic health records, electronic medical records, e-prescribing, health information technology, HIPPA, medical records, clinical decision, intelligence, implementation, adoption, primary care practices, technology acceptance model, disruptive innovation theory, health maintenance organization, computerized patient records, health care industry*, *health information exchange, managed care*.

I conducted this literature review to establish a conceptual and scholarly foundation for the proposed study by providing a critical analysis of the body of peer reviewed and academic research relating to the research question. Based on the research question, I addressed the issue of barriers to adoption of EHRs by primary care physicians. Using ABI/INFORM Global, Academic Search Complete Complete/Premier, Business Source Complete/Premier, EBSCOhost, ERIC, Emerald Management Journals, ProQuest Central, PubMed, Health Sciences: A SAGE Full-Text Collection, American Academy of Neurology Website, Sage Publications, and Science Direct. I gathered reference information from 136 resources for the literature review, of which 135 (99.3%) were peer-reviewed articles and 130 (95.5%) were published between 2012 and 2016. In addition, the literature review included one dissertation (.74%) and one professional website (.74%).

Complex Adaptive Systems Theory

Qualitative researchers have studied healthcare organizations as complex adaptive systems (Hempe, 2013). Kanta and Zechman (2014) described CAS theory as a large number of components, called agents, which interact, adapt, or learn. Martin et al. (2012) posited the interaction of these agents form CAS. CAS theory grew out of the scientific study of complexity (Palombo, 2013). Barton (2014) defined CAS as the phenomena demonstrated in systems characterized by nonlinear interactive components, developed phenomena, continuous and discontinuous change, and unpredictable outcomes. Researchers have not developed a standard set of characteristics for CAS (Barton, 2014). However, Wei, Wang, and Hu (2014) captured the concepts of CAS as (a) varied agents who learn, (b) nonlinear interdependencies, (c) self-organization, (d) emergence, and (e) coevolution. Polacek et al. (2012) characterized CAS by the significant numbers of elements within a system, and the way in which connections and interactions between components bind a system together. Key constructs underlying the theory are (a) multiple agents with schemata, (b) self-organizing networks, (c) coevolution, and (d) system adaption (Karwowski, 2012). Furthermore, Sturmberg, Martin, and Katerndahl (2014) posited the core properties of CAS are (a) nonlinearity, (b) attractor, (c) open to environment, (d) self-organization, (e) emergence, (f) pattern of interaction, (g) adaption and evolution, and (h) coevolution

Martin et al. (2012) posited the constructs of the complexity theory explained why a healthcare system moved to the edge of chaos when the healthcare organization was more than capable of change. When a system is in a chaotic state, there is a particular

patterned order in the way the system changes as a whole, but the future behaviors of individual components are entirely unpredictable. Sturmberg and Lanham (2014) proposed complexity was the first consideration when designing a healthcare system. Within the complexity of the healthcare system, EHR systems transfer data between many companies and other types of enterprises (Sturmberg & Lanham, 2014). In order for this to occur, EHRs need to be fully functional and compatible with other systems (Martin et al., 2012).

Additional Theories Considered

The disruptive innovation theory (DIT) and the technology acceptance model (TAM) were additional theories I considered for the conceptual framework for this study. Sultan and van de Bunt-Kokhuis, (2012) stated DIT is utilized to explain technology advancement that enhances a service, process, or product in a way not expected by the market. The DIT was not suitable for this study because the intent of my study was not to understand how EHR disrupt PCPP after adoption. Moreover, Collazo, Wu, Elen, and Clarebout, (2014) used TAM to model how users accept and use technology. The TAM was not suitable for this study given that I did not focus on modeling PCPP acceptance of EHR systems.

Disruptive innovation theory. According to the DIT, innovation can interrupt an existing market (Ramdorai & Herstatt, 2015). EHR implementation represents a disruptive innovation in the health care industry (Weaver, Lindsay, & Gitelman, 2012). Vance (2013) acknowledged DIT is radical technical innovation with the potential to change an organization or industry's existing business model. Comparably, Lau et al.

(2012) affirmed that the implementation of EHRs was a radical innovation for the healthcare industry (Lau et al., 2012). Katina, Keating, and Jaradat (2014) avowed that the barriers confronting technology managers are complex adaptive systems problems that circle around emerging and nonlinear tendencies such as the increase of information and knowledge, the globalization of technology, and DIT.

Barnett et al. (2011) advocated the use of DIT to enhance healthcare organizational leaders understanding regarding the difficulty U.S. healthcare providers encompass to manage and sustain innovation. According to Barnett et al., disruptive technological innovation in healthcare are not entrenched in related business-model innovation, which would permit healthcare organizations to take advantage of the technological enablers and to deliver significance propositions to medical professionals. Barnett et al. stated disruptive technological advancements happen because healthcare organizations, prearranged previously in the form of hospitals and physicians' practices, conflate different business models. Barnett et al. suggested appropriate business models and rigid reform are needed for disruptive innovations to become embedded in the U.S. healthcare industry. Moreover, Corsi and Di Minin (2014) stated to understand innovation from emerging economies as a phenomenon DIT is a valuable tool.

Technology acceptance model. The purpose of TAM is to explain why people use or do not use information technology in a job environment (Ingham, Cadieux, & Mekkki Berrada, 2015). Çuhadar (2014) utilized TAM as a conceptual framework in a qualitative phenomenology study regarding IT pre-service teachers' acceptance of tablet PCs on personal; instructional and technical grounds within the framework of variables of

perceived usefulness and perceived ease of use. Amornkitpinyo and Piriyasurawong (2015) suggested TAM is one of the most recognized and frequently used models with regard to information and communication technology acceptance. According to Choi and Chung (2013), a critical factor in user acceptance and utilization of new technology depends on end-user attitudes. User acceptance of an EHR system is an essential condition for successful implementation (Heselmans et al., 2012). User support of an information system is dependent on approval of the underlying goals of the system implementation process by the primary care practice (Heselmans et al., 2012).

Kuang-Ming et al. (2013) employed TAM to investigate nurses' personality traits regarding technology readiness towards mobile electronic medical record systems. Schnall and Bakken (2011) used TAM to model physicians' acceptance of telemedicine technology and patients' approval of healthcare provider delivered e-health and electronic medical records. The majority of TAM research is outside the healthcare arena; however, more recent applies constructs from the TAM to healthcare (Asua, Orruno, Reviriego, & Gagnon, 2012). I did not model how PCPP accept and use EHR technology, thus making TAM not suitable for this study.

Historical Overview of Electronic Health Records

Policy makers and healthcare leaders have considered IT as a strategy to improve the healthcare delivery system (DeVoe, Angier, Burdick, & Gold, 2014). Healthcare reform efforts have placed further emphasis on the need for EHR as a way to provide efficient exchange of patient health information (Lyles et al., 2015). Therefore, EHR systems are an essential technological tool to improve delivery and quality of healthcare,

provide significant cost savings, and make patient information available 24 hours a day, around the world (Adler-Milstein, Everson, & Shoou-Yih, 2015). Moreover, in 2010 and 2011, the IOM reported computer-based patient records were an essential technology for healthcare to improve the quality of care and patient safety (Ozair, Jamshed, Sharma, & Aggarwal, 2015).

Governmental influences. The U.S. government suggested dangerous medical mistakes, reduce costs, and improving the delivery of healthcare to patients is avoidable by using computerizing health records (Kern, Barrón, Dhopeshwarkar, Edwards, & Kaushal, 2013). The U.S. government role in understanding the importance of EHR provided governmental initiatives to implement a meaningful use EHR system for private-industry, health care providers, and health maintenance organizations (Agris, 2014). The U.S government placed emphasis on the use of this technology for most U.S. citizens within 10 years of the introduction to the HITECH Act (Agris, 2014). In 2008, the U.S. government proposed an effort to modernize the U.S. healthcare system by making all medical records standardized and electronic as part of several efforts to revive the U.S. economy (Kern et al., 2013).

The American Recovery and Reinvestment Act (ARRA) motivated hospitals, clinics, health systems, and practices to implement EHR systems (Tharp, 2014). The ARRA authorized payment reimbursement of $41,000 over 5 years to physicians who purchased and implemented EHR systems based on industry standards and regulations; the Centers for Medicare and Medicaid Services (CMS) disbursed the payments (Ghitza et al., 2013). As part of the ARRA, the HITECH Act involved a national commitment to

implement HIT. Further, Galbraith (2013) stated the objective of the HITECH Act is to promote the utilization of EHR systems and included $27 billion in inducements for Medicare and Medicaid providers as a means to enhance quality, decrease cost growth, and fuel the economy in the short term. Implementers faced numerous challenges; however, one of the greatest was ensuring the inclusion of small PCPs in EHR implementation (Galbraith, 2013).

Managed care. In the last 20 years of the 20th century, healthcare has progressed toward a greater focus on managed care outside of the hospital setting as an avenue to control escalating health costs (Adelson et al., 2014). Primary care physicians became the principal source of health care and the gatekeepers for access to specialty health care providers (Adelson et al., 2014). The managed healthcare system gave PCPPs a central role within an integrated delivery system of healthcare providers, service providers, and to provide amenities for a range of healthcare services (Adelson et al., 2014). In addition, health insurance payers and federal regulators requested report cards on quality, results, and costs of health care. This action resulted in a need to shift healthcare information systems from financial systems to clinical systems capable of capturing, managing, and analyzing clinical data collected at various sites (Adelson et al., 2014). National organizations dedicated to improving healthcare quality, such as the American Health Information Management Association and the Agency for Health and Research Quality, responded to the need of managed care by pinpointing the problems regarding data collection and reporting, and employ key leaders from across the industry to organize and commence solutions to coerce healthcare transformation (Piña et al., 2015).

In the late 1990s, the U.S. public wanted more control over the out-of-pocket healthcare costs for which they were paying (Gunnarsson et al., 2012). Preferred provider organization (PPO) plans became more popular than the traditional health maintenance organization (HMO) and medical care organization plan, and free choice became significant for quality patient care (Orfield, Hula, Barna, & Hoag, 2015). A HMO is an organization that oversees and governs the exchange of health-related information between organizations according to nationally recognized standards (Wedig, 2013). The Patient Protection and Affordable Care Act (PPACA) of 2010 stipulated free choice of choosing health insurance by patients was the main cause for increased healthcare sector costs (Pate, 2012). Additionally, the purpose of the PPACA was to revert to the practice of managed care with the PCP being the gatekeeper to manage the patient's whole health (Pate, 2012). As of May 2014, an estimated 20 million U.S. citizens gained health insurance coverage under the PPACA (Tsai & Rosenheck, 2014). In 2013, 18% of U.S. citizens were uninsured. In 2014, the percentage of uninsured U.S citizens dropped to 13.4% (Giaimo, 2013). The PPACA will ensure all U.S. citizens have access to quality, affordable healthcare and will create change within the healthcare system to contain healthcare cost.

Many specialty practitioners resisted this concept, however, stating that PCPP lack the medical knowledge to identify when a patient is in need of specialty care, and attempt to manage health concerns they do not have the training to address (Grams, 2012). Therefore, there is currently conflict between the PPACA regulations, the PCPP, and specialists who do not want the PCPs being gatekeepers for the specialists' patients

(Grams, 2012). The goal of the PPACA regulations was to reduce healthcare costs, control spending, and reduce waste (Shane & Ayyagari, 2015).

Computerized patient records. Information technology (IT) offers healthcare providers ways to store and access substantial amounts of health data without the use of physical storage equipment and offers multiple primary care providers access to health information simultaneously from different locations (Savage, 2012). The healthcare industry started computerizing health information over a decade ago. From 1984 to 1994, healthcare-related computer transactions increased from 5% to 36% (Diana, Kazley, & Menachemi, 2011). In the early 1990s, the IOM and the National Committee on Quality Assurance (NCQA) recommended healthcare and health insurance providers adopt a computerized patient record (CPR) as the standard for health records related to patient care (Kannry, Beuria, Wang, & Nissim, 2012).

Computerized patient records are elements of a database system of electronically maintained information regarding an individual's lifetime health status and care; data is stored so authorized users can access patient health information from multiple locations (Hope et al., 2014). The purpose of CPRs was to replace paper-based medical records as the main source of information for healthcare records and meet clinical, legal, and administrative practice requirements (Hope et al., 2014). CPRs support existing computer systems that captured, stored, processed, communicated, secured, and presented information from multiple disparate locations (Roshanov, Gerstein, Hunt, Sebaldt, & Haynes, 2012). CPR systems have reduced cost and improved quality of care through informed healthcare patients and providers, the removal of duplicate testing, and

enhanced coordination of treatment by more than one healthcare provider (Sittig & Singh, 2012). CPR system implementation represented a major change in the management of patient records (Roshanov, Gerstein, Hunt, Sebaldt, & Haynes, 2012).

Historically, paper records have remained the approach used for PCPP documented medical treatment received by, and medical information pertaining to, each patient (Lassere, Baker, Parle, Sara, & Johnson, 2015). Health industry experts recognized computers based records were a more efficient method for collecting and aggregating data; thus the development of the CPR (Appari, Johnson, & Anthony, 2013). Health industry experts designed CPR to incorporate administrative and financial information, and support clinical decision-making (Street et al., 2014). However, the healthcare industry lacked agreement on which features and functions a CPR should include (Rameshwara, Kumar, & Raghavendra, 2015). The healthcare industry has embraced various models of CPR systems with a variety of different names and acronyms to describe the CPR concept (Middleton et al., 2013). Computerized medical records, continuity of care records, digital medical records, EMR, electronic patient records, and personal health records are a few of the examples of CPRs. CPR models have increased in sophistication and complexity over time (Middleton et al., 2013).

Advancements in computer systems, the Internet, and healthcare organizations internal Intranets favorably influenced the development and evolution of CPRs (Piscotty, Kalisch, & Gracey-Thomas, 2015). In the mid-1990s, comprehensive information system (IS) products that seamlessly integrated data and coordinated processes across the entire continuum of healthcare services were rare (Piscotty, Kalisch, & Gracey-Thomas, 2015).

By the late-1990s, six institutions were part of the Computer-based Patient Record Institute's Davies CPR Recognition program (Lynch et al., 2014). The Computer-based Patient Record Institute's Davies CPR Recognition program is an Award of Excellence, which recognizes exceptional accomplishment in the achievement and significance of health information technology organizational initiatives, in particular EHR system (Lynch et al., 2014). The program promoted EHR system implementation through (a) distribution information and lessons learned on adoption strategies, (b) financial return on investment, (c) and worth of the EHR to enhance patient care and results (Kaushal & Blumenthal, 2014). Four teaching hospitals, the Departments of Defense, and Veterans Affairs had advanced CPR systems by 2010 (Richards, Prybutok, & Ryan, 2012).

Patient safety and electronic prescribing. In June 1998, the IOM created the Committee on the Quality of Health Care in America (CQHCA) to ascertain plans for enhancing the quality of health care in the United States (Finney Rutten et al., 2014). The CQHCA committee published a report entitled *Crossing the Quality Chasm: A New Health System for the 21st Century* (Frimpong et al., 2013) to focus on issues related to health care quality in the United States (Dykes & Collins, 2013). The CQHCA committee speculated the U.S. health care system did not steadily distribute the type of premium care that U.S. citizens required and deserved (Goldstein, 2014). A key finding in the report was that information and communication technologies are fundamental to attaining considerable quality enhancement in the distribution of healthcare (Blayney, 2013). The use of IT to enrich access to patient medical information and maintain evidence-based decision-making was another recommendation in the report (Frimpong et al., 2013). The

committee's strategy to use IT substantially improved the quality of healthcare in the United States over the next 10 years (Yoon et al., 2013).

In 1999, the IOM published a report stating as many as 98,000 people died and hundreds of thousands suffer non-fatal injuries in hospitals each year because of medical errors that could have been prevented (Yoon et al., 2013). The implementation of CPRs by hospitals could potentially reduce non-fatal injuries due to medical errors (Kannry et al., 2012). In 2001, the CQHCA published a follow-up report providing recommendations to improve healthcare quality and reduce medical errors (Traynor, 2012). One of the committee's recommendations was the creation of an environment that fostered and rewarded improvements to health care by (a) creating an infrastructure to support evidence based practice, (b) facilitating the use of information technology, (c) aligning payment incentives, and (d) preparing the workforce to serve patients better in a world of expanding knowledge and rapid change (Traynor, 2012). Traynor found that these recommendations attracted wide attention in the medical community (Traynor, 2012).

Greater interest in patient safety strategies grew from the release of the 1999 IOM report. One strategy included electronic prescribing (Mattox, 2012). Electronic prescribing (eRx) required the use of computer systems to facilitate prescriptions, supplies, and the administration of medicines within healthcare facilities (Rothbard et al., 2013). In addition, eRx systems captured full prescribing history for patients in a transferrable manner, and provided the option for the potential use of databases and decision support tools to assist the prescriber in medicine selection (Kan, 2012).

Healthcare professionals insisted that eRx systems would improve efficiency, accuracy, and appropriateness of the medication prescribed (Dainty, Adhikari, Kiss, Quan, & Zwarenstein, 2012).

Pedersen, Schneider, and Schecklehoff (2014) conducted a study that explored refill functionality within eRx software. Study participants described their experiences with the refill functionality of the eRx software and provided suggestions for improving the eRx software, office procedures, and software functionality (Pedersen, Schneider, & Schecklehoff, 2014). Study results indicated that, each day, there was a 50% reduction in time spent on refills because of eRx software adoption (Pedersen, Schneider, & Schecklehoff, 2014). In addition, study participants (a) identified several difficulties and malfunctions associated with managing prescription refills within the eRx software, (b) noted time saved as well as patient convenience as benefits of the eRx software, and (c) appreciated the ability to track whether patients were filling and refilling prescriptions (Pedersen, Schneider, & Schecklehoff, 2014). Rothbard et al. (2013) conducted a study that explored eRx software system used by general practitioners that included functional capabilities that assist enhanced patient safety and care, with a focal point on quality utilization of medicines. Study participants described lived experiences regarding the implementation of 50 functionality features of the eRx software across seven eRx software systems (Rothbard et al., 2013). Study results indicated entry to fact based therapeutic and drug information was restricted. In addition, decision support for electronic prescribing of medicine was obtainable however varied between systems (Rothbard et al., 2013). By 2004 roughly 0.4% of office-based providers, or 2,500

providers in the United States, had adopted electronic prescribing (Joseph, Sow, Furukawa, Posnack, & Daniel, 2013). However, physician employment of eRx was low and differences in the rates of adoption of eRx systems across practice settings and medical specialties were inconsistent (Joseph, Sow, Furukawa, Posnack, & Daniel, 2013). A 2011 eHealth Initiative report stated eRx systems were available to physicians as (a) part of an integrated EMR system; (b) a stand-alone system available as a software package purchased and downloaded to the office's computer system; and (c) a system made available through the Internet, connecting the physician to an eRx software application service provider for a fee (Kan, 2011). As the functionality of electronic prescribing systems expanded, interest in the use of technology to improve clinical decision-making also grew (Kan, 2011).

In 2012, the CMS issued final details of the eRx incentive program. The objective of the eRx incentive program was to raise the implementation of eRx through Medicare incentives and penalties (Kan, 2012). The eRx program influenced the following qualified professionals: (a) medical doctors, (b) podiatrists, (c) nurse practitioners, and (d) physician assistants (Kan, 2012). Centers for Medicare and Medicaid were to impose a 1.5% financial penalty automatically from the eligible professionals (EPs) Medicare Part B Physicians Fee Schedule (PFS) permitted charges if EPs did not account for utilization of an eRx system by 2013 (Ahmed, McLeod, Barber, Jacklin, & Franklin, 2013). Physicians would earn a 1% financial bonus if they reported the use of an eRx system to CMS (Ahmed et al., 2013). The eRx incentive was scheduled to fall to 0.5%, and the penalty scheduled to rise to 2% in 2014. In 2013, EPs no longer

had access to receive the eRx incentive (Ahmed et al., 2013). The U.S. government has not authorized the CMS to continue the eRx incentive program past 2014 (Pedersen, Schneider, & Scheckelhoff, 2014).

Clinical decision intelligence. Another recommendation from the *Crossing the Quality Chasm: A New Health System for the 21st Century* report by the IOM suggested an increase in the efforts to develop clinical decision intelligence (CDI) as a means to discover new treatments, improve care delivery, and affect health policy (Kelly & Moore, 2012). Clinical decision intelligence was a section of healthcare, covering a broad range of subjects from clinical data integration and analysis to knowledge management and application development (Bennett & Hauser, 2013). CDI also support decision-making by offering in-depth analysis of clinical data from multiple sources (Moja et al., 2014). Sources of data included clinical practice management, nursing, healthcare management, healthcare administration, and medical research (Bennett & Hauser, 2013). Moja et al. (2014) claimed CDI would replace physicians in common tasks in the future by providing decisions on how to treat patients based on their symptoms.

Kelly and Moore (2012) posited clinical decision-making was the most studied application of CDI in HIT, and suggested knowledge in clinical decision-support systems (CDSS) affected physician's behavior at the time of care. Advancement in CDSS took place, as EHR was widely adopted within PCP in the United States (Kelly & Moore, 2012). Nirantharakumar, Chen, Marshall, Webber, and Coleman (2012) reported CDSS increased adherence to care guidelines, reduced medication error rates, and decreased unnecessary care utilization. Information systems offered a number of benefits, including

higher quality healthcare, improved patient safety, and efficient information processing, and lowered administrative costs (Scholz, Ngoli, & Flessa, 2015). The overall goal of CDSS was to maximize the efficiency and efficacy of patient care (Nirantharakumar et al., 2012).

The intended function of both EHR systems and chronic disease management system (CDMS) was to assist healthcare providers to provide the right care to their patients (Fraccaro, Dentone, Fenoglio, & Giacomini, 2013). CDMS systems help physicians manage patients with chronic diseases, such as asthma, cardiovascular disease, depression, diabetes, and others (Wootton, 2012). The physician does not document the entire patient encounter in CDMS; the focus of CDMS is on chronic disease and preventative care (Fraccaro et al., 2013).

Since EHR systems include other patient management functions, CDMS are not always as robust as the EHR systems in their disease management capabilities and the use of stand-alone CDMS was not widespread (Fraccaro et al., 2013). However, the integration of chronic disease management into PCPs became more extensive as more providers moved to EHR (Goldwater et al., 2013). Both EHR and CDMS software offer assistance for the following functions, which can be either prebuilt or customized:

1. Support for multiple diseases and conditions,
2. Reminders and alerts,
3. eRx,
4. Patient education materials,
5. Documentation of medical encounters,

6. Decision support,
7. Reporting capabilities,
8. Population management, and
9. Care protocols and guidelines. (Goldwater et al., 2013)

The range of functionality between EHR and CDMS software held promise for improved patient care (Chaudhry et al., 2012). The results from this range caused confusion for PCPP related to the commonality use of terminology between EHR and CDMS software system because these software provided the same functions (Chaudhry et al., 2012).

Electronic health records. The term electronic medical record (EMR) and EHR have been interchangeable since the mid-2000s (Fairley et al., 2013). EMRs are legal computerized clinical records created by hospitals and physician offices and are the data source for EHRs (Luchenski et al., 2012). However, EHR allow stakeholders to share medical information easily and allow medical information to follow the patient through various modalities of care (McCowan et al., 2015). Stakeholders included (a) consumers, (b) healthcare providers, (c) insurance payers, and/or (d) the U.S. government (McCowan et al., 2015). EHR systems provide functionality for (a) patient demographics, financial information, and an ability to view clinical data; (b) documentation of clinical notes, electronic problem lists, and allergy templates; (c) ordering of prescriptions and alerts regarding medication errors, drug interactions, and patient allergies; (d) improved data collection to enable quality management initiatives; and (e) access to electronic mail or other electronic data exchanges to provide health information to other healthcare

providers such as laboratories, pharmacies, hospitals, and specialized healthcare providers (DesRoches, Audet, Painter, & Donelan, 2013). Attributable to varied functionalities of an EHR system, researchers continued to struggle to clarify the terminology between the EHR and EMR system (Fairley et al., 2013; Herrin et al., 2012).

In a 2011 survey of ambulatory care physicians, Landman, Lee, Sasson, Van Gelder, and Curry (2012) defined two levels of EHR systems: Basic and fully functional. Basic systems included (a) health information, (b) patient demographics, (c) patient problem lists, (d) electronic lists of patient medication, (e) and clinical notes. In addition, data results from order entry management of prescriptions, laboratory results, and imaging findings could be integrated (Landman et al., 2012). Fully functional systems included health information, patient history, and necessary medical test results to provide treatment to patients. Results management and clinical decision support systems included warnings of drug interaction or contra-indications (Landman et al., 2012). PCPPs who extracted patient medical data from EHR systems prior to examinations claimed that overall medical treatment was more effective (Conrad, Hanson, Hasenau, & Stocker-Schneider, 2012).

In 2004, the U.S. government set a goal of 10 years for the complete transition to EHRs, providing significant funding to PCPP (Takian, Petrakaki, Cornford, Sheikh, & Barbr, 2012). The Department of Health and Human Services established a National Coordinator for Health Information Technology to manage national efforts to implement and utilize advanced HIT for the electronic exchange of health information (Calman, Hauser, Lurio, Wu, & Pichardo, 2012; Singh, Singh, Singh, & Singh, 2013). Electronic

health record systems are essential in the healthcare industry (Matson, Stephens, Steiner, Kozakowski, & Davis, 2014). Among the many factors at work to encourage PCPP to change from paper to EHR system are reduced medical errors, increased quality of care, increased effectiveness of patient care, and increased savings of billions of dollars to the healthcare industry (Calman et al., 2012). Introducing an EHR system into a PCP could have unpredictable effects, and may increase safety in some areas and increase vulnerabilities in others (Moxham et al., 2012). Health care organizations, medical schools, employers, and the U.S. government have recognized the importance of computerizing the various components of medical records (Muhammad Zia, Telang, & Marella, 2015). EHR systems had become a priority for medical practices because of the U.S. federal government initiative to digitize medical records (Terry, 2013). National health care associations, such as the American Health Information Management Association, Healthcare Information and Management Systems Society, Medical Group Management Association, and the Medical Records Institute encouraged their members to implement EHR systems (McAlearney, Hefner, Sieck, & Huerta, 2015).

Implementing EHR system is a complex and expensive investment and IT professionals who specialize in healthcare are in demand because of the increase of EHR system implementations (Alder-Milstein, Salzberg, Franz, Oray, & Westfall Bates, 2013). The average cost of a three-physician practice for an EHR system evaluation, installation, and training are between $50,000 and $75,000 (Singh, Singh, Singh, & Singh, 2013). However, PCPP should recoup more than their investment in 5 years because of U.S. government financial incentives and the increased number of patients seen by the

physicians (Porter, 2013). The largest portion of this healthcare saving would come from reduced drug expenditures, which allows the healthcare industry to save money and provide affordable healthcare to individuals (Alder-Milstein et al, 2013).

The costs associated with inadequate EHR systems and medical record mistakes could cost the U.S. healthcare system up to $29 billion annually (Grant & Greene, 2012). EHR systems and medical record problems were often the result of (a) computer and network issues, (b) lack of data protection, (c) lack of standard processes, (d) data entry errors, and (e) programs not performing to meet the needs of the physician or healthcare professional. D'Amore, Sittig, and Ness (2012) noted continued paper use in an electronic environment was one type of unintended negative consequence of an EMR or CPOE system because the expected use was to eliminate paper medical records.

Health Information Exchanges

Health care providers are increasingly sharing clinical data with other providers who care for the same patient by using electronic HIE (Rudin, Motala, Goldzweig, & Shekelle, 2014). In the United States, more than 100 organizations facilitate HIEs among provider organizations, and 30% of hospitals and 10% of ambulatory clinics participate (Rudin et al., 2014).The eHealth Initiative highlighted examples of successfully implemented HIEs. The eHealth Initiative is an independent, nonprofit organization that engages physicians and patients in order to standardize and reform the use of HIT to improve patient care in the United States (Volkman et al., 2014). The discussion of the successful implementation of HIE is important to this study because PCPP should have

the appropriate EHR system to exchange information with other PCPs and healthcare providers.

HealthBridge. HealthBridge was one of United States biggest and most flourishing community HIEs, providing 2.4 million clinical results each month to thousands of healthcare professionals in the Cincinnati, Ohio tri-state area (Beck, Klein, & Kahn, 2012). HealthBridge's infrastructure, which interconnected 24 different hospitals and health systems, dozens of laboratories, diagnostic and imaging facilities, physician offices and clinics, local health departments, nursing homes, and community health centers, made HealthBridge one of the most superior regions in the country for using electronic health information to enhance the value and effectiveness of healthcare. In the greater Cincinnati, Ohio area, the HealthBridge system covered 95% of the hospitals, 4,600 of the area's 5,000 physicians, 17 local health departments, and 2.2 million patients. HealthBridge also provided business and technical support to other HIEs, in Springfield, Ohio, and Bloomington, Indiana to speed the growth of new exchanges (Beck, Klein, & Kahn, 2012).

The State of Arizona. The State of Arizona has been a leader in the development of regional collaborations for health information (Sao, Gupta, & Gantz, 2013). In 2005, Arizona's governor signed an executive order to develop a statewide health information infrastructure or HIE. In 2006, Arizona published a strategy to develop the HIE, which included the need to (a) develop public-private partnerships, (b) negotiate an agreement on technology standards and governance, and (c) design a strategy to reach the goal. In 2007, the state established the Arizona Health-e Connection (AzHeC) as a not-for-profit

organization whose mission was to lead Arizona in establishing and adopting an HIT. Arizona Health-e Connection actively pursued initiatives to address all of the challenges identified in its 2006 strategy, including sponsoring initiatives that educated physicians about EHRs and promoted their use (Sao, Gupta, & Gantz, 2013).

Coastal Women's Healthcare. Coastal Women's Healthcare was an independent women's medical practice located in Scarborough, ME (Patel et al., 2012). The practice employed eight physicians, two nurse practitioners, a midwife, and a support staff, which serviced 22,705 patients in 2011 (Patel et al., 2012). The medical practice offered gynecologic and obstetric care, mammography, bone density, and minimally invasive surgery to women (Patel et al., 2012). In 2011, Coastal Women's Healthcare adopted a meaningful-use EHR system (Patel et al., 2012). Jones, Rudin, Perry, and Shekelle (2014) defined meaningful use as a CMS Medicare and Medicaid program that awards incentives for using EHRs to improve patient care. Adler-Milstein, Everson, and Lee (2014) stated the centerpiece of HITECH is a financial incentive for doctors and hospitals to implement EHRs systems and used the system in ways expected to improve the safety, effectiveness, and efficiency of care known as the meaningful use criteria. In 2012, CMS, Maine's congressional delegation, and the Maine Medical Association recognized Coastal Women's Healthcare for being the first independent women's health practice to be connected to the State of Maine's HIE, managed by HealthInfoNet (Patel et al., 2012). The Maine Regional Extension Center (REC) and the HIE was operated by HealthInfoNet, and funded by the Office of the National Coordinator for Health Information Technology (Patel et al., 2012). Coastal Women's Healthcare

implementation of an EHR system produced quality improvements and cost savings to include a/an (a) savings of $5,000 per year in printing and postage to patients; (b) decreased patient wait times for appointments by 2 weeks to 19 minutes; (c) replacement of the paper charge captured form saving $4,100 annually in printing, while reducing insurance billing time from 19 days to 4 days; (d) reduced duplication of medical diagnostic testing; (e) EHR reminder module to capture 334 missed appointments per year; (f) reduced time spent on medical records management, saving practices approximately $75,000 per year; and (g) reduced time spent on billing, saving practices nearly $140,000 annually (Patel et al., 2012).

The State of New York. National and states initiatives have promoted implementation and meaningful utilization of EHR with HIE (Abramson et al., 2012). The State of New York has led the nation in state initiatives to adopt EHR with HIE. The State of New York has conducted surveillance of EHR adoption initiatives to assess the usefulness of EHR adoption initiatives. In support, Abramson et al. conducted a survey to assess EHR adoption and HIE usage among 205 hospitals in the State of New York. One hundred and forty-eight (72.2%) hospitals responded to the survey. Twenty-three (15.5%) of the hospitals adopted EHR and 29 (23.2%) participated in HIE. EHR adoption rates and HIE participation are advanced among New York hospitals versus hospitals nationally. However, even with higher rates of adoption, the overall EHR rate and preparedness to meet meaningful use was low in the State of New York (Abramson et al., 2012).

Unsuccessful HIEs. Not all HIEs have been successful. In 1998, Santa Barbara County, California, formed the Santa Barbara County Care Data Exchange (Rudin, Motala, Goldzweig, & Shekelle, 2014). The Santa Barbara County Care data exchange issues were (a) legal problems related to the exchange of private health information, (b) data exchange, and (c) financial questions regarding the self-sufficiency of the exchange (Rudin, Motala, Goldzweig, & Shekelle, 2014). After years and spending over $10 million, the Santa Barbara County Care data exchange planned to exchange data for only a few months, and the participants found no compelling value for the initial HIE services (Rudin et al., 2014).

Adoption of Electronic Health Records and E-Prescribing

Electronic health record. EHR systems can have either a positive or a negative effect on the healthcare professional (Carter & Potts, 2014). The adoption of EHR systems has resulted in healthcare savings, medical error reduction, and improved quality of healthcare services for patients (Xierali, Phillips, Green, Bazemore, & Puffer, 2013). According to the U.S. Department of Health and Human Services, Health Resources, and Services Administration (HRSA), the majority of personnel in the healthcare field were pursuing opportunities to use HIT to reach improved patient health results, less medical errors, and larger administrative effectiveness (Dixon, Grannis, & Revere, 2013). However, even with the best planning and under the best conditions, HIT and EHR implementation remained a challenge (Graetz et al., 2014). Regardless of the financial incentives, PCPP are less likely than hospitals to adopt EHR and other software applications that are preconditions to accomplish meaningful use requirements

(Silverman, 2013). Hans and Loop (2013) stated limited access to capital and technology infrastructures and lack a qualified and cost-effective workforce contributed to adoption challenges. There have been numerous efforts to survey the number of healthcare providers using EHR systems (Sao, Gupta, & Gantz, 2013). Studies by researchers have shown that the rate of EHR use from the early to mid-2000s until 2010 remained relatively unchanged (Graetz et al., 2014).

In 2007, the Medical Records Institute reported the following reasons for the low adoption of EHR systems by healthcare professionals:

1. Difficulty in changing to an EHR system: 31%
2. Difficulty in building a strong business case: 24%,
3. Difficulty in finding a system not fragmented among vendors or platforms: 19%, and
4. Lack of support by medical staff or partners: 19% (Heselmans et al., 2012).

Despite increased usage of technology in the healthcare industry, paper medical records remained the primary way of documenting patient health information (Gilmer et al., 2012). By 2010, 24.9% of office-based physicians adopted a basic EHR system, according to the National Center for Health Statistics Survey of IT adoption in physician practices. EHR system adoption was strongest among primary care physicians in 2011, of which 29.6% had adopted at least a basic EHR (Gilmer et al., 2012).

In 2006, between 17% and 25% of physicians in ambulatory care reported using an EMR, based on an analysis of 32 studies of EHR use conducted from 1995 to 2005 (Kern et al., 2013). The results of this study also indicated between 13% and 16% of

individual practitioners utilized EHRs and 19% to 57% of large physician offices (20 or more physicians) utilized EHRs. The data from the study did not identify EHR use in hospitals; however, results showed that CPOE systems were in use, in 4% to 21% of hospitals (Kern et al., 2013).

In 2006, the Commonwealth Fund conducted an international survey of primary care physicians in Australia, Canada, Germany, the Netherlands, New Zealand, the United Kingdom, and the United States (Yao, Zhang, Li, Sanseau, & Agarwal, 2011). Results of the survey indicated PCPP in the United States and Canada were far less likely than other countries to use EMRs. The following are percentages of PCPs who use EMR systems:

1. Canada: 23%,
2. United States: 28%,
3. Australian: 79%,
4. United Kingdom: 89%,
5. New Zealand: 92%, and
6. Netherlands: 98% (Yao et al., 2011).

In 2008, the New England Journal of Medicine published results of a nationwide study of 2,758 physicians intended to provide clearer estimates of the adoption rate of EHRs (LeBlanc, Back, Danis, & Abernethy, 2014). In this study, 4% of participating physicians reported using a fully functioning EHR system while 13% reported having a basic EHR system. Physicians in large practices, hospitals, or medical centers, and in the western region were more likely to use an EHR (LeBlanc, Back, Danis, & Abernethy,

2014). The results indicated that, of those who used a fully functioning EHR, the system had a positive effect on

1. Appropriate entry to medical records: 97%,
2. Prescription refills: 95%,
3. Communication with other providers: 92%,
4. Prevention of medical errors: 86%,
5. Value of clinical decisions: 82%, and
6. Communication with patients: 72% (LeBlanc, Back, Danis, & Abernethy, 2014).

Using a qualitative approach, McAlearney, Hefner, Sieck, and Huerta (2015) explored the experiences of administrators and physicians who participated in EHR implementations that had been reputed to be successful. McAlearney, Hefner, Sieck, and Huerta (2015) conducted in-person or telephone interviews with 35 administrative key informants, including (a) organizational leaders and managers, (b) information systems leaders and professionals, and (c) staff. The findings from the study showed three opportunities to facilitate physicians' adoption and utilization of EHR systems in clinical practice: (a) conceptualizing EHR adoption as personal change through a metaphor of loss and grief, (b) framing EHR implementation using an organizational change management model, and (c) mapping these two approaches together to develop 10 deployment strategies for EHR systems. Wilson et al. (2014) determined how ambulatory leaders distinguished implementation approaches between practices that were paper-based medical records and practices with a legacy EHR to a newer system. Twenty-three

practice managers and medical directors from an academic ambulatory care network of a teaching hospital in New York City participated in the five-month study in 2006 (Wilson et al., 2014).

The purpose of this qualitative study was to compare and contrast perceived benefits, challenges with implementing ambulatory EHR system between practice leaders using paper based medical records, and EHR based practices. Based on the findings, paper-based practice leaders prioritized benefits as (a) sufficient workstations and printers to accommodate the use of an EHR system, (b) a physician IT champion at the practice, (c) workflow education to guarantee a flourishing transition to a paperless medical practice, and (d) a high existing comfort level of practitioners and support staff with IT so they can maximize the full use of the EHR system (Wilson et al., 2014). Leaders of EHR based practices prioritized challenges (Wilson et al., 2014) as the following: (a) improved technical training and ongoing technical support, (b) sufficient protection of patient privacy, and (c) open recognition of physician resistance. Shen et al. (2012) examined the use of EHR systems by physicians in Allegheny and Westmoreland counties, in Southwestern Pennsylvania. Shen et al. surveyed 169 physicians to collect data regarding the (a) physician's characteristics and relationship to the EHR system deployment, (b) importance of educational intervention in the EHR system adoption, and (c) physician's perception regarding whether the EHR system contributed to improved quality of patient care, practice productivity, and profitability. Results of the survey indicated a correlation between having an EHR system and the effects of implementation and use on a practice.

The EHR system implementation led to improvements in the quality of patient care and increased practice productivity and profitability (Shen et al., 2012).

Electronic prescribing. A 2011 American Medical Association (AMA) survey of eRx indicated that 22% of physicians used an eRx program. For those who operated an eRx program,

1. 63% used the functionality through an EHR system,
2. 17% used an Internet-based system, and
3. 16% used stand-alone eRx software (Cresswell et al., 2013).

The respondents listed the benefits of eRx as reduced risk of medical errors, efficient workflow for physicians, and abridged refill requests and authorizations (Cresswell et al., 2013).

HIPAA compliance challenges to adoption. White (2007) surveyed 30 hospital executives and IT directors from 54 Maryland acute care facilities to evaluate HIPAA compliance challenges on a 5-point Likert-type scale from 0 (not challenging) to 4 (highly challenging). There were three categories of HIPAA compliance challenge questions in this survey instrument: function, integration, and code of federal regulations (CFR). Selected demographic variables of interest (e.g., age, education level, IT tenure, current employer tenure, hospital size, IT budget, and number of IT full-time employees) also stratified the data. The results from the survey indicated increased age, education level, IT tenure, and current employer tenure resulted in decreased HIPAA compliance challenges. Larger institutions, based on the number of hospital inpatient beds and higher numbers of IT staff, resulted in a statistically significant relationship with lower

compliance challenge ratings. In addition, there were higher challenge ratings with CFR compliance questions as compared to function and integration questions stratified across all demographic variables of interest (White, 2007).

Efforts to Expand the Use of EHRs and HIEs

E-prescribing. The use of eRx rapidly increased (Kan, 2012). Fifty-eight percent of the nonusers (mostly in larger practices) planned to implement an e-prescribing system within the next few years (Westbrook et al., 2012). Incentives, as well as penalties, drove eRx use (Westbrook et al., 2012). For example, in 2008, Center for Medicare & Medicaid (CMS) announced a new incentive program for eRx (Wright et al., 2014). Beginning in 2009, physicians who successfully adopted electronic prescribing (Wright et al., 2014) would be eligible for a bonus of 2% in 2009 and 2010, 1% in 2011, and 0.5% in 2012. Beginning in 2012, providers who did not use eRx would be penalized 1% in 2012, 1.5% in 2013, and 2% in 2014 onward. In this manner, the CMS encouraged providers to utilize eRx software (Wright et al., 2014).

Incentive programs. In September 2008, the Certification Commission for Health Information Technology (Sittig & Singh, 2012) reported since the exceptions to the Stark Law and Anti-Kickback Statute were finalized, more than 40 incentive programs offered by government agencies, insurance plans, employer coalitions, and public-private partnerships and 50 programs representing 115 hospitals were initiated in response to the federal safe-harbor regulations (Sittig & Singh, 2012). The CCHIT estimated that these incentive programs offered more than $703 million to encourage physicians to adopt EHR systems (Sittig & Singh, 2012). Examples of these associations

included the Health Resources and Services Administration, the Hawaii Medical Service Association, the American College of Physicians, Highmark, and the New Mexico Department of Health (Sittig & Singh, 2012) as described in the following paragraphs.

The Health Resources and Services Administration (HRSA) announced $31.4 million in grants in August 2007 to help health centers adopt and implement EHRs and other health IT innovations (Fleurant et al., 2012). This included twenty-five grants totaling $27 million for health centers and networks that linked multiple health centers, and eight grants totaling $1 million to assist health centers planning to adopt EHR and other health IT (Fleurant et al., 2012). HRSA's EHR selection guidelines required that products be CCHIT certified (Fleurant et al., 2012).

The Hawaii Medical Service Association (HMSA), the BlueCross BlueShield plan for Hawaii, established the Initiative for Innovation and Quality, which provided $20 million to purchase EHR systems for physician practices, which covered up to half the cost of an EHR, capped at $20,000 per physician, for approximately 1,000 physicians (Axtell-Thompson, 2012). In addition, $30 million ($10 million annually over 3 years) was made available to acute-care hospitals to fund innovative advancements in patient care and outcomes, which included the use of IT (Axtell-Thompson, 2012). The focus of EHR subsidies from the HMSA was on small and rural practices where adoption rates were low, and all subsidized EHR software must be CCHIT certified (Axtell-Thompson, 2012).

Installation assistance programs. The American College of Physicians' (ACP) EHR Partners Program, launched in 2008, assisted ACP member practicing physicians

purchase and install EHR systems (Diaz & Bubalo, 2014). The purpose of the ACP program is to focus on EHR that achieved 2006 or 2007 certification by CCHIT. The program was a collaborative effort between ACP and eight participating companies with CCHIT certified products: e-MDs, GE Healthcare, Glenwood Systems, iSALUS, InteGreat, McKesson, MedInformatix, and Sage (Diaz & Bubalo, 2014). Highmark, a health insurer serving western Pennsylvania and West Virginia, was offering grants of up to $7,000 per physician or 75% of the cost to acquire, install, and implement an eRx system, or an EHR that integrated with an eRx system (Diaz & Bubalo, 2014). Total subsidies were $29 million, and EHR were required to meet CCHIT functionality standards in order for PCPP to receive pay for performance monetary incentives (Diaz & Bubalo, 2014). The New Mexico Department of Health implemented EHR in all 49 public health offices that provide clinical services, at a cost of $1.3 million. In addition, 122 physicians in 36 communities received $900,000 through a matching grant program to establish EHR in PCPP (Diaz & Bubalo, 2014).

Quality improvement initiatives. Furthermore, the CCHIT reported that several quality improvement initiatives required the utilization of CCHIT certified EHR systems as a component of the EHR Incentive Program (Makam et al., 2013). The Bridges to Excellence quality improvement recognition and rewards program deemed that using a CCHIT certified EHR systems in a PCP qualified as sufficient evidence that the practice used electronic systems to maintain patient records, provide decision support, and enter orders for prescriptions and lab test results. Using a CCHIT, certified EHR systems also

made physicians eligible for a bonus of $50 to $125 per patient per year (Makam et al., 2013).

Centers for Medicare and Medicaid Services (CMS) demonstration program included 12,000 participating practices in 13 states or cities that used CCHIT certified EMRs to meet quality measures (Makam et al., 2013). Physicians received financial incentives and bonuses of up to $58,000 or $290,000 per practice for 5 years (Patel, Jamoom, Hsiao, Furukawa, & Buntin, 2013). CareFirst BlueCross BlueShield initiated a reward system for effectiveness in care practices that awarded points to physician groups for achieving certain measures of quality utilizing a CCHIT certified EHR was one of the 11 qualifying measures; physician groups could earn as much as 7% more than the fee schedule under this program. To promote participation in HIEs, CCHIT launched the EHR Incentive Program in 2008 to certify operational HIEs in 2009. Certified HIEs were required to meet all security requirements and the ability to send and receive HL7 lab result transactions, HL7 lab report documentation, and CCD patient summary document transactions (Makam et al., 2013).

Since the late 1990s, there has been a significant effort to design and implement effective strategies to improve the quality of healthcare (DeVoe, Angier, Burdick, & Gold, 2014). Crucial among these strategies has been the development and use of EHRs and HIEs (Gilmer et al., 2012). By the mid-1990s, four teaching hospitals and the U.S. Departments of Defense and Veterans Affairs were using the precursor to EHRs, which were CDMS systems (Traynor, 2012). Thousands of physicians' offices and hospitals across the nation utilize EHRs (King, Patel, Jamoom, & Furukawa, 2014). However, the

adoption rate has been slow with an estimate only 22% of individual physicians are using EHR (Kruse et al., 2012). Researchers showed the low adoption rate was attributed to the (a) high cost of purchasing, installing, and learning how to use the EHR system; (b) concerns about privacy and security; and (c) the inability to exchange information electronically among different EHR systems (Zhivan & Diana, 2012). From 2008 to 2012, U.S. organizations and federal and state governments made substantial progress towards solving EHR adoption problems, including: (a) amendments to federal fraud statutes to allow for the donation of EHRs by hospitals and health plans to physicians, (b) financial incentives to encourage physicians' use of EHRs and electronic prescribing (e-prescribing or eRx) systems, and (c) processes for certification to ensure EHR meet high standards for use, interoperability, and security (Makam et al., 2014).

By 2011, the CMS had adopted measures to provide incentives for physicians to use eRx for their patients by 2012 (Kan, 2012). As a result, an increased number of PCPP implemented certified eRx systems or EHR, which included eRx functionality, to allow for faster refill of medication by a pharmacist (Kan, 2012). There has also been progress towards the development and implementation of local, regional, and state HIE (eHealth Initiative, 2011). In a 2011 eHealth Initiative survey, there were 117 HIE in various stages of implementation, including 42 operational HIE, and an additional 18 respondents expressed an interest in developing an HIE. The U.S. federal government has been very instrumental in developing a roadmap for the development of HIE, including the concept of personal health records (eHealth Initiative, 2011). Since 2004, the U.S. Department of Health and Human Services has initiated several advisory groups to tackle tough issues

relating to incentives, privacy and security, standards, interoperability, and guiding local and state HIE (eHealth Initiative, 2011). These efforts were instrumental in advancing the adoption of EHR in PCPP (eHealth Initiative, 2011). Technological infrastructure must be in place before the vision of a national HIE that allows the exchange of personal health information in a secure, accurate, and timely manner becomes a reality (Liebovitz, 2013). However, technological advancements were essential steps towards building that necessary infrastructure (Silverman, 2013).

Transition

The goal of this study was to explore primary care physicians' lived experiences regarding potential barriers to the implementation of EHR within PCP. I used a phenomenological approach to describe these experiences. In Section 1 of this study, I introduced the foundation and background for the study related to (a) the problem and purpose statements, (b) nature of study, (c) research question, (d) the conceptual framework, (e) definition of terms, (f) significance of the study, and (g) academic literature review. In Section 2, I address (a) the role of the researcher, (b) the qualitative study method and phenomenological research design, (c) population and sampling used in the study, (d) ethical research, (e) validity and reliability, (f) data collection, and (g) analysis and organization. I conclude Section 3 with the (a) presentation of the findings, (b) applications to professional practice, (c) implications for social change, (d) recommendations for action, (e) recommendation for further study, (f) reflections, and (g) summary and study conclusions.

Section 2: The Project

In Section 2, I discuss the study purpose, methodology, and design to collect, validate, and analyze the data on factors that influence EHR system adoption in PCPs offices. I further described using QSR NVivo®, a computer generated software, to analyze the data for this study from a semistructured interview format. Following the purpose statement and the role of the researcher, I provide details outlining the criteria used to select the 26 participants. Additional areas covered in this section include the research design and method, reliability and validity of this study, and summary of Section 2 and the contents of Section 3.

Purpose Statement

The purpose of this qualitative phenomenological study was to determine why some PCPP were slow to adopt an EHR system despite the potential to increase efficiency and quality of health care. The targeted population comprised of PCPP in the Southwestern region of Ohio who experienced EHR system implementation. The implications for positive social change include the potential to (a) reduce healthcare costs; (b) increase patient access to care; and (c) improve the diagnosis, treatment, and outcome of patient care.

Role of the Researcher

The role of the researcher in a qualitative study is to serve as the primary instrument of data collection (Shields & Rangarjan, 2013). As the research instrument, I collected organized and analyzed data from a purposive sample of PCPPs in the Southwestern Ohio area to whom the problem relates. A primary researcher facilitates

interviews, observes, and engages in sampling, data collection, analysis, and interpretation (Postholm & Skrøvset, 2013). Primary researchers explore participant experiences to identify and interpret common themes, and to provide assurance of negating personal bias through disclosure (Moustakas, 1994). Wisdom, Cavaleri, Onwuegbuzie, and Green (2012) stated the role of a researcher within a study is to collect materials using a variety of means to report on the target phenomenon.

As a previous assistant director of IT at a private 4-year college, I have been involved in implementing various computerized-system development solutions. One of my key responsibilities was to interview different departmental unit directors to assess their technology needs. However, I have never worked in the healthcare sector or used EHR systems. My goal was to explore a gap in business practice regarding factors influencing EHR adoption by PCPP.

I maintained full control of the interview process, and the interviews occurred with honesty and respect to the participants. Abraham (2013) indicated semistructured interviews permit control and flexibility in the data collection process. All participants understood and signed the agreed consent form prior to engagement in any interview process. Cummings, Zagrodney, and Day (2015) noted researchers must ensure participants are fully aware of the risk in participating in a study. According to Vollmer and Howard (2010), protecting research subjects who are not competent of making independent decisions is the purpose of the Belmont Report. To comply with the Belmont Report, I completed the Collaborative Institutional Training Initiative Certification (ID #252892).

Bias can occur in any study and may misrepresent the assessment of information (Roulston, & Shelton, 2015). As the researcher, in an effort to mitigate bias, I set aside my own personal views and judgments. Moustakas (1994) defined epoché as the process of setting aside prejudgments in a research to remove bias. The purpose of epoché is for researchers to set aside prejudices and biases to ensure that the research is *pure* (Bazzano, 2013). Furthermore, Patton (2002) stated epoché is the process by which a researcher takes on a phenomenological attitude to eliminate personal bias. To achieve epoché, researchers must be cognizant of avoiding predeterminations and rely solely on the study's data (Moustakas, 1994). During the course of the interviews, the researcher must remain unbiased to the subject matter. Moreover, participants' experiences and perspectives related to the study were outside my personal experience and did not invoke bias or assumptions.

Qu and Dumay (2011) acknowledged interview questions must be well intended and thought out by the interviewer. I used telephone interviews, as this approach was more suitable for medical professionals due to their schedule-seeing patients. Irvine, Drew, and Sainsbury (2013) stated utilizing the telephone for qualitative data collection was a viable option over face-to-face interviews. Glogowska, Young, and Lockyer (2011) pointed out conducting interviews over the telephone is an increasingly utilized method of collecting data in a variety of research fields. Glogowska, Young, and Lockyer (2011) also stated the use of telephone interviews in healthcare research to elicit views of healthcare services is evident in existing literature. Rhee, Zwar, and Kemp (2012)

collected data from semistructured telephone interviews from 23 participants to understand the role of advance care planning during end of life care.

Participants

A qualitative study required participants with experiences in the subject phenomenon (Yin, 2014). My purposeful sample included 26 PCPPs from the Ohio medical directories who were required to meet each of the following eligibility criteria to serve as participants for the study.

1. Participant practice must be located in Southwestern Ohio,
2. Participant must have been in active medical practice from 2004 to 2015. In 2004, the AHIC met to develop recommendations to promote the nationwide adoption of EHRs, a significant milestone (Epling, Mader, & Morley, 2014),
3. Participant must have implemented a basic EHR and have used the EHR system within their workflow processes for at least 6 months after transition,
4. Participant must have qualified as a small-contract provider (i.e., providers of services with fewer than 25 full-time equivalent employees, or a physician, practitioner, facility or supplier with fewer than 10 full time employees).
5. Participant must have been willing to participate in a telephone interview that required approximately 45 minutes.
6. Participant must have had an interest in the study topic and firsthand experience in the execution of a strategy to implement an EHR system.

Sargeant (2012) stated in a qualitative study to select participants who can best inform the research questions and enhance the understanding of the phenomenon.

Moustakas (1994) suggested in qualitative research, experiences with the phenomenon serve as the basis for the selection of study participants. Patton (2002) indicated the significance of selecting participants based on their ability to provide rich data, making purposive sampling the most useful method of recruitment for a phenomenological study. Participants must be able to provide facets and perspectives regarding a phenomenon in qualitative research (Northrup & Shumway, 2014).

I accessed participant contact information from publically available medical directories: The *Buckeye Community Health Plan Provider Directory* (http://www.bchpohio.com/for-members/find-a-doctor/), *Molina Healthcare 2013 Ohio Provider Directory Southwest Region – ABD* (www.molinahealthcare.com), and *TriHealth Physician Practices Directory* (http://www.trihealth.com/hospitals-and-practices/find-a-trihealth-physician/). McCormack, Adams, and Anderson (2013) viewed online directories as a fertile space for the recruitment of research participants because these database types provide profile information to help select participants who meet the criteria of the study. Ryan (2013) stated online directories are a successful, cost-effective, and efficient method by which to target and recruit participants for qualitative research. Smith, Wilde, and Brasch (2012) noted utilization of the Internet to recruit research participants has become increasingly widespread, particularly for interviews. Potential participants received an informed consent letter via email or U.S. Postal Service introducing the study and inviting them to participate.

Swauger (2011) stated building a working relationship with participants is essential to successful qualitative research. This relationship building process included

purposely connecting with participants, having continuing communication, and reflecting on my responsibility to participants. I was clear about my intentions, principles, and position when established a working relationship with participants. Maintaining ethical principles throughout research process is critical (Gibson et al., 2013). Trainor and Bouchard (2013) described the researcher-participant relationship as reciprocal because each contributes something the other needs or desires in order to shape the researcher's study. Furthermore, Haahr, Norlyk, and Hall (2014) asserted researcher and participant interaction during the interview process influences trust and confidentiality.

I employed an ethic of care approach, which involved intentionally connecting with participants through consistent communication and maintaining principles of my responsibility to the participants. Elmir, Schmied, Jackson, and Wilkes (2011) posited establishing a trusting relationship with research participants to overcome barriers and fear that would prevent honest disclosure is paramount. Swauger (2011) stated qualitative researchers engaged in ethics as process by intentionally, instinctively producing, and preserving relationships with participants. Dickerson-Swift, James, Kippen, and Liamputtong (2007) emphasized qualitative researchers must commence a relationship building process from their first meeting with a participant to build a research relationship that allows the researcher entry into the participant's story.

Research Method and Design

Research Method

I explored the barriers to adoption of EHR systems by PCPPs using a qualitative method and an in-depth analysis of semistructured interview responses. Researchers use

the qualitative method to provide understanding of a social phenomenon (Yang, 2013). The qualitative method was appropriate to address the goals of my study because the process involved isolating and determining the meaning of the participants' experience and perceptions of a phenomenon. The qualitative researcher isolates themselves from the phenomena and tries to put aside knowledge and experiences that might cause biases, assumptions, and obstacles to the unique experiences of the participant (Lascar et al., 2014).

Quantitative researchers explain phenomena by collecting and analyzing numerical data (McCusker & Gunaydin, 2015). According to Jervis and Drake (2014), dependent and independent variables are organized with data collection instruments, so that numerical data can be analyzed using statistical procedures. Additionally, Wagener, Hansen, and Kronberger (2014) described quantitative research as a methodology in which researchers apply statistical and inferential measures to corroborate results. Since I did not seek to test a hypothesis or apply numerical measurements to substantiate data, a quantitative based method was not appropriate for this proposed study.

Mixed methods researchers combine qualitative and quantitative methods to overcome potential limitations of a single research method (Peterson et al., 2013). The mixed methods approach involves philosophical assumptions and the use of qualitative and quantitative approaches (McKim, 2013). Additionally, McCusker and Gunaydin (2015) stated the mixed methods approach is most appropriate for research requiring extensive deep analysis of qualitative data and multivariate analysis of quantitative data. The mixed methods approach was not suitable for this study since I did not seek to

employ a combination of qualitative and quantitative data collection and analysis methods to gain further understanding of my research problem.

Research Design

The five most common qualitative research designs are (a) case study, (b) ethnography, (c) grounded theory, (d) narrative, and (e) phenomenological (Erickson, 2012). The intent of a case study researcher is to explore an in-depth activity, process, or event experienced by research participants during the time of happening (Watson, Wagner, & Rivers, 2013). A case study was not applicable since this study was not restricted to a single experience, as the research involved exploring the lived experiences of PCPP regarding EHR system implementation.

Eika, Dale, Espnes, and Hvalvik (2015) used an ethnographic design to gain in-depth understanding of staff interaction in a long-term care facility. Ethnographical inquiries include narrative interviewing during the data collection process that allow for open-ended discussion involving the researcher and interviewee (Evans, 2012). Moreover, ethnographic researchers explore the culture of an organization or social setting and interact with the participants in their setting (Nelund, 2013). The ethnographic approach was not suitable for my study because I did not explore the culture of PCPP. The purpose of a grounded theory design is to describe a phenomenon in the context within which the phenomenon exists (Dunne, 2011). Foley and Timonen (2015) posited grounded theory researchers are concerned with a systematic set of techniques and procedures that enable researchers to identify concepts and build theory from qualitative data. Whisenhunt et al. (2010) concluded grounded theory allows for the reexamination

of data in order to aid in the formulation of new theories. The emphasis for my study was to understand the lived experiences of primary care providers and individual meaning from the participants' perspectives. I did not use the grounded theory approach in this research study because the data were not for developing one or more theories.

Researchers used the narrative design to process information for the purpose of research through storytelling (Haydon & Riet, 2014). In addition, the purpose of narrative design is to focus on the organization of human knowledge more than merely the collection and processing of data (Chan, Jones, & Wong, 2013). Field notes, interviews, journals, letters, autobiographies, and orally told stories are all techniques of narrative design (Latta & Kim, 2011). The narrative design was not appropriate for my study because I did not elicit stories from participants.

Phenomenological research involves describing and interpreting human lived experiences regarding a particular phenomenon (Applebaum, 2012). Phenomenology is the study of lived experiences by humans within an event (Moustakas, 1994). Procter, Johnson, and Medina (2010) maintained the object of phenomenological research is to explore what people experience and how they see the world. The phenomenological design allows researchers to concentrate on how individuals experience daily life and how their collective world becomes significant to the researchers (Wells, 2013). The goals of phenomenological researchers are to describe human events and to unveil their essential meanings (Englander, 2012). Nolen and Talbert (2011) noted the aim of a phenomenological inquiry was to determine what an experience means from those who have lived the phenomenon, and their ability to provide a comprehensive description of

the experience. Phenomenology leads to the discovery of knowledge from the participants' perspectives, based on their personal understanding of the phenomenon (Hodge, 2013).

A phenomenology design differs from other qualitative designs to collect and analyze data (Henriques, 2014). Researchers using the phenomenological design follow a disciplined and systematic approach to abstain from making prejudgments (i.e., the epoché process) regarding the phenomenon under study (Moustakas, 1994). In the context of phenomenological research, the epoché process requires researchers to put aside their bias and refrain from prejudgments (Rockenbach, Walker, & Luzader, 2012). Investigators must engage in a systematic process to reserve any prejudgment concerning the phenomenon being explored (Moustakas, 1994).

I used the phenomenological design. The purpose of choosing the phenomenological design was to allow PCPPs sufficient time to reflect on individual subjective experiences and interpretations of the world regarding their lived experiences. The phenomenological research design was appropriate for this study to understand multiple perspectives among PCPPs regarding EHR system adoption.

I achieved data saturation with 26 participant interviews. Svensson and Doumas (2013) noted data saturation occurs when the qualitative researcher is no longer seeing new information in the findings. Frels and Onwuegbuzie (2013) stated data saturation is a concept that addressed whether a theory based interview study has an adequate sample to demonstrate content validity. Furthermore, O'Reilly and Parker (2012) posited the

occurrence of redundancy of information or data that provided no additional insights during the data collection signaled data saturation.

Population and Sampling

I used purposeful sampling to solicit participants for this study. Kieft, de Brouwer, Francke, and Delnoij (2010) stated purposive sampling was the most common type of nonprobability sampling method and deemed 2 to 10 participants were sufficient to reach dissemination for a qualitative study. Purposeful sampling contributes to credibility in qualitative phenomenological research (Suri, 2011). Palinkas et al. (2013) used purposeful sampling in qualitative research for the identification and selection of information-rich cases related to the research topic. With purposeful sampling, I was able to identify barriers to EHR system adoption by PCPP through semistructured interviews.

Sharp et al. (2014) suggested the number of participants could range from 5 to 25 depending on the requirements for the research study. Furthermore, Draper and Swift (2011) suggested the number could range between 5 to 25 participants. Moreover, Rowley (2012) opined 5 to 25 individuals with lived experience represented a typical sample size for a qualitative phenomenological study. I utilized 26 participants for this study.

The concept of data saturation pertains to the adequacy of the research sample size being sufficient for the purpose concerned (O'Reilly & Parker, 2012). Svensson and Doumas (2013) stated the moment in data collection when no new or related information materialized is the point of data saturation. Redundancy of information received and the lack of new data presented by the sample is relevant in determining the likelihood of

saturation during data collection (Francis et al., 2010). Thus, the 26 participants in this study were sufficient to generate suitable data to answer the research question and achieve data saturation.

Selected participants must demonstrate the knowledge and experience needed for research and the ability to reflect on the topic under investigation (Moustakas, 1994). The population for this study included all primary care physicians listed in the following public Ohio medical directories: (a) *Buckeye Community Health Plan Provider Directory*, (b) *Molina Healthcare 2013 Ohio Provider Directory Southwest Region – ABD*, and (c) *TriHealth Physician Practices Directory*. The participants for this study consisted of 26 PCPP with EHR implementation experience from a purposive sample of PCPs in Southwestern Ohio. To determine each participant's suitability for this study, I used the following criteria as a guideline for selecting participants: (a) experience of the phenomenon, (b) an intense interest in understanding the nature and meanings of EHR adoption, (c) willingness to participate in a telephone interview, and (d) willingness to allow their data published.

Ethical Research

Moustakas (1994) stated phenomenological researchers are to follow ethical principles in conducting research involving human subjects, and state the scope of the study, the researcher's role, and expectations from the participants. Prospective participants received an informed consent letter via email or U.S. Postal Service that introduced the study's purpose, and asked for voluntary participation. In the informed consent, I explained the following: (a) purpose of the study, (b) institution sponsoring the

study, (c) any anticipated risks, and (e) voluntary nature of the study. Bernard (2013) acknowledged obtaining an informed consent from participants is a core principle of research. Bhattacharya (2014) acknowledged research participants signed an informed consent form prior to any interview or questioning to collect data. Furthermore, Ahern (2012) noted informed consent plays a major function in participants' expectations concerning participation in a study.

Either the participant signed the consent form electronically or by hand signature and sent back to me via email or U.S. Postal Service. After receipt of the returned consent letter, I sent a follow-up email that included a request for available appointment times to conduct each interview. Participants could withdraw from the study at any time, and until the commencement of data analysis, by sending me a request via email. Comprehensive disclosures of all research practices, policies, and information are actions that lead to a trusting atmosphere (MacKenzie et al., 2013; Wisdom et al., 2012). Participants did not receive payment for their participation in this study.

For ethical protection of research participants, I obtained permission from the Walden University Institutional Review Board (IRB) prior to commencing research. Khan et al. (2014) reported IRBs ensure the ethical treatment and protection of all research participants. A researcher's study receives a knowledgeable and thorough review by a committee board to demonstrate sound development and application of ethical standards, validated through approval by the IRB (Nijhawan et al., 2013). My Walden University IRB approval number for this study was 09-26-13-0155441.

I used the numbering format RP1 to RP26 as unique pseudonyms to conceal the identity of the participants. While the results of this study included quotes from the participants' responses, the numbering format ensured and maintained the confidentiality of the PCPs. Baines, Taylor, and Vanclay (2013) suggested the confidentiality of participants is a fundamental guide in ethical research. McDermid, Peters, Jackson, and Daly (2014) stated the use of pseudonyms to hide participants' identities is customary practice in research. Moreover, Bristowe et al. (2015) used pseudonyms on patient and staff identifiable information in a study to explore the experiences of people with end-stage kidney disease. All documentation will remain on an external hard drive in a locked safe for 5 years; I will maintain sole access.

Data Collection Instruments

Researchers are the primary instruments for data collection in qualitative studies (Marbach, 2013). Haahr, Norlyk, and Hall (2014) emphasized researchers must recognize themselves as focal instruments in the research process. Barrett (2007) stated the researcher as the data collection instrument emphasizes the researcher's wisdom, perception, and subjectivity in data collection. I was the primary instrument for data collection during this study.

I used semistructured interview questions to elicit information from the participants (Appendix A). Rowley (2012) posited semistructured interviews allow participants to reflect on personal experiences and freely express individual points of view, personal insights, and ideas. Wilson (2014) noted semistructured interviews are open and allow new ideas to emerge during the interview through how the interviewee

responds to the questions. Moreover, Irvine, Drew, and Sainsbury (2013) stated semistructured interviews are the most effective means of gathering information for qualitative research because of the flexibility in designing and refining the interview guides and in conducting the interviews. By using semistructured interviews, I asked open-ended questions that focused the interview on exploring the barriers to EHR system adoption by PCPP.

The semistructured interview format included open-ended and nonrestrictive questions. Bernard (2013) pointed out using an in-depth list of open-ended, semistructured interview questions provides the researcher with an appropriate instrument for gathering perspectives from participants. According to Bryman (2012), open-ended interview questions provide the best option to collect data that are relevant to a qualitative research question or research problem. Open-ended interview questions enable participants to respond with their insiders' viewpoints with little or no boundaries (Wisdom et al., 2012). Participants had opportunities to provide a complete description of their lived experiences, including perceptions and meaning. Asking open-ended questions ensured that participants had the opportunity to elaborate and expand on their responses.

I conducted telephone interviews with 26 participants queried with thirteen open-ended questions. To guarantee that the participant responses aligned with the research question, I applied the prescribed interview protocol in Appendix B. Åkerlind (2012) acknowledged interview protocols should include the (a) script for pre- and post-interview protocols, (b) interviewer prompts to collect informed consent, and (d) interviewee reminders of the research purpose. Hunter (2012) stated interview protocols

are a set of questions and a procedural guide for directing a new qualitative researcher through the interview process. Leins, Fisher, Pludwinski, Rivard, and Robertson (2014) acknowledged that a good interview protocol is essential for accurate information retrieval from study participants. Wilkinson, Vij, and Steele (2012) conducted a qualitative study to understand the reasons why post donation information error events transpire utilizing telephone interviews. Saada, Lieu, Morain, Zikmund-Fisher, & Wittenberg (2015) conducted telephone interviews with parents of 12- to 36-month-olds and analyzed data using an inductive approach to explore a broad spectrum of parent vaccination behavior. Ball, Hughes, & Leveritt, (2013) used telephone interviews to explore the perceptions of key health professionals relating to the effectiveness of nutrition care provided in the general practice setting. Qualitative telephone interviews are a valuable method of collecting information on sensitive topics (Mealer & Jones, 2014).

I attempted to minimize error in the interpretation of participant meaning by using member checking. Every participant in the study received a summary of my interpretation of the transcribed interview for member checking via email. Member checking ensured the accuracy of data and my interpretation of participants' responses. Member checking or participant feedback improves the reliability of qualitative research and is crucial for establishing validity (Morse, 2015). McConnell-Henry, Chapman, and Francis (2011) suggested using member checking as a final step in validation. The member checking method eliminates the possibility of misconstruing the qualitative data and taking the interviewees' responses out of context (Stack, Sahni, Mallen, & Raza,

2013). By using member checking, I validated the interviewee responses and to assure data validity.

Data Collection Technique

I collected data using an interview protocol (Appendix B). Lewis (2015) defined the interview protocol as a form of qualitative data collection by which the researcher directs the activities of an interview and records information provided by the interviewee. Bernard (2013) stated the interview protocol preparation includes (a) opening with a review of the study purpose, (b) explaining informed consent, (c) over viewing the interview format, (d) clarifying time allotted, and (e) inviting participant questions. Using the interview protocol, afforded me the opportunity to obtain detailed and vivid descriptions of the participants' feelings, thoughts, and experiences. Hunter (2012) acknowledged researchers use interview protocols to outline procedures and methods for conducting interviews. Kalkan, Roback, Hallert, and Carlsson (2014) used interview questions to explore what influences individual rheumatologists decisions when prescribing biological drugs. Hansson Halleröd, Anckarsäter, Råstam, and Hansson Scherman, (2015) conducted a qualitative phenomenological study utilizing interview questions to explore and describe patients' experiences and perceptions of being diagnosed with attention deficit hyperactivity disorder in adulthood. My data collection approach allowed participants the freedom to communicate their views in their own terms and provided reliable, comparable qualitative data. The purpose of the interview question design was to elicit answers focused on the research problem under investigation. Each participant responded to the same interview questions. Participants responded to the same

interview questions allow for meaningful comparison of the interview results (Leeman & Sandelowski, 2012). Moreover, researchers use interview questions to assist in creating dialogue and making the participants feel relaxed when responding (Qu & Dumay, 2011).

I conducted interviews using open-ended questions. The interview allows convenience for participants and is as reliable and accurate as face-to-face (Cloonan, 2012). O'Cathain et al. (2014) suggested interviews are useful when covering a large geographical area and appropriate for use with professionals. Trier-Bieniek (2012) described how interviews could limit the emotional distress experienced by participants because of the comfort afforded by a virtual communication forum.

Glogowska, Young, and Lockyer (2011) stated the disadvantage of a telephone interview technique is the potential difficulties with building rapport when visual cues are lost. Mealer and Jones (2014) identified establishing rapport and connection between researcher and participants are disadvantages associated with telephone interviewing. Doody and Noonan (2013) stated interviews as a method of data collection that seem intrusive to participants and susceptible to bias might be a disadvantage to the interview technique. As the researcher, in an effort to alleviate bias, I set aside my own personal views and judgments.

The telephone interviews began with a formal introduction, followed by a short briefing of the information queried. To ensure participants' responses aligned with the research question, the interviews followed the prescribed interview protocol in Appendix B. The interview process included the recording of all participant responses. The recordings underwent transcription and validation for accuracy. Al-Yateem (2012)

recorded, transcribed, and then analyzed data collected from qualitative telephone interviews for evident themes. Graham, Alderson, and Stokes (2015) listened to tape recorded interviews to check for accuracy of participant responses and ensured the documented responses were a comprehensive account of the interview. Kuckartz (2014) transcribed data obtained from qualitative telephone interviews with audio recordings prior to analysis for validation.

I used member checking to ensure the accurateness and legitimacy of data within participant responses relating to the outcomes and themes of this study. Every participant received a summary of my interpretation of the transcribed interview via email for member checking to ensure credibility. Member checking is a valuable means for assuring the credibility of a study (Lub, 2015). Turner and Coen (2008) stated the purpose of member checking is to function on the supposition that the degree to which members acknowledged their experiences in research products determines the reliability of research claims. Moreover, McConnell-Henry, Chapman, and Francis (2011) affirmed member checking provides research participants a chance to (a) evaluate researcher's interpretations, (b) to correct misinterpretations, and (c) offer additional information that was stimulated through the interview process. Using member checking allowed the research participants to validate interview responses to improve study credibility, reliability, and accuracy.

I uploaded the interview responses into a Microsoft Excel® spreadsheet format and then into QSR NVivo®. Derobertmasure and Robertson (2014) stated increased use of technology in the area of data analysis has given rise to a number of tools to help the

researcher. Bergin (2011) used QSR NVivo® software to support qualitative data analysis through (a) managing and organizing data, (b) managing ideas, (c) querying data, and (d) reporting results from the data. Data analysis involved several mechanisms including: (a) collecting open-ended data, (b) analyzing text, (c) understanding and preparing data for analysis, (d) moving deeper into understanding, and (e) interpreting the data (Perry, Hickson, & Thomas, 2011). I used the QSR NVivo® software to provide a repository of the participants' responses. Themes based on participant responses g emerged by using QSR NVivo® software for data analysis.

Data Organization Technique

To organize the collected data, I used pseudonym coding to match participants' identities with their responses. I arranged the data in digital folders on an external hard drive by participant and interview date. According to Bernard (2013), organizing the collected data involves the following steps: (a) data checking; (b) maintaining, and reviewing a reflective journal throughout the study; (c) entering raw data into qualitative data analysis software; and (d) reviewing researcher notes. Pinfield, Cox, and Smith (2014) recommended data organization techniques entail (a) the design and creation, (b) storage, (c) security, (d) preservation, (e) retrieval, (f) sharing, and (g) ethical considerations of the research data. Korhonen (2014) concluded efficient organization of data enables proper storage of data and analysis for effective communication of the study's findings.

Using codes to represent the identities of the participants served to ensure confidentiality. Deductive disclosure, also known as *internal confidentiality* (Gibson,

Benson, & Brand, 2013), occurs when the traits of individuals or groups make them identifiable in research reports (Leahy et al., 2013). Einwohner (2011) stated qualitative researchers could employ the use of codes to ensure the participants' confidentiality. Bradley, Getrich, and Hannigan (2015) noted that using QSR NVivo® software program enables the development of a codebook to organize data, build narrative summaries, and conduct a cross-case analysis of interview data to address the research questions. The code for each research participant consisted of the letters RP, meaning *Research Participant*, followed by letters and numbers from 1 to 26 ensured the confidentiality of the participant and organizational identities. In addition, organizing data by the research participant number allowed me to access the raw data quickly.

To minimize researcher bias, I kept a study journal to monitor personal reflections and observations that might indicate any personal partiality during the data collection process, or add to the study. Maintaining self-reflective study journals is an approach that can assist in reflexivity (Newington & Metcalfe, 2014). My study journal included (a) speculative notes concerning the outcome of this study, (b) feelings relating to participant's initial response to participating in this study, (c) problems encountered during the data collection and analysis process, and (d) ideas derived from this phenomenological study regarding factors that influence EHR system adoption. Using reflective journals enables qualitative researchers to organize and develop their (a) experiences, (b) opinions, (c) thoughts, and (d) feelings visible and an acknowledged as part of the research (Hickling, 2012). Quimby (2012) affirmed maintaining a self-reflective research journal is a strategy that facilitates *reflexivity*; researchers use their

journal to identify personal assumptions and goals, and clarify individual belief systems and subjectivities. There was no risk of potential conflicts of interest, as I had no business or personal relationship with the participants. The medium for organizing and storing the participants' transcribed responses was via an external hard drive stored in a locked safe for 5 years. After 5 years, I will destroy the data.

Data Analysis

Participants responded to the open-ended questions during a telephone interview (Appendix A). The participants did not have a copy of the questions before the call. The purpose of the open-ended questions was to explore the perceptions of PCPPs regarding potential barriers to implementation of EHR systems. I analyzed the participants' responses to the interview questions using QSR NVivo® software. In addition, I analyzed the interview responses using the methods, procedures, and practices of phenomenological research analysis in conjunction with the modified van Kaam method (Moustakas, 1994). The specific steps were as follows:

1. List and group preliminary data.
2. Reduce and eliminate superfluous data.
3. Cluster and create core themes for the invariant constituents.
4. Identify invariant constituents and themes by application.
5. Validate the data.
6. Construct an individual textural description of the experience.
7. Construct an individual structural description of the experience.

8. Construct a textural-structural description of the meanings and essences of the experiences (Moustakas, 1994).

Forber-Pratt, Aragon, and Espelage (2014) created textural structural descriptions for each transcript by (a) grouping, (b) reducing, (c) clustering, and (d) identifying themes using Moustakas' (1994) modified van Kaam approach. Carter and Baghurst (2014) identified the modified van Kaam method of data analysis process as the following:

1. List and group experiences from participants.
2. Review the transcripts and remove nondescripts words, unclear comments, or irrelevant responses to the experience in question.
3. Cluster the core themes and experiences and begin coding.
4. Identify constituents or reoccurring themes as found from step three.
5. Construct individual textural descriptions base on the responses from the participants and provide an individual summary of experiences by participants.
6. Construct individual structural descriptions base on the previous step, which will result in a summary of experiences for each participant.
7. Construct a textural-structural description, which combine steps five and six (Carter & Baghurst, 2014).

After data collection from the telephone interviews, I commenced the data analysis using the QSR NVivo® software. Each participant had a unique numerical code to differentiate between participants and maintain their confidentiality. I used the QSR NVivo® software to incorporate the interview responses into emerging themes based on

responses given during the interview. Garfield, Hibberd, and Barber (2013) explained that themes emerge by using the QSR NVivo® software for data analysis. Analysis of the results revealed common themes regarding barriers to EHR system implementation. Using the qualitative phenomenological approach provided me with the opportunity to understand PCPPs' ideas and perceptions directly from their lived experience.

Coding and Themes

I conducted interviews to capture participants' responses, transcribed these responses, and entered the responses into the software QSR NVivo® for coding and analysis. A key feature of QSR NVivo® software was the capability to guarantee coding was dependable consistent throughout the analytical process. I used codes that discretely identified the 26-interviewed research participants by a letter pair (RP) and a number (1 through 26). The purpose of coding the participants was to assist me in locating, understanding, and interpreting interview responses. Coding is the primary source used to organize and analyze data (Raaijmakers et al., 2013). The purpose for utilizing coding in this research study was to identify and manage themes.

I utilized the results from the data analysis from the participant interviews (Appendix A) to address the research question. The results from the interview may provide understanding into the respondents' thoughts and ideas regarding the factors that influenced adoption of EHR (Pemberton & Fox, 2013). The participant's responses from the telephone interview provided themes for the various barriers faced by PCPPs. I included these recommendations in Section 3 of this study. The findings from this study could contribute to a gap in business practice concerning EHR system implementation in

the healthcare industry, and assist healthcare providers who are reluctant to adopt EHR systems.

Relation of Data Themes to Conceptual Framework

I used CAS as the conceptual framework for this study. Borrego, Foster, and Froyd (2014) stated a conceptual framework connects literature, methodology, and results of the study. I used the CAS theory to assist me in interpreting the meaning of data collected. Anderson et al. (2013) posited CAS theory is a valuable tool to understand natural phenomena. Nan, Zmud, and Yetgin (2014) recommended applying CAS principles to the health care industry because of the unpredictable nature of policy development and implementing changes within health care delivery systems. Romero and Ruiz (2013) suggested CAS requires individual agents to adjust to the actions of other agents, interact with each other, and adapt to the environment, thus creating a united system pattern. I used the CAS theory to construct themes as a means to conceptualize thoughts and ideas from PCPP regarding barriers to implementing an EHR system. My interview data related to the CAS theory because of the emergence of complex themes regarding EHR system barriers generated from the semistructured interview responses by the participants. Identification of the emergent themes helped answer the overarching research question and provided exploratory information on the common factors that can affect the slow adoption of EHR system by PCPP.

Reliability and Validity

Houghton, Casey, Shaw, and Murphy (2013) acknowledged establishing data validity and reliability is essential in qualitative analysis. Morse (2015) stated when

designing, analyzing, and judging the quality of a study, qualitative researchers should address validity and reliability. Qualitative researchers conceptualize the concepts of reliability and validity in research as trustworthiness, rigor, and quality (Titze, Schenck, Logoz, & Lehmkuhl, 2014).

Reliability

Reliability is the trustworthiness of the research procedure and data (Rydwik, Bergland, Forsén, & Frändin, 2012). I used member checking to address reliability. Harper and Cole (2012) stated member checking enables researchers to verify the accuracy and completeness of the interview findings, contributing to the reliability of a study. Member checking is a candid review of the participants' responses to confirm the researcher has understood the *meaning* of the individual responses of the interview questions (Marshall & Rossman, 2011; Yin, 2014). A researcher ensures reliability and dependability through qualitative measures such as copious documentation of processes, procedures, and protocol and by use of member checking of data interpretation (Frels & Onwuegbuzie, 2013; Marshall & Rossman, 2011; Thomas & Magilvy, 2011).

Moustakas (1994) stated in qualitative research studies, the systematic compilation of data could address reliability. To assure the participants' responses aligned with the research question, I followed the prescribed interview protocol located in Appendix B. Carlson, Johnston, Westra, and Nichols (2013) defined an interview protocol as an interview worksheet, containing a series of questions for interviewee response during the interview, and defined an *interviewer's manual*, as containing a scheduled follow up for member checking. De Ceunynck, Kusumastuti, Hannes,

Janssens, and Wets (2013) stated an interview protocol is a guide for the researcher to complete the interview procedure and includes the interview type, format, and objective. Patel, Shah, and Shallcross (2015) stated interview protocols are instructions interviewers follow to ensure consistency between interviews, which increases the reliability of the study findings.

Dependability. The dependability of a qualitative research study relies on the ability of other researchers to *duplicate* the research study (Baxter, Enderby, Evans, & Judge, 2012). Onwugbuzie and Byers (2014) established dependability through mitigating bias and ensuring the integrity of research data. To ensure dependability, researchers should provide a detailed explanation of the selected design, research process, and included instruments for data collection and analysis. For this study, I clearly articulated and justified the selected design and method. Moreover, I provided a rich description of the process and instruments utilized to collect, organize, and analyze participants' experiences. Demonstrating a study's dependability is achieved through a systematic description of the process for data collection that will enable other researchers to replicate the study in another setting (Moustakas, 1994). For dependability, I detailed each step of the data collection process to allow for possible replication.

Validity

Validity in a phenomenological study occurs when researchers obtain meaningful generalizations from data regarding a sample or population (Sousa, 2014). Validity is the determination of whether the findings are truthful from the standpoint of the researcher, the participant, or the readers of an account (Baxter et al., 2012). For a phenomenological

design, validity of the data includes the truthfulness, honesty, and accuracy of the research participants as they share their perceptions and lived experiences (Sousa, 2014). Validity is a key requirement of qualitative research findings (Lub, 2015). Furthermore, Lub asserted validity occurs by determining whether the findings from the study are accurate from the standpoint of the scholarly researcher, participants, or the readers. Oleinik, Popova, Kirdina, and Shatalova (2014) noted validation of qualitative research occurs with the genuine accuracy of participant feedback. Lincoln and Guba (1985) stated the participant feedback, known as member checking, is a strategy for determining validity in qualitative research.

Creditability. I utilized member checking to assure my interview interpretation summation portrayed lived experiences accurately and to enhance credibility. Member checking is a quality control procedure that allows researchers to improve the credibility of the data collected during interviews thereby increasing the validity of the study (Harper & Cole, 2012). Using member checking enables research participant validation of the completeness and accurate interpretation (reported as categories and themes) of participants' experiences as captured by the researcher (Harper & Cole, 2012; Marshall & Rossman, 2011; Thomas & Magilvy, 2011). Cope (2014) stated credibility is the truth of the research data or the participant views and the interpretation and representation of data by the researcher. Lub (2015) stated to ensure validity (credibility); researchers must communicate directly with participants too accurately capture participants' perspectives and experiences regarding the phenomenon. Qualitative researchers establish credibility by providing a summary of interview findings for member checking to the participants

(Dunn, 2012). Cho (2006) confirmed member checking is a crucial technique for establishing credibility. Each participant in the study received a summary of my interpretation of the transcribed interview for member checking. Member checking ensured the accuracy of data and my interpretation of participants' responses.

Transferability. Qualitative researchers have defined transferability as study findings that are applicable to other settings or groups (Cope, 2014). MacNaughton, Chreim, and Bourgeault (2013) posited contextual descriptions facilitate the transferability of research findings to other settings with similar context. Houghton, Casey, Shaw, and Murphy (2013) stated to determine transferability; readers make judgments based on the original context of the research. Transferability denotes the transparency of the researcher with transferring the collected research data in a thick description that enables the readers to understand the context of the study (Alex da, Näslund, & Jasmand, 2012). To ensure transferability of this study, I provided rich descriptions of my research process and findings in Sections 2 and 3. The research process included purposeful sampling and a detailed outline of the research assumptions, limitations, and delimitations, and provided sufficient context for determining transferability of this study by other researchers.

Confirmability. Confirmability is the researcher's ability to demonstrate that the data represent the participants' responses and not the researcher's biases or viewpoints (Cope, 2014). Houghton, Casey, Shaw, and Murphy (2013) suggested researchers must ensure a level of confirmability to assure research rigor. Furthermore, Watkins (2012) stated *reflexivity* adds to confirmability of qualitative research results. Black, Palombaro,

and Dole (2013) stated reflexivity is the practice of making personal biases and roles known through a self-reflective journal, which contributes to confirmability. Morrow (2005) recommended using a self-reflective journal to obtain reflexivity for confirmability. Anney (2014) suggested using a self-reflective journal to establish confirmability. Reflexive journaling should commence at the outset of the study and allow the researcher to monitor, as well as disclose biases and record decisions made relevant to the methodology (Hietanen, Sihvonen, Tikkanen, & Mattila, 2014; Lincoln & Guba, 1985). I ensured confirmability by maintaining a self-reflective journal to assist in reflexivity and minimize personal bias. Confirmability occurs by developing and maintaining a chain of evidence that aligns data collection and analysis to the result (Andrade, 2009). Andrade indicated qualitative research is credible using the perspective of the participants and member checking.

Data saturation. Walker (2012) defined data saturation as the point where the data become redundant. Higginbottom, Rivers, and Story (2014) indicated a researcher achieves data saturation when interviews with research participants do not yield new themes. Moreover, Bristowe et al. (2014) noted qualitative researchers can n cease interviewing additional participants when further interviews no longer provide new information on the research topic. Data saturation occurred after interviewing twenty-six participants as responses provided recurring themes and no additional patterns emerged.

Transition and Summary

The purpose of this qualitative phenomenological study was to gather data from PCPPs in the Southwestern Ohio area who described factors that could influence slow

adoption of EHR systems. I used a modified van Kaam method (Moustakas, 1994) to analyze data from responses to open-ended questions using a semistructured format. My literature review provided the rationale for the methodology and data themes. In Section 3, I address the (a) presentation of the findings, (b) applications to professional practice, (c) implications for social change, (d) recommendations for action, (e) recommendation for further study, (f) reflections, and (g) summary and study conclusions.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative phenomenological study was to explore why PPCPs were slow to adopt EHR systems. I concluded staff time for training on the new EHR system played a major role in the PCPP barriers to adopt the EHR system. Significant factors PCPPs revealed as barriers to EHR system adoption were (a) decreased productivity during implementation and training, (b) staff or provider resistance, (c) cost of purchasing and implementing the EHR, (d) technical issues, (e) selecting the right EHR system, and (f) planning for maintenance and support once the EHR system implementation occurred. The findings from this study may contribute to overcoming the gap in business practice regarding factors affecting EHR system implementation.

Presentation of the Findings

The central research question was: Why are primary care physicians slow to adopt EHRs? Participants' described their background and implementation experience with EHRs. Nine providers (34.6%) chose to adopt a system for their practice to improve efficiency, communication with other providers, and/or the quality of patient care. Seven participants (27%) were motivated by the federal requirement to adopt EHR by 2015, and the monetary EHR meaningful-use incentive.

Participants' characterized their overall EHR experiences as positive, negative, or mixed. Of the 26 participants:

- Sixteen (61.5%) described their experience in positive terms. According to a 2013 National Ambulatory Medical Care Survey (NAMCS) of office-based providers, 85% of the PCPP surveyed indicated they were either very satisfied or somewhat satisfied with their EHR (King, Patel, Jamoom, and Furukawa, 2014).
- Six (23%) had mixed descriptions, with the positive and negative aspects being roughly equal, and/or implementation being too recent to state definitively whether the EHR system worked well for the participants. Noblin et al. (2013) found EHR systems had positive and negative effects on physician professional satisfaction.
- Four (15%) described their overall experience with EHR as having a net negative effect on the practice/and or the office's productivity. Hawley, Janamian, Jackson, and Wilkinson (2014) posited EHR use had a negative influence on communication within the physician's office.

Most of the participants with primarily positive experiences described EHR in terms of making their work easier, specifically, increasing efficiency and productivity, and enabling easier access to patient charts. Hsiao et al. (2013) stated EHR system adoption benefits included operational improvements through (a) facilitated entry to patient medical information, (b) cost avoidance, (c) increased medical charting documentation accuracy, and (d) execution of evidence-based practices.

Participants who fell into the category of having mixed experiences stated faster, easier access to patient files. However, the positive effects were more than offset by

problems such as data documentation errors, system usability issues, less patient interaction, EHR requiring more of doctors' time, and (with the exception of RP17) an overall *decrease* in productivity and cost-effectiveness due to EHR. Shea et al., (2014) identified (a) poor usability, (b) time-consuming data entry, (c) interference with face-to-face patient care, (d) inefficient and less fulfilling work content, (e) inability to exchange health information, and (f) degradation of clinical documentation as PCPP negative effects of EHR system adoption.

Four participants (15%) described their negative experiences regarding EHR adoption as relating to system usability issues leading to decreased productivity and cost-effectiveness. System usability issues included implementation of an EHR system that was not a good fit for the needs of the specific practice. Participants reported EHR training documentation was either superfluous or did not have the type of information necessary for the participants' practice. In addition, participants required efficient charting or data entry procedures in the training documentation to ensure proper usability of the EHR system. Commonalities among the four participants (15%) reporting negative perceptions of the EHR system adoption included leadership pressure to avoid fines, and to take advantage of the meaningful-use incentives while available. Moreover, the four participants (15%) expressed that the U.S. federal government should provide more incentives rather than penalties for noncompliance to install an EHR system within a PCP. With one exception, RP25, those who described their experiences as positive and negative, adopted EHR due to compliance mandates or meaningful use requirements. The results from the four participant (15%) interview responses suggested that a perception of

forced adoption of EHR, as opposed to a voluntary, eager approach, influenced implementation perceptions.

Theme 1: Training

One of the most common barriers to EHR implementation was training staff on the new EHR systems. Otto and Nevo (2013) claimed obstacles such as inefficient training and support have contributed to the low adoption rate of EHR by physicians. The results revealed the following barriers:

- Eleven participants (42%) stated barriers were staff time for training on the new system and the learning curve for participants.
- Five participants (19%) stated barriers included providers or staff lacking computer skills.
- Two participants (8%) stated barriers consisted of inadequate training.

Other concerns expressed as barriers included doctors who lack computer skills, staff time taken away from work for training, inadequate training time to learn the amount of information to use the new system, and managing patients while training takes place. Provision of adequate training, including continued training for staff, was a key strategy for a positive experience of several participants. Continuing HIT training is essential to help physicians attain mastery and a sense of control within the EHR environment (Bredfeldt, Award, Joseph, & Snyder, 2013). The results revealed the following strategies to address the training implementation barriers:

1. Adequate training to meet staff needs (six participants, 23%),

2. Users with extensive training who could consult and help train other staff (three participants, 12%), and
3. Self-training on the EHR through practice, trial, and error (three participants, 12%).

The participants' testimonials included

> Training staff. Learning the system took a while for the learning curve. I also saw the doctors struggling and still struggling. We were told data entry would be better that the doctors would put their own orders in however, I still see nurses having to put orders in for the doctors. (RP1)
>
> There was a lot of information presented at one time. I had two eight-hour sessions in a computer lab. The training seems very long and drawn out. Among just learning how to use an electronic record as a physician, I had other functions as well. (RP9)

"The process was not well done, as the training we received was slightly more beneficial than useless" (RP14). "What I did was ask someone who had used the system at another facility before the system came to our company and that seemed to help a lot" (RP16). "Additional basic computer training provided for those staff members who required training" (RP20).

Theme 2: Decrease in Productivity during the Implementation and Training

Related to training issues, although the range of time and frustration experienced due to the initial decrease varied widely participants described the decrease in productivity experienced by PCPs as the staff and providers adapt to new EHR systems

as *costly and frustrating*. The success of an EHR system implementation rests on the training of the staff that will be using the system (Noblin et al., 2013). The results revealed that 19% of participants insisted implementation and training would cause an initial decrease in productivity. One experienced EHR participant consulted with other practices implementing EHR, and pointed out that productivity should return to pre-implementation levels within 4 weeks after adoption. However, several participants described a general decrease in productivity lasting much longer; two participants revealed a lack of complete adoption after 1 year.

Strategies for addressing the initial decrease in productivity were limited; several practices temporarily adjusted staff workflow, patient volume, and processes for patient care. Fleming et al. (2014) acknowledged one strategy for dealing with productivity loss is to rely on support staff to perform EHR related tasks. Slightly less than 5% participants adjusted staff workflow to accommodate training. Two participants (8%) suggested implementing an EHR transition in phrases, rather than launching the entire system at once, could ease the continuity of productivity. The participants' testimonials are as follows: "Awful, the data entry was time consuming and only as good as staff putting data into the system. Was seeing twenty-five patients a day on paper but could only see three a day first week on EMR" (RP10). "Initial decrease in-patients visits" (RP18). "Initially, implementation and training of the EHR system has slowed down how quickly we can treat patients. Over the long haul, there will be slowdowns because of staff turnover for training" (RP22).

Theme 3: Staff or Provider Resistance to the EHR System

Staff or provider resistance to EHR implementation was a common barrier, stemming from concerns about cost, productivity, and/or general resistance to change. The results revealed 11(42%) participants identified staff or provider resistance was a barrier. The most common strategy for addressing resistance was education of staff and/or providers on the benefits of EHR, including improved efficiency and higher quality patient care. The implementation of EHR systems depends on frontline staff (Moxham et al., 2012). Four participants (15%) affirmed educating resistant staff about the benefits of the EHR system might ease staff resistance to implementation. RP3 described a *soft* approach in which the staff took the initiative to seek information on the benefits of EHR systems and incentives for adoption to convince the practice owners to adopt a system. The participants' testimonials are as follows: "Many providers state they lack of computer skills/experience. Physicians may require additional time and skills to learn typing" (RP5). "Tendency of the staff to be reluctant to learn and implement the EMR" (RP7).

Theme 4: Cost of Purchasing and Implementing EHR System

A primary concern among participants' practices was the cost of purchasing and implementing EHR system and when, and if, that cost would be offset by increased productivity. Physicians are slow to adopt EHRs due to high cost of system implementation (Shen et al., 2012). Ten participants (39%) identified concerns regarding the cost of purchasing and implementing the EHR system. Meaningful-use incentives, along with the eventual mandate to adopt EHR for federal and insurance reimbursement,

were a deciding factor for several practices that made the decision to take advantage of the incentive. One practice secured a business loan to purchase the system, and the hospital purchased the system that two (8%) other participants' practice operates. A cost-benefit analysis convinced another practice that EHR would prove worth the investment. The participants' testimonials were as follows: "Cost that would be shouldered (in any amount) by the practice, thereby cutting profits was out of the question" (RP3). "The systems are very expensive and also the initial investment in the infrastructure" (RP7).

Theme 5: Selecting the Right EHR System

Two participants (8%) cited that selecting the best-suited EHR system for the practice was an overwhelming task. Selecting the right certified EHR system is an essential step in successful implementation and meaningful use (Tevaarwerk et. al, 2014). Describing the experience of selecting the most suitable EHR system for their practices, two participants (8%) discussed ease of use, type of information recorded, adherence to HIPPA guidelines, and meeting the criteria for meaningful use as specific concerns in EHR selection. Another two participants (8%) noted meeting federal regulatory requirements such as HIPAA and meaningful use were concerns. Strategic processes for addressing this barrier included identifying practice needs and matching those to different EHR systems (one participant [4%], also researched different EHR systems), consulting with other similar practices already using EHR systems, and consulting with IT experts to ensure that infrastructure was adequate to handle the selected system. The EHR consultant provided responsiveness and expertise as key elements to success for choosing and implementing the best system. The participants' testimonials are as follows: "Finding

the right system establishing and adhering to HIPAA guidelines with connectivity to other vendors and hospital systems" (RP18). "Not knowing which systems to choose not being educated enough in general about EHR and the process to get started" (RP25).

Theme 6: Technical Issues/Usability

Duftschmid, Chaloupka, and Rinner (2013) claimed *usability* was one of the key issues hampering widespread adoption of EHRs, with usability-related issues falling into three specific categories: (a) system glitches or bugs during implementation, (b) selecting a system that was not well suited for the needs of the specific practice, and (c) system failures preventing access to patient records. The study results revealed three (12%) participants considered technical issues and system failures contributed to barriers for EHR implementation and three (12%) participants noted the usability issue of EHR interfaces not meeting the needs of the practice. Additionally, two (8%) participants insisted that selecting the most suitable EHR system for the practice was a barrier to EHR implementation. Furthermore, one (4%) participant asserted that lack of adequate infrastructure to handle the EHR system contributed to the barriers for EHR implementation.

For those participants experiencing system bugs, strategies included finding workarounds to avoid system barriers, or simply waiting while the IT team fixed the issues. Wang et al. (2014) posited PCPP might find it useful to hire local IT staff, at least on an on-call basis, to provide assistance with infrastructure problems. The results revealed that three (12%) participants stated they learned shortcuts or developed workarounds to overcome system limitations to avoid system barriers. Some participants

whose systems did not work well within their practices developed customized templates or processes specific to their needs, adapting to the system. Several other participants did not use any particular strategy to address the problem, feeling *trapped* with the system, describing ongoing issues with productivity because of cumbersome data entry, and using paper charts as well as the EHR.

Those mentioning system crashes described not having access to patient records until the system was repaired. Only one participant noted that a process at was in place in the practice to access backup records in case of system crashes. The participants' testimonials are as follows:

> My employer is a very large health system and attempted to convert the entire organization both inpatient and outpatient at the same time. This means several thousand people went live in two phases. As expected, there were quite a few glitches. There were tons of flaws and overlooked items due to the rush to get the EHR system started for meaningful-use purposes. (RP14)
>
> Time to develop efficient charting and care delivery tools is a major barrier. Everyone is reinventing the wheel regarding developing efficient charting and care delivery tools . . . So many of the tools are developed by IT people only and not the end user. (RP19)

Theme 7: Planning for Maintenance and Support after Adoption of EHR

The cost and down time associated with frequent upgrades, optimization, and maintenance of EHR systems were concerns of seven participants (27%). PCPP that had yet to adopt EHRs cited financial reason as barriers to adoption (Ben-Assuli, Shabtai, &

Leshno, 2013). PCPP stated high start-up costs and on-going maintenance were the reasons for the delay in the adoption of the EHR system (Ben-Assuli et al., 2013). Frequent, costly upgrades and retraining were concerns to seven participants (27%). Creating processes to smooth the workflow while conducting system upgrades and employing additional were strategies for addressing these concerns. The participants' testimonials are as follows: "Who would make sure the system was up to date and would meet meaningful-use requirements" (RP11), and "constantly changing software and coding updates" (RP18).

Findings Tied to Conceptual Framework

The research findings were consistent with the significance of the study and related to the CAS theory. The CAS theory is a framework that assists researchers to reflect on the nature of quality improvement programs in primary care organizations (Sturmberg, Martin, & Katerndahl, 2014). Applying CAS theory helps explain responses and behaviors resulting from the change instigated by the introduction of a policy (Edson, 2012). Lanham, Leykum, and McDaniel (2012) considered health care providers to be an ideal setting for the use of complexity science due to the diversity of organizational functions and collaboration among the organization that was evolving. Paina and Peters (2012) viewed health care organization through the lens of the CAS theory identifying nonlinear, dynamic organizations composed of independent and intelligent agents with no single point of control.

The participants described barriers faced during the integration of EHR technology into their practices. Edson (2012) defined CAS theory as agents (people) who

explore, experiment, self-organize, learn, and adapt to changes in the environment. The participants in this study represented agents as described in the CAS. Martin et al. (2012) stated that the purpose of the CAS theory is to cultivate an environment of (a) listening to individuals, (b) enhancing relationships amongst agents, and (c) developing emerging ideas by creating small nonthreatening changes that attract people. Mittal (2013) used CAS theory to describe the complexity of natural systems, which emerge from the interaction of multiple agents.

The primary care environment consists of multiple agents that exert a demand for access to a patient's records, patients' demand for EHRs, and payers' source demand for EHRs bill processing (Green, Dasso, Ho, and Genaidy, 2014). Internal mechanisms are communal health networks, internal technology, and technology diffusion mechanisms such as staff technology skills, knowledge, and the staff's ability to learn and adapt to systems and the environment (Leykum et al., 2011). Multiple agents include physicians, patients, insurance providers, third party payers, and other health information network exchanges (Jordon, Lanham, Anderson, & McDaniel, 2010). Drawing from CAS theory, participants may encourage other PCPs to adopt a variety of solutions, experimenting with and evolving their EHR adoption strategies according to individual practice requirements.

All themes that emerged in my study played a crucial role in understanding the research phenomenon and addressed the central research question. Each theme identified required agent interaction based on the CAS theory between (a) PCPP, (b) EHR vendors, and (c) office staff to overcome the barriers for successful EHR adoption. Understanding

EHRs implementation barriers through CAS can produce an opportunity to reduce EMR system problems.

Findings Tied to Existing Literature on Business Practice

Ben-Zion, Pliskin, and Fink (2014) noted there is limited research on information technology adoption in the healthcare industry in general and on EHR systems in particular. Jamoom, Patel, Furukawa, and King (2014) and Xierali, Phillips, et al. (2013) identified three barriers to implementation of EHR: (a) financial barriers, (b) concerns about privacy and security, and (c) challenges in exchanging data electronically. Research on information system implementation existed; however, limited research existed that focused on PCPP lived experience regarding EHR implementation.

The first barrier revealed in the study findings was staff training. Ser, Robertson, and Sheikh (2014) suggested training and support from vendors was an obstacle to the adoption of EHR by physicians. In addition, Watson, Bennett, and Al-Harbi (2014) suggested lack of adequate staff training serves as a barrier for primary care practice use of HIT. Training is a vital part of the implementation process to ensure primary care office staff is comfortable using a new EHR system (Fiks et al., 2015). Participants suggested ongoing training is imperative to ensure a smooth transition to EHRs.

The second barrier revealed was the decrease in office productivity during the implementation and training influenced EHR adoption. Kumar, Bhatia, and Chiang (2013) posited loss of productivity was a concern for physicians switching from paper to electronic medical records. Murray et al. (2013) suggested investment in required initial training for all staff employees to avoid (a) adverse influences on workflow, (b) costly

setbacks, and (c) productivity losses. Moreover, Sinard, Castellani, Wilkerson, and Henricks (2015) stated barriers to EHR adoption, credited to complex workflows that exist in PCPPs' offices, led to nonstandardized workflow structures and practices for office management. Participants recommended adjusting staff workflow as a strategy to address productivity loss.

The third barrier was staff or provider resistance to EHR implementation. Healthcare researchers have found that physician resistance was a hurdle in the adoption of a new EHR system when switching from a paper-based practice (Wilson et al., 2014). According to Keenan et al. (2012), resistance among both clinical and administrative staff often prevents healthcare organizations from fully realizing the benefits of EHR. Furthermore, Dillanhun-Aspillaga et al. (2014) posited identifying the root of resistance was a useful first step toward addressing staff member fears or misperceptions regarding EHR adoption. Findings from this study suggested educating staff about the advantages of EHR might ease resistance to EHR implementation.

The fourth barrier was the cost of purchasing and implementing the EHR. Financial barriers to EHRs include the acquisition of EMR software, training, and the cost of adapting office workflow to new technologies (Friedman, Parrish, & Ross, 2013). Jamoom, Patel, Furukawa, and King (2014) and Xierali, Phillips, et al. (2013) stated physicians' perceptions during post implementation were that EHR systems were difficult to use and too costly to adopt. The availability of federal meaningful use incentives to help purchase and implement EHR systems was cited as the primary incentive by 7 (27%) participants, while 6 (23%) additional participants were motivated by the 2015

mandate to adopt EHR for reimbursement. One (4%) participant utilized an academic grant to assist in purchasing the EHR system.

The fifth barrier participants cited was identifying the right EHR system for their primary care office. Tevaarwerk et al. (2014) stated choosing the right EHR system is fundamental to a flourishing implementation. Thirukumaran, Dolan, Webster, Panzer, and Friedman (2015) noted the medical practice objectives and office workflow helped leaders choose the correct EHR system. Selecting the right certified EHR system is a critical step towards successful implementation and meaningful use (Green et al., 2015). Participants suggested identifying practice needs and matching those to different EHR systems as a strategic process to address this obstacle. Ensuring that the EHR system selected is the *best fit* for the PCPP was advised by 9 (35%) of the 26 participants, several of whom felt they had chosen the wrong system and, as a result, suffered negative effects on their practice.

The sixth barrier reported was technical and usability concerns. Singh, Ash, and Sittig (2013) confirmed clinicians' concerns about technically supporting a system and the clinicians' ability to use the new system is top implementation barriers physician mention. Duftschmid, Chaloupka, and Rinner (2013) stated EHR usability problems caused physicians additional time to learn how to use the system effectively. Green et al. (2015) pointed out challenges receiving technical and usability support for the EHR system from the vendor contributed to slow adoption by physicians. Participants expressed that workaround development may serve as a strategy to address technical and usability issues within EHRs.

The final theme regarding participants' barriers to EHR implementation was maintenance and support planning. Biruk, Yilma, Andualem, & Tilahum (2014) posited physicians had justifiable concerns regarding stability of EHR vendors and adequate support after implementation. Darking et al. (2014) cited post implementation support were limited, and organizations would benefit from a lengthy post *go-live* period in which hands-on support is available from EHR vendors. Alder-Milstein et al. (2013) found outside consultant or vendor training and customer service support assisted PCPs with adopting fully integrated and functional EHR systems. The short supply and cost of EHR system experts can also serve as an obstacle (Alder-Milstein, 2013). Green et al. (2015) stated maintaining EHR technology required ongoing expert technical support beyond implementation to address upgrades and security needs. Participants in this study stated the accessibility of technical and training support after the initial system completion was fundamental to successful EHR adoption.

Applications to Professional Practice

All participants in this study agreed that (a) training, (b) decreased productivity during implementation and training, (c) staff or provider resistance, (d) cost of purchasing and implementing an EHR, (e) technical and usability issues, (f) selecting the right EHR system, and (g) planning for maintenance and support contributed to barriers of EHR adoption. The findings from this study may contribute to the body of knowledge regarding business practice concerning EHR system implementation in the healthcare industry, and assist healthcare providers who are reluctant to adopt EHRs. Study participants were located in Southwestern Ohio. However, the results may be applicable

to other health care providers considering EHR adoption. Additionally, the findings may assist any organization that is adopting a new information technology system to improve the efficiency of the organization. The emergent themes from this study may provide insights into reducing barriers to EHRsystem implementation.

The factors concerning barriers to EHR system adoption included in the emerging themes of this study may assist healthcare providers to (a) reduce healthcare costs, (b) increase patient access to care, and (c) improve the diagnosis, treatment, and outcomes of patient care. From an economic standpoint, PCPs view EHR as a solution to enhance effectiveness and thereby reduce health care costs (Wang et al., 2014). Previous health care researchers confirmed that the adoption of EHR systems might produce cost savings in a variety of areas including documentation, clinical, billing, customer service, and laboratory and radiology order entry expenses (King, Patel, Jamoon, & Furukawa, 2014). PCPs could use the findings to create implementation strategies that facilitate, and increase the rate of, EHR system adoption.

Implications for Social Change

Knowledge obtained from exploring barriers to EHR system adoption might assist PCPP with implementing EHR to enhance patient quality, safety, and efficiency of healthcare. Makam et al. (2014) recommend EHR system as a required component for improving the effectiveness and value of health care in the United States. Improving physician awareness of the factors that can affect the implementation of electronic health care systems may improve productivity, quality of service, and patient care (Ben-Zion, Pliskin, & Fink, 2014). According to Silverman (2013), widespread use of EHR systems

may significantly improve health care delivery within (a) inpatient, (b) outpatient, (c) community settings, and (d) through the development of personal health records; all applications would facilitate patient-centered care.

The adoption of EHR systems by PCPP might contribute to society by enhancing medical interaction among healthcare professionals and patients. PCPP who adopt an EHR system could enhance patient care by accessing patient medical records remotely to make quicker decisions regarding medical diagnosis and treatment, and share patient information with other clinical providers. Liebovitz (2013) added EHR systems could help medical providers make efficient, effective decisions regarding patient care through (a) improved aggregation, (b) analysis, and (c) communication of patient information. Patients may be able to (a) communicate electronically with healthcare providers, (b) submit prescription renewals, (c) retrieve health management information, and (d) review and track health summary information and test results, allowing for enhanced decision making regarding treatment.

Recommendations for Action

Findings from this study yielded several findings regarding perspectives of PCPP who have EHR system implementation experience. The findings from this study may assist PCPPs' developing and deploying improved strategies to overcome the barriers to EHR system implementation. Based on the study findings, I recommend the following actions for PCPPs:

1. Identify current workflow processes and redesign office processes concurrently with EHR system implementation.

2. Develop a plan on how to transition paper medical records into an EHR system.
3. Implement the EHR system in phases.
4. Research and carefully select the appropriate vendor to purchase and install the EHR system based on the practice needs.
5. Plan for continued IT and EHR technical and usability support for the PCPP.
6. Allow time for the PCPP and medical staff to adapt and learn how to use the EHR system.

Moreover, these recommendations may apply to various health care providers and might assist with EHR implementation.

Recommendations for Further Research

I found limited research on the lived experiences of PCPPs concerning barriers to EHR system implementation. Future researchers could replicate this study with a larger sample group of PCPP in other geographical locations to increase the generalizability of the study findings. I also suggest a phenomenological study on the perceptions of healthcare providers regarding the conversion of existing paper medical records into electronic medical records. Based on this study finding, two (8%) participants stated transferring old medical charts into EHR systems was a barrier to EHR adoption.

Research focusing on the security and confidentiality of personal patient information is an aspect of system implementation since EHR use may compromise or jeopardize patient privacy. Moreover, healthcare researchers might examine the effects of EHR implementation on the privacy of patient data. A study on patient security might

gauge the true functionality of the EHR software and maximum usefulness to physicians, patients, and staff.

Reflections

My findings and recommendations reflect the results of interviewing 26 participants who volunteered time to discuss their perceptions regarding barriers to EHR adoption. I have worked in the field of information technology for 13 years, including numerous IT adoption projects. In addition, I used professional and neutral mannerism to keep the interviews, and the subsequent theme analysis free from bias.

I was concerned with finding PCPPs in southwestern Ohio who were willing to participate in my study due to their busy schedules. Hysong at al. (2013) pointed out barriers to recruiting healthcare physicians in research are (a) obtaining accurate eligibility and contact information, (b) reaching busy clinicians, (c) persuading eligible candidates to participate without coercion, and (d) scheduling willing participants for data collection. I experienced the same barriers in recruiting participants. However, after developing a relationship by purposely connecting with participants through consistent communication and maintaining principles of my responsibility to the participants, I was able to setup times to interview the participants, and asked open-ended questions to allow the participants to feel comfortable. Koch, Everett, Phillips, and Davidson (2014) stated open-ended questions allow participants to feel relaxed and safe in stating their concerns. Participants were willing and receptive in their responses since the interview questions for this study pertained to barriers they had to address during EHR adoption.

To assure that the participant responses aligned with the research question, the interviews followed the prescribed interview protocol in Appendix B. I encouraged each respondent to address each interview question openly and with clarity. The interviews were informative with commonalities identified among the participants' experience. Participants provided positive, negative, and mixed experiences regarding EHR implementation. The process for, and conclusions from, capturing the lived experiences of PCPP may provide valuable information for technology adoption use within the healthcare industry.

Summary and Study Conclusions

The ARRA goal was to increase EHR systems adoption through incentive programs (Douglas, Dawes, Holden, & Mack, 2015). PCPPs not implementing a meaningful-use EHR system by 2015 were subject to financial penalties under the Medicare Incentive Program (Wright et al., 2014). PCPPs are penalized 1% of Medicare payments in 2016, increasing to 3% over a 3-year period (Abramson, McGinnis, Moore, & Kaushal, 2014). In 2013, Xierali et al. (2013) identified that 47.9% of PCPPs were not using EHR systems in Ohio. The research findings from this study may contribute to the body of knowledge regarding EHR system implementation and assist healthcare providers adopt EHR systems. Additionally, findings could contribute to social change by reducing healthcare costs, increasing patient access to care, and improving patient diagnosis and treatment.

References

Abraham, S. (2013). Will business model innovation replace strategic analysis? *Strategy*

& Leadership, 41, 31-38. doi:10.1108/10878571311318222

Abramson, E. L., Malhotra, S., Fischer, K., Edwards, A., Pfoh, E., Osorio, S., ... Kaushal, R. (2012). Transitioning between electronic health records: Effects on ambulatory prescribing safety. *Journal of General Internal Medicine*, *26*, 868-874. doi:10.1007/s11606-011-1703-z

Abramson, E. L., McGinnis, S., Moore, J., & Kaushal, R. (2014). A statewide assessment of electronic health Record adoption and health information exchange among nursing homes. *Health Services Research*, *49*, 361-372. doi:10.1111/1475-6773.12137

Adelson, K. B., Ying Chun, Q., Evangelista, M., Spencer-Cisek, P., Whipple, C., & Holcombe, R. F. (2014). Implementation of electronic chemotherapy ordering: An opportunity to improve evidence-based oncology care. *Journal of Oncology Practice*, *10*, 113-119. doi:10.1200/JOP.2013.001184

Adler-Milstein, J., Everson, J., & Lee, S.-Y. D. (2014). Sequencing of EHR adoption among US hospitals and the impact of meaningful use. *Journal of the American Medical Informatics Association*, *21*, 984-991. doi:10.1136/amiajnl-2014-002708

Adler-Milstein, J., Everson, J., & Shoou-Yih D., L. (2015). EHR adoption and hospital performance: Time-related effects. *Health Services Research*, *50*, 1751-1771. doi:10.1111/1475-6773.12406

Agris, J. L. (2014). Extending the minimum necessary standard to uses and disclosures for treatment. *Journal of Law, Medicine & Ethics*, *42*, 263-267. doi:10.1111/jlme.12140

Ahern, K. (2012). Informed consent: Are researchers accurately representing risks and benefits? *Scandinavian Journal of Caring Sciences*, *26*, 671-678. doi:10.1111/j.1471-6712.2012.00978.x

Ahmed, Z., McLeod, M., Barber, N., Jacklin, A., & Franklin, B. (2013). The use and functionality of electronic prescribing systems in english acute NHS trusts: A cross-sectional survey. *Plos ONE*, *8*(11), 1-7. doi:10.1371/journal.pone.0080378

Åkerlind, G. S. (2012). Variation and commonality in phenomenographic research methods. *Higher Education Research & Development*, *31*, 115–127. doi:10.1080/07294360.2011.642845

Alex da, M. P., Näslund, D., & Jasmand, C. (2012). Logistics case study based research: Towards higher quality. *International Journal of Physical Distribution & Logistics Management*, *42*, 275-295. doi:10.1108/09600031211225963

Al-Yateem, N. (2012). The effect of interview recording on quality of data obtained: A methodological reflection. *Nurse Researcher*, *19*, 31–35. doi:10.7748/nr2012.07.19.4.31.c9222

Amornkitpinyo, T., & Piriyasurawong, P. (2015). Causal relationship model of the information and communication technology skill affect the technology acceptance process in the 21st century for undergraduate students. *International Journal of Emerging Technologies in Learning*, *10*, 68-71. doi:10.3991/ijet.v10i1.4185

Anderson, R. A., Plowman, D., Corazzini, K., Hsieh, P., Hui Fang, S., Landerman, L. R., & McDaniel, R. R. (2013). Participation in decision making as a property of complex adaptive systems: Developing and testing a measure. *Nursing Research*

& Practice, *2013*), 1-16. doi:10.1155/2013/706842

Andrade, A. D. (2009). Interpretive research aiming at theory building: Adopting and adapting the case study design. *Qualitative Report*, *14*, 42-60. Retrieved from http://www.nova.edu/ssss/QR/indext.html

Anney, V. N. (2014). Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies*, *5*, 272-281. Retrieved from http://jeteraps.scholarlinkresearch.com/articles/Ensuring%20the%20Quality%20of%20the%20Findings%20of%20Qualitative%20Research%20NEW.pdf

Appari, A., Eric Johnson, M., & Anthony, D. L. (2013). Meaningful use of electronic health record systems and process quality of care: Evidence from a panel data analysis of U.S. acute-care hospitals. *Health Services Research*, *48*, 354-375. doi:10.1111/j.1475-6773.2012.01448.x

Applebaum, M. (2012). Phenomenological psychological research as science. *Journal of Phenomenological Psychology*, *43*, 36-72. doi:10.1163/156916212X632952

Asua, J., Orruno, E., Reviriego, E., & Gagnon, M. P. (2012). Healthcare professional acceptance of telemonitoring for chronic care patients in primary care. *BMC Medical Informatics & Decision Making*, *12*, 139-148. doi:10.1186/1472-6947-12-139

Audet, A., Squires, D., & Doty, M. M. (2014). Where are we on the diffusion curve? Trends and drivers of primary care physicians' use of health information technology. *Health Services Research*, *49*, 347-360. doi:10.1111/1475-

6773.12139

Axtell-Thompson, L. (2012). Nudge ethics for health plans. *American Journal of Bioethics*, *12*, 24-25. doi:10.1080/15265161.2011.634953

Ball, L., Hughes, R., & Leveritt, M. (2013). Health professionals' views of the effectiveness of nutrition care in general practice setting. *Nutrition & Dietetics*, *70*, 35-41. doi:10.1111/j.1747-0080.2012.01627.x

Baines, J. T., Taylor, C. N., & Vanclay, F. (2013). Social impact assessment and ethical research principles: Ethical professional practice in impact assessment part II. *Impact Assessment and Project Appraisal*, *31*, 254-260. doi:10.1080/14615517.2013.850306

Barnett, J., Vasileiou, K., Djemil, F., & Young, T. (2011). Understanding innovators' experiences of barriers and facilitators in implementation and diffusion of healthcare service innovations: A qualitative study. *BMC Health Services Research*, *11*, 342-353. doi:10.1186/1472-6963-11-342

Barrett, J. R. (2007). The researcher as instrument: learning to conduct qualitative research through analyzing and interpreting a choral rehearsal. *Music Education Research*, *9*, 417-433. doi:10.1080/14613800701587795

Barton, C. (2014). Complexity, social complexity, and modeling. *Journal of Archaeological Method & Theory*, *21*, 306-324. doi:10.1007/s10816-013-9187-2

Bazzano, M. (2014). On becoming no one: Phenomenological and empiricist contributions to the person-centered approach. *Person-Centered & Experiential Psychotherapies*, *13*, 250-258. doi:10.1080/14779757.2013.804649

Baxter, S., Enderby, P., Evans, P., & Judge, S. (2012). Barriers and facilitators to the use of high-technology augmentative and alternative communication devices: A systematic review and qualitative synthesis. *International Journal of Language & Communication Disorders*, *47*, 115-129. doi:10.1111/j.1460-6984.2011.00090.x

Beck, A. F., Klein, M. D., & Kahn, R. S. (2012). Identifying social risk via a clinical social history embedded in the electronic health record. *Clinical Pediatrics*, *51*, 972-977. doi:10.1177/0009922812441663

Ben-Assuli, O., Shabtai, I., & Leshno, M. (2013). The impact of EHR and HIE on reducing avoidable admissions: Controlling main differential diagnoses. *BMC Medical Informatics & Decision Making*, *13*(1), 1-10. doi:10.1186/1472-6947-13-49

Bennett, C. C., & Hauser, K. (2013). Artificial intelligence framework for simulating clinical decision-making: A Markov decision process approach. *Artificial Intelligence in Medicine*, 57, 9-19. doi:10.1016/j.artmed.2012.12.003

Ben-Zion, R., Pliskin, N., & Fink, L. (2014). Critical success factors for adoption of electronic health record systems: Literature Review and Prescriptive Analysis. *Information Systems Management*, *31*, 296-312. doi:10.1080/10580530.2014.958024

Bergin, M. (2011). NVivo 8 and consistency in data analysis: Reflecting on the use of a qualitative data analysis program. *Nurse Researcher*, *18*, 6–12. doi:10.7748/nr2011.04.18.3.6.c8457

Bernard, H. R. (2013). *Social research methods: Qualitative and quantitative approaches*

(2nd ed.). Thousand Oaks, CA: Sage.

Bhattacharya, S. (2014). Institutional review board and international field research in conflict zones. *PS, Political Science & Politics, 47*, 840-844. doi:10.1017/S1049096514001140

Black, J. D., Palombaro, K. M., & Dole, R. L. (2013). Student experiences in creating and launching a student-led physical therapy pro bono clinic: A qualitative investigation. *Physical Therapy*, *93*, 637-648. doi:10.2522/ptj.20110430

Blayney, D. W. (2013). Measuring and improving quality of care in an academic medical center. *Journal of Oncology Practice*, *9*, 138-141. doi:10.1200/JOP.2013.000991

Biruk, S., Yilma, T., Andualem, M., & Tilahun, B. (2014). Health Professionals' readiness to implement electronic medical record system at three hospitals in Ethiopia: A cross sectional study. *BMC Medical Informatics & Decision Making*, *14*(1), 1-14. doi:10.1186/s12911-014-0115-5

Bjørnholt, M, Farstad, G.R. (2012). Am I rambling? On the advantages of interviewing couples together. *Qualitative Research*, *14*, 3-19. doi:10.1177/1468794112459671.

Borrego, M., Foster, M. J., & Froyd, J. E. (2014). Systematic literature reviews in engineering education and other developing interdisciplinary fields. *Journal of Engineering Education*, *103*, 45-76. doi:10.1002/jee.20038

Bowers, B., Cohen, L. W., Elliot, A. E., Grabowski, D. C., Fishman, N. W., Sharkey, S. S., & ... Kemper, P. (2013). Creating and supporting a mixed methods health services research team. *Health Services Research*, *48*, 2157-2180.

doi:10.1111/1475-6773.12118

Bradley, P. V., Getrich, C. M., & Hannigan, G. G. (2015). New mexico practitioners' access to and satisfaction with online clinical information resources: An interview study using qualitative data analysis software. *Journal of the Medical Library Association*, *103*, 31-35. doi:10.3163/1536-5050.103.1.006

Bredfeldt, C. E., Awad, E., Joseph, K., & Snyder, M. H. (2013). Training providers: Beyond the basics of electronic health records. *BMC Health Services Research*, *13*(1), 1-14. doi:10.1186/1472-6963-13-503

Bristowe, K., Horsley, H. L., Shepherd, K., Brown, H., Carey, I., Matthews, B., & ... Murtagh, F. E. (2015). Thinking ahead – the need for early advance care planning for people on haemodialysis: A qualitative interview study. *Palliative Medicine*, *29*, 443-450. doi:10.1177/0269216314560209

Bryman, A. (2012). *Social research methods* (4th ed.). Oxford, UK: Oxford University Press.

Calman, N., Hauser, D., Lurio, J., Wu, W. Y., & Pichardo, M. (2012). Strengthening public health and primary care collaboration through electronic health records. *American Journal of Public Health*, *102*, 13-18. doi:10.2105/AJPH.2012.301000

Carlson, J., Johnston, L., Westra, B., & Nichols, M. (2013). Developing an approach for data management education: A report from the data information literacy project. *International Journal of Digital Curation*, *8*, 204–217. doi:10.2218/ijdc.v8i1.254

Carter, D., & Baghurst, T. (2014). The influence of servant leadership on restaurant employee engagement. *Journal of Business Ethics*, *124*, 453-464. doi:10.1007/s10551-013-1882-0

Carter, E. M., & Potts, H. W. (2014). Predicting length of stay from an electronic patient record system: A primary total knee replacement example. *BMC Medical Informatics & Decision Making*, *14*(1), 1-25. doi:10.1186/1472-6947-14-26

Chan, E. A., Jones, A., & Wong, K. (2013). The relationships between communication, care, and time are intertwined: A narrative inquiry exploring the impact of time on registered nurses' work. *Journal of Advanced Nursing*, *69*, 2020-2029. doi:10.1111/jan.12064

Chaudhry, R., Tulledge-Scheitel, S. M., Parks, D. A., Angstman, K. B., Decker, L. K., & Stroebel, R. J. (2012). Use of a web-based clinical decision support system to improve abdominal aortic aneurysm screening in a primary care practice. *Journal of Evaluation in Clinical Practice*, *18*, 666-670. doi:10.1111/j.1365-2753.2011.01661.x

Cho, J. (2006). Validity in qualitative research revisited. *Qualitative Research*, *6*, 319-340. doi:10.1177/1468794106065006

Choi, G., & Chung, H. (2013). Applying the technology acceptance model to social networking sites (sns): Impact of subjective norm and social capital on the acceptance of sns. *International Journal of Human-Computer Interaction*, *29*, 619-628. doi:10.1080/10447318.2012.756333

Cloonan, T. F. (2012). The employment of the phenomenological psychological method

in the service of art education. *Journal of Phenomenological Psychology*, *43*, 73-129. doi:10.1163/156916212X632961

Coenen, M., Stamm, T.A., Stucki, G., &Cieza, A. (2012). Individual interviews and focus groups in patients with rheumatoid arthritis: A comparison of two qualitative methods. *Qualitative of Life Research*, *21*, 359-70. doi:10.1007/s11136-011-9943-2

Collazo, N. J., Wu, X., Elen, J., & Clarebout, G. (2014). Tool use in computer-based learning environments: Adopting and extending the technology acceptance model. *ISRN Otolaryngology*, 1-11. doi:10.1155/2014/736931

Conrad, D., Hanson, P. A., Hasenau, S. M., & Stocker-Schneider, J. (2012). Identifying the barriers to use of standardized nursing language in the electronic health record by the ambulatory care nurse practitioner. *Journal of the American Academy of Nurse Practitioners*, 24, 443-451. doi:10.1111/j.1745-7599.2012.00705

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

Corsi, S., & Di Minin, A. (2014). Disruptive Innovation ... in reverse: Adding a geographical dimension to disruptive innovation theory. *Creativity & Innovation Management*, *23*, 76-90. doi:10.1111/caim.12043

Covell, C. L., Sidani, S., & Ritchie, J. A. (2012). Does the sequence of data collection influence participants' responses to closed and open-ended questions? A methodological study. *International Journal of Nursing Studies*, *49*, 664-671.

doi:10.1016/j.ijnurstu.2011.12.002

Cresswell, K. M., Slee, A., Coleman, J., Williams, R., Bates, D. W., & Sheikh, A. (2013). Qualitative analysis of round-table discussions on the business case and procurement challenges for hospital electronic prescribing systems. *Plos ONE*, *8*, 1-10. doi:10.1371/journal.pone.0079394

Cucciniello, M., Lapsley, I., Nasi, G., & Pagliari, C. (2015). Understanding key factors affecting electronic medical record implementation: A sociotechnical approach. *BMC Health Services Research*, *15*(1), 1-19. doi:10.1186/s12913-015-0928-7

Çuhadar, C. (2014). Information technologies pre-service teachers' acceptance of tablet PCs as an innovative learning tool. *Educational Sciences: Theory & Practice*, *14*, 741-753. doi:10.12738/estp.2014.2.2038

Cummings, J. A., Zagrodney, J. M., & Day, T. E. (2015). Impact of open data policies on consent to participate in human subjects' research: Discrepancies between participant action and reported concerns. *Plos ONE*, *10*, 1-11. doi:10.1371/journal.pone.0125208

Dainty, K. N., Adhikari, N. J., Kiss, A., Quan, S., & Zwarenstein, M. (2012). Electronic prescribing in an ambulatory care setting: A cluster randomized trial. *Journal of Evaluation in Clinical Practice*, *18*, 761-767. doi:10.1111/j.1365-2753.2011.01657.x

D'Amore, J. D., Sittig, D. F., & Ness, R. B. (2012). How the continuity of care document can advance medical research and public health. *American Journal of Public Health*, *102*, 1-4. doi:10.2105/AJPH.2011.300640

Darking, M., Anson, R., Bravo, F., Davis, J., Flowers, S., Gillingham, E., & ... Stirling, I. (2014). Practice-centered evaluation and the privileging of care in health information technology evaluation. *BMC Health Services Research*, *14*(1), 1-17. doi:10.1186/1472-6963-14-243

De Ceunynck, T., Kusumastuti, D., Hannes, E., Janssens, D., & Wets, G. (2013). Mapping leisure shopping trip decision making: Validation of the CNET interview protocol. *Quality & Quantity*, *47*, 1831-1849. doi:10.1007/s11135-011-9629-4

Derobertmasure, A., & Robertson, J. (2014). Data analysis in the context of teacher training: Code sequence analysis using QDA Miner. *Quality & Quantity*, *48*, 2255-2276. doi:10.1007/s11135-013-9890-9

DesRoches, C. M., Audet, A., Painter, M., & Donelan, K. (2013). Meeting meaningful use criteria and managing patient populations. *Annals of Internal Medicine*, *158*, 791-799. doi:10.7326/0003-4819-158-11-201306040-00003

DeVoe, J. E., Angier, H., Burdick, T., & Gold, R. (2014). Health information technology: An untapped resource to help keep patients insured. *Annals of Family Medicine*, *12*, 568-572. doi:10.1370/afm.1721

Diana, M. L., Kazley, A., & Menachemi, N. (2011). An assessment of health care information and management systems society and leapfrog data on computerized provider order entry. *Health Services Research*, *46*, 1575-1591. doi:10.1111/j.1475-6773.2011.01259.x

Diaz, A. H., & Bubalo, J. S. (2014). Evaluation and implementation of chemotherapy

regimen validation in an electronic health record. *Journal of Oncology Pharmacy Practice*, *20*, 461-468. doi:10.1177/1078155213520339

Dickerson-Swift, V., James, E., Kippen, S., and Liamputtong, P. (2007). Doing sensitive research: What challenges do qualitative researchers face? *Qualitative Research*, *7*, 327-353. doi:10.1177/1468794107078515

Dillahunt-Aspillaga, C., Finch, D., Massengale, J., Kretzmer, T., Luther, S. L., & McCart, J. A. (2014). Using information from the electronic health record to improve measurement of unemployment in service members and veterans with mtbi and post-deployment stress. *Plos ONE*, *9*, 1-21. doi:10.1371/journal.pone.0115873

Dixon, B. E., Grannis, S. J., & Revere, D. (2013). Measuring the impact of a health information exchange intervention on provider-based notifiable disease reporting using mixed methods: a study protocol. *BMC Medical Informatics & Decision Making*, *13*(1), 1-14. doi:10.1186/1472-6947-13-121

Douglas, M. D., Dawes, D. E., Holden, K. B., & Mack, D. (2015). Missed policy opportunities to advance health equity by recording demographic data in electronic health records. *American Journal of Public Health*, *105*, 380-388. doi:10.2105/AJPH.2014.302384

Draper, A. A., & Swift, J. A. (2011). Qualitative research in nutrition and dietetics: Data collection issues. *Journal of Human Nutrition & Dietetics*, *24*, 3-12. doi:10.1111/j.1365-277X.2010.01117.x

Dua, V. (2012). IT & mobile tower infrastructure industry collaboration - Leap towards

green, smart, & sustainable future. *Modern Applied Science*, *6*, 37-50. doi:10.5539/mas.v6n12p37

Duftschmid, G., Chaloupka, J., & Rinner, C. (2013). Towards plug-and-play integration of archetypes into legacy electronic health record systems: The archimed experience. *BMC Medical Informatics & Decision Making*, *13*(1), 1-12. doi:10.1186/1472-6947-13-11

Dunn, K. (2012). A qualitative investigation into the online counselling relationship: To meet or not to meet, that is the question. *Counselling & Psychotherapy Research*, *12*, 316-326. doi:10.1080/14733145.2012.669772

Dykes, P. C., & Collins, S. A. (2013). Building linkages between nursing care and improved patient outcomes: The role of health information technology. *Online Journal of Issues in Nursing*, *18*(3), 1-17. doi:10.3912/OJIN.Vol18No03Man04

Edson, M. C. (2012). A complex adaptive systems view of resilience in a project team. *Systems Research & Behavioral Science*, *29*, 499-516. doi:10.1002/sres.2153

eHealth Initiative. (2011). *A clinician's guide to electronic prescribing*. Retrieved from https://www.aan.com/uploadedFiles/Website_Library_Assets/Documents/3.Practice_Management/1.Reimbursement/2.Medicare/5.Electronic_Prescribing_Incentive_Program/ePrescribing%20Incentive%20Program-Clinicians%20Guide%20to%20ePrescribing.pdf

Eika, M., Dale, B., Espnes, G. A., & Hvalvik, S. (2015). Nursing staff interactions during the older residents' transition into long-term care facility in a nursing home in

rural Norway: An ethnographic study. *BMC Health Services Research*, *15*(1), 1-12. doi:10.1186/s12913-015-0818-z

Elmir, R., Schmied, V., Jackson, D., & Wilkes, L. (2011). Interviewing people about potentially sensitive topics. *Nurse Researcher*, *19*, 12-16. doi:10.7748/nr2011.10.19.1.12.c8766

Englander, M. (2012). The interview: Data collection in descriptive phenomenological human scientific research. *Journal of Phenomenological Psychology*, *43*, 13-35. doi:10.1163/156916212X632943

Epling, J. W., Mader, E. M., & Morley, C. P. (2014). Practice characteristics and prior authorization costs: Secondary analysis of data collected by salt-net in 9 central new york primary care practices. *BMC Health Services Research*, *14*(1), 1-14. doi:10.1186/1472-6963-14-109

Erickson, F. (2012). Qualitative research methods for science education. *Second International Handbook of Science Education*, 1451-1469. doi:10.1007/978-1-4020-9041-7_93

Evans, G. (2012). Practicing participant observation: An anthropologist's account. *Journal of Organizational Ethnography, 1*, 96-106. doi:10.1108/20466741211220697

Fairley, C. K., Vodstrcil, L. A., Huffam, S., Cummings, R., Chen, M. Y., Sze, J. K., & ... Hocking, J. S. (2013). Evaluation of electronic medical record (EMR) at large urban primary care sexual health centre. *Plos ONE*, *8*, 1-8. doi:10.1371/journal.pone.0060636

Fein, E. C., & Kulik, C. T. (2011). Safeguarding access and safeguarding meaning as strategies for achieving confidentiality. *Industrial and Organizational Psychology: Perspectives on Science and Practice*, *4*, 479-481.doi:10.1111/j.1754-9434.2011.01378.x

Fiks, A. G., Zhang, P., Localio, A. R., Khan, S., Grundmeier, R. W., Karavite, D. J., & ... Forrest, C. B. (2015). Adoption of electronic medical record-based decision support for otitis media in children. *Health Services Research*, *50*, 489-513. doi:10.1111/1475-6773.12240

Finney Rutten, L. J., Vieux, S. N., St Sauver, J. L., Arora, N. K., Moser, R. P., Burke Beckjord, E., & Hesse, B. W. (2014). Patient perceptions of electronic medical records use and ratings of care quality. *Patient Related Outcome Measures*, 517-522. doi:10.2147/PROM.S58967

Fleming, N. S., Becker, E. R., Culler, S. D., Cheng, D., McCorkle, R., Graca, B. d., & Ballard, D. J. (2014). The impact of electronic health records on workflow and financial measures in primary care practices. *Health Services Research*, *49*, 405-420. doi:10.1111/1475-6773.12133

Fleurant, M., Kell, R., Jenter, C., Volk, L. A., Zhang, F., Bates, D. W., & Simon, S. R. (2012). Factors associated with difficult electronic health record implementation in office practice. *Journal of the American Medical Informatics Association*, *19*, 541–544. doi:10.1136/amiajnl-2011-000689

Foldy, S., Grannis, S., Ross, D., & Smith, T. (2014). A ride in the time machine: Information management capabilities health departments will need. *American*

Journal of Public Health, *104*, 1592-1600. doi:10.2105/AJPH.2014.301956

Forber-Pratt, A. J., Aragon, S. R., & Espelage, D. L. (2014). The influence of gang presence on victimization in one middle school environment. *Psychology of Violence*, *4*, 8–20. doi:10.1037/a0031835

Fraccaro, P., Dentone, C., Fenoglio, D., & Giacomini, M. (2013). Multicentre clinical trials' data management: A hybrid solution to exploit the strengths of electronic data capture and electronic health records systems. *Informatics for Health & Social Care*, *38*, 313-329. doi:10.3109/17538157.2013.812648

Francis, J. J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M. P., & Grimshaw, J. M. (2010). What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology & Health*, *25*, 1229-1245. doi:10.1080/08870440903194015

Frels, R. K., & Onwuegbuzie, A. J. (2013). Administering quantitative instruments with qualitative interviews: A mixed research approach. *Journal of Counseling & Development*, *91*, 184–194. doi:10.1002/j.1556-6676.2013.00085.x

Friedman, D. J., Parrish, R. G., & Ross, D. A. (2013). Electronic health records and US public health: Current realities and future promise. *American Journal of Public Health*, *103*, 1560-1567. doi:10.2105/AJPH.2013.301220

Frimpong, J. A., Jackson, B. E., Stewart, L. M., Singh, K. P., Rivers, P. A., & Bae, S. (2013). Health information technology capacity at federally qualified health centers: A mechanism for improving quality of care. *BMC Health Services Research*, *13*(1), 1-12. doi:10.1186/1472-6963-13-35

Galbraith, K. L. (2013). What's So Meaningful about Meaningful Use? *Hastings Center Report*, *43*, 15-17. doi:10.1002/hast.154

Garfield, S., Hibberd, R., & Barber, N. (2013). English community pharmacists' experiences of using electronic transmission of prescriptions: A qualitative study. *BMC Health Services Research*, *13*(1), 1-26. doi:10.1186/1472-6963-13-435

Ghitza, U. E., Gore-Langton, R. E., Lindblad, R., Shide, D., Subramaniam, G., & Tai, B. (2013). Common data elements for substance use disorders in electronic health records: The NIDA clinical trials network experience. *Addiction*, *108*, 3-8. doi:10.1111/j.1360-0443.2012.03876.x

Giacomoni, M. H., Kanta, L., & Zechman, E. M. (2013). Complex adaptive systems approach to simulate the sustainability of water resources and urbanization. *Journal of Water Resources Planning & Management*, *139*, 554-564. doi:10.1061/(ASCE)WR.1943-5452.0000302

Giaimo, S. (2013). Behind the scenes of the patient protection and affordable care act: The making of a health care co-op. *Journal of Health Politics, Policy & Law*, *38*, 599-610. doi:10.1215/03616878-2079532

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

Gilmer, T. P., O'Connor, P. J., Sperl-Hillen, J. M., Rush, W. A., Johnson, P. E., Amundson, G. H., ... Ekstrom, H. L. (2012). Cost-effectiveness of an electronic medical record based clinical decision support system. *Health Services Research*,

47, 2137-2158. doi:10.1111/j.1475-6773.2012.01427.x

Glogowska, M., Young, P., & Lockyer, L. (2011). Propriety, process and purpose: Considerations of the use of the telephone interview method in an educational research study. *Higher Education*, *62*, 17-26. doi:10.1007/s10734-010-9362-2

Goldberg, D. (2012). Primary care in the United States: Practice-based innovations and factors that influence adoption. *Journal of Health Organization and Management*, *26*, 81-97. doi:10.1108/14777261211211106

Goldstein, M. M. (2014). Health information privacy and health information technology in the US correctional setting. *American Journal of Public Health*, *104*, 803-809. doi:10.2105/AJPH.2013.301845

Goldwater, J. C., Kwon, N. J., Nathanson, A., Muckle, A. E., Brown, A., & Cornejo, K. (2013). Open source electronic health records and chronic disease management. *Journal of the American Medical Informatics Association*, *21*, 50-54. doi:10.1136/amiajnl-2013-001672

Goodwin, J. S., Jinhyung, L., & Yong-Fang, K. (2013). The effect of electronic medical record adoption on outcomes in US hospitals. *BMC Health Services Research*, *13*(1), 1-7. doi:10.1186/1472-6963-13-39

Grams, R. (2012). The progress of an american ehr-part 1. *Journal of Medical Systems*, 3077-3078. doi:10.1007/s10916-011-9784-0.

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

Graham, T., Alderson, P., & Stokes, T. (2015). Managing conflicts of interest in the uk national institute for health and care excellence (NICE) clinical guidelines programme: Qualitative study. *Plos ONE*, *10*, 1-10. doi:10.1371/journal.pone.0122313

Grant, R., & Greene, D. (2012). The health care home model: Primary health care meeting public health goals. *American Journal of Public Health*, *102*, 1096-1103. doi:10.2105/AJPH.2011.300397

Greene, R. A., Dasso, E., Ho, S., & Genaidy, A. M. (2014). A person-focused model of care for the twenty-first century: A system-of-systems perspective. *Population Health Management*, *17*, 166-171. doi:10.1089/pop.2013.0040

Green, L. A., Potworowski, G., Day, A., May-Gentile, R., Vibbert, D., Maki, B., & Kiesel, L. (2015). Sustaining "meaningful use" of health information technology in low-resource practices. *Annals of Family Medicine*, *13*, 17-22. doi:10.1370/afm.1740

Gubrium, J. F., & Holstein, J. A. (2012). Theoretical validity and empirical utility of a constructionist analytics. *Sociological Quarterly*, *53*, 341-359. doi:10.1111/j.1533-8525.2012.01239.x

Gunnarsson, C., Chen, J., Rizzo, J. A., Ladapo, J. A., Naim, A., & Lofland, J. H. (2012). The direct healthcare insurer and out-of-pocket expenditures of psoriasis: Evidence from a United States national survey. *Journal of Dermatological Treatment*, *23*, 240-254. doi:10.3109/09546634.2010.550911

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

Han, H., & Lopp, L. (2013). Writing and reading in the electronic health record: An entirely new world. *Medical Education Online*, *18*, 1-7. doi:10.3402/meo.v18i0.18634

Hansson Halleröd, S. L., Anckarsäter, H., Råstam, M., & Hansson Scherman, M. (2015). Experienced consequences of being diagnosed with ADHD as an adult: A qualitative study. *BMC Psychiatry*, *15*(1), 1-13. doi:10.1186/s12888-015-0410-4

Harper, M., & Cole, P. (2012). Member checking: can benefits be gained similar to group therapy? *The Qualitative Report*, *17*, 510-517. Retrieved from http://www.nova.edu/ssss/QR/QR17-2/harper.pdf

Hawley, G., Janamian, T., Jackson, C., & Wilkinson, S. A. (2014). In a maternity shared-care environment, what do we know about the paper hand-held and electronic health record: A systematic literature review. *BMC Pregnancy & Childbirth*, *14*(1), 1-24. doi:10.1186/1471-2393-14-52

Haydon, G., & Riet, P. d. (2014). A narrative inquiry: How do nurses respond to patients' use of humor? *Contemporary Nurse: A Journal for the Australian Nursing Profession*, *46*, 197-205. doi:10.5172/conu.2014.46.2.197

Hearn, J. (2015). Demos before democracy: Ideas of nation and society in Adam Smith. *Journal of Classical Sociology*, *15*, 396-414. doi:10.1177/1468795x15574412

Hecker, L. L., & Edwards, A. B. (2014). The impact of hippa and hitech: New standards for confidentiality, security, and documentation for marriage and family

therapists. *American Journal of Family Therapy*, *42*, 95-113. doi:10.1080/01926187.2013.792711

Hempe, E. (2013). Why are organisations that provide healthcare services fuzzy? *Australasian Medical Journal*, *6*, 542-548. doi:10.4066/AMJ.2013.1857

Hennings, J., Froggatt, K., & Payne, S. (2013). Spouse caregivers of people with advanced dementia in nursing homes: A longitudinal narrative study. *Palliative Medicine*, *27*, 683-691. doi:10.1177/0269216313479685

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. *BMC Medical Informatics & Decision Making*, *13*(1), 1-13. doi:10.1186/1472-6947-13-85

Henriques, G. (2014). In search of collective experience and meaning: A transcendental phenomenological methodology for organizational research. *Human Studies*, *37*, 451-468. doi:10.1007/s10746-014-9332-2

Herrin, J., Graca, B., Nicewander, D., Fullerton, C., Aponte, P., Stanek, G., ... Ballard, D. J. (2012). The effectiveness of implementing an electronic health record on diabetes care and outcomes. *Health Services Research*, *47*, 1522-1540. doi:10.1111/j.1475-6773.2011.01370.x

Heselmans, A., Aertgeerts, B., Donceel, P., Geens, S., Van De Velde, S., & Ramaekers, D. (2012). Family physicians' perceptions and use of electronic clinical decision support during the first year of implementation. *Journal of Medical Systems*, *36*, 3677-3684. doi:10.1007/s10916-012-9841-3

Hietanen, J., Sihvonen, A., Tikkanen, H., & Mattila, P. (2014). Managerial storytelling: How we produce managerial and academic stories in qualitative b2b case study research. *Journal of Global Scholars of Marketing Science*, *24*, 295-310. doi:10.1080/21639159.2014.911496

Hickling, F. W. (2012). Understanding patients in multicultural settings: A personal reflection on ethnicity and culture in clinical practice. *Ethnicity & Health*, 17, 203-216. doi:10.1080/13557858.2012.655266

Higginbottom, G., Rivers, K., & Story, R. (2014). Health and social care needs of Somali refugees with visual impairment (VIP) living in the United Kingdom: A focused ethnography with Somali people with VIP, their caregivers, service providers, and members of the Horn of Africa Blind Society. *Journal of Transcultural Nursing*, *25*, 192-201. doi:10.1177/1043659613515715

Hodge, J. (2013). Phenomenological futures in dispute: Emmanuel levinas, jacques derrida, and jean-luc nancy. *South African Journal of Philosophy*, *32*, 383-394. doi:10.1080/02580136.2013.865100

Hope, C., Estrada, N., Weir, C., Chia-Chen, T., Damal, K., & Sauer, B. C. (2014). Documentation of delirium in the va electronic health record. *BMC Research Notes*, *7*(1), 1-10. doi:10.1186/1756-0500-7-208

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

Hsiao, C.-J., Jha, A. K., King, J., Patel, V., Furukawa, M. F., & Mostashari, F. (2013). Office-based physicians are responding to incentives and assistance by adopting and using electronic health records. *Health Affairs*, *32*, 1470–1477. doi:10.1377/hlthaff.2013.0323

Hunter, M.G., 2012. Creating qualitative interview protocols. *International Journal of Sociotechnology and Knowledge Development*, *4*(3), 1–16. doi:10.4018/jskd.2012070101

Hysong, S. J., Smitham, K. B., Knox, M., Johnson, K., SoRelle, R., & Haidet, P. (2013). Recruiting clinical personnel as research participants: A framework for assessing feasibility. *Implementation Science*, *8*(1), 1-14. doi:10.1186/1748-5908-8-125

Ingham, J., Cadieux, J., & Mekki Berrada, A. (2015). e-Shopping acceptance: A qualitative and meta-analytic review. *Information & Management*, *52*, 44-60. doi:10.1016/j.im.2014.10.002

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

Jain, S. H., Seidman, J., & Blumenthal, D. (2011). Meaningful use: The authors reply. *Health Affairs*, *30*, 182-182. doi:10.1377/hlthaff.2010.1177

Jamoom, E. W., Patel, V., Furukawa, M. F., & King, J. (2014). EHR adopters vs. non-adopters: Impacts of, barriers to, and federal initiatives for EHR adoption. *Healthcare*, *2*, 33-39. doi:10.1016/j.hjdsi.2013.12.004

Jervis, M., & Drake, M. (2014). The use of qualitative research methods in quantitative science: A review. *Journal of Sensory Studies*, *29*, 234-247. doi:10.1111/joss.12101

Jones, S. S., Rudin, R. S., Perry, T., & Shekelle, P. G. (2014). Health Information Technology: an updated systematic review with a focus on meaningful use. *Annals of internal medicine*, *160*, 48-54. doi:10.7326/m13-1531

Jordon, M., Lanham, H. J., Anderson, R. A., & McDaniel Jr, R. R. (2010). Implications of complex adaptive systems theory for interpreting research about health care organizations. *Journal of Evaluation in Clinical Practice*, 16, 228-231. doi:10.1111/j.1365-2753.2009.01359.x

Joseph, S. B., Sow, M. J., Furukawa, M. F., Posnack, S., & Daniel, J. G. (2013). E-prescribing adoption and use increased substantially following the start of a federal incentive program. *Health Affairs*, *32*, 1221–1227. doi:10.1377/hlthaff.2012.1197

Kalkan, A., Roback, K., Hallert, E., & Carlsson, P. (2014). Factors influencing rheumatologists' prescription of biological treatment in rheumatoid arthritis: An interview study. *Implementation Science*, *9*(1), 1-23. doi:10.1186/s13012-014-0153-5

Kan, J. T. (2011). The 2011 medicare electronic health records incentive program. *Journal of Oncology Practice*, *7*, 271-272. doi:10.1200/JOP.2011.000348

Kan, J. T. (2012). 2012 Electronic prescribing incentive program. *Journal of Oncology Practice*, *8*, 121-125. doi:10.1200/JOP.2012.000545

Kannry, J., Beuria, P., Wang, E., & Nissim, J. (2012). Personal health records: Meaningful use, but for whom? *Mount Sinai Journal of Medicine*, *79*, 593-602. doi:10.1002/msj.21334

Kanta, L., & Zechman, E. (2014). Complex adaptive systems framework to assess supply-side and demand-side management for urban water resources. *Journal of Water Resources Planning & Management*, *140*, 75-85. doi:10.1061/(ASCE)WR.1943-5452.0000301

Katina, P., Keating, C., & Jaradat, R. (2014). System requirements engineering in complex situations. *Requirements Engineering*, *19*, 45-62. doi:10.1007/s00766-012-0157-0

Kapu, A. N., Wheeler, A. P., & Lee, B. (2014). Addition of acute care nurse practitioners to medical and surgical rapid response teams: A pilot project. *Critical Care Nurse*, *34*, 51-60. doi:10.4037/ccn201484

Karwowski, W. (2012). A review of human factors challenges of complex adaptive systems: Discovering and understanding chaos in human performance. *Human Factors*, *54*, 983-995. doi:10.1177/0018720812467459

Kaushal, R., & Blumenthal, D. (2014). Introduction and commentary for special issue on health information technology. *Health Services Research*, *49*, 319-324. doi:10.1111/1475-6773.12146

Kelly, M. P., & Moore, T. A. (2012). The judgment process in evidence-based medicine

and health technology assessment. *Social Theory & Health, 10*(1), 1-19. doi:10.1057/sth.2011.21

Keenan, G. M., Yakel, E., Yao, Y., Xu, D., Szalacha, L., Tschannen, D., & ... Wilkie, D. J. (2012). Maintaining a consistent big picture: Meaningful use of a web-based poc ehr system. *International Journal of Nursing Knowledge*, *23*, 119-133. doi:10.1111/j.2047-3095.2012.01215.x

Kern, L., Barrón, Y., Dhopeshwarkar, R., Edwards, A., & Kaushal, R. (2013). Electronic health records and ambulatory quality of care. *JGIM: Journal of General Internal Medicine*, *28*, 496-503. doi:10.1007/s11606-012-2237-8

Khan, M. A., Barratt, M. S., Krugman, S. D., Serwint, J. R., & Dumont-Driscoll, M. (2014). Variability of the institutional review board process within a national research network. *Clinical Pediatrics*, *53*, 556-560. doi:10.1177/0009922814527504

Kieft, R. M., de Brouwer, B. M., Francke, A. L., & Delnoij, D. J. (2014). How nurses and their work environment affect patient experiences of the quality of care: A qualitative study. *BMC Health Services Research*, *14*, 118-137. doi:10.1186/1472-6963-14-249

Kim, J. (2012). Understanding the lived experience of a sioux indian male adolescent: Toward the pedagogy of hermeneutical phenomenology in education. *Educational Philosophy & Theory*, *44*, 630-648. doi:10.1111/j.1469-5812.2010.00733.x

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

Kisely, S., & Kendall, E. (2011). Critically appraising qualitative research: A guide for clinicians more familiar with quantitative techniques. *Australasian Psychiatry*, *19*, 364-367. doi:10.3109/10398562.2011.562508

Koch, J., Everett, B., Phillips, J., & Davidson, P. M. (2014). Diversity characteristics and the experiences of nursing students during clinical placements: A qualitative study of student, faculty and supervisors' views. *Contemporary Nurse: A Journal for the Australian Nursing Profession*, *4915-26*. doi:10.5172/conu.2014.49.15

Korhonen, J. J. (2014). Big data: Big deal for organization design? *Journal of Organization Design*, *3*, 31-36. doi:10.146/jod.3.1.13261

Kramer, M., Brewer, B. B., Halfer, D., Maguire, P., Beausoleil, S., Claman, K., & ... Duchscher, J. B. (2013). Changing our lens: Seeing the chaos of professional practice as complexity. *Journal of Nursing Management*, *21*, 690-704. doi:10.1111/jonm.12082

Krist, A. H., Beasley, J. W., Crosson, J. C., Kibbe, D. C., Klinkman, M. S., Lehmann, C. U., … Waldren, S. E. (2014). Electronic health record functionality needed to

better support primary care. *Journal of the American Medical Informatics Association*, 21, 764–771. doi:10.1136/amiajnl-2013-002229

Kruse, G., Kelley, J., Linder, J., Park, E., & Rigotti, N. (2012). Implementation of an electronic health record-based care management system to improve tobacco treatment. *JGIM: Journal of General Internal Medicine*, *27*, 1690-1696. doi:10.1007/s11606-012-2174-6

Kuckartz, U. (2014). Qualitative text analysis using computer assistance. *Qualitative text analysis: A guide to methods, practice & using software,* 121-151. London, England: SAGE Publications Ltd. doi:http://dx.doi.org.ezp.waldenulibrary.org/10.4135/9781446288719.n5

Kuhn, T., Basch, P., Barr, M., & Yackel, T. (2015). Clinical documentation in the 21st century: Executive summary of a policy position paper from the american college of physicians. *Annals of Internal Medicine*, *162*, 301-303. doi:10.7326/M14-2128

Kumar, A., Bhatia, S., & Chiang, I. (2013). Deployment of an in-house designed training process in a quaternary care hospital. *Technology & Health Care*, *21*, 469-478. doi:10.3233/THC-130750

Kuang-Ming, K., Chung-Feng, L., & Chen-Chung, M. (2013). An investigation of the effect of nurses' technology readiness on the acceptance of mobile electronic medical record systems. *BMC Medical Informatics & Decision Making*, *13*(1), 1-14. doi:10.1186/1472-6947-13-88

Landman, A. B., Lee, C. H., Sasson, C., Van Gelder, C. M., & Curry, L. A. (2012). Prehospital electronic patient care report systems: Early experiences from

emergency medical services agency leaders. *PLoS ONE*, *7*: e32692. doi:10.1371/journal.pone.0032692

Lanham, H, Leykum, L & McDaniel, R. (2012). Same organization, same electronic health records (EHRs) system, different use: Exploring the linkage between practice member communication patterns and EHR use patterns in an ambulatory care setting. *Journal of the American Medical Informatics Association*, *19*, 382-391. doi:10.1136/amiajnl-2011-000263

Lassere, M. N., Baker, S., Parle, A., Sara, A., & Johnson, K. R. (2015). Improving quality of care and long-term health outcomes through continuity of care with the use of an electronic or paper patient-held portable health file: Study protocol for a randomized controlled trial. *Trials*, *16*(1), 1-16. doi:10.1186/s13063-015-0760-8

Latta, M. M., & Kim, J. (2011). Investing in the curricular lives of educators: Narrative inquiry as pedagogical medium. *Journal of Curriculum Studies*, *43*, 679-695. doi:10.1080/00220272.2011.609566

Lau, F., Price, M., Boyd, J., Partridge, C., Bell, H., & Raworth, R. (2012). Impact of electronic medical record on physician practice in office settings: A systematic review. *BMC Medical Informatics & Decision Making*, *12*, 10-19. doi:10.1186/1472-6947-12-10

Leahy, D., Schaffalitzky, E., Armstrong, C., Bury, G., Cussen-Murphy, P., Davis, R., & ... Ryan, P. (2013). Primary care and youth mental health in ireland: Qualitative study in deprived urban areas. *BMC Family Practice*, *14*, 194-217. doi:10.1186/1471-2296-14-194

LeBlanc, T. W., Back, A. L., Danis, M., & Abernethy, A. P. (2014). Electronic health records (EHRs) in the oncology clinic: How clinician interaction with ehrs can improve communication with the patient. *Journal of Oncology Practice*, *10*, 317-321. doi:10.1200/JOP.2014.001385

Leeman, J., & Sandelowski, M. (2012). Practice-based evidence and qualitative inquiry. *Journal of Nursing Scholarship*, *44*, 171-179. doi:10.1111/j.1547-5069.2012.01449.x

Leins, D. A., Fisher, R. P., Pludwinski, L., Rivard, J., & Robertson, B. (2014). Interview protocols to facilitate human intelligence sources' recollections of meetings. Applied Cognitive Psychology, 28, 926-935. doi:10.1002/acp.3041

Lenert, L., & Sundwall, D. N. (2012). Public health surveillance and meaningful use regulations: A crisis of opportunity. *American Journal of Public Health*, *102*, 1-7. doi:10.2105/AJPH.2011.300542

Lewis, S. (2015). Qualitative inquiry and research design: Choosing among five approaches. *Health Promotion Practice*, *16*, 473-475. doi:10.1177/1524839915580941

Leykum, L. K., Palmer, R., Lanham, H., Jordan, M., McDaniel, R. R., Noël, P. H., & Parchman, M. (2011). Reciprocal learning and chronic care model implementation in primary care: results from a new scale of learning in primary care. *BMC Health Services Research*, *11*, 44-50. doi:10.1186/1472-6963-11-44

Liebovitz, D. (2013). Meaningful ehr attributes for an era of accountability, transparency, shared decision making, and value assessment. *Journal of Legal Medicine*, *34*, 43-

53. doi:10.1080/01947648.2013.768145

Lim, M. C., Patel, R. P., Lee, V. S., Weeks, P. D., Barber, M. K., & Watnik, M. R. (2015). The long-term financial and clinical impact of an electronic health record on an academic ophthalmology practice. *Journal of Ophthalmology*, 2015, 1-7. doi:10.1155/2015/329819

Lin, C., Lin, I., & Roan, J. (2012). Barriers to physicians' adoption of healthcare information technology: An empirical study on multiple hospitals. *Journal of Medical Systems*, *36*, 1965-1977. doi:10.1007/s10916-011-9656-7

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.

Liu, C., Chung, Y., Chen, T., & Wang, S. (2012). The enhancement of security in healthcare information systems. *Journal of Medical Systems*, *36*, 1673-1688. doi:10.1007/s10916-010-9628-3

Liu, C. H., Tang, W. R., Wang, H. M., & Lee, K. C. (2013). How cancer patients build trust in traditional Chinese medicine. *European Journal of Integrative Medicine*, *5*, 495-500. doi:10.1016/j.eujim.2013.08.003

Lowe, S. S., Milligan, C., Watanabe, S. M., & Brearley, S. G. (2015). A Grounded Theory Approach to Physical Activity and Advanced Cancer: A Qualitative Study Protocol. *International Journal of Qualitative Methods*, *14*(5), 1-10. doi:10.1177/1609406915617161

Lub, V. (2015). Validity in qualitative evaluation: Linking purposes, paradigms, and perspectives. *International Journal of Qualitative Methods*, *14*, 1-8. doi:10.1177/1609406915621406

Luchenski, S., Balasanthiran, A., Marston, C., Sasaki, K., Majeed, A., Bell, D., & Reed, J. E. (2012). Survey of patient and public perceptions of electronic health records for healthcare, policy and research: Study protocol. *BMC Medical Informatics & Decision Making*, *12*, 40-45. doi:10.1186/1472-6947-12-40

Lyles, C., Schillinger, D., & Sarkar, U. (2015). Connecting the dots: Health information technology expansion and health disparities. *Plos Medicine*, *12*, 1-5. doi:10.1371/journal.pmed.1001852

Lynch, K., Kendall, M., Shanks, K., Haque, A., Jones, E., Wanis, M. G., & ... Mostashari, F. (2014). The health IT regional extension center program: Evolution and lessons for health care transformation. *Health Services Research*, *49*, 421-437. doi:10.1111/1475-6773.12140

MacKenzie, K., Buckby, S., & Irvine, H. (2013). Business research in virtual worlds: Possibilities and practicalities. *Accounting, Auditing & Accountability Journal*, *26*, 352-373. doi:10.1108/09513571311311856

MacNaughton, K., Chreim, S., & Bourgeault, I. L. (2013). Role construction and boundaries in interprofessional primary health care teams: A qualitative study. *BMC Health Services Research*, *13*(1), 1-23. doi:10.1186/1472-6963-13-486

Makam, A. N., Lanham, H. J., Batchelor, K., Moran, B., Howell-Stampley, T., Kirk, L., & ... Halm, E. A. (2014). The good, the bad and the early adopters: Providers' attitudes about a common, commercial EHR. *Journal of Evaluation in Clinical Practice*, *20*, 36-42. doi:10.1111/jep.12076

Makam, A. N., Lanham, H. J., Batchelor, K., Samal, L., Moran, B., Howell-Stampley, T.,

& ... Halm, E. A. (2013). Use and satisfaction with key functions of a common commercial electronic health record: A survey of primary care providers. *BMC Medical Informatics & Decision Making*, *13*(1), 1-7. doi:10.1186/1472-6947-13-86

Mandl, K. D., & Kohane, I. S. (2012). Escaping the ehr trap: The future of health it. *New England Journal of Medicine*, *366*, 2240-2242. doi:10.1056/NEJMp1203102

Manookian, A., Cheraghi, M. A., & Nasrabadi, A. N. (2014). Factors influencing patients' dignity: A qualitative study. *Nursing Ethics*, *21*, 323-334. doi:10.1177/0969733013498526

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. (2011). *Designing qualitative research* (5th ed.). Thousand Oaks, CA: Sage.

Martin, K., & Parmar, B. (2012). Assumptions in decision making scholarship: Implications for business ethics research. *Journal of Business Ethics, 105*, 289–306. doi:10.1007/s10551-011-0965-z

Martin, C. M., Vogel, C., Grady, D., Zarabzadeh, A., Hederman, L., Kellett, J., & ... O' Shea, B. (2012). Implementation of complex adaptive chronic care: The patient journey record system (PaJR). *Journal of Evaluation in Clinical Practice*, *18*, 1226-1234. doi:10.1111/j.1365-2753.2012.01880.x

Mathur, G., Jugdev, K., & Tak, S. F. (2013). Project management assets and project

management performance outcomes. *Management Research Review*, *36*, 112-135. doi:10.1108/01409171311292234

Mattox, E. (2012). Strategies for improving patient safety: Linking task type to error type. *Critical Care Nurse*, *32*, 52-78. doi:10.4037/ccn2012303

Matson, C., Stephens, M., Steiner, B., Kozakowski, S. M., & Davis, A. (2014). Electronic health records: How will students learn if they cannot practice? *Annals of Family Medicine*, *12*, 582-583. doi:10.1370/afm.1716

McAlearney, A. S., Hefner, J. L., Sieck, C. J., & Huerta, T. R. (2015). The journey through grief: Insights from a qualitative study of electronic health record implementation. *Health Services Research*, *50*, 462-488. doi:10.1111/1475-6773.12227

McConnell-Henry, T., Chapman, Y., & Francis, K. (2011). Member checking and heideggerian phenomenology: A redundant component. *Nurse Researcher*, *18*, 28-37. doi: 10.7748/nr2011.01.18.2.28.c8282

McCormack, M., Adams, A., & Anderson, E. (2013). Taking to the streets: The benefits of spontaneous methodological innovation in participant recruitment. *Qualitative Research*, *13*, 228-241. doi:10.1177/1468794112451038

McCowan, C., Thomson, E., Szmigielski, C. A., Kalra, D., Sullivan, F. M., Prokosch, H., & ... Ford, I. (2015). Using electronic health records to support clinical trials: A report on stakeholder engagement for ehr4cr. *Biomed Research International*, *2015*, 1-8. doi:10.1155/2015/707891

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

McGuire, M., Noronha, G., Samal, L., Yeh, H., Crocetti, S., & Kravet, S. (2013). Patient safety perceptions of primary care providers after implementation of an electronic medical record system. *JGIM: Journal of General Internal Medicine*, *28*, 184-192. doi:10.1007/s11606-012-2153-y

McKim, C. A. (2015). The value of mixed methods research: A mixed methods study. Journal of Mixed Methods Research. doi:10.1177/1558689815607096

Mealer, M., & Jones, J. (2014). Methodological and ethical issues related to qualitative telephone interviews on sensitive topics. *Nurse Researcher*, *21*, 32-37. doi:10.7748/nr2014.03.21.4.32.e1229

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*, 1-6. doi:10.1093/jamia/ocv103

Middleton, B., Bloomrosen, M., Dente, M. A., Hashmat, B., Koppel, R., Overhage, J. M., … Zhang, J. (2013). Enhancing patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA. *Journal of the American Medical Informatics Association*, *20*, 2-8. doi:10.1136/amiajnl-2012-001458

Mittal, S. (2013). Emergence in stigmergic and complex adaptive systems: A formal discrete event systems perspective. *Cognitive Systems Research*, *21*, 22-39. doi:10.1016/j.cogsys.2012.06.003

Moja, L., Liberati, E., Galuppo, L., Gorli, M., Maraldi, M., Nanni, O., & ... Koren Hyogene, K. (2014). Barriers and facilitators to the uptake of computerized clinical decision support systems in specialty hospitals: Protocol for a qualitative cross-sectional study. *Implementation Science*, *9*(1), 1-12. doi:10.1186/s13012-014-0105-0

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

Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology*, *52*, 250-260. doi:10.1037/0022-0167.52.2.250

Moustakas, C. E. (1994). *Phenomenological research methods.* Thousand Oaks, CA: Sage.

Moxham, C., Chambers, N., Girling, J., Garg, S., Jelfs, E., & Bremner, J. (2012). Perspectives on the enablers of e-heath adoption: An international interview study of leading practitioners. *Health Services Management Research*, *25*, 129-137. doi:10.1258/hsmr.2012.012018

Muhammad Zia, H., Telang, R., & Marella, W. M. (2015). Electronic Health Records and Patient Safety. *Communications of the ACM*, *58*, 30-32. doi:10.1145/2822515

Murray, M. F., Giovanni, M. A., Klinger, E., George, E., Marinacci, L., Getty, G., & ... Haas, J. S. (2013). Comparing electronic health record portals to obtain patient-entered family health history in primary care. *JGIM: Journal of General Internal Medicine*, *28*, 1558-1564. doi:10.1007/s11606-013-2442-0

Nakamura, M. M., Harper, M. B., Castro, A. V., Yu Jr., F. B., & Jha, A. K. (2015). Impact of the meaningful use incentive program on electronic health record adoption by us children's hospitals. *Journal of the American Medical Informatics Association*, *22*, 390-398. doi:10.1093/jamia/ocu045

Nan, N., Zmud, R., & Yetgin, E. (2014). A complex adaptive systems perspective of innovation diffusion: An integrated theory and validated virtual laboratory. *Computational & Mathematical Organization Theory*, *20*, 52-88. doi:10.1007/s10588-013-9159-9

Nelund, S. (2013). Doing home works: Extended exhibitions, ethnographic tools, and the role of the researcher. *Critical Arts: A South-North Journal of Cultural & Media Studies*, *27*, 753-767. doi:10.1080/02560046.2013.867595

Newington, L., & Metcalfe, A. (2014). Factors influencing recruitment to research: Qualitative study of the experiences and perceptions of research teams. *BMC Medical Research Methodology*, *14*(1), 1-20. doi:10.1186/1471-2288-14-10

Ng, L. C., Kanyanganzi, F., Munyanah, M., Mushashi, C., & Betancourt, T. S. (2014). Developing and validating the youth conduct problems scale-Rwanda: A mixed methods approach. *Plos ONE*, *9*, 1-8. doi:10.1371/journal.pone.0100549

Nirantharakumar, K. K., Chen, Y. F., Marshall, T. T., Webber, J. J., & Coleman, J. J.

(2012). Clinical decision support systems in the care of in patients with diabetes in non-critical care setting: Systematic review. *Diabetic Medicine*, *29*, 698-708. doi:10.1111/j.1464-5491.2011.03540.x

Noblin, A., Cortelyou-Ward, K., Cantiello, J., Breyer, T., Oliveira, L., Dangiolo, M., & ... Berman, S. (2013). EHR implementation in a new clinic: A case study of clinician perceptions. *Journal of Medical Systems*, *37*, 1-6. doi:10.1007/s10916-013-9955-2

Nolen, A., & Talbert, T. (2011). Qualitative assertions as prescriptive statements. *Educational Psychology Review*, *23*, 263-271. doi:10.1007/s10648-011-9159-6

Northrup, J. C., & Shumway, S. (2014). Gamer widow: A phenomenological study of spouses of online video game addicts. *American Journal of Family Therapy*, *42*, 269-281. doi:10.1080/01926187.2013.847705

O'Cathain, A., Goode, J., Drabble, S. J., Thomas, K. J., Rudolph, A., & Hewison, J. (2014). Getting added value from using qualitative research with randomized controlled trials: A qualitative interview study. *Trials*, *15*(1), 1-20. doi:10.1186/1745-6215-15-215

Oleinik, A., Popova, I., Kirdina, S., & Shatalova, T. (2014). On the choice of measures of reliability and validity in the content-analysis of texts. *Quality & Quantity*, *48*, 2703-2718. doi:10.1007/s11135-013-9919-0

Onwugbuzie, A. J., & Byers, V. T. (2014). An exemplar for combining the collection, analysis, and interpretations of verbal and nonverbal data in qualitative research. *International Journal of Education*, *6*, 183-246. doi:10.5296/ije.v6il.4399

O'Reilly, M., & Parker, N. (2012). Unsatisfactory saturation: A critical exploration of

the notion of saturated sample sizes in qualitative research. *Qualitative Research*, *13*, 190-197.doi:10.1177/1468794112446106

Orfield, C., Hula, L., Barna, M., & Hoag, S. (2015). The affordable care act and access to care for people changing coverage sources. *American Journal of Public Health*, *105*, 651-657. doi:10.2105/AJPH.2015.302867

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

Ozair, F. F., Jamshed, N., Sharma, A., & Aggarwal, P. (2015). Ethical issues in electronic health records: A general overview. *Perspectives in Clinical Research*, *6*, 73-76. doi:10.4103/2229-3485.153997

Paina, L., & Peters, D. H. (2012). Understanding pathways for scaling up health services through the lens of complex adaptive systems. *Health Policy and Planning*, *27*, 365-373. doi:10.1093/heapol/czr054

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. *Adm Policy Ment Health*. doi:10.1007/s10488-013-0528-y

Palombo, J. (2013). The self as a complex adaptive system part I: Complexity, metapsychology, and developmental theories. *Psychoanalytic Social Work*, *20*(1), 1-25. doi:10.1080/15228878.2012.749184

Parke, A., & Griffiths, M. (2012). Beyond illusion of control: An interpretative phenomenological analysis of gambling in the context of information technology. *Addiction Research & Theory*, *20*, 250-260. doi:10.3109/16066359.2011.600480

Pate, D. C. (2012). Hospital-physician relations in a post-health care reform environment. *Journal of Legal Medicine*, *33*, 7-20. doi:10.1080/01947648.2012.657595

Patel, V., Dhopeshwarkar, R., Edwards, A., Barrón, Y., Sparenborg, J., & Kaushal, R. (2012). Consumer support for health information exchange and personal health records: A regional health information organization survey. *Journal of Medical Systems*, *36*, 1043-1052. doi:10.1007/s10916-010-9566-0

Patel, V., Jamoom, E., Hsiao, C., Furukawa, M., & Buntin, M. (2013). Variation in electronic health record adoption and readiness for meaningful use: 2008-2011. *JGIM: Journal of General Internal Medicine*, *28*, 957-964. doi:10.1007/s11606-012-2324-x

Patel, M. R., Shah, K. S., & Shallcross, M. L. (2015). A qualitative study of physician perspectives of cost-related communication and patients' financial burden with managing chronic disease. *BMC Health Services Research*, 151-157. doi:10.1186/s12913-015-1189-1

Patton, M. (2002). *Qualitative research and evaluation methods*. London: Sage.

Pedersen, C. A., Schneider, P. J., & Scheckelhoff, D. J. (2014). Ashp national survey of pharmacy practice in hospital settings: Prescribing and transcribing-2013. *American Journal of Health-System Pharmacy*, *71*, 924-942.

doi:10.2146/ajhp140032

Peikes, D. N., Reid, R. J., Day, T. J., Cornwell, D. F., Dale, S. B., Baron, R. J., & ... Shapiro, R. J. (2014). Staffing patterns of primary care practices in the comprehensive primary care initiative. *Annals of Family Medicine*, *12*, 142-149. doi:10.1370/afm.1626

Pemberton, K., & Fox, J. E. (2013). The experience and management of emotions on an inpatient setting for people with anorexia nervosa: A qualitative study. *Clinical Psychology & Psychotherapy*, *20*, 226-238. doi:10.1002/cpp.794

Penman-Aguilar, A., Macaluso, M., Peacock, N., Snead, M., & Posner, S. F. (2014). A novel approach to mixing qualitative and quantitative methods in hiv and sti prevention research. *AIDS Education & Prevention*, *26*, 95-108. doi:10.1521/aeap.2014.26.2.95

Perry, K. J., Hickson, M. M., & Thomas, J. J. (2011). Factors enabling success in weight management programmes: Systematic review and phenomenological approach. *Journal of Human Nutrition & Dietetics*, *24*, 301-302. doi:10.1111/j.1365-277X.2011.01175_32.x

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

Petty, N. J., Thomson, O. P., & Stew, G. (2012). Ready for a paradigm shift? part 2: Introducing qualitative research methodologies and methods, *Manual Therapy*, *17*, 378-384. doi:10.1016/j.math.2012.03.004

Piña, l. L., Cohen, P. D., Larson, D. B., Marion, L. N., Sills, M. R., Solberg, L. I., & Zerzan, J. (2015). A framework for describing health care delivery organizations and systems. *American Journal of Public Health*, *105*, 670-679. doi:10.2105/AJPH.2014.301926

Pinfield, S., Cox, A. M., & Smith, J. (2014). Research data management and libraries: Relationships, activities, drivers and influences. *Plos ONE*, *9*(12), 1-28. doi:10.1371/journal.pone.0114734

Piscotty, R. J., Kalisch, B., & Gracey-Thomas, A. (2015). Impact of healthcare information technology on nursing practice. *Journal of Nursing Scholarship*, *47*, 287-293. doi:10.1111/jnu.12138

Polacek, G. A., Gianetto, D. A., Khashanah, K., & Verma, D. (2012). On principles and rules in complex adaptive systems: A financial system case study. *Systems Engineering*, *15*, 433-447. doi:10.1002/sys.21213

Porter, S. (2013). Aafp interview with farzad mostashari, md, ms, national coordinator for health information technology. *Annals of Family Medicine*, *11*, 387-388. doi:10.1370/afm.1560

Postholm, M. B., & Skrøvset, S. (2013). The researcher reflecting on her own role during action research. *Educational Action Research*, *21*, 506-518. doi:10.1080/09650792.2013.833798

Qu, S., & Dumay, J. (2011). The qualitative research interview. *Qualitative Research in Accounting & Management*, *8*, 238-264. doi:10.1108/11766091111162070

Quimby, E. (2012). Qualitative research journals. *Doing Qualitative Community Research*, 197–201. doi:10.2174/978160805258511201010197

Raaijmakers, L. M., Hamers, F. M., Martens, M. K., Bagchus, C., de Vries, N. K., & Kremers, S. J. (2013). Perceived facilitators and barriers in diabetes care: A qualitative study among health care professionals in the netherlands. *BMC Family Practice*, *14*, 114-122. doi:10.1186/1471-2296-14-114

Rameshwara, G. N., Kumar, N., & Raghavendra, B. (2015). Effects of computerized patient records on patients. *Bonfring International Journal of Man Machine Interface*, *3*, 25-29. doi:10.9756/bijmmi.8068

Ramdorai, A., & Herstatt, C. (2015). Disruptive innovations theory. *Frugal Innovation in Healthcare*, 27-38. doi:10.1007/978-3-319-16336-9_3

Rhee, J. J., Zwar, N. A., & Kemp, L. A. (2012). Uptake and implementation of advance care planning in Australia: Findings of key informant interviews. *Australian Health Review*, *36*, 98-104. doi:10.1071/AH11019

Richards, R., Prybutok, V., & Ryan, S. (2012). Electronic medical records: Tools for competitive advantage. *International Journal of Quality and Service Sciences*, *4*, 120-136. doi:10.1108/17566691211232873

Rockenbach, A. B., Walker, C. R., & Luzader, J. (2012). A phenomenological analysis of college students' spiritual struggles. *Journal of College Student Development*, *53*, 55-75. doi: 10.1353/csd.2012.0000

Romero, E., & Ruiz, M. C. (2013). Framework for applying a complex adaptive system approach to model the operation of eco-industrial parks. *Journal of Industrial Ecology*, *17*, 731-741. doi:10.1111/jiec.12032

Rose, D., Richter, L. T., & Kapustin, J. (2014). Patient experiences with electronic medical records: Lessons learned. *Journal of The American Association of Nurse Practitioners*, *26*, 674-680. doi:10.1002/2327-6924.12170

Roshanov, P. S., Gerstein, H. C., Hunt, D. L., Sebaldt, R. J., & Haynes, R. (2012). Impact of a computerized system for evidence-based diabetes care on completeness of records: A before--after study. *BMC Medical Informatics & Decision Making*, 12, 63-72. doi:10.1186/1472-6947-12-63

Rothbard, A. B., Noll, E., Kuno, E., Zubritsky, C., Hurford, M. O., Holzer, C., & Hadley, T. (2013). Implementing an E-prescribing system in outpatient mental health programs. *Administration and Policy in Mental Health and Mental Health Services Research, 40*, 168-178. doi:http://dx.doi.org/10.1007/s10488-011-0392-6

Roulston, K., & Shelton, S. A. (2015). Reconceptualizing bias in teaching qualitative research methods. *Qualitative Inquiry*, *21*, 332-342. doi:10.1177/1077800414563803

Rowley, J. (2012). Conducting research interviews. *Management Research Review*, *35*, 260-271. doi:10.1108/01409171211210154

Rudin, R. S., Motala, A., Goldzweig, C. L., & Shekelle, P. G. (2014). Usage and effect of health information exchange. *Annals of Internal Medicine*, *161*, 803-811. doi:10.7326/M14-0877

Ryan, G. S. (2013). Online social networks for patient involvement and recruitment in clinical research. *Nurse Researcher*, *21*, 35–39. doi:10.7748/nr2013.09.21.1.35.e302

Rydwik, E. E., Bergland, A. A., Forsén, L. L., & Frändin, K. K. (2012). Investigation into the reliability and validity of the measurement of elderly people's clinical walking speed: A systematic review. *Physiotherapy Theory & Practice*, *28*, 238-256. doi:10.3109/09593985.2011.601804

Saada, A., Lieu, T. A., Morain, S. R., Zikmund-Fisher, B. J., & Wittenberg, E. (2015). Parents' choices and rationales for alternative vaccination schedules: A qualitative study. *Clinical Pediatrics*, *54*, 236-243. doi:10.1177/0009922814548838

Samnani, A., & Singh, P. (2013). Exploring the fit perspective: An ethnographic approach. *Human Resource Management*, *52*, 123-144. doi:10.1002/hrm.21516

Sao, D., Gupta, A., & Gantz, D. A. (2013). Interoperable electronic health care record: A case for adoption of a national standard to stem the ongoing health care crisis. *Journal of Legal Medicine*, *34*, 55-90. doi:10.1080/01947648.2013.768153

Sargeant, J. (2012) Qualitative research part II: Participants, analysis, and quality assurance. *Journal of Graduate Medical Education*, *4*(1), 1-3. doi:10.4300/JGME-D-11-00307.1

Savage, N. (2012). Better medicine through machine learning. *Communications of the ACM*, *55*, 17-19. doi:10.1145/2063176.2063182

Seidman, J. (2012). Achieving meaningful use of health information technology. *Archives of Internal Medicine*, *172*, 731. doi:10.1001/archinternmed.2012.872

Schnall, R., & Bakken, S. (2011). Testing the technology acceptance model: Hiv case managers' intention to use a continuity of care record with context-specific links. *Informatics for Health & Social Care*, *36*, 161-172. doi:10.3109/17538157.2011.584998

Scholz, S., Ngoli, B., & Flessa, S. (2015). Rapid assessment of infrastructure of primary health care facilities: A relevant instrument for health care systems management. *BMC Health Services Research*, *15*(1), 1-10. doi:10.1186/s12913-015-0838-8

Scrutton, R., & Beames, S. (2015). Measuring the unmeasurable: Upholding rigor in quantitative studies of personal and social development in outdoor adventure education. *Journal of Experiential Education*, *38*, 8-25. doi:10.1177/1053825913514730

Shane, D. M., & Ayyagari, P. (2015). Spillover effects of the affordable care act? Exploring the impact on young adult dental insurance coverage. *Health Services Research*, *50*, 1109-1124. doi:10.1111/1475-6773.12266

Sharp, R., Grech, C., Fielder, A., Mikocka-Walus, A., Cummings, M., & Esterman, A. (2014). The patient experience of a peripherally inserted central catheter (PICC): A qualitative descriptive study. Contemporary Nurse: *A Journal for the Australian Nursing Profession*, *48*, 26-35. doi:10.5172/conu.2014.48.1.26

Shaw, J., & Connelly, D. (2012). Phenomenology and physiotherapy: Meaning in research and practice. *Physical Therapy Reviews*, *17*, 398-408. doi:10.1179/1743288X12Y.0000000043

Shea, C. M., Reiter, K. L., Weaver, M. A., McIntyre, M., Mose, J., Thornhill, J., & ...

Weiner, B. J. (2014). Stage 1 of the meaningful use incentive program for electronic health records: A study of readiness for change in ambulatory practice settings in one integrated delivery system. *BMC Medical Informatics & Decision Making*, *14*(*1*), 1-14. doi:10.1186/s12911-014-0119-1

Shen, X., Dicker, A. P., Doyle, L., Showalter, T. N., Harrison, A. S., & DesHarnais, S. I. (2012). Pilot study of meaningful use of electronic health records in radiation oncology. *Journal of Oncology Practice*, 8, 219-223. doi:10.1200/JOP.2011.000382

Shields, P., & Rangarjan, N. (2013). *A playbook for research methods: Integrating conceptual frameworks and project management*. Stillwater, OK: New Forums Press.

Siddiqui, N., & Fitzgerald, J. A. (2014). Elaborated integration of qualitative and quantitative perspectives in mixed methods research: A profound enquiry into the nursing practice environment. *International Journal of Multiple Research Approaches*, *8*, 137-147. doi:10.5172/mra.2014.8.2.137

Silverman, R. D. (2013). Ehrs, emrs, and health information technology: To meaningful use and beyond. *Journal of Legal Medicine*, *34*(1), 1-6. doi:10.1080/01947648.2013.768134

Simpao, A., Ahumada, L., Gálvez, J., & Rehman, M. (2014). A Review of analytics and clinical informatics in health care. *Journal of Medical Systems*, *38*, 1-7. doi:10.1007/s10916-014-0045-x

Sinard, J. H., Castellani, W. J., Wilkerson, M. L., & Henricks, W. H. (2015). Stand-alone laboratory information systems versus laboratory modules incorporated in the electronic health record. *Archives of Pathology & Laboratory Medicine*, *139*, 311-318. doi:10.5858/arpa.2013-0711-SO

Singh, H., Ash, J. S., & Sittig, D. F. (2013). Safety assurance factors for electronic health record resilience (safer): Study protocol. *BMC Medical Informatics & Decision Making*, *13*(1), 1-8. doi:10.1186/1472-6947-13-46

Singh, R., Singh, A., Singh, D. R., & Singh, G. (2013). Improvement of workflow and processes to ease and enrich meaningful use of health information technology. *Advances in Medical Education & Practice*, 4231-236. doi:10.2147/AMEP.S53307

Sittig, D. F., & Singh, H. (2012). Electronic health records and national patient-safety goals. *New England Journal of Medicine*, *367*, 1854–1860. doi:10.1056/nejmsb1205420

Smith, J. A., Wilde, M. H., & Brasch, J. (2012). Internet recruitment and retention for a 6 months' longitudinal study. *Journal of Nursing Scholarship*, *44*, 165-170. doi:10.1111/j.1547-5069.2012.01446.x

Sousa, D. (2014). Validation in qualitative research: General aspects and specificities of the descriptive phenomenological method. *Qualitative Research in Psychology*, *11*, 211-227. doi:10.1080/14780887.2013.853855

Stack, R. J., Sahni, M., Mallen, C. D., & Raza, K. (2013). Symptom complexes at the earliest phases of rheumatoid arthritis: A synthesis of the qualitative literature. *Arthritis & Rheumatism*, *65*, 1916-1926. doi:10.1002/acr.22097

Strauss, A. T., Martinez, D. A., Garcia-Arce, A., Taylor, S., Mateja, C., Fabri, P. J., & Zayas-Castro, J. L. (2015). A user needs assessment to inform health information exchange design and implementation. *BMC Medical Informatics & Decision Making*, 1-11. doi:10.1186/s12911-015-0207-x

Street, R. L., Liu, L., Farber, N. J., Chen, Y., Calvitti, A., Zuest, D., … Agha, Z. (2014). Provider interaction with the electronic health record: The effects on patient-centered communication in medical encounters. *Patient Education and Counseling*, *96*, 315-319. doi:10.1016/j.pec.2014.05.004

Struik, M. L., Koster, F., Jantine Schuit, A., Nugteren, R., Veldwijk, J., & Lambooij, M. S. (2014). The preferences of users of electronic medical records in hospitals: Quantifying the relative importance of barriers and facilitators of an innovation. *Implementation Science*, *9*(1), 1-22. doi:10.1186/1748-5908-9-69

Sturmberg, J., & Lanham, H. J. (2014). Understanding health care delivery as a complex system. *Journal of Evaluation in Clinical Practice*, *20*, 1005-1009. doi:10.1111/jep.12142

Sturmberg, J. P., Martin, C. M., & Katerndahl, D. A. (2014). Systems and complexity thinking in the general practice literature: An integrative, historical narrative review. *Annals of Family Medicine*, *12*, 66-74. doi:10.1370/afm.1593

Svensson, L. & Doumas, K. (2013). Contextual and analytic qualities of research

methods exemplified in research on teaching. *Qualitative Inquiry*, *19*, 441-450. doi:10.1177/1077800413482097

Swauger, M. (2011). Afterword: The ethics of risk, power, and representation. *Qualitative Sociology*, *34*, 497-502. doi:10.1007/s11133-011-9201-5

Sultan, N., & van de Bunt-Kokhuis, S. (2012). Organisational culture and cloud computing: Coping with a disruptive innovation. *Technology Analysis & Strategic Management*, *24*, 167-179. doi:10.1080/09537325.2012.647644

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

Takian, A., Petrakaki, D., Cornford, T., Sheikh, A., & Barber, N. (2012). Building a house on shifting sand: Methodological considerations when evaluating the implementation and adoption of national electronic health record systems. *BMC Health Services Research*, *12*, 105-115. doi:10.1186/1472-6963-12-105

Terry, N. P. (2013). Meaningful adoption: What we know or think we know about the financing, effectiveness, quality, and safety of electronic medical records. *Journal of Legal Medicine*, *34*, 7-42. doi:10.1080/01947648.2013.768143

Tevaarwerk, A. J., Wisinski, K. B., Buhr, K. A., Njiaju, U. O., Tun, M., Donohue, S., & ... Sesto, M. E. (2014). Leveraging electronic health record systems to create and provide electronic cancer survivorship care plans: A pilot study. *Journal of Oncology Practice*, *10*, 150-159. doi:10.1200/JOP.2013.001115

Tharp, J. (2014). Stark law and the affordable care act: Bridging the disconnect. *Journal of Legal Medicine*, *35*, 433-444. doi:10.1080/01947648.2014.936266

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

Thomas, E., & Magilvy, J. K. (2011). Qualitative rigor or research validity in qualitative research. *Journal for Specialists in Pediatric Nursing*, *16*, 151-155. doi:10.1111/j.1744-6155.2011.00283.x

Titze, K., Schenck, S., Logoz, M., & Lehmkuhl, U. (2014). Assessing the quality of the parent-child relationship: Validity and reliability of the child-parent relationship test (ChiP-C). *Journal of Child & Family Studies*, *23*, 917-933. doi:10.1007/s10826-013-9749-7

Trainor, A., & Bouchard, K. A. (2013). Exploring and developing reciprocity in research design. *International Journal of Qualitative Studies in Education*, *26*, 986-1003. doi:10.1080/09518398.2012.724467

Traynor, K. (2012). Solid data lacking on HIT and patient safety. *American Journal of Health-System Pharmacy*, *69*, 91-92. doi:10.2146/news120006

Trier-Bieniek, A. (2012). Framing the telephone interview as a participant-centred tool for qualitative research: A methodological discussion. *Qualitative Research*, *12*, 630–644. doi:10.1177/1468794112439005

Tsai, J., & Rosenheck, R. (2014). Uninsured veterans who will need to obtain insurance coverage under the patient protection and affordable care act. *American Journal of Public Health*, *104*, 57-62. doi:10.2105/AJPH.2013.301791

Tufford, L., & Newman, P. (2012). Bracketing in qualitative research. *Qualitative Social Work*, *11*, 80-96. doi:10.1177/1473325010368316

Vachon, B., Désorcy, B., Camirand, M., Rodrigue, J., Quesnel, L., Guimond, C., & ... Grimshaw, J. (2013). Engaging primary care practitioners in quality improvement: Making explicit the program theory of an interprofessional education intervention. *BMC Health Services Research*, *13*(1), 1-12. doi:10.1186/1472-6963-13-106

Vakili, G., Tabatabaee, F., & Khorsandi, S. (2013). Emergence of cooperation in peer-to-peer systems: A complex adaptive system approach. *Systems Engineering*, *16*, 213-223. doi:10.1002/sys.21225

Vance, C. M. (2013). The birth of disruptive innovation theory. *Journal of Management Inquiry*, *22*, 356–356. doi:10.1177/1056492613488721

Volkman, J. E., Luger, T. M., Harvey, K. L., Hogan, T. P., Shimada, S. L., Amante, D., & ... Houston, T. K. (2014). The national cancer institute's health information national trends survey: A national cross-sectional analysis of talking to your doctor and other healthcare providers for health information. *BMC Family Practice*, *15*, 2-16. doi:10.1186/1471-2296-15-11

Vollmer, S. H., & Howard, G. (2010). Statistical power, the Belmont report, and the ethics of clinical trials. *Science & Engineering Ethics*, *16*, 675-691. doi:10.1007/s11948-010-9244-0

Wagner, W., Hansen, K., & Kronberger, N. (2014). Quantitative and qualitative research across cultures and languages: Cultural metrics and their application. *Integrative*

Psychological & Behavioral Science, *48*, 418-434. doi:10.1007/s12124-014-9269-z

Walker, J. L. (2012). Research column: The use of saturation in qualitative research. *Canadian Journal of Cardiovascular Nursing*, *22*, 37-41. Retrieved from http://www.cccn.ca/content.php?doc=21

Wang, J. J., Cha, J., Sebek, K. M., McCullough, C. M., Parsons, A. S., Singer, J., & Shih, S. C. (2014). Factors related to clinical quality improvement for small practices using an ehr. *Health Services Research*, *49*, 1729-1746. doi:10.1111/1475-6773.12243

Watkins, D. (2012). Qualitative research: The importance of conducting research that doesn't "count". *Health Promotion Practice*, *13*, 153-158. doi:10.1177/1524839912437370

Watson, S., Bennett, C.J., & Al-Harbi, A. (2014) Understanding the factors affecting employees' perceived benefits of healthcare information technology. *International Journal of Healthcare Management*, *7*, 35-44. doi: 10.1179/2047971913Y.0000000051

Watson, D., Wagner, D., & Rivers, M. (2013). Understanding the critical ingredients for facilitating consumer change in housing first programming: A case study approach. *Journal of Behavioral Health Services & Research*, *40*, 169-179. doi:10.1007/s11414-012-9312-0

Weaver, B., Lindsay, B., & Gitelman, B. (2012). Communication technology and social media: Opportunities and implications for healthcare systems. *Online Journal of*

Issues in Nursing, *17*, 1. doi:10.3912/OJIN.Vol17No03Man03

Wedig, G. J. (2013). The value of consumer choice and the decline in hmo enrollments. *Economic Inquiry*, *51*, 1066-1086. doi:10.1111/j.1465-7295.2011.00437.x

Wei, Q., Wang, X., & Hu, X. (2014). Adaptive hybrid complex projective synchronization of chaotic complex system. *Transactions of the Institute of Measurement & Control*, *36*, 1093-1097. doi:10.1177/0142331214534722

Wells, A. (2013). The importance of design thinking for technological literacy: A phenomenological perspective. *International Journal of Technology & Design Education*, *23*, 623-636. doi:10.1007/s10798-012-9207-7

Westbrook, J. I., Reckmann, M., Ling, L., Runciman, W. B., Burke, R., Lo, C., & ... Day, R. O. (2012). Effects of two commercial electronic prescribing systems on prescribing error rates in hospital in-patients: A before and after study. *Plos Medicine*, *9*(1), 1-11. doi:10.1371/journal.pmed.1001164

Whisenhunt, J. L., Chang, C. Y., Flowers, L. R., Brack, G. L., O'Hara, C., & Raines, T. C. (2014). Working with clients who self-injure: A grounded theory approach. *Journal of Counseling & Development*, *92*, 387-397. doi:10.1002/j.1556-6676.2014.00165.x

White, R. (2007). *The challenges associated with health information portability accountability act compliance at Maryland acute care facilities* (Doctoral dissertation). Available from ProQuest Dissertation and Theses database. (UMI No. 3288712)

Wilkinson, S. L., Vij, V., & Steele, W. R. (2012). Donors' perspectives on their

postdonation information (PDI) event: A qualitative interview study of PDI donors. *Transfusion*, *52*, 1062-1069. doi:10.1111/j.1537-2995.2011.03430.x

Wilson, C. (2014). Semi-structured interviews. *Interview Techniques for Ux Practitioners*, *2014*, 23–41. doi:10.1016/b978-0-12-410393-1.00002-8

Wilson, E. L., Egger, J. R., Konty, K. J., Paladini, M., Weiss, D., & Trang Q., N. (2014). Description of a school nurse visit syndromic surveillance system and comparison to emergency department visits, New York City. *American Journal of Public Health*, *104*, 50-56. doi:10.2105/AJPH.2013.301411

Winkler, R., & Botha, C. F. (2013). Phenomenology and its futures. *South African Journal of Philosophy*, *32*, 291-294. doi:10.1080/02580136.2013.867393

Wisdom, J. P., Cavaleri, M. A., Onwuegbuzie, A. J., & Green, C. A. (2012). Methodological reporting in qualitative, quantitative, and mixed methods health services research articles. *Health Services Research*, *47*, 721-745. doi:10.1111/j.1475-6773.2011.01344.x

Wootton, R. (2012). Twenty years of telemedicine in chronic disease management: An evidence synthesis. *Journal of Telemedicine and Telecare*, *18*, 211–220. doi:10.1258/jtt.2012.120219

Wright, A., Feblowitz, J., Samal, L., McCoy, A. B., & Sittig, D. F. (2014). The medicare electronic health record incentive program: Provider performance on core and menu measures. *Health Services Research*, *49*, 325-346. doi:10.1111/1475-6773.12134

Xierali, I. M., Chun-Ju, H., Puffer, J. C., Green, L. A., Rinaldo, J. B., Bazemore, A. W.,

& ... Phillips Jr, R. L. (2013). The rise of electronic health record adoption among family physicians. *Annals of Family Medicine*, *11*, 14-19. doi:10.1370/afm.1461

Xierali, I. M., Phillips, R. L., Green, L. A., Bazemore, A. W., & Puffer, J. C. (2013). Factors influencing family physician adoption of electronic health records (EHRs). *The Journal of the American Board of Family Medicine*, *26*, 388–393. doi:10.3122/jabfm.2013.04.120351

Yang, S. (2013). Surviving as a qualitative researcher in a quantitative world: A personal reflection. *International Journal of Social Research Methodology*, *16*, 81-85. doi:10.1080/13645579.2012.709803

Yao, L., Zhang, Y., Li, Y., Sanseau, P., & Agarwal, P. (2011). Electronic health records: Implications for drug discovery. *Drug Discovery Today*, *16*, 594–599. doi:10.1016/j.drudis.2011.05.009

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

Yoon, D., Park, I., Schuemie, M. J., Park, M. Y., Kim, J. H., & Park, R. W. (2013). A quantitative method for assessment of prescribing patterns using electronic health records. *Plos ONE*, *8*, 1-9. doi:10.1371/journal.pone.0075214

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 & Decision Making*, *15*(1), 1-10. doi:10.1186/s12911-015-0154-6

Zhivan, N. A., & Diana, M. L. (2012). U.S. hospital efficiency and adoption of health

information technology. *Health Care Management Science, 15*, 37-47. doi:10.1007/s10729-011-9179-2

Appendix A: Interview Questions

1. What are your experiences with the implementation of an EHR system within your practice?
2. What were your major barriers to implementing an EHR system?
3. How did you address the major barriers as you implemented the EHR system?
4. What effect has the EHR system had on your practice?
5. How effective is the EHR system in your practice?
6. What incentives were the most effective for obtaining your use of the EHR system on the local level?
7. How has your daily workflow processes changed since transitioning to EHR?
8. What is the comparison of time spent with patients before and after EHR implementation?
9. What business processes did you eliminate or create when you implemented the EHR system?
10. What advice can you offer other primary care physicians who are considering implementing an EHR system?
11. In terms of overall office and physician productivity time and cost, what is the comparison of the physician typing or office staff scanning information into an EHR system versus dictating a record for electronic transcription into an EHR?
12. How do you view possible consequences of non-compliance with adopting an EHR system?

13. What more would you like to add that would be beneficial to this study?

Appendix B: Interview Protocol

Interview: Adoption of Electronic Health Record Systems within Primary Care Practices	
What you will do	**What you will say—script**
• Introduce the interview and set the stage • Give the applicant the opportunity to introduce themselves	My name is Marvin Leon Reid Jr., and I appreciate you taking time out of your schedule to participate in my research project". I am studying why PCPs were slow to adopt EHRs. My central research question that will drive this study is: Why are primary care physicians slow to adopt EHRs? I will ask 13 open-ended questions you. I have been a student of Walden University for approximately 4.5 years. I have worked in the field of information technology for 13 years, being part of numerous IT adoption projects. Just to reiterate, you have consented to become part of this research project by agreeing to be interviewed. Remember, your participation in this project is voluntary, and you may withdraw from the study at any time prior to data analysis stage. Do you have any questions about the informed consent form that I previously sent to you or the informed consent process? I will audio record this interview along with taking notes. Your participation along with this interview is a private matter, and I will keep these proceedings confidential. Do you have any questions or concerns about the confidentiality of your participation? Do you have any questions or concerns about anything that I have discussed with you thus far? Let us begin with the questions.
• Paraphrase as needed • Ask follow-up probing questions to get more in-depth	1. What are your experiences with the implementation of an EHR system within your practice?
	2. What were your major barriers to implementing an EHR system?
	3. How did you address the major barriers as you implemented the EHR system?
	4. What effect has the EHR system had on your practice?

	5. How effective is the EHR system in your practice?
	6. What incentives were the most effective for obtaining your use of the EHR system on the local level?
	7. How has your daily workflow processes changed since transitioning to EHRs?
	8. What is the comparison of time spent with patients before and after EHR implementation?
	9. What business processes did you eliminate or create when you implemented the EHR system?
	10. What advice can you offer other primary care physicians who are considering implementing an EHR system?
	11. In terms of overall office and physician productivity time and cost, what is the comparison of the physician typing or office staff scanning information into an EHR system versus dictating a record for electronic transcription into an EHR?
	12. How do you view possible consequences of non-compliance with adopting an EHR system?
	13. What more would you like to add that would be beneficial to this study?
Wrap up interview thanking participant	This concludes our interview session.
Schedule follow-up member checking interview	I will transcribe this interview and provide a summary of your responses to each of the questions to you via email within three business days from today so that you can make certain that I have captured the essence of your responses to the questions. If there are inconsistencies in my transcription and the intended meaning of your responses, we will have a follow-up interview so that you can provide clarification. Thank you for your time and I hope that you have a great rest of the day.

Appendix C: Invariant Constituents Table

Barriers to EHR Implementation

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Staff time for training on the system, learning curve	11	42%	P1, P3, P5, P6, P16, P17, P20, P21, P22, P23, P26
Staff or provider resistance	11	42%	P3, P4, P5, P6, P7, P8, P9, P12, P15, P18, P20
Concerns about costs of EHR system, staff training, and/or reduced productivity	10	39%	P2, P4, P7, P8, P11, P12, P18, P20, P25, P26
Frequent, costly upgrades and retraining	7	27%	P1, P7, P11, P17, P18, P20, P21
Providers or staff lacking in computer skills	5	19%	P1, P5, P12, P20, P21
Initial decrease in productivity	5	19%	P12, P13, P18, P20, P22
Technical issues, system failures	3	12%	P13, P17, P22
Usability issues with EHR interface not fitting practice needs	3	12%	P19, P21, P23
Inadequate training	2	8%	P14, P16
Selecting the most suitable EHR system for the practice	2	8%	P18, P25
Implementation is too time consuming	2	8%	P2, P26
Meeting federal regulatory requirements such as HIPAA, meaningful use	2	8%	P11, P18
Transferring old chart data into new system	2	8%	P17, P26
Potential security issues compromising patient confidentiality	1	4%	P7
Attempting to implement the system too quickly	1	4%	P14
EHR system incompatible with other	1	4%	P24

software used by practice such as billing			
Inadequate support from the EHR team	1	4%	P10
Lack of adequate infrastructure to handle the EHR system	1	4%	P20
Not knowing where to start the process	1	4%	P25
Obtaining buy- in from partners	1	4%	P26
Potential impact on workflow is unpredictable	1	4%	P8

Strategies for Addressing EHR Implementation Barriers

Invariant Constituent	**Number of Participants Describing Experience**	**Percent of Participants Describing Experience**	**Participants Describing Experience**
Ensured adequate training to meet staff needs	6	23%	P3, P5, P17, P20, P21, P24
Educated resistant staff of the benefits of her	4	15%	P4, P7, P18, P20
Adapted EHR to fit specific practice needs	4	15%	P7, P17, P19, P25
Self-trained on the EHR system	3	12%	P9, P13, P15
Allowed staff and providers flexibility to accommodate needs and skills	3	12%	P3, P8, P26
Trained some staff as superusers to train or consult with other users	3	12%	P1, P17, P24
Learned shortcuts or developed workarounds to overcome system limitations	3	12%	P13, P14, P23
Established partnership with hospital to help fund EHR system	2	8%	P12, P21
Implemented EHR transition in phases	2	8%	P2, P19
Consulted with similar practices already using her	2	8%	P16, P25
Secured business grants or loans to fund EHR system	2	8%	P7, P25
Collaborated with IT and users to ensure appropriate infrastructure was in place	1	4%	P25
Identified practice needs, researched EHR systems that fit needs	1	4%	P20
Conducted cost/benefit analysis prior to selecting EHR system	1	4%	P8
Adjusted staff workflow to accommodate training	1	4%	P6

Positive Impacts of EHR on Practice

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Improved efficiency/productivity	12	46%	P1, P3, P4, P5, P7, P9, P10, P12, P13, P17, P18, P24
Easy, centralized access to complete patient file	11	42%	P1, P4, P5, P7, P9, P12, P13, P15, P16, P19, P20
Faster access to/analysis of data, communication with other providers	9	35%	P1, P4, P5, P12, P13, P17, P18, P21, P25
Improved accuracy of patient data, fewer errors	7	27%	P5, P7, P13, P16, P18, P21, P24
Increased continuity of care among different providers	6	23%	P2, P4, P13, P17, P18, P20
Faster patient communication and delivery of care	4	15%	P1, P15, P19, P20
Improved patient tracking	4	15%	P1, P6, P13, P16
Data entry/charting is easier, faster	3	12%	P4, P13, P18
Better patient experience/satisfaction	3	12%	P4, P9, P18
Better patient care (general)	3	12%	P16, P18, P20
Ability to spend more time with patients	3	12%	P9, P13, P24
Providers are happier, less stressed	1	4%	P4
Improved patient safety	1	4%	P18
Higher business revenue, lower costs	1	4%	P18
Ability to see higher volume of patients	1	4%	P7
Allows flexibility for staff and doctors	1	4%	P1

Negative Impacts of EHR on Practice

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Decreased productivity	8	31%	P10, P14, P16, P19, P21, P23, P25, P26
EHR system is not well-suited for practice needs	8	31%	P10, P13, P14, P17, P19, P20, P23, P24
EHR requires more of doctor's time	6	23%	P8, P11, P14, P19, P21, P25
Data entry/charting cumbersome, time consuming	5	19%	P6, P8, P10, P23, P25
EHR not cost-effective	5	19%	P8, P11, P12, P23, P25
Less interaction with patients	4	15%	P7, P10, P15, P20, P22
Data entry/documentation errors	4	15%	P10, P14, P16, P26
General usability issues	3	12%	P1, P9, P22
Technical issues cost time to fix	1	4%	P9

Overall Effectiveness of EHR

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
EHR has both benefits and drawbacks	11	42%	P2, P3, P7, P8, P11, P14, P17, P20, P23, P24, P25
Overall EHR is effective/efficient	11	42%	P2, P3, P7, P9, P12, P13, P16, P17, P20, P24, P26
EHR is necessary/important for quality practice	5	19%	P2, P15, P17, P20, P24
Too early to judge effectiveness; takes time to get used to system and maximize effectiveness	5	19%	P15, P16, P19, P23, P25
EHR is not cost-effective	2	8%	P11, P22
EHR can be effective under the right conditions	2	8%	P2, P22
Neutral-Gets the job done, not better or worse	2	8%	P12, P15

Workflow Changes Resulting From EHR Adoption

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
More time is spent on documentation, less on patient interaction	11	42%	P1, P2, P4, P7, P8, P14, P17, P20, P21, P22, P25
Time spent with patients unchanged after EHR implementation	8	31%	P3, P6, P8, P12, P14, P18, P19, P26
Provider enters chart information while patient is present	6	23%	P3, P9, P15, P16, P20, P23
Chart data can be entered after seeing patient, not during visit	4	15%	P12, P14, P15, P16
Some chart information must still be recorded on paper, causes inefficiency	4	15%	P7, P9, P17, P22
More time spent with patients since EHR implementation because computer charting is done in the room with the patient	3	12%	P9, P16, P23
EHR has increased doctors' work time	3	12%	P10, P15, P19
Charts require pre-preparation before seeing patients	3	12%	P8, P11, P15
Workflow has increased but fewer patients are seen because of increased documentation required	3	12%	P2, P11, P25
Main tasks are the same but workflow has changed significantly	2	8%	P8, P26
Nurses responsible for more business-related tasks after EHR implementation	2	8%	P1
Some work processes take longer because verbal orders must now be entered and approved in EHR	1	4%	P21
EHR has saved time tracking patient data	1	4%	P13

Business Process Changed through EHR

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Reduction or elimination of medical record clerical/storage	11	42%	P2, P7, P9, P12, P13, P15, P18, P19, P20, P21, P26
Reduction or elimination of transcription	6	23%	P4, P6, P8, P11, P12, P19
More IT personnel time needed to manage EHR	3	12%	P7, P15, P26
Reduction in claims/billing processes	2	8%	P24, P25
Business practices different but labor is the same	2	8%	P8, P17
Business process created for continuation of work when updating systems	1	4%	P20
Chart auditors added	1	4%	P23
Created extra layer in billing system	1	4%	P8
More work added than eliminated	1	4%	P21
Lobby kiosk added	1	4%	P3
Paper prescriptions and faxes eliminated	1	4%	P25
Fewer phone calls to different departments necessary	1	4%	P13

Comparison of Voice Dictation and Typing/Scanning into EHR

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Voice recognition system/dictation is more efficient	5	19%	P1, P2, P6, P12, P23
Typing/scanning is more efficient than dictation	5	19%	P7, P10, P13, P23, P24
Dictation is more accurate but more time consuming, expensive	3	12%	P7, P17, P23
Both transcription and dictation have to done for different reasons	2	8%	P22, P25
Dictation not an option due to confidentiality	1	4%	P10

Incentives Motivating Adoption of EHR

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Required by job/practice	8	31%	P5, P14, P15, P16, P17, P22, P23, P26
Federal mandate for Medicare reimbursement	7	27%	P8, P10, P22, P23
Medicare/Meaningful Use incentive grants	6	23%	P4, P7, P8, P11, P12, P17
No incentive	3	12%	P15, P19, P21
Better patient care/outcomes	2	8%	P13, P16
Other grant/monetary incentive	1	4%	P24

Perspectives on Consequences of EHR Non-Compliance

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Noncompliant practices will not be able to keep up	6	23%	P1, P2, P4, P7, P5, P20
Noncompliant practices will lose federal reimbursement	6	23%	P4, P15, P18, P21, P24, P25
Practices not in compliance will incur fines, loss of incentives	3	12%	P11, P13, P20
Practices in noncompliance will lose patients due to slower access to care	2	8%	P13, P14
Compliance will get easier as EHR systems will improve with time	2	8%	P17, P22
Compliance necessary to provide quality patient care	2	8%	P4, P18
Increased compliance will provide more data on EHR effectiveness	2	8%	P4, P14
Smaller practices unable to implement EHR will be bought out by larger practices	2	8%	P9, P14
Federal government should provide incentive rather than penalty for noncompliance	1	4%	P6
Benefits of compliance depends on CMA population, need for federal reimbursement	1	4%	P8

Advice Offered to PCPs Considering EHR

Invariant Constituent	Number of Participants Describing Experience	Percent of Participants Describing Experience	Participants Describing Experience
Carefully consider the system specifications that will fit your practice; extent of customization, compatibility with other systems, user friendliness	6	23%	P6, P12, P13, P19, P23, P25
Adequate training, including continued training and auditing, is essential	4	15%	P12, P17, P19, P20
Use an IT/EHR consultant to research and implement the best system for your practice	4	15%	P11, P18, P21, P22
Have a well-organized plan for implementation	3	12%	P8, P14, P22
Choose EHR system, IT consultant carefully	3	12%	P15, P21, P23
Consider hiring extra staff for support tasks	3	12%	P15, P21, P23
Ensure EHR system meets Meaningful Use criteria	3	12%	P4, P11, P18
Plan for lapse in productivity during implementation	2	8%	P10, P12
Employ a backup system for when technical issues or upgrades arise	2	8%	P2, P20
Accept technological innovation, be open to change	2	8%	P7, P14
Be realistic, EHR will not save time to see more patients	1	4%	P15
Doctors should create standard codes, regulations, financial implications to be captured in the EHR system	1	4%	P20
Doctors should have access to the EHR outside of hospital/office	1	4%	P1
Use staff to their highest abilities	1	4%	P19
Ensure adequate continuing maintenance/IT support for EHR system	1	4%	P18
Conduct cost-benefit analysis prior to purchasing system	1	4%	P8