Walden Dissertations and Doctoral Studies

2019

Electronic Health Record Implementation Strategies for Decreasing Healthcare Costs

Christopher A. Foster
Walden University

Follow this and additional works at: https://scholarworks.waldenu.edu/dissertations

Part of the Health and Medical Administration Commons

Walden University

College of Management and Technology

This is to certify that the doctoral study by

Christopher A. Foster

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. Krista Laursen, Committee Chairperson, Doctor of Business Administration Faculty

Dr. Brandon Simmons, Committee Member, Doctor of Business Administration Faculty

Dr. Matthew Knight, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2019

Abstract

Electronic Health Record Implementation Strategies for Decreasing Healthcare Costs

by

Christopher A. Foster

MS, Central Michigan University, 1988

BA, Norfolk State University, 1982

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

March 2019

Abstract

Some managers of primary care provider (PCP) facilities lack the strategies to implement electronic health records (EHRs), which could decrease healthcare costs and enhance the efficiency and quality of healthcare that patients receive. The purpose of this single-case study was to explore the strategies PCP managers used to implement EHRs to decrease healthcare costs. The population consisted of 5 primary care managers with responsibility for the administration, oversight, and direct working knowledge of EHRs in Central Florida. The conceptual framework was the technology acceptance model. Data were collected from semistructured face-to-face interviews and the review of company documents, including training logs, activity records, and cost information. Methodological triangulation was used to validate the creditability and interpretation of the data in transcribing themes. Three themes emerged from the analysis of study data: implementation of EHRs, costs of implementing EHRs, and perceived usefulness of EHRs. Participants indicated that the implementation of EHRs depended on motivation, financial cost, and the usefulness of EHRs relating to training that reflected user-friendliness. The implications of this study for social change include the potential to lower the cost and improve the efficiency of healthcare for patients. The use of EHR systems could enhance the quality of care delivered to patients through improved accessibility, elimination of duplicative tests, and retrieval of accurate patient information. The use of EHRs can lead to a comprehensive preventative healthcare system resulting in a healthier environment.

Electronic Health Record Implementation Strategies for Decreasing Healthcare Costs

by

Christopher A. Foster

MS, Central Michigan University, 1988

BA, Norfolk State University, 1982

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

March 2019

Dedication

Heart for the spirit. Not that I can't, but yes I can. Truly I must, therefore, I will. Have the indomitable spirit to always persevere. Thru the gravest of adversities and conscience of faith. I toil for spiritual embodiment and actualization of self. Adjoined with my better half that makes me whole. My wife, Cynthia, I dedicate this doctoral study to you. For allowing and providing me space, time, motivation, structure, love and unwavering support. To excel in the accomplishment and completion of the Doctor of Business Administration journey. A long road, less traveled.

Acknowledgments

Completion of this study would not have been possible without the generous and unwavering support of my doctoral committee. First, I wish to express my deepest gratitude to my committee chair, Dr. Krista Laursen, for being friendly, reliable, and accessible, never overbearing, and knowledgeable (frank). Dr. Krista raises the bar in group and personal engagement and interaction with students in the virtual environment. Second, I want to thank Dr. Brandon Simmons for recommendations that improved the overall quality of my study, and many thanks to Dr. Matt Knight for his thorough review as my URR. I want to acknowledge our program director, Dr. Susan Davis for her commitment to excellence of the DBA program. I also want to express a debt of gratitude to my former committee chair, Dr. Woo Yong Chung for guidance that helped me chart the direction of my study, and former committee member, Dr. Al Endres for his critiques that further improved my doctoral study. I want to thank the Walden IRB team for their explicit directional guidance for completing the IRB application process. I also wish to acknowledge and thank former program director, Dr. Freda Turner and Dr. Gene Fusch for providing thorough research support both online and during academic residencies. I also want to thank my friend and mentor, Dr. James Dugan for SPSS and research study support.

Table of Contents

List of Tables

List of Figures

Section 1: Foundation of the Study

The intent of the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 was accelerating the adoption and promoting the meaningful use (MU) of the Electronic Health Record (EHR). The HITECH Act continues to provide billions of dollars in financial incentives for healthcare providers nationwide who demonstrate that their EHR systems have a meaningful impact on care and costs (Mennemeyer, Menachemi, Rahurkar, & Ford, 2016; Mirani & Harpalani, 2014). Since the implementation of HITECH, office-based physicians have increasingly transitioned to the use of EHR systems (DesRoches, 2015). Accordingly, healthcare providers and members of the public require an understanding of the impact of EHR systems on decreasing healthcare costs.

Background of the Problem

Researchers cited advances in health information technology (HIT) as both improving the quality of care and increasing costs, but there is also evidence that HIT decreases health care costs, with EHR adoption being a primary contributor. Implementation costs represent a significant barrier to EHR adoption, especially for small and medium-size physician practices (Ajami & BagheriTadi, 2013; Wallace, Maxey, & Iyer, 2014). Although maximum incentives for physicians are $44,000 from Medicare and $63,750 from Medicaid, in a national survey about 45% of physicians spent more than $100,000 on their EHR systems (Cleveland, 2015). The Office of the National Coordinator for Health IT (ONCHIT) reported that in 2014, 5% of eligible physicians were willing to absorb penalties rather than invest in EHR systems (Cohen, 2015).

While researchers have provided insight into the national adoption rate of EHRs (Adler-Milstein, Green, & Bates, 2013; Baird & Nowak, 2014; Otto & Nevo, 2013; Thurston, 2014), limited research exists connecting EHR implementation strategies to decreasing healthcare costs in small to medium-sized physician office practices. These EHR implementation strategies may help physicians in small and medium-sized practices improve patient care by enabling physicians to reduce medical errors and improve the accuracy and clarity of medical records. These strategies may also help patients by increasing the accessibility of health information such as x-rays and prescriptions, reducing duplication of tests and delays in treatment, and by enabling evidence-based decision support that is necessary for both providers and patients.

Problem Statement

Primary care providers (PCPs) not using an EHR system are subject to financial penalties under the HITECH Act of 2009. For PCPs who did not use a certified EHR by 2018, the U.S. Government began deducting 5% of the total payment for all medical services that these nonadopter PCPs provide under the Medicare and Medicare program (Mennemeyer et al., 2016). The general business problem was that PCPs not adopting EHRs are increasing the costs of doing business. The specific business problem was that some PCP managers lack the strategies to implement EHRs to decrease healthcare costs.

Purpose Statement

The purpose of this qualitative, single-case study was to explore what strategies PCP managers use to implement EHRs to decrease healthcare costs. The study population included five PCP managers in a healthcare network located in Central Florida who have

successfully implemented an EHR system. The findings from this study may be helpful

for physicians in implementing the EHR mandated regulation and in facilitating the

expansion of the use of EHRs to lower the cost of healthcare to patients and to the

economy. At the same time, the use of EHR systems may also enhance the efficiency and

quality of health care that patients receive.

Nature of the Study

Researchers use qualitative methods to produce a rich and thick description of the

phenomena under study (Patton, 2002). The qualitative method was appropriate for this

study because the goal was to produce a rich thick description of strategies that PCP

managers use to implement EHR. The quantitative method is appropriate for a study

when the researcher intends to use statistical analyses to test hypotheses about variables'

relationships or differences (Scrutton & Beames, 2015). The quantitative method was not

appropriate for this study because I did not intend to test any hypotheses for examining

variables' differences or relationships. Researchers use the mixed method to combine or

associate both qualitative and quantitative forms of research (Siddiqui & Fitzgerald,

2014). The mixed method was not appropriate for this study because I did not need to use

the quantitative method for the purpose of this study.

Researchers use case studies to study the *what*, *how*, or *why* research question

(Yin, 2014). The case study research design was appropriate for this study because I

studied strategies that PCP managers use—that is, the *how*—to successfully implement

electronic health records that decrease healthcare costs. Researchers use

phenomenological design to derive knowledge from the participants' perceptions of their

lived experiences (Marshall & Rossman, 2016). The phenomenological design was not appropriate for this study because I did not focus on exploring the meanings of participants' lived experiences. Researchers use ethnographic design to study culture of groups or communities (Samnani & Singh, 2013). The ethnographic design was not appropriate for this study because I did not focus on the participants' culture. Researchers use the narrative research design when the focus is on exploring stories about the lives of the participants (Clandinin, 2006). The narrative research design was not appropriate for this study because there was no focus on obtaining and exploring stories about the lives of the participants.

<div align="center">**Research Question**</div>

What strategies did Primary Care Practice managers use to implement EHRs to decrease healthcare costs?

<div align="center">**Interview Questions**</div>

1. What strategies did you use for implementing the EHR?
2. What were the key barriers for implementing the EHR?
3. How did you address key implementation barriers?
4. What perceived ease of use/perceived usefulness considerations factored into the decision of which EHR system to purchase and implement?
5. What perceived ease of use/perceived usefulness considerations factored into implementing the EHR?
6. How, if at all, have operating costs altered your strategies to implement the EHR?

7. How did you assess the effectiveness of the strategies?

8. What, if any, cost reduction was realized by your practice since implementing the EHR?

9. What, if any, costs savings to patients was realized since implementing the EHR?

10. What additional information regarding implementation can you share?

Conceptual Framework

I used the technology acceptance model (TAM) as the conceptual framework in this study. Davis (1989) proposed that, in TAM, two factors, perceived usefulness (PU) and perceived ease of use (PEOU), affect users' decisions to use the technology. The TAM is useful for understanding how users come to accept and use EHRs (Marangunić & Granić, 2015). The TAM can improve users' understanding of the impact that design choices have on the acceptance of technology.

The PU means that implementation strategies may involve learning the features and benefits of EHRs. In the context of implementing EHR, learning the benefits and functions of EHR would fall under the strategies for affecting PU. The PEOU means that the strategies may focus on training how to use (Davis, 1989). Providing training on how to use and maintain EHR systems are an expected part of the strategies for the effect of PEOU. In terms of significance, PU is more important than PEOU, and the attitude of the users indicates whether they will use an application (Davis, 1993). The TAM was applied to this study because its theoretical concepts are one of the lenses that I used to analyze and describe the strategies that PCP managers use to implement the EHR.

Operational Definitions

Electronic health record (EHR): An EHR is a longitudinal collection of electronic health information about individual patients (Bushelle-Edghill, Lee Brown, & Dong, 2017).

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).

Health information technology (HIT): This generic term refers to the different software and technologies used to collect patient data and assist healthcare providers in the documentation of patient care, managing patient records, and sharing those records with patients and other providers (Cohen, 2015).

Perceived ease of use (PEOU): The extent to which end users believe the technology is easy to use (Davis, 1989).

Perceived usefulness (PU): The extent to which the end users believe using a particular system may enhance their job performance (Davis, 1989).

Assumptions, Limitations, and Delimitations

Assumptions

Ellis and Levy (2009) described assumptions as facts that the researcher holds to be true but cannot verify. First, I assumed that PCP managers who participated in this study realized the need to implement an adequate EHR system in their primary care practice. This process was appropriate because they would have to develop strategies for the successful implementation of the EHR. Second, I assumed that the data collection

process would yield valuable insight on the strategies that PCP managers use in

implementing EHR systems. This was important because I studied strategies PCP

managers use to implement EHRs that decrease healthcare costs. Third, I assumed that

participants would answer questions truthfully and honestly. This was important in

establishing the overall validity of the research study.

Limitations

Kirkwood and Price (2013) defined limitations as the potential weaknesses,

constraints, or influences of a study the researcher cannot control. The first limitation was

that study participants were volunteers who could withdraw from the study at any time.

The number of participants could affect data saturation if the sample was not large

enough to capture all or most of the important information. The second limitation was

that study participants might not possess complete insight and expertise in EHR decision-

making processes. This could affect the validity and reliability of the assumptions. The

third limitation was that participants could have restrictions on discussing operating cost

factors related to strategies used to implement EHR systems. The participants could have

stated a need to adhere to nondisclosure, proprietary, or confidentiality agreements,

which would have limited their interview responses.

Delimitations

Leedy and Ormond (2005) described delimitations as the researcher outlining the

boundaries and identifying the factors, constructs, and/or variables intentionally left out

of the study. The first delimitation was the study location in Central Florida. As such, the

study findings might be unique to that geographical location and may not be applicable to

other regions of the state or the United States. The second delimitation was that I

conducted this study within a PCP organization of the healthcare industry. Because the

study was limited only to PCP organizations, study findings will not be applicable to

other types of healthcare organizations. The third delimitation was that participants had

already implemented an EHR in the year 2016 or before. Because the study was limited

to participants who had implemented an EHR in 2016 or before, study findings might not

be applicable to participants who implemented an EHR in 2017 or later due to differences

in length of time the organizations had to become fully operational utilizing the EHR.

Significance of the Study

Contribution to Business Practice

The study was significant to business because the findings could be useful for

physicians in facilitating the successful adoption of the EHRs, specifically, in devising

strategies to implement EHRs in their office practices. The findings of this study could

also be useful in determining how to lower the operating costs of physicians' offices and

improve the quality of the health care services that they provide. Implementing an EHR

in a physician's office could significantly lower the operating cost and increase the

profitability of the office. First, physician practices need to avoid the penalty of reduction

in federal reimbursement in accordance with HITECH Act of 2009. Second, practices

must decrease the cost due to medication errors and inaccurate paper records which lead

to additional costs for test results, consultations, follow-up after emergency departments

and hospital stays and payment adjustments (CMS, 2018; Nilasena, 2013). Third,

physicians' practices could realize efficiency improvements due to computerized records,

which require less office space, less staff time to retrieve and update records, and eliminate redundant paper processes (McAlearney, Hefner, Siekc, & Huerta, 2015).

Implications for Social Change

Findings of this study may be helpful in expanding the use of EHR systems, benefiting the patients who receive health care using these systems. First, physicians may have the opportunity to pass on to patients, part of cost savings from the use of EHR. Second, EHRs can improve the accuracy of medical records by reducing medication errors and adverse drug events for improving the quality of patients' health care (Forrester, Hepp, Roth, Wirtz, & Devine, 2014). New EHR systems connecting international healthcare providers allow rapidly sharing patient data and enable achieving the *triple aim* of healthcare reform: significant improvements to the quality of healthcare, the health of populations, and the efficiency of healthcare systems (Windle & Windle, 2015).

A Review of the Professional and Academic Literature

In this literature review, I provided selective, critical analysis of peer-reviewed sources related to the conceptual model of the study and to the existing body of knowledge on the research subject. The literature review includes a discussion of (a) the conceptual framework, TAM, and an alternative theory; (b) financial penalties under the HITECH Act of 2009; (c) EHR adoption and barriers to implementation strategies; and (d) an overview of healthcare costs. I provided the context for understanding EHR implementation strategies for decreasing healthcare costs.

I used scholarly seminal monographs by authors and peer-reviewed journal articles in an extensive review and analysis to provide the conceptual framework for the study. To conduct the literature review I used the following databases: ABI/INFORM, Business Source Complete, Computer and Applied Sciences Complete, EBSCO, Google Scholar, Medline, ProQuest Central, and Thoreau Multi-Database Search. I used the following keywords alone or in combination: *EHRs, HIT, computerized physician order entry, primary care physicians, health maintenance organizations (HMOs), technology acceptance model (TAM), disruptive innovation, managed care,* and *MU*. I used 75 resources for the review, 71 of which were peer-reviewed. Of these 71 articles, 45 (63%) were published between 2014 and 2018. I also used four authors' seminal works (monographs). Additionally, I used two governmental websites; Centers for Medicare and Medicaid Services (CMS) and U.S. Department of Health and Human Services in the literature review.

The purpose of this qualitative single-case study was to explore what strategies PCP managers use to implement EHRs to decrease healthcare costs. The study may help researchers more thoroughly understand strategies needed for successfully implementing EHRs to decrease healthcare costs. My review of the literature provides the contextual background on strategies for EHR implementation with the specific goal of eliminating processes, paper, and time (person-hours) to reduce the operational expense component of healthcare costs.

Hamid and Cline (2013) found during their review of literature from the early 2000s that after the experimental phase the majority of EHR system implementations fail,

with only 55% of physicians nationwide successfully adopting EHR systems (Hamid & Cline, 2013). Eligible healthcare professionals are facing various challenges that limit their ability to adopt an EHR system. Eligible professionals are primarily physicians but can also include nurse practitioners, certified midwives, dentists, and physician assistants who provide services in a Federally Qualified Health Center or Rural Health Clinic led by a physician assistant (Cleveland, 2015; HITECH Act of 2009, 2009). Physicians who fail to address these limiting challenges and move toward EHR adoption face negative implications as the penalty phase of the MU program draws closer (DesRoches, 2015). Along with physician resistance, additional major barriers to EHR adoption include healthcare practitioner concerns about privacy, security, costs, and lack of funding (Hamid & Cline, 2013).

Technology Acceptance Model (TAM)

The TAM is an information systems theory that enables users to make predictions about the acceptance of technology. The TAM includes the premise that when presented with the need to make decisions about new technologies, specific factors influence how and when users will use that technology (Davis Jr., 1986; Lala, 2014). The TAM derives from the belief of the casual relationship of attitude and intention-behavior within the theory of reasoned action (TRA) along with the theory of planned behavior (TPB) developed by Martin Fishbein and Icek Ajzen in 1967 (Lala, 2014; Venkatesh, Davis, & Morris, 2007). Within the TRA model, behavior intentions rather than attitudes are the main predictor of behaviors. Within the TPB model, the focus is on the individual's intention to perform a given behavior. Davis Jr. proposed TAM in 1985 when he stated

his theory's purpose is to explain the determinants of computer acceptance that explain a user's behavior over a wide range of computing technology (Davis Jr., 1986; Razmak & Bélanger, 2018). Davis Jr. asserted that the use of information systems is a response driven by users' motivation, which is when there is direct influence, by an external stimulus consisting of the actual system's features and capabilities (Davis Jr., 1986; Lala, 2014).

The TAM is widely used to enhance understanding of user acceptance processes through new theoretical insights into the successful design and implementation of information systems. The major goal of the TAM is to predict information systems acceptance that allows system implementers and designers to evaluate proposed new systems before their implementation (AlShibly, 2014). Davis Jr. asserted that individuals could use system prototypes to demonstrate the user acceptance testing approach and measure potential users' motivation to use alternative systems (Davis, 1986). Therefore, user acceptance testing of TAM before implementation would be a useful indication of the success of a proposed system and yield valuable information about system characteristics, user motivation, organizational implementation, and user acceptance of proposed new systems. The TAM is useful for researchers describing the motivational processes that mediate between system characteristics and user behavior.

System characteristics affect how motivated users are to use the system, which in turn affects their system use or non-use. Psychologically, user motivation towards system use derives from understanding what influences beliefs, attitudes, and behaviors of the individual or group implementing a new technology (AlShibly, 2014). Davis Jr. (1986)

posited the use of TAM for decisions regarding how and when users employ the

successful design and implementation of new technologies and how TAM measures and

explains user motivation. Researchers often use TAM to evaluate a system of new

technology even before the new technology's implementation. The TAM also serves as a

conceptual framework for better understanding EHR adoption. Researchers used a

longitudinal quantitative study to analyze utilization of an EHR using the TAM to explain

end user's acceptance of this technology through a lens of continuous behavioral

adaptation and changes (Johnson, Zheng, & Padman, 2014). Figures 1 and 2 illustrate the

TAM and TRA conceptual models, respectively.

stimulus   organism   response
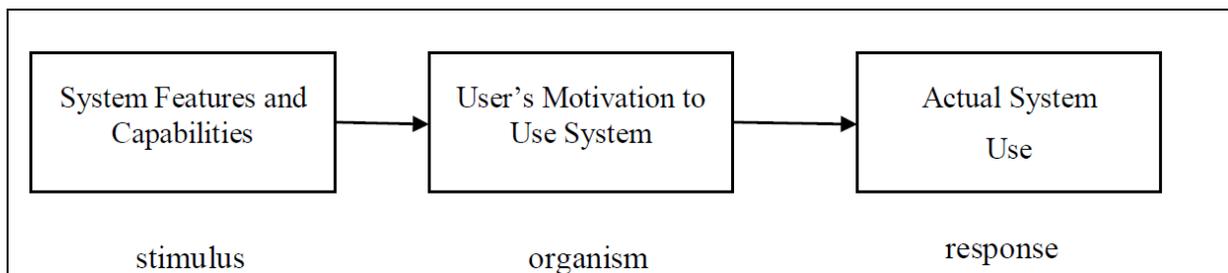
Figure 1. A conceptual model for technology acceptance. System use, a response explained by user motivation, is directly influenced by an external stimulus consisting of the actual system features and capabilities. Reproduced from "The Emergence and Development of the Technology Acceptance Model (TAM)", by G. Lala, 2014, *International Conference on Marketing From Information to Decision, 7*, p. 150. Copyright 2014 by International Conference RisoPrint Publishing House.
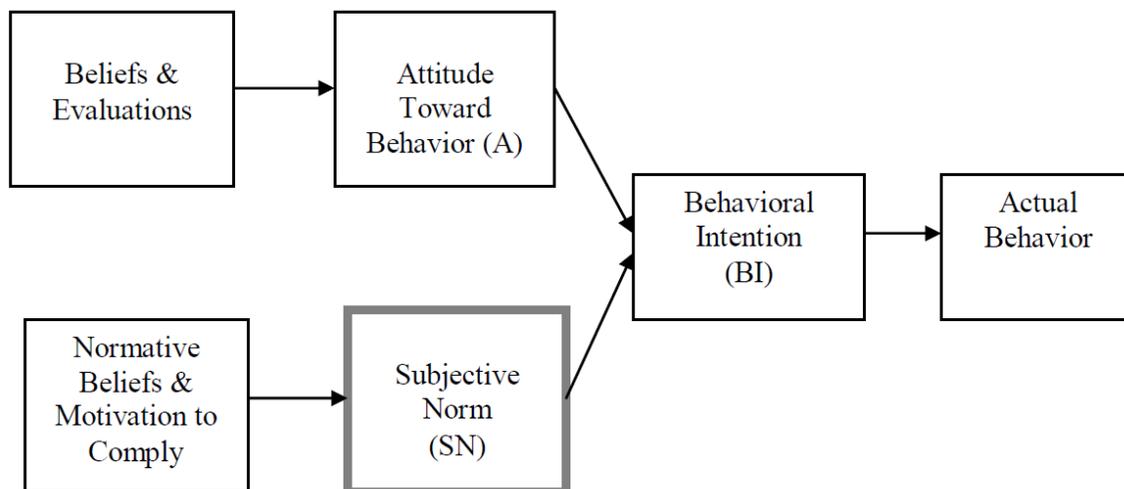
Figure 2. A conceptual model for the theory of reasoned action. Performance of a behavior is determined by BI to perform the behavior, and BI is jointly determined by the person's attitude A and SN concerning the behavior. Reproduced from "The Emergence and Development of the Technology Acceptance Model (TAM)", by G. Lala, 2014, *International Conference on Marketing From Information to Decision, 7*, p. 150. Copyright 2014 by International Conference RisoPrint Publishing House.

The broad objective of TAM research is to enable understanding of the motivation of the intended user to accept and use new end-user information systems. The difference in how perceived consequences are specified, modeled, and measured is what separates Fishbein's (Lala, 2014) representation of the TRA model from Davis' (1986) treatment of the TAM (Davis, 1986). People tend to use or not use an application to the extent they believe it will help them perform their job better which is the same as PU (Davis, 1989). Within TAM, an individual's attitude toward use is a direct function of two beliefs: PU and PEOU. Davis (1989) posited that PEOU has a significant direct effect on PU since a system, which is easier to use, will result in increased job performance.

Both PU and PEOU are important to individual job performance. Taken in an organizational context, promotions, bonuses, and raises reinforce employees' good job performance. The definition of PU is the degree to which a person believes that using a particular system enhances their job performance (Brandon-Jones & Kauppi, 2018; Barnett, Pearson, Pearson, & Kellermans, 2014; Davis, 1989). This definition directly relates to the word "useful" which means capable of being used advantageously (Davis, 1989). The definition of PEOU is the degree to which a person believes that use of a system will be free of effort (Brandon-Jones & Kauppi, 2018; Barnett et al., 2014; Davis, 1989). This definition directly relates to the word "ease" which means freedom from difficulty or great effort (Davis, 1989). Therefore, ease is relevant and significant to job performance. Users are more likely to accept an application they perceive to be easier to use than another application, which they perceive to be more difficult to use.

A technology system that is easier to use is a system that is more useful. Accordingly, ease of use influences usefulness but usefulness does not influence ease of use (Davis, 1993). Users should find systems that are easier to use more useful. Thus, system designers enhance PU by adding new functional capabilities or by making current functions easier to use. One of the operative questions in information technology continues to be which particular design features contribute most to user acceptance and performance. Fishbein and Ajzen (1975) postulated that external stimuli or design features influence users' attitudes toward behavior and beliefs about using a system. This attitude theory from psychology provides a rationale for the flow of causality from system design features through perceptions to attitude and finally to usage (Davis, 1993). Researchers conducting TAM research are trying to provide a better understanding of user acceptance and development of better information systems.

Researchers extended the replicability and generalizability of TAM over a broad range of contexts. From 1992 to 2003, researchers extended the replication and generalizability of TAM to many different information systems including e-mail, digital libraries, e-health systems/expert systems in different countries including the U.S., Japan, and Saudi Arabia (Venkatesh et al., 2007). Early tests of TAM predictive validity included examinations of intention, self-reported use, choice, and actual use (Venkatesh et al., 2007). Researchers raised several important and interesting contingencies (temporal dynamics, voluntariness, gender, age) with TAM that affect key relationships and have recently identified higher-order interaction terms as being significant (Davis, 1989; Venkatesh et al., 2007). These extensions of TAM and the broad range of contexts

over time increase the validity and popularity of TAM. In recent years, investigators have continued TAMs testing with varying new factors identified that impact intention and use.

Some researchers who have investigated new factors with TAM have focused on EHR adoption and HIT. Physician members of Quebec Medical Association tested four theoretical models (TAM, Extended TAM, Psychosocial Model, and Integrated Model) to identify the main determinants of physicians' intention to use the EHR. Results from the integrated model showed that PEOU, demonstrability of the results, social norm, and professional norm, are the strongest predictors of a physician's intention to use the EHR (Gagnon et al., 2014). Age, gender, previous experience, and specialty are factors that modify determinants of intention. Gagnon et al. also found that physicians' age, gender, specialty, and experience are determinants when developing EHR implementation strategies and targeting physicians. Johnson et al. (2014) analyzed utilization of an EHR system to support evidenced-based medicine practice. Johnson et al. developed a new construct based on the TAM to explain end users' acceptance of an EHR using a lens of continuous behavioral adaptation and changes. This extension of the TAM incorporated four objective measures of actual usage from an implemented EHR. Johnson et al. concluded that sophisticated users of IT applications have high expectations of application quality, and traditional notions of comfort with IT do not correlate with levels of usage. The origin, modification, and application of TAM research is extensive.

One extensive review of literature on TAM provides both a complicated and complex review of the topic. The literature review by Marangunić and Granić (2015)

considered TAM in three phases: (a) origins and overview of technology acceptance; (b) development and extension of TAM; and (c) modification and application of TAM. Marangunic and Granic chronicled the following TAM authors' review methods and findings. Lee, Kozar, and Larsen (2003) analyzed the history of TAM and provided a prediction of its future trajectory. Legris, Ingham, and Collerette's (2003) review was an analysis of empirical TAM research. King and He (2006) conducted a statistical meta-analysis of TAM studies. Sharp (2006) examined the development, extension, and application of TAM. Chuttur (2009) analyzed the theoretical assumptions and practical effectiveness of TAM and provided a valid and robust model with the potential of broader applicability. Additionally, Chuttur identified three specific areas for future research and posited that TAM lacks sufficient and rigorous research. Turner, Kitchenham, Brereton, Charters, and Budgen (2010) analyzed TAM in the context of technology usage prediction, and Hsiao and Yang (2011) used statistical analysis to identify three main trends in TAM application (Marangunić & Granić, 2015). Marangunić and Granić provided conclusions and a qualitative assessment of the data that illustrates TAM's broad applicability to various technologies and provides indications for future research.

Within the TAM and rooted in the TRA, user motivation predicts determinants of technology acceptance which directly influences an external stimulus of actual (computer) systems features and capabilities. Lala (2014) conducted a quantitative study of 27 articles for historical emergence, related applications, replication studies, and limitations and criticisms addressed to TAM and the extended models. In Lala's view,

three factors contribute to user motivation: PEOU, PU, and attitude toward usage. In contrast, Davis (1986) asserted that an individual's attitude toward use is a direct function of PU and PEOU. Lala examined the role of TAM in user acceptance and use of technology, TAM's evolution through the years, TAM's use in assessing technology-based learning environments, and concerns of some researchers about applications and accuracy of the theoretical model (Lala, 2014).

Over the years, researchers have developed additional theories derived from TAM explaining technological acceptance and adoption. Several researchers (Iqbal et al., 2013; Kim, Lee, Hwang, & Yoo, 2015; Lala, 2014; Williams, Rana, & Dwivedi, 2015) have provided a greater understanding of how TAM theory and the extended technology acceptance models have been developed based on this theory. Lala (2014) reported these studies had included (a) TAM2 (voluntary and mandatory settings), (b) TAM3 (expectancy and adjustments), and (c) unified theory of acceptance and use of technology (UTAUT). The UTAT is based on expected performance, expected effort social influence, and facilitating conditions. Garavand et al. (2016) determined that TAM is the most crucial model for identification of the factors influencing the adoption of information technologies in healthcare systems. Garavand et al. also determined that the UTAUT model has recently increased in usage and has many applications in the healthcare system. The robustness of additional TAM theories predicated on ease of use, usefulness, and social factors bode well for its continued use for evaluative assessments involving knowledge management, social media, and mobile-based platforms. Continual TAM research furthers understanding of technology adoption.

While the TAM has been most useful in providing understanding and explaining the nature and determinants of technology usage, further extensions of TAM provide additional determinants of the adoption of technology. Brezavscek, Sparl & Znidarsic (2014) posited the key constructs that determine a user acceptance of innovation is an advantage by the user and the ease of operating the technology. From a HIT perspective, Beglaryan, Petrosyan, and Bunker (2017) examined barriers to EHR implementation, identified major determinants of acceptance of technology, and developed a model that explains the acceptance of EHRs. Other factors such as organizational change, professional relationships, administrative monitoring, and computer anxiety exert their effects through projected collected usefulness, PU, and PEOU. With the original TAM, the user intends to use technology if they feel the technology is easy to use and if the user feels the technology will be useful for them (Brezavscek et al., 2014). Beglaryan et al. reconciled individually and environmentally oriented theoretical approaches and proposed a tripolar model of technology acceptance (TMTA), bringing together three pillars of healthcare: patients, practitioners, and provider organizations. Beglaryan et al. concluded TMTA explained 85% of the variance of behavioral intention to use technology and proposed TMTA as affording stronger explanative and predictive abilities for the health care system. Researchers frequently use TAM or any of its associated extensions in examining factors influencing healthcare worker intention in HIT adoption.

Two different studies, one examining physician adoption of HIT using TAM and the other examining acceptance and usage of electronic patient record (EPR) among nurses using UTAT, have similar themes relative to usage, performance, and influencing

external factors. Hsiao and Chen (2016) investigated critical factors influencing

physicians' intention to computerize clinical practice guidelines using an integrative

model of activity theory and TAM. Hsiao and Chen analyzed data from 238 out of 505

total questionnaires using the structural equation modeling technique. The results of the

data analysis were that attitudes toward use, organizational support, PU, and social

influence were critical factors influencing physicians' intention to computerize clinical

practice guidelines (Hsiao & Chen, 2016). Maillet, Mathieu, and Sicotte (2015) explained

acceptance and actual use of an EPR and nurses' satisfaction by testing a theoretical

model adapted from the UTAUT. Maillet et al. conducted a cross-sectional study of four

hospitals at different EPR adoption stages using randomized stratified sampling and

structural equation modeling. They concluded compatibility of the EPR with preferred

work style; existing work practices and the values of nurses were the important factors

explaining nurses' satisfaction, as well as the statistical significance of links such as

social influence and effort expectancy on the performance expectancy construct (Maillet

et al., 2015). Researchers are continually exploring and expanding into new areas of

TAM research.

New areas of TAM research are examining the meaning of certain variable

relationships for an in-depth understanding of techonology acceptance and adoption.

Marangunić and Granić (2015) reviewed the literature and identified four possible new

areas for TAM research: (a) the moderating role of individual variables, (b) incorporation

of additional variables to the model, (c) investigation of actual usage and the relationships

between actual usage and objective outcome measures, and (d) the target group of older

adults. Marangunić and Granić concluded the growing need for technology—especially information and communications technology (ICT)—would enhance interest in the field of technology acceptance for many years. For example, the declining cost of smartphones to an ever-increasing global population and novel smartphone interface options make secure mobile money solutions more accessible than ever (Lien, Hughes, Kina, & Villasenor, 2015). Newly designed interfaces and architectural innovations such as these are changing and revolutionizing the world. Innovations that revolutionize are disruptive innovations because they create new market value and displace established market leaders.

Disruptive innovation can serve as a conceptual framework for HIT. The three characteristics of disruptive innovation are technology enablers, business model innovations, and value networks. Coined by C. Christensen in his seminal work, "The Innovators Prescription," one example of disruptive innovation is the failure of mainframe computers verses desktop computers. Mainframe computers did not adapt along with the changing technology markets of desktop computers which lowered cost, had similar quality, and scalable technology products (Srinivasan, 2013). In healthcare, telemedicine is a new business model in which medical care is received directly in patient's home which negates the need of travel costs and time, reduces expert physician overhead, and increases access to high quality care for patients and primary care providers (Srinivasan, 2013). Healthcare providers can use telemedicine to reduce geographical challenges faced by patients and providers in rural and less developed communities. Garrety, McLoughlin, and Zelle (2014) examined how disruptive

innovation affects instances of EHR adoption in England and Australia. The basic ability to transfer moral orders governing medical information while using paper processes does not easily translate to transfer moral orders in the digital world. Garrety et al. (2014) utilized the cost model approach to valuation, decision-making process, and control of the process for a traditional absorption costing system as an alternative cost calculation tool for data protection activities. Moral orders that governed privacy and security are not applicable in the age of digitization. The entire healthcare community must quickly evolve to accommodate the security and integrity of directive medical information of digitized records in healthcare.

Another conceptual framework for understanding EHR adoption is the complex adaptive systems (CAS) theory. Qualitative researchers are actively studying healthcare industry organizations as complex adaptive systems (Barton, 2014; Hempe, 2013). Sturmberg and Lanham (2014) observed that complexity is the first consideration when designing a healthcare system. Within the CAS theory, "agents" are whole entities composed of many different and autonomous parts. These agents are interrelated and linked via many various interdependent connections and act as one whole unit through adjusting and adapting to environmental change as well as learning from experience (Stacey, 2011). Within CAS theory, individual agents (people) adjust and interact with the actions of other agents and adapt to the environment creating a united system package (Vessey & Ward, 2013). The world, weather, healthcare systems, and the human body have many different types of relationships, repetitious activity, emergence, and patterns

that are quite complex. Many different types of agents are components of the same system and components of many different systems.

An organization is one type of CAS, beginning with the individual, division, department, company, and industry. Changes occur through random mutation and competitive selection. The CAS is a network of cybernetic and cognitivist agents that store representations in the form of rules and then act according to those rules (Giacomoni, Kanta, & Zechman, 2013). Researchers to explain why a healthcare system is moving close to the brink of chaos while the healthcare organization is sufficiently qualified to change (Sturmberg & Lanham, 2014) can use the constructs of the CAS theory. With CAS, complexity reduces to simplicity as complex patterns emerge from simple rules. In addition, with CAS, the formation of a few simple rules, with the rest left to self-organization that will unleash human creativity. Activity is vital for the system and its ability to produce novelty, in which unpredictability seems to be the norm.

From a CAS perspective, innovation in organizations involves short-term exploitation and longer-term exploration as an essential strategy. However, innovation may also produce potentially conflicting organizational activities. Organizations go through various transformations (change) depending on the level of chaotic dynamics, how far an organization is from equilibrium, and a spontaneous self-organizing activity (Stacey, 2011). Complex adaptive organizations absorb turbulence and work with turbulence is a creative (not disruptive) force not necessarily maintaining equilibrium but to facilitate continual becoming or emergence. This process allows the emerging organization to operate in an environment supportive of participative interaction, network

building, and knowledge sharing to enable the organization to adapt to the community it serves (Ford, 2009). As CAS, healthcare organizations are continually innovating to adapt and evolve during constant change. Researchers using the CAS framework examine the relationships and interdependencies among complex organizational structures to understand patterns in how agents adapt and evolve to change. Using the CAS framework to conduct the study to explore what strategies PCP managers use to implement EHRs to decrease healthcare costs is a valid choice. However, the main concerns of the study are about technology adoption so TAM is more appropriate for exploring this question.

Health Information Technology for Economic and Clinical Health (HITECH)

The HITECH Act of 2009 is part of broad U.S. legislative policy to promote the adoption and meaningful use of health information technology. Legislators enacted the Patient Protection and Affordable Care Act (PPACA) in 2010 to reduce healthcare costs via the inclusion of provisions regarding policy and financial structure for information technology systems and data. The American Recovery and Reinvestment Act (ARRA) of 2009 authorized incentive payments to eligible providers (EPs), eligible hospitals, critical access hospitals (CAHs), and Medicare Advantage organizations to promote the adoption and MU of EHRs. The HITECH Act of 2009, under Title XIII of Division A and Title IV of Division B of ARRA 2009, includes $19.2 billion to increase the use of EHRs by physicians and hospitals (HITECH Act of 2009, 2009). Additionally, the HITECH Act of 2009 strengthened the privacy and security requirements in the Health Insurance Portability and Accountability Act (HIPAA) of 1996 (Cleveland, 2015). The ONCHIT, located within the Office of the Secretary for the US Department of Health and Human

Services (HHS), operates under the legislative mandate in the HITECH Act of 2009. The

ONCHIT is responsible for ensuring a U.S. nationwide effort to coordinate, implement,

and utilize the most advanced health information technology and the electronic exchange

of information. The ONCHIT and the Centers for Medicare and Medicaid Services

(CMS) are responsible for regulating HIT infrastructure and incentivizing EHR purchases

by Medicare and Medicaid providers.

The overall goal of the CMS is to improve effectiveness and efficiency of the U.S.

healthcare system through greater adoption of EHRs. CMS is the agency responsible for

administering incentive payments and adherence to adoption and meaningful use

guidelines (HITECH Act of 2009, 2009). The CMS definition for MU is for healthcare

practitioners to (a) use EHRs to improve quality, safety, efficiency, and health disparities;

(b) engage patients and families improve care coordination, and population and public

health; and (c) maintain privacy and security of patient health information (CMS, 2018).

Long-term implications of meaningful use are healthcare providers will be able to easily

track, identify, and monitor patient data over time, improve healthcare quality, and lower

healthcare costs. The HITECH Act of 2009 is vital to providers overcoming potential

barriers and including financial incentives to adoption of EHRs.

The main purpose of the HITECH Act of 2009 is to encourage healthcare

providers to adopt EHRs by creating programs for developing health IT infrastructure and

incentivizing the purchase of certain EHRs by Medicare and Medicaid providers.

Specifically, providers must adopt and achieve "MU" of "certified" EHRs (Cleveland,

2015; HITECH Act of 2009, 2009). The MU use is what gives CMS the authority to

determine what physicians and hospitals must do with EHRs to receive financial

assistance or incentives (Weeks, Keeney, Evans, Moore, & Conrad, 2015). The objective

of CMS is to incentivize EPs to adopt and use certified EHRs that meet MU standards

established by CMS. EPs who meet MU criteria receive reimbursement of up to $44,000

from Medicare or $63,500 from Medicaid (Weeks et al., 2015). The CMS needs to

increase engagement with EPs in future planning for the MU program as well as provide

support for achieving MU standards.

Central to MU via provider's use of EHRs to improve quality, safety, efficiency,

and health disparities is improving functionality and lowering costs. Krist et al. (2014)

examined gaps in existing EHR functionality and needed enhancements to support

primary care. Krist et al. postulated that current goals remain focused on disease rather

than the whole person, ignoring factors such as behaviors, personal risks, family

structure, and environmental and occupational influences. Primary care practices need

EHR systems to move beyond documentation to interpreting and tracking information

over time and enabling patient-partnering activities, support for team-based care, and

reduced documentation burdens. Adler-Milstein, Salzberg et al. (2013) conducted a

quantitative study to assess costs savings from community-wide adoption of ambulatory

EHRs. Adler-Milstein, Salzberg et al. evaluated 806 ambulatory clinicians across three

Massachusetts communities involving 47,979 intervention patients and 130,603 control

patients from January 2005 to June 2009 from the standpoint of total cost, inpatient cost,

and ambulatory cost and its subtypes (pharmacy, laboratory, and radiology). Adler-

Milstein, Salzberg et al. found that ambulatory EHR adoption did not influence total cost

but positively impacted savings, decreases ambulatory care costs, and influences broader

changes in organization payment methods that may incentivize clinicians to use for

savings that are more substantial. Krist et al. concluded EHR systems still need increased

functionality, modifications, expanded use of patient portals, seamless integration with

external applications, and advancement of national infrastructure and policies. An

inherent challenge for improving EHR adoption is meeting MU requirements while

overcoming financial costs associated with adoption.

EHR costs are higher during the EHR adoption process due to inflation and the

need for healthcare providers to meet MU technology requirements. The MU incentives

under HITECH may be inadequate to address the financial challenges many hospitals

face in implementing EHRs (Wang, Wang, & Biedermann, 2013). Financial costs are one

of many factors that affect the adoption and implementation of EHRs. In 2009, only 7%

of doctors and 10% of hospitals had even basic EHRs in use (Shin & Sharac, 2013). In

2012, nearly three out of four office-based physicians used either EHR or EMR systems,

up 48% from 18% in 2001 (Silverman, 2013). A significant necessary change by CMS in

helping the nation decrease costs is to ensure that eligible participants with MU financial

implementation costs receive total cost reimbursement. Total cost reimbursement would

significantly increase nationwide EHR adoption and thus improve healthcare quality,

patient outcomes, and decrease healthcare costs (Shin & Sharac, 2013). Overall, HITECH

appears to be having the intended effect of promoting adoption and meaningful use of

health information technology.

Rates of EHR adoption and implementation have steadily increased since HITECH. As of 2014, 76% of nonfederal acute care hospitals have adopted at least a basic EHR system with clinician notes (CMS, 2018). EHR adoption rates have increased 27% from 2013, a more than eight-fold increase in EHR adoption since 2008 (CMS, 2018). Additionally, hospital adoption of technology with advanced functionality has increased significantly. However, Abramson, McGinnis, Moore, Kaushal, and HITEC investigators (2014) determined rates of EHR adoption and health information exchange (HIE) use among New York state nursing homes are behind other health care sectors and highlight the need for more research on widespread adoption of EHRs. Collum, Menachemi, and Sen (2016) examined the impact of EHR adoption on hospital financial performance using 2007-2010 survey data from American Hospital Association (AHA) and Medicare Costs Reports. The authors concluded, that 2 years after EHR adoption, financial performance improved based on MU incentive payments under the HITECH ACT (Collum et al., 2016). Improving EHR system functions and capabilities throughout primary and specialty clinics and hospital networks will provide healthcare and research personnel a wealth of information from which to extract important and useful data. Adoption of advanced or sophisticated EHRs will further advance HIT and healthcare reform.

One goal of healthcare reform is that EHRs become platforms for the bidirectional flow of information from patients and providers to researchers and policymakers to create a nationwide learning health system. Sophisticated EHRs will include improved cognitive support, information synthesis, interoperability, and filters for quickly extracting

meaningful information (Weiss & Nunes Amaral, 2013). Sophisticated EHRs include

integrated care models of managing pulmonary, critical care, sleep medicine, and other

disease processes across multiple settings that require multidisciplinary and coordinated

care (Weiss & Nunes Amaral, 2013). Consequently, sophisticated users of IT applications

have high expectations of application quality, and traditional notions of comfort with IT

are not associated with levels of usage (Johnson et al., 2014). Sophisticated EHRs also

include capabilities to deliver analytics useful for reviewing patient care outcomes and

decreasing healthcare costs. The use of data analytics in HIT assessment is important in

realizing the full potential of all EHRs to improve quality of care and decrease costs.

A study of the use of EHRs by PCPs of the Israeli Defense Forces (IDF) provided

useful data regarding utilization by healthcare providers and associated costs (Bar-Dayan

et al., 2012). The IDF divided cost data into four financial classes based on cost from

class 1 (*least expensive*) to class 4 (*most expensive*). There was an inverse correlation

between year and total costs for all visits to specialists, and between the mean costs of

one specialist visit over the four years (2005-2008), indicating a significant reduction in

real costs in 2008 prices. The reduction in cost did not affect quality assurance. Bar-

Dayan et al. 2012 concluded from the data that EHRs could facilitate efficient utilization

of healthcare providers and decrease cost. In a different scenario, Bullard (2016)

examined the costs of EHR implementation utilizing a nurse "super user" in a

metropolitan healthcare system. In this healthcare system, unemployed, newly graduated

nurses served as trainers of EHR super users. Bullard identified a need for increased EHR

adoption as a cost-effective utilization tool for clinical support as well as for cost

effectiveness in the manner and approach of EHR implementation. In two different

situations (open and closed system) and clinical users, EHR utilization was efficient and

cost effective.

Government and healthcare industry representatives are interested in assessing the

utilization of EHR systems and electronic health data for improving clinical research

methodologies and empowering quality improvement initiatives. Clinicians and

researchers often find EHR data heterogeneous, complex, and underutilized (Arsoniadis

& Melton, 2016). Healthcare providers wanting to leverage EHRs for research and

quality improvement in healthcare will require biostatistical, programming, technical

knowledge, and specialized disciplines for analysis of clinical decision support tools

(Arsoniadis & Melton, 2016). The importance of appropriate training and resource

support for successful EHR adoption and implementation is evident when analyzing

clinical decision support tools. Blavin and Buntin (2013) combined an expert opinion

method (18 experts), a modified Delphi Technique, and a technological diffusion

framework to forecast percentages of office-based physicians from 2012 to 2019 who

will become adopters and meaningful users of health information technology. Blavin and

Buntin projected that 80% of primary care physicians in large group practices, 65% of

primary care physicians in small group practices, and 66% of all other specialists could

achieve MU by 2019. Blavin and Buntin concluded the study is valuable when there was

a shortage of data and a high level of uncertainty in a new policy environment. The

Blavin and Buntin study may prove advantageous in the evaluation of various essential

government programs such as the Regional Extension Centers (REC) for example. The

convergence of different perspectives on EHR and HIT adoption is necessary for improvement and forward progression.

At one HIT symposium, presenters filled gaps in the academic literature regarding shortcomings of EHRs, EMRs, and HIT policy and discussed whether mandatory implementation guidelines should replace the federal governments' passive policy for EHR implementation. Silverman (2013) provided an overview of the Fourteenth Annual Southern Illinois Healthcare/ Southern Illinois University Health Policy Institute Symposium on EHRs, EMRs, and HIT. Silverman highlighted the main points of the symposium presenters Nicholas P. Terry, Dr. David Liebovitz, Deth Sao, Amar Gupta, and David Gantz, respectively. Terry questioned the wisdom of aggressive implementation and marketing failures of EMRs. Liebovitz found gaps between the promise and delivery of EHR adoptions. Sao, Gupta, and Gantz expressed concern that current EHR achievements have fallen short of original goals for adoption and use. Silverman (2013) concluded that information on the contribution of EHRs to improving the quality, safety, and equity of health care in the United States would offer invaluable guidance to policymakers, providers, and patients alike for years to come. The movement toward a national health system buttressed by an integrated HIT infrastructure that provides safe, effective, patient-centered, timely, efficient, and equitable healthcare is still evolving. The successful adoption of EHRs overwhelmingly depends on eliminating barriers to implementation strategies that often confront EHR adopters.

EHR Adoption and Barriers to Implementation Strategies

The most common barriers to adoption for small- to medium-sized practices are familiarity with EHRs, training and support, and cost, with cost being the most significant barrier. Ajami and BagheriTadi (2013) identified 25 of the most common barriers to EHR adoption, with the top five barriers listed as time, cost, the absence of computer skill, workflow disruption, and security and privacy concerns. Ajami and BagheriTadi concluded EHR use requires the presence of a certain user and system attributes, support from others, and needs organizational and environmental facilitators. Additionally, Ajami and BagheriTadi identified how organizational support for users, strong leadership, project management, and training might accelerate EHR adoption.

Focusing attention on assessment of organizational HIT needs ultimately decrease the number of barriers and improve EHR adoption. Hochron and Goldberg (2014) studied a multidisciplinary team to conduct a survey of physicians focused on identifying potential barriers to EHR adoption. The survey evaluation included tailoring EHR to physician, adapting and personalizing training methods, identifying physicians as moderate or high risk for non-adoption, and identifying gaps in communication. Hochron and Goldberg concluded physician acceptance of EHR adoption depends on how clearly the EHR implementation and communication plan address physician's needs and concerns, effective targeted messaging of physicians based on identified needs, and manner in which hospital follows through with addressing physicians' needs. Successful EHR adoption approaches use actionable intelligence for adapting, implementing, and

following through on EHR that addresses physician's needs. Appropriate investment in both the EHR and the individual user are necessary for EHR adoption.

EHR use is an important factor relative to EHR adoption. Physicians use various features in their use of the EHR, associations with other use predictors, and usage intensity over time. Healthcare providers using the same EHR developed personalized patterns of use of EHR features (Ancker et al., 2014). The effects of EHR systems on healthcare quality and costs may be a valuable additional predictor in research of physician-level usage of EHR features. Personalized patterns of EHR use highlight the need for an additional explanation of the variability of individual-level measures of usage of EHR functions (Ancker et al., 2014). Iqbal et al. (2013) examined the key factors affecting physicians' adoption pattern and found these key factors to be the intention to use and higher PU and PEOU. Many of the previously referenced studies of TAM are evidence of the influence of Davis Jr.'s (1986) seminal TAM research in which Davis Jr. identified PU and PEOU as significant determinants of user acceptance. The TAM is a systematic evaluation of how the basic mechanisms that are central to user behavior will assist understanding of reactions to complex, often multifaceted computer systems (Davis, 1989.)

Various factors lead to a lack of physician enthusiasm for EHR adoption even though physicians are leaders in technology adoption. Some EHR systems decrease the productivity of physicians, do not include data sharing capabilities, or do not include other key interoperability features (Mennemeyer et al., 2016). One common example is that many primary care physicians could further decrease costs through total elimination

of paper processes that EHR systems replace. Factors considered vital ingredients for long-term EHR implementation include the ability to accommodate changing emphasis, encourage physician engagement, utilizing appropriate vendor assisted approaches, and combining or switching of EHR systems within the health system as needed for improving business functions and interoperability of EHR systems (Daly, 2016). EHR networks lack interoperability, which allows proper, complete data transfer. Interoperability of EHR systems supports an improved quality of care from providers, reductions in mistakes, more timely research in public health, and reduction in costs (DeAngles, 2015). Fragmented data disclosure results in misdiagnoses and improper and duplicate testing, so to achieve more significant interoperability, healthcare leaders should transition to widespread use of advanced EHRs in the healthcare system. Regardless of EHR type, interoperability, or provider usage, one factor that is continually a major barrier to EHR adoption and implementation is cost.

Implementation costs represent a significant barrier to EHR adoption, especially for small- and medium-size physician practices (SMPP). Although maximum incentives for physicians are $44,000 from Medicare and $63,750 from Medicaid, in a national survey about 45% of physicians spent more than $100,000 on their EHR systems (Cleveland, 2015). Wallace et al. (2014) indicated that SMPPs address the questions of accomplishing EHR adoption and furnishes practical guidelines for EHR implementation. Wallace et al. postulated that SMPPs could successfully implement EHRs and exemplify the diverse ways an EHR can positively influence an SMPP through sufficient training and appropriate use of a project champion (Wallace et al., 2014). Payment reforms,

delivery systems, and federally funded extension programs could offer promising pathways for further diffusion (Audet, Squires, & Doty, 2014). The rapid rise in HIT capacity coincides with the efforts of U.S. federal government officials to increase EHR adoption. Greater adoption of EHRs and information exchange aligns closely with receiving or being eligible for financial incentives. Other ways EHR either negatively or positively influences SMPPs involves the amount of patient volume and workload physicians handle during a specific timeframe.

Researchers examined the impact of EHRs on the workload of primary care physicians, explicitly examining whether there is an association with EHR that increases physician face time with the patient per visit and increases in the physician's patient volume per week. Bae and Encinosa (2016) used a nationally representative sample of 37,962 patient visits to 1470 primary care physicians during the pre-HITECH years 2006-2009 from the restricted access version of the National Ambulatory Medical Care Survey. Primary care physicians using EHRs spend an extra 1.3 face time minutes per visitor or 1.5 extra hours per week (Bae & Encinosa, 2016). The time totals amount to 34,000 additional hours of face time per week in the United States. The use of EHRs contributes to a decline in weekly patient volume among young physicians and an increase in weekly patient volume among older physicians (Bae & Encinosa, 2016).

Understanding factors affecting physician's intention to use EHRs can lead to greater EHR adoption. In the Gagnon et al. (2014) study, age, gender, previous experience, and specialty modified the association between main determinants of physician's intention to use the EHR. Bae and Encinosa concluded there would be 37,600

additional patient visits per week in the U.S. if younger physicians duplicated older

physician behavior, which is equivalent to adding 500 more primary care physicians to

the workforce. However, the operative question is whether the decline in patient volume

among younger physicians represents mastery of EHR along with clinical decision

support tools, improved quality face time per visit, and unnecessary need for additional

workload.

Many EHR adopters are learning valuable lessons utilizing evidence-based

clinical decision support (CDS) tools along with alerts for putting evaluative findings into

practice. Bookman et al. (2017) accentuated the importance of evidence-based medicine

methodology by showing embedded clinical decision support in an electronic health

record decreases use of high-cost imaging in the emergency department. The authors

concluded CDS embedded directly into the provider workflow decreased the overall

utilization and physician variability of high-cost imaging, especially among higher

utilizers (Bookman et al., 2017). Fleming et al. (2014) used an interrupted time series

design for studying workflow and financial measures data collected from 26 primary care

practices in a fee-for-service network in Dallas-Fort Worth, Texas for 2004-2009 and

changes evaluated 6, 12, and more than 12 months post-EHR implementation. The

authors concluded practice and staffing expenses increased following EHR

implementation (3% and 6%, respectively, after 12 months). Visit intensity had

insignificant change, and a secular trend (annual contracting rates) offset the decrease in

payment received (Fleming et al., 2014). Productivity, volume, and net income decreased

initially but recovered close to pre-implementation levels after 12 months. Evidence-

based CDS tools in EHRs enhances healthcare practitioner's clinical decisions to eliminate unnecessary high cost imagery and overall avoid increases in practice and staffing expenses.

The rise in the cost of U.S. healthcare is attributable to the health status of the population. The increase in the prevalence of disease, changes in clinical thresholds for treating and diagnosing disease, and new technologies that allow physicians to treat patients with particular medical conditions contribute to the rise in health care cost spending (Thorpe, Florence, Howard, & Joski, 2005). Additionally, hospital and other healthcare reimbursement costs are sometimes unpredictably high. This unpredictability is due to the payor mix being largely dependent on demographic traits that fall outside healthcare management control (Gamble, 2012). During a study of 30 ambulatory care practices two years after EHR implementation concluded, Howley, Chou, Hansen, and Dalrymple (2015) found that reimbursements increased after EHR implementation (attributed to efficiency) even though there was a long-term decrease in the number of patients seen. Many different kinds of HIT applications are responsible for decreasing healthcare costs. Major transitions of any kind can be difficult organizations and transitions involving EHR implementation are no different.

Researchers used a transition phase management-model to learn and evaluate an organization's ability to implement new process changes commensurate with process improvement and management approaches. Calvo-Amodio, Patterson, Smith, and Burns (2015) conducted three case studies to examine the transition phase of EHR systems during the EHR implementation process. Calvo-Amodio et al. found that the transition-

phase management model captured the dynamic behaviors in each organization change process and identified areas with the biggest impact to achieve desired outcomes. Calvo-Amodio et al. concluded this model helps managers involved in new process implementations access their organization's capabilities to implement new processes. The transition-phase management model can assist organizational learning (double-loop learning approach) and advance situational awareness of the state of the organization and level of resources necessary before beginning an EHR implementation process (Calvo-Amodio et al., 2015). Myriad changes to physicians' workflow and time distribution are inevitable and disruptive during EHR implementations. HCOs can minimize disruptions by having a good change management plan already established that sets reasonable expectations, anticipates change, and places a strong foundation for success (Cohen, 2017). Flexibility and adaptability of EHR to clinicians is vital to avoiding the chaos due to organizational process changes impacting management operations.

Critical-access hospitals more likely to adopt health IT capabilities and less likely to report significant challenges to EHR implementation had certain types of technical assistance and resources available to them. In one survey, 89% of critical-access hospitals are on record as either a full or a partial EHR implementation (Gabriel, Jones, Samy, & King, 2014). The authors conclude that financial, workflow staffing and technical barriers inhibit EHR adoption and use of advanced health IT capabilities in rural areas. Gabriel et al. identified a need for resources and support available to critical-access hospitals, particularly the independent operators, to assist in health IT adoption and electronically link to the broader healthcare system. These are the types of challenges affecting the

progress of rural hospital's health IT adoption as well as the need for funding to target

outreach, education, technical assistance, and practice coaching. Rural facilities

experiencing any barriers to EHR adoption should utilize resources from RECs in their

local area (Cohen, 2017). RECs are federally funded charter organizations capable of

assisting providers in HIT and EHR needs. Healthcare in the U.S. is certainly expensive.

Just how expensive requires closer examination.

Overview of Healthcare Costs

According to the World Health Organization (WHO), the U.S. spent more on

health per capita ($8,608) and per gross domestic product (GDP; 17.2%) than any other

nation in 2011. The federal government pays 20% of Medicare costs, 16% of Medicaid

costs, and 14% of federal, state, local, and public health costs for 50% of U.S. healthcare

costs. Healthcare spending in the United States totaled $2.6 trillion (including a

government share of $1.4 trillion) in 2010 (Ehlke & Morone, 2013). The U.S.

government is investing nearly $30 billion in incentives to encourage physicians and

hospitals to adopt the use of EHRs following federally defined meaningful use criteria

(Adler-Milstein, Green, & Bates, 2013). The HITECH Act of 2009 set economic

incentives for healthcare providers nationwide to encourage achieving MU of a

"certified" EHR system in the time span from 2011 to 2014. Penalties for failure to meet

the EHR requirements after 2015 are in the form of reductions of the Medicare fee

schedule (Ben-Zion, Pliskin, & Fink, 2014). Long term implications are healthcare

providers will be able to easily track, identify, and monitor patient data over time,

improve healthcare quality, and lower healthcare costs. There will be a new healthcare

efficiency dynamic between healthcare providers, government, and health insurance against the backdrop of the health industry born out of necessity from the PPACA, human longevity, and evolving healthcare needs.

The PPACA has expanded affordability, healthcare coverage, and the number of employers providing health coverage to millions of uninsured Americans. However, the majority of the healthcare services in production are still expensive rather than inexpensive, contributing to the inflation of healthcare costs (Ehlke & Morone, 2013). Improvement of the care experience and the health of the population and reducing per capita costs of care through an efficient healthcare delivery system together comprise the "triple aim" of healthcare (Windle & Windle, 2015). Administrative expenses including time spent filling out paperwork for multiple health insurers and expenses associated with a lack of computerized records account for 15% of medical spending (Cutler, 2010). Excess and waste in the U.S. healthcare system can be attributable to insurance companies' marketing, advertising, and underwriting, fraud, lawsuits, unnecessary tests and treatments, new technology, and artificial restrictions on the supply of drugs and healthcare providers (Heskett, 2007). EHRs play a transformative role in the quality of coordinated care for patients, physicians, healthcare facilities, and insurers. Still, widespread EHR adoption is not as robust as initially predicted.

The problem for nationwide adoption of EHRs lies in the inability of healthcare organizations to fully account for hidden costs affecting both adoption and implementation strategies that decrease healthcare costs. Moore, Eyestone, and Coddington (2013) found that physicians expect to lose, on average, $43,743 over 5 years

and that only 27% of physicians expected to achieve a positive return on their EHR investments. Moore et al. did not include future changes in payment methods, clinically integrated networks that share data and contractual arrangements, the long-term importance of technology, and effective EHR use increasing efficiency and reducing costs as factors in their study. Physicians must conduct thorough and responsible examinations, order the appropriate tests for each patient, and evaluate the results of these tests before discharging patients and while making the appropriate diagnosis. Physicians may be overly cautious due to their concerns about medical liability and may order unnecessary tests. Healthcare providers who order additional diagnostic tests, consultations, and imaging studies are satisfying a perceived legal risk, not medical risk, and may contribute to higher healthcare expenditures.

Researchers in England conducted a case study modeling the costs of stable coronary artery disease. Asaria, Grasic, and Walker (2016) examined critical challenges and opportunities that arise when using linked EHRs in health economics and outcomes research (HEOR), with a particular focus on estimating healthcare costs. Asaria et al. found those researchers and clinicians' experienced new challenges and opportunities while handling sensitive data and extracting clinical endpoints and concluding a requirement exists for greater clinician involvement and intelligent use of sensitivity analysis. Howley, Chou, Hansen, and Dalrymple (2015) studied the long-term financial impact of EHR implementation within 30 ambulatory practices for two years and concluded reimbursements increased. Howley et al. advocated for the advancement of EHR functionality to include analytics in order for practices to analyze patient data for

greater efficiency. Findings from the analysis of cost data and clinical events are beneficial to healthcare decision makers. Connecting healthcare providers around the world via EHRs may significantly increase the value to healthcare businesses and improves overall individual healthcare.

The EHR is one technology solution for mitigating geography, time, space, and cost. EHR systems can influence healthcare costs. The EHR is useful for understanding different types of patient's risks while estimating lifetime healthcare costs and quality-adjusted life years for reimbursements and expenses, along with the impact on cost-effectiveness (Asaria, Walker et al., 2016). A majority (81%) of physicians reported that real-time display of cost information in an EHR could lead to a modest reduction in the ordering of laboratory tests which provides increasing evidence of EHRs value as a tool to promote cost transparency and reduce laboratory test use (Horn, Koplan, Senese, Orav, & Sequist, 2014). The significant improvements to health system efficiencies, improving cost effectiveness and time saving strategies, and safe secure storing and sharing of healthcare information will ultimately revolutionize the healthcare industry.

Health care organization (HCO) leaders frequently do not consider support costs; upgrade fees, and other long-term costs of EHR systems in determining the total cost of ownership. Eastaugh (2013) found that hospital executives indicate key drivers of cost overruns to be the number of required support full-time equivalents (FTEs) and the fees charged for major software upgrades, which can produce an operational margin differential of 28% or $2.3 million for the average 350-bed hospital. Support and upgrade costs varied widely depending on the choice of the EHR system vendor (Eastaugh, 2013).

Long-term EHR costs vary dramatically depending on which system HCOs select, so HCO leaders must scrutinize vendor selection, which directly affects the opportunity to predict the impact on operating margin (Eastaugh, 2013). In addition, it is important to remember that healthcare experts and policy analysts rely on the reporting data generated by these systems for decision making of specific disease categories and different population groups in determining cost benefits of medical acquisitions. The successful financial management of diverse HCOs is critical for budget analysis in effective accounting and monitoring of all organizational cost centers.

Leader and managers must track and analyze financial, operational, and strategic metrics at each level of the organization where cost drivers are controllable to determine accurate organizational costs and their financial ramifications. Another reason for high healthcare costs is that many HCOs do not have sophisticated cost systems that provide the true cost of a department or service to efficiently aide operations (Lawson, 2005). This requires the adoption of Activity Based Management (ABM) and Activity Based Costing (ABC) already in use in other industries but not as prevalent in the healthcare industry due to a lack of understanding of the benefit of ABM and ABC and the misconception both practices are more expensive and complex to deploy (Lawson, 2005). High healthcare costs will begin to decrease once HCO personnel understand and utilize ABM/ABC cost systems that accurately "cost" their organization services.

Achieving the healthcare reform goal of cost reduction requires training, coordination, and communication, motivation, reward, recognition of accomplishments, and strong focus on data analysis. The provision of quality healthcare by organizations

increases through the efficiency of knowledge management and data sharing, by

improving access to information and communication platforms and devices, and

continuous improvement of statistical analysis tools (Burns, Bradley, Weiner, & Shortell,

2012). Forrester et al. (2014) found that in a 400-provider multidisciplinary medical

group over a 5-year period (2010-2014), use of an EHR system led to savings of $18

million and $1.5 million in prescription and medication errors, respectively, and

contributed to 14,500 fewer adverse drug events. A minority of providers abuse the

system by billing for services not provided or were not medically necessary, billing for a

higher level of service than provided, misreporting costs and other data to increase

payments, paying kickbacks, and stealing providers and beneficiary's identities.

Healthcare providers can be liable for knowingly submitting (or causing submitting)

claims for reimbursement in reckless disregard or deliberate ignorance of the truth, as

well as for intentional fraud.

The actual cost of healthcare is not the only factor contributing to increasing

healthcare costs. Fraud, waste, and abuse significantly influence healthcare costs. In

fiscal year (FY) 2009, CMS estimated that 7.8% of the $24.1 billion spent for Medicare

fee-for-service claims did not meet program requirements. One Office of Inspector

General (OIG) audit in the period 2004-2006 for care services in New York City

identified $275.3 million in improper Medicaid payments and $96 million in improper

(pain management treatment) payments to Medicare (New York State Department of

Health, Office of the Medicaid Inspector General, 2012). The OIG identified several

instances in which Medicare and Medicaid officials overpaid for specific products and

services that aligning payments with market costs could save taxpayers substantial

savings (Morris, 2010). The healthcare industry can fundamentally change the U.S.

healthcare delivery system to mitigate the significant impact on quality that fraud, waste,

and abuse causes and strengthen legal and ethical principles for its prevention.

Researchers have cited advances in technology as necessary for both improving

the quality of care and increasing costs, but there is also evidence that advances in

technology are decreasing health care costs, with EHR adoption being a primary

contributor. For example, criminals set up sham durable medical equipment (DME)

storefronts as legitimate providers, fraudulently bill Medicare for millions of dollars, then

close their storefronts and reopen in a new location under a new name and repeat the

fraud. Additionally, fraudsters can shift the fraud scheme from DME to billing for home

health services (Morris, 2010). Leaders and managers can improve their organizational

cultures to promote legal and ethical behavior, compliance with applicable laws and

regulations, privacy and security of health information while improving health service

delivery, and decreasing costs (CMS, 2018). Lack of data sharing and interoperability

between networks stifles the potential cost reduction, which EHRs may enable. Health

care providers working in interoperable EHR systems are also equipped to control costs

associated with fraud and abuse in the EHR market, such as that associated with duplicate

testing. Medical waste, fraud, and abuse wastes billions of heath care dollars that take

away from the care of elderly, blind, disabled, and low income Americans.

The healthcare industry has to mobilize organizational cultural changes, enabling

technologies, and quality improvement for innovation in healthcare delivery systems to

benefit society. Payors, providers, and regulators are increasingly adopting quality of care

as an emerging standard for the provision of healthcare that is safe, patient-centered,

effective, timely, efficient, and equitable (U.S. Department of Health and Human

Services, Office of the Inspector General and the American Health Lawyers Association,

2011). Healthcare fraud is big business averaging over $70 billion annually, so mitigation

efforts need to be substantial effectively coordinated, and frequent (Morris, 2010). Major

increases in technology and human fraud fighting tools, locked down security access of

EHR and information systems, and effectively tailored compliance programs to meet the

expanding needs of various healthcare organizations will greatly aid fraud mitigation

(Morris, 2010). Healthcare fraud detection is appropriate for detecting checklist-based

coding noncompliance or goods and services billed but is not adept at uncovering

inappropriate practice patterns involving actual administering of unnecessary treatments,

because the ability to detect requires medical knowledge (Steensma, 2016). The

healthcare industry would benefit from a proliferation of businesses that develop

technology to detect healthcare fraud anomalies automatically in major

healthcare payer systems. Healthcare fraud mitigation can be successful if healthcare

industry can ramp up fraud detection within payment systems, to begin with, and match

that intensity with detection and recovery.

The healthcare industry can fully engage leadership and management to leverage

innovation and quality improvement in healthcare organizations. Achieving these goals

requires training, coordination, communication, motivation, vigilance, and focus on data

analysis. The healthcare industry needs to utilize improved technology, HIM, and EHRs to realize the full potential of data sharing and continuous organizational learning.

Summary and Transition

The problem of EHR adoption and implementation has many different potential causes as documented in the review of the literature. Scholars and healthcare professionals examining the problem of EHR adoption and implementation have articulated a variety of possible improvements. Healthcare providers, moderately incentivized by the HITECH Act, are adopting EHRs in order to improve care and access to information, to reduce medical errors and unnecessary testing, and to reduce costs in the health care industry.

Costs are a major factor associated with EHR adoption and implementation in hospital and clinics. Additional factors that affect behavior and user acceptance influence how and when healthcare providers will use EHR systems. Acceptance of technology is integrally related to how effective users of EHRs leverage features of the systems to improve access to patient information, operability, and cost effectiveness.

I articulated problem and purpose statements for the proposed qualitative case study that would support exploration of what strategies PCP managers in Central Florida used to implement EHRs to decrease healthcare costs. Additionally, I used the TAM framework for conducting an examination that identified what strategies PCP managers use when adopting and implementing EHRs to decrease and control healthcare costs. In the following section, I provide a description of plans for structuring and conducting the

proposed qualitative case study and present findings and recommendations from the study.

I begin Section 2 with an explanation of the exact steps taken during the qualitative case study examining EHR implementation strategies for decreasing healthcare costs. In Section 2, I explain the methodologies influencing the study. I also define who the participants are for the study. I provide an explanation of why a qualitative case study is the best option for the research study. I continue Section 2 with a description of the techniques that address population sampling and ethical research. In this section, I also include an explanation of the collection, organization, and analysis of data. I conclude Section 2 with an explanation of how the study will be reliable and valid.

I begin Section 3 by reintroducing the purpose of the study and providing a description of the findings of the study. The presentation of the findings of the study include the research question, identification of themes, and comparison of findings with other peer reviewed studies, connections to the conceptual framework, and how the findings tie or dispute existing literature on effective business practice. Finally, in Section 3, I present information on the application of study findings to professional practice and the implications for social change. I also present recommendations for action, recommendations for further study, reflections, and study conclusions.

Section 2: The Project

Section 2 begins with an explanation of the steps taken for the qualitative case study of the strategies PCP managers have used to implement EHRs to decrease healthcare costs. Section 2 includes a descriptive narrative of the purpose of the study and the role and responsibilities of the researcher. I discuss the type of participants, type of participant sampling, types of resources, and the nature and type of engagement for the researcher to gain access to the participants. Finally, Section 2 includes an overview of the research method and design, population and sampling method, ethical research requirements, data collection and data analysis, and reliability and validity.

Purpose Statement

The purpose of this qualitative, single-case study was to explore what strategies PCP managers use to implement EHRs to decrease healthcare costs. The study population included five PCP managers in a healthcare network in Central Florida who successfully implemented an EHR system. The study has implications for positive social change. The findings may be helpful for physicians in implementing the EHR mandated regulation and facilitating the expansion of the use of EHRs to lower the cost of healthcare to patients and the economy. At the same time, the use of EHR systems may also enhance the efficiency and quality of healthcare that patients receive.

Role of the Researcher

My primary role as the researcher was to function as the data collector and analyzer. The role of the researcher is awareness of one's own social reality while being involved intimately with study participants, the context of the study, and the collection of

data (Yates & Leggett, 2016). I conducted interviews in an unbiased manner during the most accessible time and acceptable secure location for the participants. I understood my biases in this study were the belief that EHRs are more efficient than traditional paper records and that they can have a meaningful impact on healthcare quality and cost. Researchers access study participants to collect information, conduct interviews, interpret and analyze data, and explore experiences to identify common themes (Patton, 2002). During the interviews I listened to, observed, and documented participants both verbal and nonverbal cues. In a relaxed, confidential environment, participants openly responded and shared their insights and knowledge about EHR implementation strategies.

As a retired Navy Healthcare Administrator and current Veterans Affairs Program Specialist, I have extensive educational and professional experience in the healthcare industry and the research topic of this study. My experiences include broad and general experience with the administration of healthcare programs and the implementation process of various healthcare program initiatives. I am familiar with basic and general EHR systems but have no specific training or work experience with EHR implementation.

As a researcher, I ensured the study conformed to high ethical standards and endeavored to function as an unbiased primary data collector during the data collection process (Yilmaz, 2013; Yin, 2014). Specifically, I adhered to the ethical principles and guidelines for research involving human subjects in *The Belmont Report* protocols which are (a) respect for persons, (b) beneficence, (c) justice, and (d) informed consent (Zucker, 2014). Additionally, involving protection of human subjects in *The Belmont Report*, I did

not harm vulnerable subjects that include racial minorities, institutionalized mentally infirmed or prisoners, and children. I mitigated bias by viewing data findings from the perspective of the participants and obtained participants' view of the credibility of findings through member checking. I ensured data saturation occurred when new input no longer contributed substantially to understanding.

As a researcher, I adhered to an interview protocol (see Appendix A) of the appropriate interview questions to ask all participants. I used the interview protocol to ensure I conducted a quality interview in terms of structure, comfort, privacy, and assurance of confidentiality. I used the interview protocol to ensure ethical compliance, informed consent, explanations or clarifications, and appropriate length of time for study participants. For researchers new to qualitative research, an interview protocol is a procedural guide that directs, prompts, and reminds the interviewer of the information they are interested in collecting (Jacob & Furgerson, 2012).

Participants

In a qualitative study, the researcher requires participants with knowledge and experience in the subject phenomenon (Yin, 2014). Study participants included primary care managers who met the criteria of responsibility for the administration, oversight, and direct working knowledge of EHRs in Central Florida. I used purposeful sampling to select interviewees for the study. Gathering data from individuals or groups of individuals with knowledge and experience relevant to the topic of study is the reason for purposeful sampling (Bernard, 2013). Purposeful sampling is the recommended best practice for researchers conducting qualitative case studies (Palinkas et al., 2013). For a

qualitative study, the ideal sample size is the one most appropriate for the research

(Marshall & Rossman, 2016).

My purposeful sample included five PCP managers from Central Florida primary

care medical facilities who met eligibility criteria to serve as participants for the study.

The participants selected met the qualification criteria to provide an understanding of the

research question and provide insight into the phenomenon. The participants had

experience with the strategies used in the successful implementation of an EHR system.

In qualitative research, the basis for selection of study participants should be those who

have had experience with the phenomenon (Sargeant, 2012).

I used online public medical directories, annual organizational reports, and

websites for gaining access to participants. Online databases furnish a wealth of

information that aid in the recruitment and selection of research participants that meet the

criteria for the study (Smith, Wilde, & Brasch, 2012). I gained initial access to

participants via a letter sent by email explaining the purpose of the study and inviting

them to participate in the study (see Appendix B). After initial contact, I also used the

recruitment method known as snowball sampling. Researchers explain snowball sampling

as use of existing members to recommend other potential members that met the inclusion

criteria (Sedgwick, 2013). Furthermore, I used email, phone calls, and onsite visits to

gain access to participants. Patton (2002) advocated advanced fieldwork as a reliable

method for providing access to study sites of the reputable organization.

I developed a working relationship with the participants by sending emails with

attachments that explained how I would conduct the interview, use the interview protocol

for the conducted interviews (see Appendix A), and how I would obtain informed

consent. It is important for the researcher to establish a rapport with the participant to

ensure open, honest, and frank discussion in a qualitative study (Roulston, 2014). I

structured initial and follow-up questions in an open-ended manner. Quality in-depth

interviews are a result of appropriately structured initial and follow-up questions asked by

the interviewer (Marshall & Rossman, 2016). I assured participants of strict

confidentiality throughout and after conduct of the study. I informed interviewees they

had the option to end the interview at any time, they would be de-identified during the

data analysis process, and that both electronic and hard copy files pertinent to the study

would be thoroughly secured (password protected, locked container) in my possession.

I ensured that each participant had the opportunity to decide whether or not to

participate based on the email contents and information provided in the consent form. I

obtained informed consent by either having participants reply via email or by actual

signature on a consent form. I ensured the study conformed to high ethical standards and

strived to remain an unbiased primary data collector during the data collection process.

Research Method and Design

Quantitative, qualitative, and mixed methods are three research methods that

researchers use to conduct studies (Denzin & Lincoln, 2011). I carefully evaluated the

appropriateness and merits of each approach for conducting my study. I selected the

research method that most closely aligned with the methodological approach of the study

research question and subquestions and the objective of the study: to explore what

strategies healthcare managers use to implement EHRs to decrease healthcare costs in Central Florida.

Research Method

The objective of qualitative research is for the investigator to explore, observe, and understand lived experiences and perceptions of a phenomenon (Patton, 2002). Qualitative researchers seek to study phenomenon through the personal perspective, paying attention to the context of the emerging perspective (Daher, Carré, Jaramillo, Olivares, & Tomicic, 2017). The qualitative method is appropriate because the goal of this study was to produce a rich, thick description of strategies that PCP managers might use to implement EHR systems.

The research question was the following: What strategies do PCP managers use to implement EHRs to decrease healthcare costs? The research question dictates the type of study the researcher conducts. The exploratory and interpretative nature of this study was appropriate for a qualitative approach (Ellis & Levy, 2009). Researchers often use qualitative research designs for healthcare management and healthcare research studies (Marshall & Rossman, 2016). The use of a qualitative approach to explore strategies PCP managers use to implement EHRs to decrease healthcare costs was appropriate for the study of healthcare management practice and research.

Forrester et al. (2014) used a qualitative method to examine the cost-effectiveness of computer provider order-entry (CPOE) in reducing medication errors and adverse drug events (ADEs) in a 400-provider multidisciplinary medical group over a 5-year period. Jung, Unruh, Kaushal, and Vest (2015) used a qualitative approach to examine the

participation characteristics of physicians in New York during the first 2 years of the MU initiative through longitudinal patterns identifying characteristics associated with nonparticipation, late adoption of EHRs, noncontinuous participation, and switching programs. Riddell, Sandford, Johnson, Steltenkamp, and Pearce (2014) identified critical processes for MU of EHRs in the Kentucky Ambulatory Network.

The relevance of experience and meaning in qualitative research is an accepted principle for qualitative studies (Daher et al., 2017). With qualitative research, the researcher is an active participant and observer, using fieldnotes, interviews, conversations, photographs, and memos (Yin, 2014). In qualitative research, the researcher provides an interpretive, naturalist approach to the understanding of world phenomenon concerning the meanings people bring to them (Denzin & Lincoln, 2011).

A quantitative approach is ideal for collecting and analyzing data that is structured and can be represented numerically (Goertzen, 2017). Researchers use a quantitative approach to examine relations of magnitude between variables measuring quantities (Landrum & Garza, 2015). The objective of a quantitative study is to classify features, count them, and construct statistical models that attempt to explain what the researcher is observing. Additionally, quantitative researchers know in advance, what they are looking for and tend to remain objectively separated from the subject matter (McCusker & Gunaydin, 2015). Using a quantitative approach, researchers seek to predict and analyze social phenomena and use hypothesis testing to achieve research goals in controlled and contrived studies (Park & Park, 2016). My goal of understanding and describing responses to the strategies healthcare managers used in implementing EHRs to reduce

healthcare costs did not involve the quantification and analysis of numerical data.

Accordingly, I did not select a quantitative research approach for the proposed study.

The mixed methods approach includes both quantitative and qualitative

approaches to the types of questions, research methods, inferences, and data collection

and analysis procedures (Teddlie & Tashakkori, 2009). Pillemer et al. (2016) used a

mixed method approach to examine EHR data, surveys, and interviews and study the

impact of allowing patients to view their test results via a patient portal in one large

health system. I focused on the exploration and description of PCP manager responses to

their EHR implementation strategies to decrease healthcare costs and did not intend to

include quantitative assessment of factors and causal relationships in the study.

Therefore, I determined a mixed methods approach to be unsuitable for the study.

Research Design

Researchers asking how or what questions will employ a case study design

(Amerson, 2011; Andrade, 2009; Yin, 2014). Researchers often use the case study design

to examine a phenomenon (Andrade, 2009; Baxter & Jack, 2008; Yin, 2014). A

comparative case study involves different types of case studies that include exploratory,

explanatory, or descriptive cases and may involve one or multiple organizations and

locations (Amerson, 2011; Stake, 1995; Yin, 2014).

The use of the case study design to explore what strategies PCP managers used to

implement EHRs to decrease healthcare cost was appropriate because I explored a

specific phenomenon. Yin (2014) posited case studies are useful when researchers seek

an in-depth understanding of the phenomenon, issue, or event within context. When using

case studies, a researcher answers how, what, and why questions and provides additional insight when gaps exist in the literature (Crowe et al., 2011). Researchers should conduct interviews to the point of data saturation, which no new themes emerge from the interview responses (Trotter, 2012). Researchers may achieve data saturation as soon as conducting three or four interviews, but more interviews may be required to achieve data saturation. I stopped interviewing participants at the point when data saturation occurred and new input no longer contributed substantially to understanding of the research question. In qualitative research an established range of the sample population is not always relevant, but should be large enough to achieve data saturation but not so large as to be overly repetitious in data collected (O'Reilly & Parker, 2013). Qualitative researchers determine the sample size by considering the purpose of the study and the diversity of perspectives given by participants (Trotter, 2012). Yin (2014) explained case studies are a contemporary way to explore and examine a phenomenon descriptively.

The case study was appropriate for explaining what strategies PCP managers use to implement electronic health records that decrease healthcare costs. Daher et al. (2017) explained that case study research is instrumental in theory development. Shachak et al. (2013) used multiple case studies of family health teams and a family health organization in Ontario, Canada to provide insight into end-users' expectation and needs for primary care electronic medical records (EMRs). Wallace et al. (2014) conducted a qualitative multicase study to examine the impact of EHRs within small and medium-size physician practices (SMPPs). Boswell (2013) conducted a single-case study to describe the

behaviors, readiness, pros, cons, and strategies for HR professionals looking to

implement EHRs.

Other qualitative research designs do not support the detail-rich case exploration

of the study. In phenomenological research, the researchers' focus is on understanding

the essence of a lived experience for several individuals (Petty, Thomson, & Stew, 2012).

The phenomenological design gives researchers opportunity to focus on individuals'

daily life experiences and activities and how individual's experiences are significant to

the researcher (Wells, 2013). Researchers using a phenomenological design adhere to a

systematic, disciplined approach to making prejudgments regarding the phenomenon

under study (Moustakas, 1994). A phenomenological design was not appropriate for this

study since my objectives was not the interpretation of participants' lived experiences

regarding a particular phenomenon.

Researchers use an ethnographic design to conduct prolonged observation for

describing and interpreting a culture-sharing group (Marshall & Rossman, 2016).

Ethnographic researchers interact with participants in their natural setting while exploring

their social or organizational culture (Nelund, 2013). Beliefs and behaviors of groups

within a culture were not the objectives of this study of the strategies PCP managers used

to implement EHRs to decrease healthcare costs.

Researchers use a narrative design to conduct a limited unit of analysis that

focuses on studying the storytelling, art, or autobiographies of one or two individuals.

Narrative research is dependent on the experiences as expressed in lived and told stories

of individuals (Haydon & Riet, 2014). Narrative research is also dependent on an

extensive collection of information on the participant as well as a clear understanding of the context of the individual's life (Denzin & Lincoln, 2011). A narrative design was not appropriate for the study because I did not focus on understanding the context of an individual life.

Population and Sampling

The sample population for the study consisted of primary care managers in Central Florida with responsibility for the administration and oversight of EHRs in Central Florida. Each of the participants had direct working knowledge of EHRs. The objective of the study was the collection of data from documents and participants with experience and specific knowledge of the strategies used in the successful implementation of an EHR system in the state of Florida. Consequently, I employed purposeful sampling (as suggested by Bernard, 2013; Petty et al., 2012) to recruit participants with relevant knowledge and experience sets.

I initially employed *maximum variation sampling* to identify and recruit study participants. I explored maximum variation sampling through the purposeful selection of participants from a wide range of groups to ensure a multiplicity of perspectives on the phenomenon of interest (Marshall & Rossman, 2016). The use of maximum variation sampling also facilitates the identification of common patterns in collected data (Marshall & Rossman, 2016). Klingler and Marckmann (2016) employed maximum variation sampling in a study examining difficulties experienced by migrant physicians working in German hospitals. Maximum variation sampling ensured the collected study data represented a suitable range of obstacles encountered by migrant physicians.

I recruited participants from Central Florida primary care practice facilities to assess and represent the diversity of perspectives regarding EHR implementation strategies to decrease healthcare costs. I obtained contact information for some initial participants during a routine primary care appointment at a selected primary care practice. A wide range of healthcare professionals employed by primary care practices met the criteria for the study. I also conducted a review of publicly available documents and websites to locate additional contact information for initial study participants. I did not ask organizations to assist in providing participant contact information.

I also used snowball sampling as a mechanism for identifying and recruiting study participants. Snowball sampling is a form of network sampling used to determine respondents within challenging to recruit or elite populations (Bernard, 2013). Snowball sampling consists of researchers relying on participants' previously established relationships for identification of participants within difficult to recruit populations (Arnold et al., 2012). The snowball sampling method involves the researcher asking current study participants to identify and recommend additional participants (Baltar & Brunet, 2012). Sedgwick (2013) employed snowball sampling to recruit participants for a quantitative study of the incidence of HIV in a community of injecting drug users and noted snowball sampling is prone to selection bias. Trotter (2012) explained snowball sampling is a technique that builds from convenience sampling to reach elusive participants. I employed snowball sampling to recruit additional interviewees based on recommendations provided by initial participants identified using the maximum variation

sampling technique. I used snowball sampling to obtain a suitable sample size for the study of EHR implementation strategies that decrease healthcare costs.

I determined an appropriate sample size for the proposed study of responses to EHR implementation strategies that decrease healthcare costs. The responses came from the study participants recruited from the selected site and the targeted number of interviewees recruited from the site. As argued by Rubin and Rubin (2012), the number of sites selected for a qualitative study is dependent on the research question under investigation and the number of factors that might be influencing the phenomenon of study. To fully characterize and describe responses to the problem of EHR implementation strategies that decrease healthcare costs, I examined the perspectives of PCP Managers with responsibility for the administration, data entry, and adoption of EHR systems. I gathered documents and recruited interviewees from identified primary care practices to include (a) an executive, (b) a physician, (c) a nurse or nurse practitioner, (d) an administrative or contract professional, and (e) a fiscal or budget analyst.

While conducting a qualitative study, Rubin and Rubin (2012) asserted that a large number of interviewees are not necessary to achieve or ensure balance and thoroughness. To ensure the achievement of proper depth and diversity of perspectives, a minimum of one interview per subsample area is sufficient if achieved (Rubin & Rubin, 2012). Based on the proposed minimum of one site type for inclusion and an assumption of conducting six interviews at the selected sites, I determined a minimum pool size of five to seven interviewees to be appropriate. I conducted five interviews. Griffith (2013)

noted that sample size is essential for qualitative studies for demonstrating transferability and discovery. Researchers using purposeful sampling in qualitative research can use small sample sizes, even as small as one (Griffith, 2013). Trotter (2012) explained qualitative research has specific parameters for small, consensus-oriented sample populations.

Qualitative researchers strive to achieve data saturation, which may occur quickly after three or four interviews or may require additional interviews to achieve data saturation. I ceased interviewing at the point when data saturation occurs when new input no longer contributed substantially to understanding. O'Reilly and Parker (2013) noted that complying with an established range of the sample population is not always relevant for qualitative studies. Population sample size should be large enough for generalization but not so large as to be overly repetitious in data collected (O'Reilly & Parker, 2013). By considering the purpose of the study and the diversity of perspectives given by participants, qualitative researchers determine the sample size (Trotter, 2012).

Ethical Research

The conduct of ethical research is an essential element of the qualitative research process. Ethical qualitative research reaches beyond whether a study design is appropriate and includes ethical considerations that require treating human subjects participating in the study with respect, beneficence, and fairness (Marshall & Rossman, 2016). Social researchers need to ensure they do not put study participants at risk (Bernard, 2013).

Walden University's Institutional Review Board (IRB) established a process for students to follow in conducting ethical research. I conducted the study within strict

ethical bounds. The IRB process guided the formation and conduct of the study data

collection phase, and no data collection commenced before receipt of IRB approval of the

submitted research plan. Under this process, I completed the National Institutes of Health

(NIH) web-based training course for the protection of human subjects during this

research. My certificate number is 2109361. The data collected for the study is about the

EHR system. Additionally, interviews for the study were only with competent adults over

18 years of age. The IRB approval number is # 07-24-18-0011277. Before administering

the interviews, I provided participants with information about the objectives and intent of

the study. I also provided an informed consent form for all interviewees to review and

sign.

I provided participants with informed consent forms by email and information

about the research study before administering interviews. Once the participants had

reviewed the study information, participants signed an informed consent form with a

digital or physical signature. Study participants did not receive any incentives.

Participants could withdraw from the study by sending an email at any time during the

study period. No repercussions, identification, or memorialization of their data would

exist for participants that decided to withdraw from the study. De-identification of

participants during the data analysis process would protect the privacy of study

participants and the PCP. I would not ask participants to share information they felt

would compromise their professional status, nor would I ask participants to respond to

specific interview questions they were not comfortable in answering. I will store the data

in a secure and safe location for 5 years to protect the privacy and rights of the

participants. I will keep the hard copies and the backup file of the study and analysis in a

locked file cabinet. The original electronic copies are on a password-protected computer.

I will destroy all data collected 5 years after publication.

Data Collection Instruments

I was the primary instrument for conduct of the case study of EHR systems that

help to decrease healthcare costs. I collected study data from the review of documents

and from the conduct of interviews with primary care managers with responsibility for

the administration, oversight, and direct working knowledge of EHRs in Central Florida.

I obtained reliable and valid information when interview subjects answered questions

honestly and candidly about their individual professional experiences involving adopting

and implementing EHR systems.

I enhanced the reliability and validity of the data collection instrument/process

through transcript review and member checking. I used multiple sources of data to ensure

study construct validity through methodological triangulation. Denzin and Lincoln (2011)

defined triangulation as the use of several different data sources to support the

comprehensive examination of identified phenomena. The interview participants can

provide a list of practical strategies to aid other healthcare organizations implement EHR

systems that aid in cost reduction. PCP managers can provide deep insight into the

overall implementation process. I used an interview protocol as a guide for the interview

process. I used the interview protocol (see Appendix A) as the script for interview

sessions. In addition to using the interview protocol, I discussed the interview questions

with each participant. Discussions with interview participants may yield valuable insights

into how change management or training process impact workflow and productivity involving EHR implementation (Kumar, Bhatia, & Chiang, 2013).

I used other data sources such as company documents on the process and strategies the PCP managers use in implementing EHR systems to reduce costs effectively. For a succinct review of data, I provided participants with a summary of interview responses, annual report records, and company documents for verification that the captured data was accurate and that I had interpreted the data correctly.

I used a digital voice recorder and wrote detailed notes in my researcher's journal to highlight all pertinent information obtained from the interviews during data collection. During the research process, I organized the data in a centralized database for secure storage and further analysis. I organized the interview data by identifying and tagging entries of crucial sorting factors. These sorting factors included the subject name, job title, number years of experience with EHRs, and training level or expertise involving EHR systems to allow for the efficient sorting of the data.

Data Collection Technique

After receiving study approval from the Walden University IRB, I used online public medical directories, annual organizational reports, and websites to gain access to potential participants. I recruited potential participants using face-to-face, telephone and email methods, and I asked each participant to complete and sign a consent form permitting me to conduct an interview. I scheduled face-to-face interviews at a preferred designated, accessible location. I emphasized the rights of each participant at the beginning of each interview session. I collected, recorded, and transcribed data from

every interviewee whether in-person or via email. I used a handheld digital recorder to record face-to-face interviews and alternatively use a cell phone recorder to record interviews via phone if a face-to-face interview was not possible. I followed the interview protocol (see Appendix A) during all interview sessions. During the interview process, I also took notes in my researcher's journal regarding any additional thoughts, insights, or questions I might ask at the end of the interview.

I used semistructured interviews to gather data during the conduct of the proposed case study. As described by Cridland, Jones, Caputi, and Magee (2015), semistructured interviews involve in-depth conversations between the researcher and interviewee. Although the goals of the researcher drive the purpose, it is the interviewee's perceptions, opinions, and experiences that drive semistructured interviews (Cridland et al., 2015). I provided interviewees the opportunity to answer at length and to deliver rich and detailed responses (Rubin & Rubin, 2012). Dong et al. (2016) employed semistructured interviews with clinicians to explore perspectives on managing multiple occurring symptom clusters of patients with advanced cancer. Samra, Bottle, and Aylin (2015) used semistructured interviews to examine how primary care professionals use information and data to monitor quality and patient safety. I used semistructured interviews to explore and explain how PCP managers with responsibility for the administration and oversight of EHRs in Central Florida describe EHR implementation strategies that aid in overall healthcare cost reduction. Each of the participants had direct working knowledge of EHRs.

I reviewed and compared all data documents, training logs, activity records, and cost information to prevent missing any critical information that may provide additional insight into the study. I conducted interviews to the point of data saturation in which there are no new themes that emerged from the interview responses (Trotter, 2012). I augmented the interview data by obtaining primary care practice documents such as implementation policy and or resource(s) utilization plans. I asked participants to review all captured company documents and transcripts within their purview to assess and verify the authenticity of the documents. I ensured member checking included interview participants reviewing the transcribed interview and responding to company documents and interview information for accuracy of the recorded interview. Member checking means the participants review the interview transcript to verify the accuracy of the interview (Torrance, 2012). If necessary, I modified the transcript content via member checking to ensure the accuracy of the recorded interview. I de-identified study participant information from all documents I received in order to maintain participant privacy.

The advantages of using PCP available information is the information is not expensive to acquire and offers the opportunity to evaluate specific trends over time. The disadvantages of using PCP available information is the information may be difficult to obtain, may be confidential or have privacy and disclosure restrictions, and the information may be incomplete. The advantages of interviewing PCP managers is the appropriateness for relating to each individuals educational level, higher response rate than questionnaires, and provides the opportunity for interviewees to clarify questions.

The disadvantages of interviewing PCP managers was that I might bias individual responses and interviewees' accounts of actual events might not be as accurate as actual observation of events.

Data Organization Technique

I organized the raw data into digital and physical file folders. I have safeguarded and prevented unauthorized access to the data by encrypting and storing the data in a secure location. I have stored transcribed interviews on a password-protected computer and maintained contacts list and handwritten journal notes in a physical folder stored in a locked container (Jacob & Furgerson, 2012). I coded the database entries with key identifier information that includes each subject's reference number and details specific to the interviewee that do not correlate any identifying information with the subject site. I created a data log on a password-protected computer and included an entry for each article of data that provides information on (a) data type (document or interview), (b) data identification (document name or interviewee number), (c) document file name on the computer, (d) date of collection, (e) location of collection, and (f) corresponding research notes file name.

The coding process is essential to maintaining the confidentiality of personal details of the participants. I used an encrypted file to store the code key with the information regarding all database entries. I used a brand-name computer software package to import the transcribed data from a Microsoft Word document for analysis and storage. I coded interview responses based on common themes to expedite the identification of emerging thematic topics within the data. Rowlands, Waddell, and

McKenna (2015) described coding as the process of deriving emerging concepts and themes from the interview. Yin (2014) characterized member checking as essential for validating the accuracy of interview data and eliminating any erroneous interpretation of interview data. For a succinct review of data, I provided participants a summary of interview responses, annual organization reports, and company documents for verification that the captured data and my interpretations of the data are accurate. I have stored the data on a password-protected laptop and will keep the data for 5 years. After 5 years, I will destroy all electronic data files and paper copies unless an additional research need becomes evident.

Data Analysis

I created interview questions to support my exploration of the central research question: what strategies do PCP managers use to implement EHRs to decrease healthcare costs? I used open-ended questions to create a space in which study participants shared their thoughts, experiences, and perspectives regarding the strategies PCP managers use to implement EHRs to decrease healthcare costs. I asked study participants to give responses to the following questions:

1. What strategies did you use for implementing the EHR?

2. What were the key barriers for implementing the EHR?

3. How did you address key implementation barriers?

4. What perceived ease of use/perceived usefulness considerations factored into the decision of which EHR system to purchase and implement?

5. What perceived ease of use/perceived usefulness considerations factored into implementing the EHR?

6. How, if at all, have operating costs altered your strategies to implement the EHR?

7. How did you assess the effectiveness of the strategies?

8. What, if any, cost reduction was realized by your practice since implementing the EHR?

9. What, if any, costs savings to patients was realized since implementing the EHR?

10. What additional information regarding implementation can you share?

I developed interview questions that encouraged study participants to share insights and perspectives regarding the various factors that might limit strategies PCP managers used to implement EHRs to decrease healthcare costs. Additionally, I conducted reviews of documents for further assessing how individual, institutional, and societal factors influences EHR implementation initiatives. I aligned the collection and analysis of study data with the conceptual framework selected for the study: the technology-acceptance model framework.

Proposed by Davis in 1985, the TAM is in frequent use to explain the determinants of computer acceptance that explain a user's behavior over a wide range of computing technology. The TAM is a model for users to make predictions about the acceptance of technology. With TAM, Davis explained an individual's attitude toward use of technology is a direct function of perceived usefulness and perceived ease of use

(Davis, 1993). It is important to consider TAM in design and implementation of new

technologies and TAM measures and explains user motivation to adopt technology. The

TAM is important in the decision-making process when purchasing new information

technology that impact operational costs of implementing the technology, and end users

technology acceptance, job performance, productivity, and efficiency. The TAM provides

a framework for researcher's better understanding of user acceptance of technology and

development of better information systems (Davis, 1993). I used the TAM framework to

align data collection and analysis for my study on EHR implementation strategies for

decreasing healthcare costs.

For the qualitative case study, I utilized coding as the primary data analysis

technique. Coding methods include deductive coding and inductive (open) coding.

Researchers use deductive coding for the theoretical or conceptual framework of their

studies as the basis for deriving codes during the data analysis process (Bernard, 2013).

Researchers immerse themselves in the data during the review process while applying

open coding and focus on capturing emerging instead of predetermined themes (Bernard,

2013).

I used both deductive and open coding to conduct a thorough analysis of data

collected for the qualitative case study. As described by Yates and Leggett (2016),

qualitative researchers often employ inductive coding to identify patterns, themes, and

categories in data. I used inductive coding for developing the codebook used for tying

data to my conceptual framework. I used deductive coding to develop the initial codes for

analysis of the collected document review and interview data. In a study examining the

brand perception of product advertising and viral stealth video marketing of "YouTube," Wendt, Griesbaum, and Kölle (2016) used an inductive approach to achieve a first overview of the data set and a deductive method to extract defined elements of the set. Robson and Robinson (2015) employed deductive coding to derive coding categories from the interview questions used during a case study investigating the validity of the information seeking and communication model (ISCM). Robson and Robinson examined the behavior of healthcare professionals who both seek and use information and of those who communicate information. I generated deductive codes based on a review of the interview questions to identify and isolate keywords and themes related to the conceptual framework selected for the study.

Open coding is rooted in the identification of concepts and themes that emerge during the review of collected qualitative data (Bernard, 2013; Rubin & Rubin, 2012). Nelson (2016) used open coding to identify new themes and theoretical concepts during the review of data collected during the conduct of a qualitative study examining attributes of African Americans in the Department of Defense Senior Executive Service Corp. Similarly, I employed open coding during the review of documents and interview data collected during the conduct of the case study to surface and examine concepts and themes that are supplemental to the deductive codes used during the analysis process. The use of open coding supports the application of methodological triangulation: the exploration of alternative explanations for the social phenomenon currently being studied (Stake, 1995). By combining open coding with deductive coding during the conduct of the study of EHR implementation strategies for decreasing healthcare costs, I was able to

explore the relevance of the technology-acceptance model framework and possible

alternative conceptual framework for explaining impediments to the adoption and

implementation of EHRs.

<div align="center">**Reliability and Validity**</div>

Reliability

A critical test for establishing the quality of social science research is the

assessment of study reliability (Yin, 2014). Reliability is a measure of study repeatability.

An investigator following the same procedures outlined by another investigator should

obtain the same results (Bernard, 2013). Moreover, reliability is the replicability,

repeatability, and stability of results or observation of the phenomenon under study

(Cypress, 2017). The scientific aspect of reliability assumes that repeatable measures of a

phenomenon using objective methods establish truth of the findings (Cypress, 2017).

Qualitative researchers use case study protocols and case study databases to establish

dependability (Barratt, Choi, & Li, 2011; Frels, Sharma, Onwuegbuzie, Leech, & Stark,

2011; Yin, 2014). Marshall and Rossman (2016) stated that dependability is how the

researcher plans to react to changing conditions.

A case study protocol includes an outline of the procedures the researcher will

follow and use to ensure that case study data collection, analysis, and reporting activities

remain focused on the study line of inquiry (Yin, 2014). Berg, Rørtveit, Walby, and Aase

(2017) asserted the importance of the use of case study protocols during the conduct of

qualitative case studies in health service research of safe clinical practice for patients

hospitalized in a suicidal crisis to ensure study reliability. I used a case study protocol

(see Appendix C) to ensure adherence to best practices for conducting qualitative case studies.

Qualitative researchers advocate the use of member checking for establishing and ensuring dependability (Marshall & Rossman, 2016; Petty et al., 2012; Yin, 2014). The member checking process involves providing a synopsis of the interview for the participant to review (Marshall & Rossman, 2016). I scheduled an appointment for member checking with each participant at the completion of all interviews. The five study participants independently reviewed a summarization of their answers for each question and provided their opinion whether the data interpretation was accurate. I gave specifics on each participant's opinion by indicating whether they recognized the descriptions as their own. I corrected the summarizations to reflect the opinions of the participants accurately. Reliability is the researcher demonstrating consistency and care in the application of research practices, analysis, and conclusions and in remaining cognizant of the partiality and limits of the research findings (Cypress, 2017).

Validity

Validity is the state of research being well grounded or justifiable, relevant, meaningful, logical, and conforming to accepted principles of quality (Cypress, 2017). Validity is the researcher's concern with the accuracy and truth of scientific findings (Cypress, 2017). Credibility and transferability are the measures ensured in quality qualitative studies (Denzin & Lincoln, 2011; Marshall & Rossman, 2016). Transferability is the application of the findings to another context or population (Petty et al., 2012). The qualitative researcher conducting a case study outlines the exact steps taken for data

collection and analysis to create study transferability (Marshall & Rossman, 2016). The

qualitative researcher ensures transparency by addressing any changes, which occur

during the research process (Petty et al., 2012). Creating a direct audit trail enables

readers to follow decision changes (Petty et al., 2012). Gerring (2011) noted that in field

research methodological transparency is just as important as statistical significance in

developing collective knowledge. Marshall and Rossman (2016) observed that it is a

good practice for the researcher to keep a data collection journal to document all

decisions made during the data collection process (Marshall & Rossman, 2016).

Researchers can review the data collection decisions that lead to transferability when they

review the data collection journal. Triangulation, referential adequacy of materials,

alternative explanations, and member checking are some of the strategies that establish

credibility (Petty et al., 2012). Qualitative researchers ensure rigor in their case study

research by comparing multiple sources (Petty et al., 2012; Scheffer, Tausche, &

Edelhäuser, 2011; Yin, 2014).

Qualitative researchers should use triangulation to achieve credibility (Marshall &

Rossman, 2016). Johnson et al. (2017) used multiple triangulation approaches

establishing credibility and validity to explore decision making in prehospital emergency

care. Confirmability is similar to the quantitative research concept of objectivity

(Marshall & Rossman, 2016). Marshall and Rossman (2016) stated that in qualitative

research, the researcher will not get the same results from participants as during the

previous study, but given changes over time can prove the results as dependable. A study

is replicable when a different researcher can achieve the same result (Gerring, 2011; Yin,

2014). Reaching data saturation occurs when no new critical issues or themes emerge from interview responses (Trotter, 2012). O'Reilly and Parker (2013) recommended testing for saturation throughout the interview process but not to the point as to be overly repetitious in data collected.

Qualitative researchers strive to enhance transferability and credibility with sampling procedures (Marshall & Rossman, 2016). To ensure credibility and transferability, I (a) allowed an adequate amount of time for interviews and analysis, (b) used member checking, (c) created a journal of research decisions made during data collection, and (d) used methodological triangulation. I ensured an audit trail by providing a complete description of plan changes as changes occurred. Researchers can demonstrate case study reliability by using case study protocols and case study databases (Yin, 2014). Researchers can demonstrate the validity of a study by describing the true existence, accuracy, and valid measures of the phenomenon. Qualitative researchers must be concerned with rigor in order to ensure their studies are viewed as reliable and valid (Cypress, 2017).

Summary and Transition

In this section, I provided an explanation of the purpose of the study and the role of the researcher and provided a description of the study participants. I provided a description of the study population, the sampling methods employed, the intended sample size, and the ethical treatment and informed consent of study participants. I described the data collection instruments, data collection technique, data collection, data organization, and data analysis methods I used for the study. I also described how I established

reliability and validity. I conducted a qualitative case study to facilitate understanding of how healthcare leaders in Central Florida implement EHR systems to aid in cost reduction. I gathered and analyzed data from the review of documents and the conduct of semistructured interviews in order to understand the strategies that PCP managers used to implement EHRs to decrease healthcare costs.

In Section 3, I reintroduce the purpose of the study and provide a description of the findings of the study. The presentation of the findings of the study includes the research question, identification of themes, and comparison of findings with other peer-reviewed studies, connections to the conceptual framework, and the findings ties or disputes to existing literature on effective business practice. Finally, in Section 3, I discuss the application of study findings to professional practice and implications for social change. I also present recommendations for action, recommendations for further study, and reflections.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative single-case study was to explore the strategies that PCP managers use to implement EHRs to decrease healthcare costs. The study population included five PCP managers in a healthcare network located in Central Florida who had successfully implemented an EHR system. The study featured methodological triangulation of semistructured interviews, documentation from literature reviews, and publicly available online documents. Data analysis included member checking to assure the accuracy of data interpretation and coding in revealing emergent themes. The study findings aligned with the TAM (Davis, 1993) the conceptual framework which explains that an individual's attitude toward the use of technology is a direct function of the perceived usefulness and perceived ease of use of technology. Participants cited several reasons for the implementation of EHRs, including training, cost, and the ease of use. Participants indicated that an EHR system that is user-friendly and easy for healthcare practitioners to use following training supports lower healthcare costs for patients. Cost savings resulting from EHR system implementation could come from nonduplication of laboratory tests, lower medication costs, and fewer office visits for patients.

Presentation of Findings

The research question was as follows: What strategies do PCP managers use to implement EHRs to decrease healthcare costs? To answer the research question and to gain an understanding of the strategies, I collected data from semistructured face-to-face interviews (with member checking), and I reviewed company documents comparing all

data relevant to training logs, activity records, and cost information PCP managers use to implement EHRs. During the data analysis, the primary themes resulting from analysis of interview and document data were: (a) implementation of EHRs, (b) costs of implementing EHRs, and (c) perceived usefulness of EHRs.

I used the TAM theory of Davis Jr. (1986) as the conceptual framework to explore strategies that PCP managers used to implement EHRs to reduce costs. The PU and PEOU are two concepts of the TAM theory that managers can use to determine if using technology will make a job easier for employees (AlShibly, 2014). The TAM theory is appropriate to enhance understanding of user acceptance processes based on new theoretical insights into the successful design and implementation of information systems.

The TAM theory is useful for researchers describing the motivational processes that mediate between system characteristics and user behavior. The major goal of the TAM theory in this study was to predict information systems acceptance that would allow system implementers and designers to evaluate proposed new technology systems before their implementation (AlShibly, 2014). Davis Jr. (1986) asserted that individuals could use system prototypes to demonstrate the user acceptance testing approach and measure potential users' motivation to use alternative systems. Therefore, user acceptance testing of the TAM theory before implementation would be a useful indication of the success of a proposed system and yield valuable information about system characteristics, user motivation, organizational implementation, and user acceptance of proposed new systems.

System characteristics affect how motivated users are to use the system, which in turn affects their system use or non-use. Psychologically, user motivation toward system use derives from understanding what influences beliefs, attitudes, and behaviors of the individual or group implementing new technology (AlShibly, 2014). Davis Jr. (1986) posited the use of TAM for decisions regarding how and when users employ the successful design and implementation of new technologies and how TAM measures and explains user motivation. The three themes that emerged from this study have a connection to the TAM theory.

Theme 1: Implementation of EHRs

Implementation of EHRs is a theme all five PCP managers confirmed to be important during the interviews. The results of the publicly available document indicated success or failure of EHR implementations depend on the freedom of PCPs to change the software to conform to HCOs needs and standards. The implementation of EHRs themes emerged from the following interview questions (IQ): IQ1, IQ2, IQ3, and IQ7. The five managers indicated that implementation of EHRs depends on the motivation of the employees. P1 observed, "Cultural change can be very challenging! There will always be the first edge, early adopters, bulk transition, slow adopters, and laggards in any large implementation." P2 said, "As far as timing goes, it was all about the practice getting people onboard with using the EHR as soon as possible because they wanted to keep up with technology changes and stay ahead of the competition." P3 said,

You need organizational change management to assist with the changes a

new EHR brings to the organization. Getting the organization motivated,

ready for change, you start early in the cycle through communication,

flyers, kickoffs, team meetings, fun activities to engage the employees,

and continue until after the GoLive date.

P4 said, Our practice vetted out several different EHR vendors in order to implement the

one that we felt would work all around for all of the different 'personalities' of each

provider and their ease of use. P5 indicated success of implementing EHRs depends on

the viability of the patient.

P5 observed,

The only thing really the physician has been interested in forever, is the

patient, the patient's viability, and whether the patient is doing well or

sliding off and not doing as well. The EHR now can give them (providers)

indicators that lead them to a better clinical critical pathway than the old

patient charts. Implementing the EHR depends on an organizations ability

to engage and motivate clinicians to effectively utilize the EHR in the

provision of quality care for patients.

With the TAM, Davis Jr. (1986) confirmed that the use of information systems is

a response driven by users' motivation, which is when a direct influence occurs and

driven by an external stimulus consisting of the actual system's features and capabilities.

Davis Jr. asserted there is great value in how you measure user motivation prior to

organizational implementation in order to evaluate user acceptance of new systems. The

TAM is useful for researchers describing the motivational processes that mediate

between system characteristics and user behavior. Researchers frequently use TAM or

any of its associated extensions in examining factors influencing healthcare worker intention in HIT adoption. Three subthemes derived from the implementation of EHRs: (a) training, (b) time, and (c) change.

      Training. Arsoniadis and Melton (2016) indicated the importance of appropriate training and resource support for successful EHR adoption and implementation is evident when analyzing clinical decision support tools. The five participants were passionate about training on the EHRs system. P1 stated,

> Anyone who will use the EHR in any way, will need to have some type of training. Whether it's training for full use, or training just to view information only. If you don't train close to the GoLive date, people will forget what they have learned and there will be a lot of unhappy users at GoLive.

      P1 went on to further explain that his organization developed a training team to plan out their training strategy for determining the number, length, location, and best method to train their staff. P1 emphasized the importance of involving key operational sponsors, like the nursing education director to assist with training strategy. P2 observed,

> Throughout the year EHR systems upgrades are streamlining the process. This means more training for users. Some programs may take two days of training, while others may take two hours of training, depending on the EHR system you are working with.

P3 noted that common training mistakes include staff not attending training or providing staff with short 10-minute training overviews that are impractical for training on all aspects of a particular platform. P3 likened the training approach to an Excel spreadsheet. Many Excel users have some training on Excel which has been around for quite some time and still are not aware of every single feature of Excel, such as pivot tables. The training issue with physicians is simple. When physicians adopt an electronic health record, they miss out on key training necessary to do their work and rely too much on other office staff in operating the EHR.

P4 indicated the barriers to implementation had to do with staffing and training, observing,

> For the providers that were less technologically savvy, they were offered
>
> the option to train on a dictation software package that would enable them
>
> to do less "clicking" and to "talk" into the areas of the compatible areas of
>
> the software.

P5 indicated training should occur before the actual implementation of EHR systems. The strategies that focus on training help enhance PEOU. The provision of training pertaining to how to use and maintain EHR systems is an expected part of the strategies that effect PU since participants believe using an EHR system may enhance their job performance. Participant observations align with the work of Davis (1989), who found that training, experience, perceived accuracy, and perceived relevancy significantly relates to system usage. In terms of significance, PU is more important than PEOU, and the attitude of the users indicates whether they will use an application (Davis, 1993).

Davis (1989) conducted a study with MBA students that revealed a significant increase in

PU with 1 hour of training as opposed to MBA students not receiving 1 hour of training.

Therefore, an appropriate amount of training increases how well you can operate the

technology and benefits you in how it improves your job performance. The amount of

training received, measured by frequency or duration, is an important time factor.

      Time. As indicated in the literature review, time is one of the top 25 barriers to

EHR implementation indicated by Ajami and BagheriTadi (2013). All study participants'

emphasized time as a hindrance in using the EHR system. The participants also observed

that the amount of time patients spend with doctors changes following EHR system

implementation. Since 1993, P1 has been involved with the selection of several EMRs

and noted the difficulty in quantifying ease of use for surveys. One particularly effective

method they used was from the time of initiation of the EMR to the time the provider,

nurse, technician or other healthcare professional got involved in touching the medical

record system. By comparison of time, P2 explained doctors saw on average 4 patients

per hour before EHR implementation and 6-8 patients per hour after EHR

implementation. Seeing twice as many patients increases revenue and is due to doctors

being able to get through more information at a faster pace. P3 stated, "Strategies to

implement the system depends on how much time is needed."

      P4 noted the time factor before or pre-EHR implementation. P4 noted that due to

the complexity or sophistication of EHR systems, vendors could require from 6 months to

over 18 months to implement a solution. P5 observed,

There is this individual mindset that everyone that works with an EHR is

going to work with the EHR in the same way. But obviously, most people

don't work in the same manner. Each person in a team have some

differences so each person has their own individual pace, method, and

workflow. So, time varies on how long it takes for teams to get up to

speed and counts toward assessing effectiveness of the implementation.

The observations provided by P2 and P5 are supported by Bae and Encinosa

(2016), who observed that primary care physicians using EHRs spend an extra 1.3 face

time minutes for each visitor or 1.5 extra hours a week. The time totals amount to 34,000

additional hours of face time each week in the United States. The use of EHRs

contributes to a decline in weekly patient volume among young physicians and an

increase in weekly patient volume among older physicians (Bae & Encinosa, 2016).

Myriad changes to physicians' workflow and time distribution are inevitable and

disruptive during EHR implementations. However, by their own accounts participants say

EHR systems save time by allowing physicians to see more patients per hour thereby

increasing revenue. The ability to see more patients ranks as a distinct advantage. In an

extended TAM model, Brezavscek et al. (2014) explained that the key constructs that

determine a user acceptance of innovation is an advantage by the user and the ease of

operating the technology.

Change. Numerous changes to physicians' workflow and time distribution are

inevitable and disruptive during EHR implementations (Bae & Encinosa, 2016; Garrety

et al., 2014; Srinivasan, 2013). A majority of HCOs can minimize disruptions by having a

good change management plan already established that sets reasonable expectations, anticipates change, and places a strong foundation for success (Cohen, 2017). Flexibility and adaptability of EHRs to clinicians is vital to avoiding the chaos because of organizational process changes impacting management operations. The five PCP managers all agreed change is an important factor when implementing EHRs. P1 stated,

This is all about change management, changing hearts and minds, it's not about the technology. Get away from the idea of technology. It's about humans. Change management involves presenting a goal, a kickoff, you must have senior leadership support so that people know senior leaders are enthusiastic about this, too.

P2 stated, "Florida is a retiree state, people like stuff the old-fashioned way, even doctors want things on paper, not on the screen, they want a hard copy. So I would say seniors and doctors are both resistant to change." P3 indicated the change in the implementation of the EHRs caused a change in workflow and a disruption in service. P3 explained the importance of individual process workflows and reviewing how people do their work. P3 also explained being big on looking at change management for preparing people to adopt the new process, adopt the new functionality, and adopt the new software. P3 stated, "You must make your organization aware that change is coming, and you also need to inspire them to want the change by showing them and helping them understand what's in it for them." Often during the change management process there is a period of adjustment everyone goes through while adapting to changes in their routine. P4 observed,

People are resistance to change. With the early adopters not so much. As
you got toward the bell-shaped curve and where the federal government
mandated it, you had an awful lot of resistance because people preferred
paper. When you're taking somebody from paper into an electronic world,
to your point, the learning curve on somebody who is not computer literate
is difficult. I would say the physicians who were sixty and older were
probably more resistant than the younger doctors coming out of medical
school.

P5 offered an interesting and humorous analogy on change. P5 offered the
assumption that everyone knows change is difficult. Furthermore, the implementation of
an EHR initially causes anxiety in both office staff and patients. Generally, people do not
want their information shared with anyone. When implementing an EHR, "know your
audience--both clinical, clerical and patient wise and 'sale' the advantages of it--the best
that you can". The observations provided by Participants 1-5 are supported by Beglaryan
et al. (2017), who observed the acceptance of technology and organizational change were
among the barriers. Table 1 is a list of subthemes related to implementing EHRs.

Table 1

Implementation of EHRs

Subtheme	Frequency of occurrence
Training	53
Time	50
Change	53

Theme 2: Costs of Implementing EHRs

Operating costs associated with the implementation of EHRs are inevitable.

Participant responses pertaining to operating costs derived from IQ6, IQ8, and IQ9. As

observed by Shin and Sharac (2013) financial cost is one of the factors influencing the

adoption and implementation of EHRs. Eliminating processes, paper, and time (person-

hours) reduces organizational operational expenses. Utilizing less costly nurse

practitioners, physician assistants, and medical technologists frees up physicians to care

for patients (Cleveland, 2015). The TAM pertains to how system design features affects

user acceptance and why users accept or reject information systems. Perceived usefulness

reflects two considerations: the benefits and costs of using a particular system, and

perceived ease of use (from the users' perspective) reflecting part of the cost of using the

system. Using the TAM for assessing and forecasting user acceptance of technology

design choices underscores the importance of the cost variable in the incorporation of

appropriate functional capabilities when implementing new systems (Davis, 1993). When

the five PCP managers answered the question if operating cost-altered strategies to

implement the EHRs system, they all agreed financial cost is a factor.

Operating cost. All study participants noted operating cost to be a significant

factor when they began working with EHRs. Some of the participants indicated operating

cost came from implementation and upgrades, and some of the participants indicated they

saved money on operations by reducing the transfer and long-term storage of paper

medical records and saving money on prescriptions. P1 indicated health care

organizations must pay the cost of maintaining the system through upgrades and

evaluating the system for quality, stating

>Healthcare organizations are paying big bucks to maintain their EHRs,
>
>keeping their systems up to date. And it's the opportunity for the vendors
>
>to push their products to their customers to say in order for us to be able to
>
>make that change that you need, you have to upgrade to this system or in
>
>other words they are trying to make as much money as they can and their
>
>product.

P2 observed office management practices in which cost reduction centers on e-

prescribing or e-results. Many physicians were using an EHR system associated with

certain laboratories which provided inhouse laboratory testing as opposed to outside

testing. In this example, Quest laboratories provided the physician the terminal, supplies,

and EHR for free in exchange for sending the blood work to them. It was convenient

since Quest had a phlebotomist on site servicing the blood draws and would immediately

populate lab results into the EHR. Another example of cost reduction came from the

office total elimination of paper, charts, and onsite storage space by relocation offsite to a

secure space inside a mountain. A HIPAA provision requires medical records be

maintained for 10 years. P3 added,

>We saved a ton of money in paper when we did that and we saved a ton of
>
>money in repeat EKGs because we could get the old one and we didn't
>
>have to repeat it because it was available now. If you go from here to the
>
>next clinic nobody has to do another EKG on you, they just pull it up and

see it. You save a lot of money on that and save a lot of time and effort of

the employees who have to do those things. You don't have the additional

cost for the cardiologist reading it because there is a charge for that.

P4 did not see any cost savings from EHR implementation and observed,

"Vendors have add-on products that can be costly," which essentially validates an earlier

observation P1 made. In another example, P5 described how "with the EHR system many

practices no longer must pay medical records staff, which can save some practices

thousands of dollars a year." Paying employees' salaries accounts for the largest costs

associated with maintaining paper charts. Average cost per practice for one person

performing charting is between $15-20 thousand per year, multiplied by 10 for some

companies totals $200,000 per year that can be saved by eliminating paper charts.

Decrease cost of personnel, save money for the company.

P5 indicated implementing EHRs could save money by eliminating the medical

records staff. P2 stated,

It was supposed to eliminate paper, we're still using paper. We print

straight from the EHR. Some healthcare providers want something in

hand, a hard copy often to simultaneously review results with patients.

With the EHR system many practices no longer must pay medical records

staff, which can save some practices thousands of dollars a year. The

largest cost reduction is the cost of paying employees to do paper charts.

The observations provided by Participants 1-5 align with the findings of Johnson

et al. (2014), who posited determining meaningful acceptance and or actual system usage

of technology can be difficult to define often due to prohibitive costs to collect data or

privacy concerns of end users. In reference to the second publicly available document

reviewed, one PCP manager expressed with our next implementation, our clinic is

receiving significant savings on a robust EHR implementation that meets MU criteria,

24/7 IT professional assistance received through Managed Service Offering, and has no

upfront costs.

Cost reductions. The five PCP participants all agreed cost did not come from

implementing the EHRs; however, patients did receive cost reductions. Reduced costs for

patients were due to an end in duplicate lab tests ordered and lowering of prescription

costs. Only one participant indicated savings did not occur for the patients; however, over

time, savings could come from fewer office visits and reduced overall health costs. P1

indicated one example of savings for the patients occurred because the patients did not

have to have duplicate lab tests. P1 expressed sentiments from a patient's perspective that

almost everyone has experienced at one time or another. When a doctor's office has

interoperability with EHRs where they can share information at that office, the provider

can see the patient's hospital information as well as provide the patient information they

may not have known. The reduction of medication errors in hospital settings is due to

built-in system alerts allowing the provider to see if there are any duplicative lab tests.

P2 observed,

> The biggest benefits to patients was probably on two fronts: getting their
>
> lab results and electronic e prescribing. From a patient's perspective, I'm a
>
> brand-new diabetic, I know nothing about the disease, the electronic health

record, the H1C, the lab test for glucose, but now all that stuff happens

with the touch of a button. Versus the old way a physician would do it, to

go get two or three different pamphlets around diabetes and get

information to educate the patient on this new disease state.

P3 indicated there were no patient costs; implementing EHRs could diminish

constant expenses because EHRs can enhance the general wellbeing for the patient,

prompting less office visits after a period of time. P3 elaborated that since the

implementation of EHRs, office expenses may have risen, even in light of the fact that

the general purpose of moving towards an electronic domain was to have a full network

of care considerations for the patient and the majority of their providers. There are "gaps

in care" being addressed that improve the overall care but implies more office visits for

some patients, thus more expense. Over time, this leads to fewer office visits, a decrease

in expense, and healthier patients. P4 stated,

> When prescribing medication in the EHR, it will automatically offer
>
> alternative medications at lower prices if available. The good thing about
>
> the electronic health record is when we prescribe a patient a script of
>
> medication, it will automatically give me option of equivalent, and
>
> alterative or generic medications that cost less if they are available. A
>
> window automatically pops up giving me the whole scale of medications
>
> that cost more and medications that cost less. If I can find equivalent
>
> medication and the efficacy is the same as the brand name drug, I've saved
>
> them money.

P5 explained EHRs create savings to the patients because their radiology records remain in the system, which creates some efficiencies as well. There was a study and process implementation that tracked the facility's EKG results to validate patients receiving their results in accordance with a 14-day time requirement. This added three additional people and their individual processes to the EHR system, which upon review cost over a third of a million dollars. Money that can be of use elsewhere. As far as savings to the patient, ironically those ordering systems delayed the result of the EKG to the patient. Before the study, patients were getting an average 3-day result, with some as soon as 30 minutes. Efficiency was lost due to government requirements to track, record, and report time requirement. Ironic, there was a delay of time of the report from the original three days and everybody ignored it because they were satisfied with meeting the 14-day requirement. Even more so that without the electronic tracking some patients got their EKG results in about a half hour. Johnson et al. (2014) supported the participated by stipulating sophisticated EHRs include capabilities to deliver analytics useful for reviewing patient care outcomes and decreasing healthcare costs. The use of data analytics in HIT assessment is important in realizing the full potential of all EHRs to improve quality of care and decrease costs.

Participant observations align with Horn et al. (2014), who noted that a majority (81%) of physicians reported that real-time display of cost information in an EHR could lead to a modest reduction in the ordering of laboratory tests. In the United States, Americans spend $600 billion annually on laboratory tests, of which 70% of the money is for paperwork (Omachonu & Einspruch, 2010). The use of EHRs improves efficiency,

cost effectiveness, profit and cost containment of healthcare systems. This is increasing

evidence of EHRs value as a tool to promote cost transparency, eliminate costly errors

and reduce laboratory test use.

Labor costs. All five participants indicated labor cost incurred because

they had to hire trainers to teach the staff and participants that indicated reducing

labor helped save operating costs. P1 indicated cost incurred by hiring subject

matter experts who trained people to operate the EHRs. Pl stated, "Healthcare

subject matter experts (SMEs) – who understand their workflows – these folks

will be needed during process sessions, designing sessions, testing, and training."

In another example, P2 described how "with the EHR system many practices no

longer must pay medical records staff, which can save some practices thousands of

dollars a year." Paying employees' salaries accounts for the largest costs associated with

maintaining paper charts. Average cost per practice for one person performing charting is

between 15-20 thousand dollars per year, multiplied by 10 for some companies totals

$200,000 per year that can be saved by eliminating paper charts. P3 stated, "At the end of

the day that would be a good buy in for the total cost, but after 6 months, they would find

that they would need additional training. So, the cost actually went up, it increased." The

main point is decreasing cost of personnel saves money for the company.

As far as savings in time, P4 explained how the elimination of two technicians

working four hours per day checking and filing all the EKGs into the correct charts costs

on average $30,000 per year. It is better to spend half of that four hours and $15,000 on

the technicians providing direct patient care. P4 emphasized the viewpoint of his

organization was not entirely about making more money but how to get better care and access for the patients. The EKG charting actions by one technician occur in much less time; only 5 minutes a month. The observations of the five participants aligned with the findings of Mennemeyer et al. (2016), who noted that many primary care physicians could further decrease costs through total elimination of paper processes that EHR systems are designed to replace. The two subthemes related to cost were "operating cost" and "savings", and the frequency in which they occurred were 37 and 13 times respectively.

Theme 3: Perceived Usefulness of EHRs

As indicated in the literature, Davis (1993) explained the TAM theory as an individual's attitude toward use of technology is a direct function of perceived usefulness and perceived ease of use with technology. Emergent theme three emerged from participant responses to IQ4, IQ5, and IQ10. All five participants indicated that after the EHR implementation, training on the system made the system user-friendly. Generally, their physicians selected systems with customized features that made the system easier to understand, greater interoperability among all of their network locations, and more robust electronic documenting for their healthcare staff. Employees preferred systems that were not mentally taxing, would work with their current infrastructure, and only minimally disruptive to organizational workflow. P4 and P5 stated "Their administrations purchased a system based on accuracy, speed, safety compliance, price, and effective use of patient care."

User friendly. Davis (1993) stipulated the TAM provides a framework for researchers to gain an understanding of user acceptance of technology and to develop better information systems. The five participants indicated a user-friendly system was an important factor in implementing the EHRs. For instance, they readily acknowledge that the purpose of vendor demonstrations are to sell the organization their number one product verses the organizations intention to buy a system that is easy to use from a clinician, mainly provider perspective. Generally, there had to be consensus with the organizational leaders on the purchase of the right system that fits the needs of the entire organization.

From a training perspective, P2 stated, "Training is easier with an EHR system that is user friendly, where employees will use more frequently and learn more options for use as they learn on their own." P3 stated, "This decision was made wholly on the ease of use to the providers/physicians." In paraphrasing P4's experience with vendors, the following applies: The top 10 major EHR vendors would all talk about ease of use of the EHR, but had little to say about perceived usefulness. The vendors were focused on providing training and re-training of employees as needed due to a high turnover within certain medical professions; i.e. medical assistants. So, vendor's initially proving usefulness of an EHR did not happen. The vendors and the organization would say they were buying an electronic health record because it will be useful, but actually wasn't, due to inadequate training. Today, after more than 15 years of the EHR, primary care practices are mindful of EHR solutions that provided both perceived usefulness in

improving job performance and perceived ease of use in being free of effort and easy for staff members to learn.

Workflow. All five participants were passionate about the system compatibility with the workflow of the organization. P1 stated, "one of the reasons for going with Cerner was the ability to customize features and functionalities based on workflows within hospital systems for healthcare providers including physicians."
P2 stated, "The minimal or least amount of disruption to practice workflow." P3 noted, "The employees were able to create a template that they would use for their patient visits."

P4 observed, "At the end of the very last implementation, there were six offices, they didn't like that system. So, we vetted out other systems and within a year, we moved to another system." P4 elaborated further that the implementation process was pretty much the same for both systems. However, they saw a lot of change in individual's workflows. They noted their provider's age group of early forties and older does make a difference because most providers in that age group are used to paper systems. This was fulltime disruption in their workflows even though their workflow was in the office between the provider and their nurse. So, there was a little bit of massaging the situation needed since the disruption to their workflow meant other workflows had to be changed. One measure of effectiveness pertained to not interrupting the workflows or work process for the practice.
P5 noted,

As far as implementation for ease of use, it wasn't about changing a

doctor's workflow, it was actually understanding the physicians workflow

because each of the 37 specialties had their own workflow. A pediatrician

or OB/GYN would have a different workflow than a cardiologist or an

orthopedic surgeon, they would look at different things. So, talking to the

end user and finding out about their workflow. For perceived usefulness

considerations, if you design the solution and it's nimble enough to adapt

to the physicians workflow, you're not changing anything for the

physician.

Publicly available document contained statements that the software used to

automate PCP management, EHR, managed care functions, and linked patient charts to

the billing processes enhanced and improved workflow. The observations by the five

participants are supported by Davis (1989), with his observation, people tend to use or

not use an application to the extent they believe it will help them perform their job better.

A system, which is easier to use, will result in increased job performance. The two

subthemes related to perceived usefulness of EHRs were "ease" and "workflow", and the

frequency in which they occurred were 32 and 37 times respectively.

Applications to Professional Practice

Managers of PCPs may use findings from this study to identify strategies to

implement EHRs for decreasing health care costs. I used the TAM theory by Davis

(1989) to guide the direction of the study. The specific business problem was that some

PCP managers lack the strategies to implement EHRs to decrease healthcare costs. The

results from this study may assist physicians in facilitating the successful adoption of

EHRs and in the development of strategies to implement EHRs in their office practices.

The findings of this study could also be useful in determining how to lower the

operating costs of physician's offices and improve the quality of the health care services

physicians provide. The results of the study indicated PCP managers should consider

developing and implementing strategies to implement EHRs in their office practices.

Employees who receive proper training feel motivated to use EHRs, and selection and

implementation of a user-friendly system may lead to better patient care and cost savings

for patients.

In addition to the potential cost savings, physicians who use EHRs can improve

the quality of the care they deliver with less medical errors. The savings could provide

benefits to other miscellaneous expenses such as outpatient services because the

physicians and other professional support staff will not rely on pen and paper in folders

that move from hand to hand. The records can remain within a network for other

participating physicians that can remain confidential sharing data regarding a patient's

treatment plan. Patients could feel more confident in receiving and trusting medical

treatment because physicians can share the same information regarding treatments, test,

and prescriptions. Lowering cost from quality information shared within a medical

network could lower cost for healthcare administrators because the number of patients

receiving expensive treatment, preventable by early detection, could lower overall cost

with EHR systems. Clinical decision support systems rely on evidence-based knowledge

and standard care practices that EHR systems can provide for improving quality,

eliminating duplication and medication errors, thereby lowering the cost of medical care.

Implications for Social Change

The implications regarding tangible improvements to individuals, communities,

organizations, institutions, and cultures could affect social change and behavior pattern

for physicians and community residents. The implications for positive social change are

that the results from this study may prove helpful for physicians in implementing

regulatory-mandated EHR and facilitating the expansion of the use of EHRs. The intent is

to lower the cost and improve efficiency of healthcare to patients and the economy. The

use of EHR systems may also enhance quality of healthcare that patients receive creating

an environment where more people become conscientious of their health. Cost savings

may result from reductions in paperwork required due to enhanced efficiency in

diagnosing medical issues, fewer mistakes being made with prescribed medications, and

reductions in duplicate laboratory work orders. Physicians can use an EHR system to

explore alternative medications at lower prices.

The results from this study may prove helpful in exploring further use of EHR

systems in many communities by changing the landscape of healthcare in low-income

communities while benefiting the patients who receive healthcare. For example,

physicians may have the opportunity to pass on to the patients a portion of the cost

savings from the use of EHRs. Second, physicians can use EHRs to improve the accuracy

of medical records by reducing medication errors and adverse drug events, thereby

improving the quality of patients' health care (Forrester et al., 2014). Physicians who use

EHR systems have the potential to increase the number of lives saved. The system can align with many strategies to maintain healthy communities in which individuals live longer and more independently.

New EHR systems connecting international healthcare providers could allow rapidly sharing patient data and enable achieving the *triple aim* of healthcare reform, which can lead to significant improvements to the quality of healthcare, the health of populations, and the efficiency of healthcare systems (Windle & Windle, 2015). From another perspective, the implementation must come with careful precision because using the system without proper caution can lead to many disastrous effects for community residents. Improper implementation can prove dangerous for patients and placing physicians in a position to face legal challenges. In other words, poor implementation can cause fraud-leaving uncertainty in quality health care.

Recommendations for Action

The results of the study are relevant to healthcare organizational managers who want to reduce healthcare cost through the implementation of EHRs. PCP managers in a healthcare setting may implement the results of the study to have success implementing EHRs, reduce healthcare cost for patients, and facilitate smooth health record transfer from facilities within their network. Business professionals such as managers, supervisors, and physicians who may not have effective strategies can use the results of the study to implement EHRs. Study participants identified factors for implementing EHRs including training, cost, and the ease of using the system. PCP managers should consider developing and implementing strategies that provide employees with easy to use

EHRs systems that provide work flexibility and increase better care for patients and savings in healthcare cost.

The results of this study are feasible for PCP managers to implement EHRs in numerous organizations. Managers should adopt user-friendly systems that motivate employees to learn effectively. Psychologically, user motivation towards system use derives from understanding what influences beliefs, attitudes, and behaviors of the individual or group implementing new technology (AlShibly, 2014). Customers of health clinics can review this study to understand why PCP managers implemented EHRs and how EHRs can improve the ease of service, and how EHRs can save health care cost. Adler-Milstein and Salzberg et al. (2013) found that ambulatory EHR adoption did not influence total cost but positively impacted savings, decreases ambulatory care costs and impacts broader changes in organizational payment methods that may incentivize clinicians to use for savings that are more substantial. The strategies resulting from this study could improve patient care in the health clinics that implement the EHRs. PCP managers can use this study when deciding on selecting a quality system and training on EHRs systems.

In order for physicians to use an EHR system appropriately, other stakeholders must support the use of the system, such as other researchers, policy makers, and healthcare professional administrators. Community leaders need education on the social benefits from the EHR network, such as immediate information of a patient's medical history, allergies, shot records, and laboratory results. Community leaders can encourage the use of EHR systems to save lives because of catastrophic situations that could occur.

For example, during a natural disaster, electronic information could remain available within an EHR network if manual records are missing. My goal is to disseminate the results of this study to business publications, such as ProQuest Dissertations, distribution to participants presented at professional conferences, and related forums when applicable. I will seek publication opportunities in business and healthcare journals nationally and locally.

Recommendations for Further Research

The themes gathered from this study were extensive, but more researchers could potentially uncover implementation strategies that may help physicians in small-and medium-sized practices improve patient care. Physicians could use the results from the study to reduce medical errors and improve the accuracy and clarity of medical records. My intent of this qualitative single-case study was to explore strategies PCP managers use to implement EHRs to decrease healthcare costs. Considering that, one limitation was that participants might not possess complete insight and expertise in EHR decision-making processes; perhaps, additional studies using a phenomenological design may appear appropriate.

The phenomenological design could include the lived experiences of 10-20 participants and may generate more substantive detailed information. A researcher could use a quantitative study in generalizing the results from a small sample of the entire population with random data with a variety of people from different locations. A researcher could use quantitative or mixed method research to expose further insights using a formula that can reflect the relationship between variables in revealing the

potential number of PCP managers using strategies in regard to the accessibility of

healthcare records. No matter the method or design, expanding the geographical location

and demographics to a larger group of PCP managers could appear appropriate for future

studies to obtain a broader perspective of strategies.

Reflections

I studied the topic of EHR implementation strategies for decreasing healthcare

costs for a 3-year period. The initial mindset I had of EHRs was that they improved

healthcare efficiency in numerous ways, compared to excessive paper records, and it

should contribute to reducing healthcare costs. I was surprised to learn that some areas of

cost savings exist for primary care practices and their patients, but no definitive overall

cost reduction of operating costs. When realizing that keeping an open mind was

challenging because of personal bias in this qualitative research study, remaining

conscious of perceptions helped enhance the quest for honest and fair information.

Finally, I developed a self-reflective and introspective analysis of self that enlightened

me more on many different levels.

I found the IRB approval process challenging and educational. When following

IRB directions for answering questions regarding the process of conducting the research

study and interaction with study participants, I gained more understanding of the research

process while filling in some of the gaps of the overall process. From the perspective of a

student, the Walden DBA experience was challenging and informative from a practitioner

perspective and adequately inspired success in the business arena. An important element

was learning how decision makers effectively met elements of their strategic plan or the organization's mission to meet goals and objectives.

As the research progressed into developing themes and subthemes, my knowledge expanded with insights to become a better problem solver to assist other potential scholars and practitioners. I am pleased with the work and happy to think that this research may benefit many people that do not know me, or the nature of the research. Reflecting on the results of this study, this research could empower physicians and community residents, which changed my perception of the value of conducting scholarly research.

Summary and Study Conclusions

Some PCP managers lack strategies to implement EHRs. The implementation of EHRs could decrease health care cost savings for medical facilities and enhance the quality of care patients receive. The specific intent of the HITECH Act of 2009 was to accelerate the adoption and promoting the MU of the EHRs. The HITECH members provided billions of dollars and incentives for health care providers who implement EHRs systems (Mennemeyer et al., 2016; Mirani & Harpalani, 2014). Implementing EHRs strategies may help reduce healthcare cost for patients by increasing the accessibility of health records, reducing the duplication of records and enable evidence-based decision support necessary for both providers and patients. The purpose of this qualitative single-case study was to explore what strategies PCP managers use to implement EHRs to decrease healthcare costs by asking the research question: What strategies did PCP managers use to implement EHRs to decrease healthcare costs?

Implementation of EHRs, cost of implementing EHRs, and perceived usefulness of EHRs were the three major themes that emerged from the collection and interpretation of the data from this study. The findings revealed PCP managers should develop and implement strategies to implement EHRs in their office practices. Employees feel motivated using EHRs with proper training, and a timely selection of a user friendly system implemented by managers may lead to better patient care and cost savings to the patients. AlShibly (2014) confirmed psychologically, user motivation towards system use derives from understanding what influences beliefs, attitudes, and behaviors of the individual or group implementing new technology.

Training, time, and the ease of use are significant for the implementation of EHRs. Trained employees on a system that is user friendly in a significant amount of time without interrupting the workflow of the organization are more motivated to use the EHRs system. Implementation of EHRs system can help reduce healthcare cost to the organization and improve patient care. Primary care providers are the backbone or core of the basic doctor office visit and represent major diversity in EHR adoption practices that yield valuable insight on decreasing costs through EHR usage. One goal of health reform is that EHRs become platforms for the bidirectional flow of information from patients and providers to researchers and policy makers to create a nationwide learning health system. Utilizing EHR systems should facilitate MU and efficient exchange of patient clinical data between patients, healthcare providers, and insurers. EHR implementation may influence social change globally by enabling healthcare providers to improve

healthcare cognitive support, information synthesis, interoperability, and preventive

healthcare maintenance.

References

Abramson, E. L., McGinnis, S., Moore, J., Kaushal, R., & HITEC investigators. (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

Adler-Milstein, J., Green, C., & Bates, D. (2013). A survey analysis suggest that
electronic health records will yield revenue gains for some practices and losses for
many. *Health Affairs, 32*, 562-570. doi:10.1377/hlthaff.2012.0306

Adler-Milstein, J., Salzberg, C., Franz, C., Orav, E. J., Newhouse, J. P., & Bates, D. W.
(2013). Effect of electronic health records on health care costs: longitudinal
comparative evidence from community practices. *Annals of Internal Medicine*,
159, 97-104. Retrieved from https://www.cms.gov/mmrr/Downloads/MMRR2013
_003_02_a03.pdf

Ajami, S., & BagheriTadi, T. (2013). Barriers for adopting electronic health records
EHRs by physicians. *Acta Informatica Medica*, *21*, 129.
doi:10.5455/aim.2013.21.129-134

AlShibly, H. H. (2014). The effects of characteristics of electronic document
management systems on their acceptance of empirical study in Jordan.
International Journal of Information, Business and Management, 6(4), 126-145.
Retrieved from http://ijibm.elitehall.com/

Amerson, R. (2011). Making a case for the case study method. *Journal of Nursing
Education*, *50*, 427-428. doi:10.3928.01484834-20110719-01

Ancker, J. S., Kern, L. M., Edwards, A., Nosal, S., Stein, D. M., & Hauser, D. (2014). How is the electronic health record being used? Use of EHR data to assess physician-level variability in technology use. *Journal of the American Medical Informatics Association*, *21*, 1001-1008. doi:10.1136/amiajnl-2013-002627

Andrade, A. D. (2009). Interpretive research aiming at theory building: Adopting and adapting the case study design. *The Qualitative Report, 14*(1), 42-60. Retrieved from http://www.nova.edu/ssss/QR/QR14-1/diaz-andrade

Arnold, E. A., Hazelton, P., Lane, T., Christopoulos, K. A., Galindo, G. R., Steward, W. T., & Morin, S. F. (2012). A qualitative study of provider thoughts on implementing pre-exposure prophylaxis (PrEP) in clinical settings to prevent HIV infection. *PloS One, 7*, e40603. doi:10.1371/journal.pone.0040603

Arsoniadis, E. G., & Melton, G. B. (2016). Leveraging the electronic health record for research and quality improvement: Current strengths and future challenges. *Seminars in Colon and Rectal Surgery*, *27*, 102-110. doi:10.1053/j.scrs.2016.01.009

Asaria, M., Grasic, K., & Walker, S. (2016). Using linked electronic health records to estimate healthcare costs: Key challenges and opportunities. *PharmacoEconomics*, *34*, 155-160. doi:10.1007/s40273-015-0358-8

Asaria, M., Walker, S., Palmer, S., Gale, C. P., Shah, A. D., Abrams, K. R., … Sculpher, M. (2016). Using electronic health records to predict costs and outcomes in stable coronary artery disease. *Heart*, *102*, 755-762. doi:10.1136/heartjnl-2015-308850

Audet, A.-M., 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

Bae, J., & Encinosa, W. E. (2016). National estimates of the impact of electronic health records on the workload of primary care physicians. *BMC Health Services Research*, *16*(1), 1-11. doi:10.1186/s12913-016-1422-6

Baird, A., & Nowak, S. (2014). Why primary care practices should become digital health information hubs for their patients. *BMC Family Practice, 15*(1), 1-5. doi:10.1186/s12b75-014-0190-9

Baltar, F., & Brunet, I. (2012). Social research 2.0: Virtual snowball sampling method using Facebook. *Internet Research, 22*, 57-74. doi:10.1108/10662241211199960

Bar-Dayan, Y., Saed, H., Boaz, M., Misch, Y., Shahar, T., Husiascky, I., & Blumenfeld, O. (2012). Using electronic health records to save money. *Journal of the American Medical Informatics Association*, *20*, e17-e20. doi:10.1136/amiajnl-2012-001504

Barnett, T., Pearson, A. W., Pearson, R., & Kellermans, F. W. (2014). Five-factor model personality traits as predictors of perceived and actual usage of technology. *European Journal of Information Systems*, *21*, 680-698. doi:10.1057/ejis.2014.10

Barratt, M., Choi, T. Y., & Li, M. (2011). Qualitative case studies in operations management: Trends, research outcomes, and future research implications. *Journal of Operations Management, 29*, 329-342. doi:10.1016/j.jom.2010.06.002

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

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544-559. Retrieved from http://www.nova.edu/ssss/QR/QR13-4/baxter

Beglaryan, M., Petrosyan, V., & Bunker, E. (2017). Development of a tripolar model of technology acceptance: Hospital-based physicians' perspective on EHR. *International Journal of Medical Informatics*, *102*, 50-61. doi:10.1016/j.ijmedinf.2017.02.013

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

Berg, S. H., Rørtveit, K., Walby, F. A., & Aase, K. (2017). Safe clinical practice for patients hospitalised in a suicidal crisis: A study protocol for a qualitative case study. *BMJ Open*, *7*(1), 1-6. doi:10.1136/bmjopen-2016-012874

Bernard, H. R. (2013). *Social research methods: Qualitative and quantitative approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Blavin, F., & Buntin, M. (2013). Forecasting the use of electronic health records: An expert opinion approach. *Medicare & Medicaid Research Review*, *3*(2), E1-E16. doi:10.5600/mmrr.003.02.a02

Bookman et al. (2017). Embedded clinical decision support in an electronic health record

decreases use of high cost imaging in the emergency department. *Academy of Emergency Medicine*, *68*, S4-S5. doi:10.1016/j.annemergmed.2016.08.020

Boswell, R. A. (2013). Implementing electronic health records: implications for HR professionals. *Strategic HR Review*, *12*, 262-268. doi:10.1108/SHR-08-2012-0010

Brandon-Jones, A., & Kauppi, K. (2018). Examining the antecedents of the technology acceptance model within e-procurement. *International Journal of Operations & Production Management*, *38,* 22–42. doi:10.1108/IJOPM-06-2015-0346

Brezavscek, A., Sparl, P., & Znidarsic, A. (2014). Extended technology acceptance model for SPSS acceptance among Slovenian students of social sciences. *Organizacija*, *47*, 116-127. doi:10.2478/orga-2014-0009

Bullard, K. L. (2016). Cost-effective staffing for an EHR implementation. *Nursing Economics*, *34*, 72. Retrieved from https://www.ncbi.nlm.nih.gov/27265948

Burns, L. R., Bradley, E. H., Weiner, B. J., & Shortell, S. M. (2012). *Shortell and Kaluzny's health care management: Organization, design, and behavior*. Clifton Park, NY: Delmar/Cengage Learning.

Bushelle-Edghill, J., Lee Brown, J., & Dong, S. (2017). An examination of EHR implementation impacts on patient-flow. *Health Policy and Technology*, *6*, 114-120. doi:10.1016/j.hlpt.2016.11.005

Calvo-Amodio, J., Patterson, P. E., Smith, M. L., & Burns, J. R. (2015). Application of transition-phase management model for an electronic health record system implementation: A case study. *Engineering Management Journal*, *27*, 131-140. doi:10.1080/10429247.2015.1064662

Centers for Medicare and Medicaid Services (CMS). (2018). *EHR incentive programs 2018 program requirements*. Retrieved from https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html

Chuttur, M. (2009). Overview of the technology acceptance model: Origins, developments and future directions. *Sprouts*: *Working Papers on Information Systems, 9*(37), 1-21. Retrieved from http://aisel.aisnet.org/sprouts_all/290

Clandinin, J. (2006). (Ed.). *Handbook of narrative inquiry: Mapping a methodology*. Thousand Oaks, CA: Sage.

Cleveland, B. (2015). Using the law to correct the market: The electronic health record (EHR) incentives program. *Harvard Journal of Law and Technology, 29*, 291-314. Retrieved from http://jolt.law.harvard.edu

Cohen, D. (2015). Effect of the exclusion of behavioral health from health information technology (HIT) legislation on the future of integrated health care. *The Journal of Behavioral Health Services & Research*, *42*, 534-539. doi:10.1007/s11414-014-9407-x

Cohen, M. R. (2017). The challenge of EHR acceptance by physicians. *Journal of Medical Practice Management, 31*(2), 117-120. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/26665483

Collum, T., Menachemi, N., & Sen, B. (2016). Does electronic health record use improve hospital financial performance? Evidence from panel data: *Health Care Management Review*, *41*, 267-274. doi:10.1097/HMR.0000000000000068

Cridland, E. K., Jones, S. C., Caputi, P., & Magee, C. A. (2015). Qualitative research

with families living with autism spectrum disorder: Recommendations for

conducting semistructured interviews. *Journal of Intellectual and Developmental*

Disability, *40*, 78-91. doi:10.3109/13668250.2014.964191

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The

case study approach. *BMC Medical Research Methodology, 11*, 100-108.

doi:10.1186/1471-2288-11-100

Cutler, D. (2010). How health care reform must bend the cost curve. *Health Affairs*, *29*,

1131-1135. doi:10.1377/hlthaff.2010.0416

Cypress, B. S. (2017). Rigor or reliability and validity in qualitative research:

perspectives, strategies, reconceptualization, and recommendations. *Dimensions*

of Critical Care Nursing, *36*, 253-263. doi:10.1097/DCC.0000000000000253

Daher, M., Carré, D., Jaramillo, A., Olivares, H., & Tomicic, A. (2017). Experience and

meaning in qualitative research: A conceptual review and a methodological

device proposal. *Forum Qualitative Sozialforschung/Forum: Qualitative Social*

Research, 18(3). Retrieved from http://www.qualitative-

research.net/index.php/fqs/article/view/2696/4130

Daly, R. (2016). The EHR evolution: new priorities and implementation challenges.

Healthcare Financial Management, *70*(2), 45–51. Retrieved from

https://www.hfma.org

Davis, F. D., Jr. (1986). *A technology acceptance model for empirically testing new end-*

user information systems: Theory and results. Massachusetts Institute of

Technology. Retrieved from

https://www.researchgate.net/profile/Fred_Davis2/publication/35465050_A_techn

ology_acceptance_model_for_empirically_testing_new_enduser_information_sys

tems__theory_and_results_/links/0c960519fbaddf3ba7000000.pdf

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of

information technology. *MIS Quarterly*, *13*, 319-340. doi:10.2307/249008

Davis, F. D. (1993). User acceptance of information technology: system characteristics,

user perceptions and behavioral impacts. *International Journal of Man-Machine

Studies*, *38*, 475-487. doi:10.1006/imms.1993.1022

DeAngles, M. (2015). National electronic health record network regulation and

synchronization of national and state privacy laws needed to increase efficiency

and reduce costs in healthcare. *Journal of Legal Medicine*, *36*, 413-419.

doi:10.1080/01947648.2015.1262194

Denzin, N. K., & Lincoln, Y. S. (2011). Introduction: The discipline and practice of

qualitative research. N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of

qualitative research* (4th ed.) [Kindle version]. Retrieved from

http://www.amazon.com

DesRoches, C. (2015). Progress and challenges in electronic health record adoption:

Findings from a national survey of physicians, *Annals of Internal Medicine*, *162*,

396. doi: 10.7326/L15-5060.

Dong, S. T., Butow, P. N., Agar, M., Lovell, M. R., Boyle, F., Stockler, M., … Tong, A.

(2016). Clinicians' perspectives on managing symptom clusters in advanced

cancer: A semistructured interview study. *Journal of Pain and Symptom*

Management, *51*, 706-717. doi:10.1016/j.jpainsymman.2015.11.021

Eastaugh, S. R. (2013). The total cost of EHR ownership: healthcare organizations should consider support costs, upgrade fees, and other long-term costs of EHR systems in determining the total cost of ownership. *Healthcare Financial Management*, *67*(2), 66-71. Retrieved from http://www.hfma.org

Ehlke, D. C., & Morone, J. A. (2013). *Health politics and policy*. (5th ed.). Stamford, CT: Cengage Learning.

Ellis, T. J., & Levy, Y. (2009). Towards a guide for novice researchers on research methodology: Review and proposed methods. *Issues in Informing Science & Information Technology*, *6*, 323-337. Retrieved from http://books.google.com

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research,* Reading, MA, Addison-Wesley.

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

Ford, R. (2009). Complex leadership competency in healthcare: Towards framing a theory of practice. *Health Services Management Research*, *22*, 101-114. doi:10.1258/hsmr.2008.008016

Forrester, S. H., Hepp, Z., Roth, J. A., Wirtz, H. S., & Devine, E. B. (2014). Cost-effectiveness of a computerized provider order entry system in improving

medication safety ambulatory care. *Value in Health*, *17*, 340-349.

doi:10.1016/j.jval.2014.01.009

Frels, R. K., Sharma, B., Onwuegbuzie, A. J., Leech, N. L., & Stark, M. D. (2011). The

use of a checklist and qualitative notebooks for an interactive process of learning

qualitative research. *The Journal of Effective Teaching, 11*, 62-79. Retrieved

from: http://uncw.edu/cte/ET/

Gabriel, M., Jones, E., Samy, L., & King, J. (2014). Progress and challenges:

Implementation and use of health information technology among critical-access

hospitals. *Health Affairs*, *33*, 1262-1270. doi:10.1377/hlthaff.2014.0279

Gagnon, M., Ghandour, E., Talla, P., Simonyan, D., Godin, G., Labrecque, … &

Rousseau, M. (2014). Electronic health record acceptance by physicians: Testing

an integrated theoretical model. *Journal of Biomedical Informatics*, *48*, 17-27.

doi:10.1016/j.jbi.2013.10.010

Gamble, M. (2012). Is your hospital sustainable? 8 questions to ask. *Beckers Hospital

Review*. Retrieved from http://www.beckershospitalreview.com/hospital-

management-administration/is-your-hospital-sustainable-8-questions-to-ask.html

Garavand, A., Mohseni, M., Asadi, H., Etemadi, M., Moradi-Joo, M., & Moosavi, A.

(2016). Factors influencing the adoption of health information technologies: a

systematic review. *Electronic Physician*, *8*, 2713-2718. doi:10.19082/2713

Garrety, K., McLoughlin, I., & Zelle, G. (2014). Disruptive innovation in health care:

Business models, moral orders and electronic records. *Social Policy and Society*,

13, 579-592. doi:10.1017/S1474746413000560

Gerring, J. (2011). How good is enough? A multidimensional, best-possible standard for research design. *Political Research Quarterly, 64*, 625-636. doi:10.1177/1065912910361221

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 and Management*, *139*, 554-564.

Goertzen, M. J. (2017). Introduction to quantitative research and data. *Library Technology Reports*, *53,* 12-17. Retrieved from https://www.questia.com/library/p416585/library-technology-reports/i4225537/vol-53-no-4-may-june

Griffith, D. A. (2013). Establishing qualitative geographic sample size in the presence of spatial autocorrelation. *Annals of the Association of American Geographers*, *103*, 1107-1122. doi:10.1080/00045608.2013.776884

Hamid, F., & Cline, T. (2013). Providers acceptance factors and their perceived barriers to electronic health records (EHR) adoption, *Online Journal of Nursing Informatics, 17*(3), 1-11. Retrieved from http://ojni.org

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

Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, 42 U.S.C. §§300jj et seq.; §§17901 et seq. (2009).

Hempe, E. (2013). Why are organizations that provide healthcare services fuzzy?

Australian Medical Journal, *6*, 542-548. doi:10.4066/AMJ.2013.1857

Heskett, J. (2007, March 2). What is the government's role in U.S. healthcare? Harvard
Business School: *Working Knowledge* (Online). Retrieved from
http://hbswk.hbs.edu/item/5645/html

Hochron, S., & Goldberg, P. (2014). Overcoming barriers to physician adoption of EHRs.
Healthcare Financial Management, *68*(2), 48-52. doi:10.5600/mmrr.003.04.b01

Howley, M., Chou, E., Hansen, N., & Dalrymple, P. (2015). The long-term financial
impact of electronic health record implementation. *Journal of the Americam
Medical Informatics Association, 22*, 443-452. doi:10.1136/amiajnl-2014-002686

Horn, D. M., Koplan, K. E., Senese, M. D., Orav, E. J., & Sequist, T. D. (2014). The
impact of cost displays on primary care physician laboratory test ordering.
Journal of General Internal Medicine, *29*, 708-714. doi:10.1007/s11606-013-
2672-1

Hsiao, J., & Chen, R. (2016). Critical factors influencing physician intention to use
computerized clinical practice guidelines: An integrative model of activity theory
and technology acceptance model. *BMC Medical Informatics and Decision
Making. 16*(3), 1-15. doi:10.1186/s12911-016-0241-3

Hsiao, C. H., & Yang, C. (2011). The intellectual development of the technology
acceptance model: A co-citation analysis. *International Journal of Information
Management*, *31*, 128-136. doi:10.1016/j.ijinfomgt.2010.07.003

Iqbal, U., Ho, C.-H., Li, Y.-C., Nguyen, P.-A., Jian, W.-S., & Wen, H.-C. (2013). The
relationship between usage intention and adoption of electronic health records at

primary care clinics. *Computer Methods and Programs in Biomedicine*, *112*, 731-737. doi:10.1016/j.cmpb.2013.09.001

Jacob, S. A., & Furgerson, S. P. (2012). Writing interview protocols and conducting interviews: Tips for students new to the field of qualitative research. *The Qualitative Report*, *17*(42), 1-10. Retrieved from http://www.nova.edu.ssss/QR/QR17/jacob.pdf

Johnson, M., Zheng, K., & Padman, R. (2014). Modeling the longitudinality of user acceptance of technology with an evidence-adaptive clinical decision support system. *Decision Support Systems*, *57*, 444-453. doi:10.1016/j.dss.2012.10.049

Johnson, M., O'Hara, R., Hirst, E., Weyman, A., Turner, J., Mason, S., … Siriwardena, A. N. (2017). Multiple triangulation and collaborative research using qualitative methods to explore decision making in pre-hospital emergency care. *BMC Medical Research Methodology*, *17*(1), 1-11. doi:10.1186/s12874-017-0290-z

Jung, H., Unruh, M., Kaushal, R., & Vest, J. (2015). Growth of new york physician participation in meaningful use of electronic health records was variable, 2011-12. *Health Affairs*, *34*, 1035-1043. doi:10.1377/hlthaff.2014.1189

Kim, S., Lee, K., Hwang, H., & Yoo, S. (2015). Analysis of the factors influencing healthcare professionals' adoption of mobile electronic medical record (EMR) using the unified theory of acceptance and use of technology (UTAUT) in a tertiary hospital. *BMC Medical Informatics and Decision Making*, *16*(1), 1-12. doi:10.1186/s12911-016-0249-8

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model.

Information & Management, *43*, 740-755. doi:10.1016/j.im.2006.05.003

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. *British Journal of Educational Technology*, *44*, 536-543. doi:10.1111/bjet.12049

Klingler, C., & Marckmann, G. (2016). Difficulties experienced by migrant physicians working in German hospitals: a qualitative interview study. *Human Resources for Health*, *14*(1), 1-13. doi:10.1186/s12960-016-0153-4

Kohn, L. T., Corrigan, J. M. & Donaldson, M. S. (Eds). (2000). *To Err is Human: Building a Safer Health System*. Washington, D. C. : National Academies Press.

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

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

Lala, G. (2014). The emergence and development of the technology acceptance model (TAM). *International Conference "Marketing From Information to Decision*, *7*, 149-160. http://scholar.google.com

Landrum, B., & Garza, G. (2015). Mending fences: Defining the domains and approaches of quantitative and qualitative research. *Qualitative Psychology*, *2*, 199-209.

doi:10.1037/qup0000030

Lawson, R. A. (2005). The use of activity based costing in the healthcare industry: 1994 vs. 2004. *Research in Healthcare Financial Management*, *10*, 77-94. Retrieved from http://www.freepatentsonline.com/article/Research-in-Healthcare-Financial-Management/141802259.html

Lee, Y., Kozar, K. A., & Larsen, K. R. (2003). The technology acceptance model: Past, present, and future. *Communications of the Association for Information Systems*, *12*, 752-780. Retrieved from http://aisel.aisnet.org/cais/vol12/iss1/50

Leedy, P. D., & Ormond, J. E. (2005). *Practical Research: Planning and design* (8th ed.). Upper Saddle River, NJ: Prentice Hall.

Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information and Management*, *40*, 191-204. doi:10.1016/S0378-7206(01)00143-4

Lien, J., Hughes, L., Kina, J., & Villasenor, J. (2015). Mobile money solutions for a smartphone-dominated world. *Journal of Payments Strategy & Systems*, *9*, 341-350. Retrieved from https://ssrn/.com/abstract=2632372

Maillet, É., Mathieu, L., & Sicotte, C. (2015). Modeling factors explaining the acceptance, actual use and satisfaction of nurses using an Electronic Patient Record in acute care settings: An extension of the UTAUT. *International Journal of Medical Informatics*, *84*, 36-47. doi:10.1016/j.ijmedinf.2014.09.004

Marangunić, N., & Granić, A. (2015). Technology acceptance model: A literature review from 1986 to 2013. *Universal Access in the Information Society*, *14*, 81-95.

doi:10.1007/s10209-014-0348-1

Marshall, C., & Rossman, G. B. (2016). *Designing qualitative research* (6th ed.).

Thousand Oaks, CA: Sage.

McAlearney, A., Hefner, J., Siekc, C., & Huerta, T. (2015). The journey through grief:

Insights of a qualitative study of electronic health record implementation. *Health*

Service Research, 50, 462-488. doi:10.1111/1475-6773.12227

McCusker, K., & Gunaydin, S. (2015). Research using qualitative, quantitative or mixed

methods and choice based on the research. *Perfusion*, *30*, 537-542.

doi:10.1177/0267659114559116

Mennemeyer, S. T., Menachemi, N., Rahurkar, S., & Ford, E. W. (2016). Impact of the

HITECH Act on physicians' adoption of electronic health records. *Journal of the*

American Medical Informatics Association, *23*, 375-379.

doi:10.1093/jamia/ocv103

Mirani, R., & Harpalani, A. (2014). The medicare electronic health records (EHR)

incentive program: First-year adoption response from inpatient hospitals. *Journal*

of Organizational Computing and Electronic Commerce, *24*, 388-401.

doi:10.1080/10919392.2014.956601

Moore, K., Eyestone, K., & Coddington, D. (2013). Costs and benefits of EHRs: A

broader view. *Healthcare Financial Management, 67*, 126-129. Retrieved from

http://www.hfma.org/content.aspx?id=16290

Morris, L. (2010). *Statement by Lewis Morris, Chief Counsel, Office of Inspector*

General, U.S. Department of Health and Human Services (HHS), on Reducing

Fraud, waste, and Abuse in Medicare before the Committee on Ways and Means,
Subcommittee on Health Subcommittee on Oversight United States House of
Representatives. Retrieved from
http://www.hhs.gov/asl/testify/2010/06t20100615c.html

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

Nelson, A. M. (2016). Methodology for examining attributes of african americans in the
department of defense senior executive service corp. *Journal of Economic*
Development, Management, IT, Finance, and Marketing, *8*, 48-68. Retrieved from
http:// www.gsmi-ijgb.com/Documents/JEDMITFM V8 N1 P04

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

New York State Department of Health, Office of the Medicaid Inspector General (2012).
Compliance program guidance for general hospitals. Retrieved from
http://www.omig.ny.gov/images/stories/compliance/compliance_program_guidan
ce-general_hospitals.pdf

Nilasena, D. (2013). Medicare EHR incentive program: Learn about payment
adjustments and hardship exceptions. *Journal of Health Care Compliance, 15*, 51-
51. Retrieved from http://www.healthcarecompliance.us/journal-of-health-care-
compliance.html

Omachonu, V. K., & Einspruch, N. G. (2010). Innovation in healthcare delivery systems:

a conceptual framework. *The Innovation Journal: The Public Sector Innovation Journal*, *15*(1), 1–20. Retrieved from http://www.innovation.cc/scholarly-style/omachonu_healthcare_3innovate2.pdf

O'Reilly, M., & Parker, N. (2013). 'Unsatisfactory saturation': A critical exploration of the notion of saturated sample sizes in qualitative research. *Qualitative Research, 13*, 190-197. doi:10.1177/1468794112446106

Otto, P., & Nevo, D. (2013). Electronic health records. *Journal of Enterprise Information Management, 26*, 165-182. doi:10.1108/17410391311289613

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

Park, J., & Park, M. (2016). Qualitative versus quantitative research methods: Discovery or justification. *Journal of Marketing Thought*, *3*(1), 1-7. doi:10.15577/jmt.2016.03.01.1

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

Petty, N. J., Thomson, O. P., & Stew, G. (2012). Ready for a paradigm shift? Part 1: Introducing the philosophy of qualitative research. *Manual Therapy*, *17*, 267-274. doi.org:10.1016/j.math.2012.03.006

Pillemer, F., Price, R., Paone, S., Martich, G., Albert, S., Haidari, L., & Mehrotra, A. (2016). Direct release of test results to patients increases patient engagement and utilization of care. *PLOS ONE*, *11*, 1-9. doi:10.1371/journal.pone.0154743

Razmak, J., & Bélanger, C. (2018). Using the technology acceptance model to predict patient attitude toward personal health records in regional communities. *Information Technology & People*, *31*, 306–326. doi:10.1108/ITP-07-2016-0160

Riddell, M. C., Sandford, K. G., Johnson, A. O., Steltenkamp, C., & Pearce, K. A. (2014). Achieving meaningful use of electronic health records (EHRs) in primary care: proposed critical processes from the Kentucky Ambulatory Network (KAN). *The Journal of the American Board of Family Medicine*, *27*, 772-779. doi:10.3122/jabfm.2014.06.140030

Robson, A., & Robinson, L. (2015). The information seeking and communication model: A study of its practical application in healthcare. *Journal of Documentation*, *71*, 1043-1069. doi:10.1108/JD-01-2015-0023

Roulston, K. (2014). Interactional problems in research interviews. *Qualitative Research, 14*, 277-293. doi:10.1177/1468794112473497

Rowlands, T., Waddell, N., & McKenna, B. (2015). Are we there yet? A technique to theoretical saturation. *Journal of Computer Information Systems, 56*, 40-47. doi:10.1080/08874417.2015.11645799

Rubin, H. J., & Rubin, I. S. (2012). *Qualitative interviewing: The art of hearing data* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

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

Samra, R., Bottle, A., & Aylin, P. (2015). Monitoring patient safety in primary care: an exploratory study using in-depth semistructured interviews. *BMJ Open*, *5*(9), 1-7.

doi:10.1136/bmjopen-2015-008128

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

Scheffer, C., Tausche, D., & Edelhäuser, F. (2011). "I wish I had a physician like

 that…"—the use of triangulation on the way towards a patient-centered medical

 education. *Patient Education and Counseling, 82*, 465-467.

 doi:10.1016/j.pec.2010.12.027

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

Sedgwick, P. (2013). Snowball sampling. *British Medical Journal*, *347,* f7511-f7511.

 doi:10.1136/bmj.f7511

Shachak, A., Montgomery, C., Dow, R., Barnsley, J., Tu, K., Jadad, A. R., & Lemieux-

 Charles, L. (2013). End-user support for primary care electronic medical records:

 a qualitative case study of users' needs, expectations, and realities. *Health

 Systems*, *2*, 198-212. Retrieved from http://www.palgrave-journals.com/hs/

Sharp, J. H. (2006). Development, extension, and application: a review of the technology

 acceptance model. *Information Systems Education Journal, 5*(9), 1-11. Retrieved

 from http://isedj.org/5/9/

Shin, P., & Sharac, J. (2013). Readiness for meaningful use of health information

technology and patient centered medical home recognition survey results. *Medicare & Medicaid Research Review*, *3*(4), E1-E11. doi:10.5600/mmrr.003.04.b01

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: A symposium introduction and overview. *Journal of Legal Medicine*, *34*(1), 1-6. doi:10.1080/01947648.2013.768134

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

Srinivasan, M. (2013). Disruptive and deliberate innovations in healthcare. *Journal of General Internal Medicine*, *28*, 1117-1118. doi:10.1007/s11606-013-2550-x

Stacey, R. D. (2011). *Strategic management and organisational dynamics: The challenge of complexity* (6th ed.). Essex, England: Pearson Education Limited.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Steensma, D. P. (2016). The Farid Fata medicare fraud case and misplaced incentives in oncology care. *Journal of Oncology Practice*, *12,* 51-54. Retrieved from http://ascopubs.org/doi/full/10.1200/jop.2015.008557

Struik, M. H., Koster, F., Schuit, A. J., 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:1111/jep.12142

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research*. Thousand Oaks, CA: Sage

Thorpe, K. E., Florence, C. S., Howard, D. H., & Joski, P. (2005). The rising prevalence of treated disease: effects on private health insurance spending. *Health Affairs*, *24*, W5. doi:10.1377/hlthaff.w5.317

Thurston, J. (2014). Meaningful use of electronic health records. *The Journal for Nurse Practitioners, 10*, 510-513. doi:10.1016/j.nurpra.2014.05.012

Torrance, H. (2012). Triangulation, respondent validation, and democratic participation in mixed methods research. *Journal of Mixed Methods Research*, *6*, 111-123. doi:10.1177/1558689812437185

Trotter, R. T. (2012). Qualitative research sample design and sample size: Resolving and unresolved issues and inferential imperatives. *Preventive Medicine, 55*, 398-400. doi:10.1016/j.ypmed.2012.07.003

Turner, M., Kitchenham, B., Brereton, P., Charters, S., & Budgen, D. (2010). Does the technology acceptance model predict actual use? A systematic literature review. *Information and Software Technology*, 52, 463-469.

doi:10.1016/j.infsof.2009.11.005

U.S. Department of Health and Human Services, Office of the Inspector General and the American Health Lawyers Association (2011). Retrieved from http://www.hhs.gov/ocr/privacy/hippa/understanding/summary/index.html

Venkatesh, V., Davis, F. D., & Morris, M. G. (2007). Dead or alive? The development, trajectory and future of technology adoption research. *Journal of the Association for Information Systems*, *8*, 267-286. Retrieved from http://aisel/aisnet.org

Vessey, I., & Ward, K. (2013). The dynamics of sustainable IS alignment: The case for IS adaptivity. *Journal of the association for Information Systems*, *14*, 283-311. Retrieved from http://aisel.aisnet.org/

Wallace, S., Maxey, K., & Iyer, L. (2014). A multi-case investigation of electronic health record implementation in small-and medium-size physician practices. *Journal of Information Technology Case and Application Research*, *16*, 27-48. doi:10.1080/15228053.2014.912478

Wang, T., Wang, Y., & Biedermann, S. (2013). Funding alternatives in EHR adoption: beyond HITECH incentives and traditional approaches. *Healthcare Financial Management*, *67,* 86-92. Retrieved from https://www.researchgate.net/publication /236913269_Funding_alternatives_in_EHR_adoption_beyond_HITECH_incentiv es_and_traditional_approaches/download

Weeks, D. L., Keeney, B. J., Evans, P. C., Moore, Q. D., & Conrad, D. A. (2015). Provider perceptions of the electronic health record incentive programs: A survey of eligible professionals who have and have not attested to meaningful use.

Journal of General Internal Medicine, *30*, 123-130. doi:10.1007/s11606-014-3008-5

Weiss, C., & Nunes Amaral, L. (2013). Envisioning sophisticated electronic health records through the lens of health care reform. *American Journal of Respiratory and Critical Care Medicine, 188*, 636-638. doi:10.1164/rccm.201304-0615ED

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

Wendt, L. M., Griesbaum, J., & Kölle, R. (2016). Product advertising and viral stealth marketing in online videos: A description and comparison of comments on YouTube. *Aslib Journal of Information Management*, *68*, 250-264. doi:10.1108/AJIM-11-2015-0174

Williams, M., Rana, N., & Dwivedi, Y. (2015). The unified theory of acceptance and use of technology (UTAUT): a literature review. *Journal of Enterprise Information Management*, *28*, 443-488. doi:10.1108/JEIM-09-2014-0088

Windle, J. R., & Windle, T. A. (2015). Electronic health records and the quest to achieve the "Triple Aim." *Journal of the American College of Cardiology, 65*, 1973-1975. doi:10.1016/j.jacc.2015.03.038

Yates, J., & Leggett, T. (2016). Qualitative research: An introduction. *Radiologic Technology*, *88*, 225-231. Retrieved from http://www.radiologictechnology.org/content/88/2/225.full.pdf+html

Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education*, *48*, 311-325. doi:10.1111/ejed.12014

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

Zucker, D. (2014). The Belmont Report. *Wiley StatsRef: Statistics reference online*. doi:10.1002/9781118445112.stat06924

Appendix A: Interview Protocol

What you will do	What you will Say--Script
Ensure quiet, uninterrupted, ample amount of time for interview. Have informed consent form. Have digital recorder ready to record once you receive consent (cell phone recorder as backup). Introduce yourself	I'm Chris Foster. Thank you for taking the time to participate in my research project. This interview is to explore the strategies PCP managers use to successfully implement electronic health records that decrease healthcare costs. This information may prove useful for future PCP managers. The questions are open ended allowing you to provide detail or expand on your answers with any information you feel is relevant. I've been a doctoral student with Walden University for 3 years. I'm a retired Navy Healthcare Administrator and current Veterans Affairs Program Specialist, my relationship with the research topic is through past and present educational and work experiences in the healthcare industry.
Interviewee introduces them self	By signing this consent form, you are consenting to become part of this research project by agreeing to this interview. Your participation in this project is voluntary and you may withdraw at any time. To maintain confidentiality during transcription, your name will be de-identified. I'll be recording the interview as well as taking notes. Do you have any concerns or questions about anything discussed so far? Tell me about your background: Age, Sex, Race, What is your educational level? How long have you been involved with the administration, oversight, and direct working knowledge of EHRs in the state of Florida? This is inclusive of:

	How long have you worked in healthcare, IT, admin or exec medicine, (your specialty) field? Any specialty education, training, experiences, or certifications related to HIT (Health Information Technology) Ok, Let's begin the interview
• Watch for non-verbal queues • Paraphrase as needed • Ask follow-up probing questions to get more in depth (Phrase question the same way each time). Probing question help list: • Why? • How do you …? • What were you trying to achieve? • Why were your expectations so high/ so low? • If you could do something differently, what would it be and why?	1. What strategies did you use for implementing the EHR? 2. What were the key barriers for implementing the EHR? 3. How did you address key implementation barriers? 4. What perceived ease of use/perceived usefulness considerations factored into the decision of which EHR system to purchase and implement? 5. What perceived ease of use/perceived usefulness considerations factored into implementing the EHR? 6. How, if at all, have operating costs altered your strategies to implement the EHR? 7. How did you assess the effectiveness of the strategies? 8. What, if any, cost reduction was realized by your practice since implementing the EHR? 9. What, if any, costs savings to patients was realized since implementing the EHR? 10. What additional information regarding implementation can you share?

Wrap up interview thanking participant	Thank you so much for your time and sharing your experiences with me.
Schedule follow-up member-checking interview	I would like to meet again to review a summary of your answers to the interview questions. Would _____ work for you on next _____ day?

Appendix B: Cover Letter

Date

Dear _____:

My name is Christopher Foster, and I am a Doctor of Business Administration (DBA) candidate at Walden University. I am conducting a doctoral study project to examine how primary care practice (PCP) managers in Central Florida implement regulatory mandated electronic health record (EHR) systems to facilitate lowering the cost of healthcare to patients and the economy. The purpose of my study is to explore the following question: What strategies do PCP managers use to implement EHRs to decrease healthcare costs?

Based on your experiences with the administration of a PCP that has implemented regulatory mandated EHR systems to facilitate lowering the cost of healthcare to patients and the economy, I would like to interview you in order to gather information about your perceptions and beliefs about strategies healthcare administrators may use for a successful implementation of a compliant EHR system at a PCP network. The interview will take 50-60 minutes of your time and I will schedule the interview at your convenience within five days. I will conduct this in-person interview at a location that is most convenient for you. If an in-person interview is not possible, I will conduct the interview over the telephone. I will send a copy of the interview transcript by email for your review for accuracy which should take 20-30 minutes. I invite you to voluntarily share with me any administrative documents, reports, and/or memoranda that you feel may provide additional information about EHR implementation and cost reduction. If you decline sharing any documents, I respect your decision. You may still participate in the interview even if you do not wish to provide documents.

Your participation in my study will be instrumental in ensuring I gather data from health care leaders at the PCP network with direct knowledge of the implementation of compliant EHR systems. If you express interest in participating in my study, I will send you an informed consent form via e-mail for your review. This informed consent form provides background information on the study and outlines your rights during the interview process. Please contact me if you have any questions or require additional information.

Please respond to this email indicating your interest in participating by [RESPONSE DATE INSERTED AFTER INTERVIEW TIME PERIOD FINALIZED FOLLOWING IRB APPROVAL]. If you decline participation, simply do not respond to this invitation. I thank you in advance for your consideration and your support of my study of a topic of national significance.

Sincerely,
Christopher A. Foster

Appendix C: Case Study Protocol

A. Case Study Introduction

    1. Research Question

        a. How do primary care practice managers in Central Florida describe (a) factors contributing to the successful implementation of electronic health record (EHR) systems and (b) necessary strategies for implementing EHRs for decreasing healthcare costs?

    2. Research Subquestions

        a. How do primary care practice managers charged with the administration, oversight, and implementation of EHR systems in Central Florida perceive the problem of healthcare cost reduction?

        b. What do primary care practice managers with responsibility for the administration, oversight, and implementation of EHR systems in Central Florida perceive of the strategies necessary for the implementing EHRs for decreasing healthcare costs in their primary care practice network and the larger U.S. economy?

        c. How do health care leaders with responsibility for the administration, delivery, and regulation of EHRs in the state of Florida describe necessary implementation changes to address at the national level to help individual states develop effective strategies for the successful implementation of EHRs for reducing healthcare costs?

d. What do health care leaders with responsibility for the administration, delivery, and regulation of EHRs in the state of Florida perceive to be necessary strategies for preventing key barriers for implementing EHRs?

e. What do health care leaders with responsibility for the administration, delivery, and regulation of EHRs in the state of Florida perceive to be necessary strategies for addressing cost reduction features inherent in EHR systems?

3. Conceptual Framework

a. Technology acceptance model framework (Davis, 2002)

B. Protocol Purpose and Intended Use

1. Protocol to be used by the researcher to guide and inform all study data collection, analysis, and findings and conclusions preparation efforts

2. Researcher will use the protocol to ensure reliability of case study methods, findings, and conclusions

C. Data Collection Procedures

1. Data to be collected from the review of documents and the conduct of semistructured interviews with health care leaders with responsibility for the administration, oversight, and implementation of EHR systems in the state of Florida

2. Researcher will recruit interviewees from the following positions with the PCP network (a) executive (b) physician (c) nurse or nurse practitioner (d) administrative or contract professional, and (e) fiscal or budget analyst

3. Specific study sites and contact persons at each site to be identified after letters are sent and responses received to finalize sites and interviewees

4. Expected preparation activities to take place prior to site visits to conduct interviews

   a. Collection and review of documents for the organization(s) to be represented in study to assess organizational perspectives regarding EHR implementation

   b. Preparation of informed consent forms for each interviewee

   c. Review and finalization of planned interview questions

5. Data collection tools

   a. Digital audio recordings

   b. Researcher field notes

   c. Case study database

D. Outline of Case Study Report Contents

   1. Overview of study

   2. Presentation of the findings

   3. Applications to professional practice

   4. Implications for social change

   5. Recommendations for action

6. Recommendations for further study

7. Reflections

8. Summary and study conclusions

E. Case Study Interview Questions

1. What strategies did you use for implementing the EHR?

2. What were the key barriers for implementing the EHR?

3. How did you address key implementation barriers?

4. What perceived ease of use/perceived usefulness considerations factored into the decision of which EHR system to purchase and implement?

5. What perceived ease of use/perceived usefulness considerations factored into implementing the EHR?

6. How, if at all, have operating costs altered your strategies to implement the EHR?

7. How did you assess the effectiveness of the strategies?

8. What, if any, cost reduction was realized by your practice since implementing the EHR?

9. What, if any, costs savings to patients was realized since implementing the EHR?

10. What additional information regarding implementation can you share?

F. Data Analysis Techniques and Tools

1. Coding (deductive and inductive)

2. Analysis tools

        a. NVivo

G. Study Reliability and Validity Methods

    3. Reliability methods

        a. Case study protocol use

        b. Case study database creation

    2. Validity methods

        a. Multiple data sources (construct validity)

        b. Assessment of rival explanations, research bias identification, and member checking (internal validity)

        c. Rich description of study sample population and context and use of field review panel (external validity)