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The Barriers Encountered in Telemedicine Implementation by Health Care Practitioners

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Walden University

College of Management and Technology

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Olatunji Obikunle

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the review committee have been made.

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Walden University
2015

Abstract

The Barriers Encountered in Telemedicine Implementation by Health Care Practitioners

by

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

December 2015

Abstract

Patients in rural areas in the United States do not have adequate health care facilities for illnesses and injuries not serious enough for emergency care, but telemedicine could have a positive impact both economically and medically to control rapidly rising health care costs, which is a significant percentage of the gross national product. The purpose of this case study was to explore the barriers physicians encountered in telemedicine implementation. Participants included 4 physicians who took part in face-to-face interviews in a clinical setting in Ohio to explore strategies used in implementing telemedicine. The results of these interviews, coupled with observations and document reviews, were analyzed. Complex adaptive systems theory was used to conceptualize the existing association between individual behavioral patterns and the social system in which the patterns take place. Significant themes showed (a) how physicians utilize the technology and (b) how the application allows physicians to build relationships with patients. The characterization strategies aimed to mitigate barriers in adopting telemedicine technology in rural markets were consistent with the study findings and the literature review. The results of this research study might contribute to positive social change through economic and health benefits to rural inhabitants by reducing the distance barrier to physicians' offices and increasing timely and effective patient diagnosis in the selected location.

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Dedication

This dissertation is dedicated to God who has made it possible for me to reach this milestone in life. Nothing can be achieved without Him. I also dedicate this study to the memory of my father. May his soul rest in peace.

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I would not have been able to complete this study without the backing of my doctoral committee chair, Dr. Kenneth Gossett, who provided me with deep encouragement, and a high level of unrelenting support. Dr. Gossett always assured me that there is light at the end of the tunnel. I am also thankful to my second committee chair, Dr. Roger Mayer, for his objective reviews; methodologist, Dr. Gene Fusch, for his constructive contribution, the URR reviewer, Dr. Charles Needham, and program director, Dr. Freda Tuner, for their guidance.

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Section 1: Foundation of the Study

The cost of providing medical services has been rising steadily (Pope, Deshmukh, Johnson, & Rohack, 2013). Individuals, especially people living in rural areas, face challenges in gaining access to health care (Fanale & Demaerschalk, 2012). Telemedicine is an innovative way of achieving a common goal and a shared vision to deliver value-added services in the global health care system. The American Telemedicine Association (2012) involves exchanging medical information from one site to another via electronic communications to advance patient care. Closely associated with this term is telehealth, which includes remote access without the necessity of clinical settings (Wade & Elliott, 2012). Telemedicine technology could bridge the gap between urban and rural areas with respect to health care accessibility barriers (Grawboski & O'Malley, 2014) and improve the business environment by reducing costs to providers.

Background of the Problem

Individuals who live in rural areas in the United States face the challenge of finding adequate access to health care. The economy has shown unprecedented trends affecting hospital-operating budgets. Energy, food, and supply costs rise, and the costs continue to surge (Kaiser, 2009). Some hospitals are leading the way to bring national awareness promoting wellness and prevention to help defray the burden. An appropriate diet and lifestyle of any individual may prevent many chronic conditions from occurring; thereby, reducing health care costs (Kaiser, 2009). Physicians must communicate how patients manage chronic ailments such as heart disease, lung cancer, and diabetes, which is consuming American health. Moderating lingering conditions may lift the financial

debt placed on the hospital's budget by addressing three unhealthy behaviors: smoking, poor diet, and lack of exercise. The cost of health care keeps rising, and health care reform initiatives may bring another 40 million people under coverage (Kaiser, 2009). Stakeholders help control costs by helping to change patient behavior and lifestyle choices. Recognizing that the number of elderly people in the United States is increasing, hospital executives may see an escalation of costs not sustainable in the present system (Kaiser, 2009).

Telemedicine has a pivotal role in generating cost savings for hospitals, improving patient care, and maintaining Health Insurance Portability and Accountability Act (HIPAA) compliant medical records (Grawboski & O'Malley, 2014). Some practitioners have been slow to adapt to new technology (Martin, Probst, Shah, Chen, & Garr, 2012). Exploring the practitioner's reluctance and discovering behaviors to engage more practitioners in adopting this prudent and socially acceptable solution might show business leaders how to attain organizational growth.

Problem Statement

The relative shortage of physicians in U.S. rural areas has created opportunities for physicians who are able to expand the patient base through telemedicine technology (Aneja et al., 2011). As of 2011, over 55 million people (20% of the U.S. population) who resided in the United States lived in rural areas (Buntin, 2011). Rural areas had 9% of the nation's physicians practicing in underserved communities, and fewer than 3% of new medical students planned to practice in rural areas (Rabinowitz et al., 2011). The general business problem is that some physicians have difficulty reaching patients in rural

markets and miss potential rural community patients available through telemedicine. The specific business problem is that some physicians have limited strategies for using the technological advantages of telemedicine in rural markets.

Purpose Statement

The purpose of this qualitative, single site case study was to explore the strategies that physicians use with the technological advantages of telemedicine in rural markets (Burns, Bradley, & Weiner, 2012; Feldstein, 2012). A qualitative, exploratory, single site study was best suited for discovering how the innovative field could help physicians expand health care access to the rural population. A purposeful sample of four physicians from a clinic in Ohio who used telemedicine participated in semistructured interviews. I used follow-up interviews and member checking strategies to ensure that I reached data saturation from the interviews I conducted.

The findings might provide opportunities for health care practitioners, venture capitalists, community leaders, and government officials to evaluate and initiate cost-effective solutions to combat the challenges faced in implementing telemedicine. The increase in the number of physicians who use this technology could improve the business environment, thereby improving patients' health. The findings from the study might contribute to social change by increasing health care access to patients living in rural locations.

Nature of the Study

For the study, I employed a qualitative method. A qualitative methodology was appropriate because qualitative researchers explore what, how, and why a phenomenon

took place (Denzin & Lincoln, 2011). My intention was to explore how practitioners working in a rural location in the U.S. Midwest have successfully implemented telemedicine programs, thereby expanding the physician's business practice and providing medical clinic services to rural patients (Burns et al., 2012; Feldstein, 2012). The participative approach of the qualitative method allowed the contributors in this study the opportunity to share their real life experiences using telemedicine, rather than to test a hypothesis. A quantitative method was not an appropriate approach for the study because it does not provide ample means for participants to share their points of view. The intent of a quantitative method is to evaluate the relationships between variables that pertain to hypothesis testing (Watkins, 2012). A mixed-method design was not appropriate for the study because it includes both qualitative and quantitative characteristics.

A case study design was the best method to advance the central research question posed in the study and to synthesize the voluminous data flowing throughout the processes of my research (Bongiovanni-Delarozière, Le, & Rapp, 2014; George, Hamilton, & Baker, 2012; Marshall & Rossman, 2011; Yin, 2012). A narrative design was not appropriate because the researcher selects individuals to recount stories of their lives, such as an historical perspective or from personal experiences in war (Connelly & Clandinin, 1990). A researcher would embed him- or herself into the daily life of participants over a long period to collect data through observations. A phenomenological design was not appropriate because the researcher identifies an essence of human experience about a phenomenon as described by the participants, such as an earthquake

or natural disaster (Yin, 2012). Both designs include the conduct of interviews, yet the underpinning of the chosen qualitative, single site study design requires researchers to use a systematic procedure for data collection. A case study research design is common in several disciplines, including health care, medicine, business, education, and other social science areas, to discover the perceptions of participants (Yin, 2012).

Research and Interview Questions

The overarching research question was as follows: What strategies do physicians use to implement telemedicine in rural areas? Semistructured interview questions do not include hypotheses associated in a quantitative approach (Yin, 2012). The following interview questions helped illuminate the experience of physicians as the exploration advanced.

1. What are the ways in which you have used telemedicine?
2. How did you go about implementing telemedicine successfully in a rural location?
3. What were the barriers you encountered in the successful implementation of telemedicine in rural areas?
4. How did you market the medical benefits of telemedicine for residents from the rural communities in your area?
5. What kind of cost issues did you encounter in setting up your telemedicine practice?
6. What legal issue(s) did you encounter in your telemedicine implementation?

7. What technical difficulties did you encounter during your telemedicine implementation?
8. What type of service level agreement did you put in place for telemedicine equipment support?
9. How effective has the technology been?
10. What other insights can you share about your experiences implementing telemedicine in your medical practice?

Conceptual Framework

The conceptual framework used in this study was the theory of complex adaptive systems (Boustani et al., 2010; Burns et al., 2012; Paina & Peters, 2012). Complex adaptive systems theory includes the general systems theory of von Bertalanffy's (1968) work, and can show the existing association between individual behavioral patterns and the social system in which the patterns take place. Complex adaptive systems include a set of unique agents with rules that govern the behavior within a multifaceted, structured system that produce an evolving pattern for the whole system. Health care systems are highly complex, have many interconnections, and can be analyzed by using the complex adaptive systems theory (Boustani et al., 2010). Technological tools such as telemedicine deliver electronic access to a patient's medical record or physician, which help provide patients, especially people who reside in rural areas, with timely and affordable care.

Operational Definitions

Health care practitioners: Health care practitioners are licensed professionals who provide health services; such as dentists, physicians or osteopaths, chiropractors, nurse practitioners, or clinical social workers (Swanepoel et al., 2010).

Rural: Rural settings are not included within a metropolitan area (U.S. Department of Health and Human Services, 2013).

Store and forward: Store and forward is the process of sending data, such as protected health information, that may include images, sounds, and medical records to another destination where clinicians retrieve and evaluate the information (McFarland, Raugi, Taylor, & Reiber, 2012).

Telehealth: Telehealth providers are practitioners who use telecommunication technology to support long-distance clinical and public health care, patient communication, and administration (Wade & Elliott, 2012)

Telemedicine: Telemedicine is a forward-thinking concept. The terminology most often associated with the construct is multifaceted. Simple, researched-based definitions facilitate an understanding of the issue of adopting this technology in the industry. Telemedicine is the exchange of medical data between sites with the goal of improving patients' clinical health status through various media including smart phones, wireless instruments, two-way videos, and other telecommunication devices (American Telemedicine Association, 2012).

Telepathology: Telepathology arises from clinicians carrying out medical diagnoses via digital transmission of data that involve pathology (Hitchcock, 2011).

Telerehabilitation: Telerehabilitation refers to health professionals who deliver various rehabilitation services via the Internet and other telecommunication networks (Kim, Kim, & Schmeler, 2012).

Telestroke: Telestroke is a telemedicine device that helps stroke victims (Johansson & Wild, 2010).

Assumptions, Limitations, and Delimitations

Certain assumptions, limitations, and delimitations framed this study. The explanation in this section could illuminate potential weaknesses that might have existed and offer readers a manner in which to validate the quality of the research. As the main instrument for this research, collecting data using semistructured interviews, field notes, and observations were the attributes of the case study. The intent was to mitigate the risk of bias with relevant discussions, openness, and transparency of data (Rubin & Rubin, 2012).

Assumptions

Assumptions include the nature of the phenomenon being studied (Sonuga-Barke, 2011). Assumptions are specific to the discipline or subdiscipline and represent the facts about the phenomenon that are unproven (Sonuga-Barke, 2011). Certain assumptions for this study were that most people living in rural areas of the United States would not have sufficient access to medical care facilities, and the population might benefit from improved medical treatment with the introduction of telemedicine. Another assumption was that the distance to urban areas might limit the possibility for rural inhabitants of having regular appointments with doctors. The third assumption was that physicians and

health care workers were willing to offer telemedicine services to people living in rural areas. The assumption was that participants would require education and training on the various benefits of telemedicine and might provide truthful information about one's experience using telemedicine technology.

Limitations

The potential weaknesses of a study are the limitations of the study (Kirkwood & Price, 2013). A limitation of the study was making sure the four physicians with telemedicine experience were still willing to participate in my research. The group was a small sample size in terms of numbers but was still sufficient for my study. Another limitation of the study was the scope of a single case study of one site in Ohio. Data saturation occurs when no new information develops through the conduct of interviews in case study research (Bowen, 2008). The findings from this case study did not generalize to all physicians who have provided telemedicine services because the research design was limited to a single clinic in Ohio.

Delimitations

Delimitations are the conditions that researchers have control over and choose to study (Denzin & Lincoln, 2011). Physicians and health care practitioners who have implemented telemedicine in locations designated as rural areas were the first delimitation and bound this study. Excluded was the exploration of the perceptions of patients who received telemedicine and physicians not utilizing the technology. An exploration of the views of physicians who have adopted the technology should have provided an in-depth understanding of their success strategies. Exclusion of a quantitative

and mixed methods approach to collecting data was appropriate to gain an in-depth account from the participants' perspective of my research question for this study.

The Significance of the Study

Contributions to the business practice and implications of social change require transformational leadership. The study should appear valuable to the business community because implementation of this technology could reduce operational expenses, improve patient access, and lower the frequency of missed appointments (Kaczmarek, Trinh, Menon, & Rogers, 2012).

The research may add to the existing body of knowledge in terms of contributing to business practice. Telemedicine could link to increasing portability of patient data, improve communication between patients and physicians, and demonstrate how the technology may reduce costs for health care providers. The findings of this study might show local and state government officials how to integrate telemedicine in rural communities across the United States by identifying strategies that have worked for implementing telemedicine in rural locations.

Medical professionals could use telemedicine to improve health care accessibility (Heath, Salerno, Hopkins, Hertzig, & Caputo, 2009). One of the most important issues in rural areas is the lack of accessibility to health care professionals. The findings from the study might contribute to social change, as the knowledge gained may help individuals residing in rural communities gain needed treatment and affordable care to live healthier and happier lives.

Review of the Professional and Academic Literature

The rationale for the literature review was the basis of inquiry for the primary research question: What strategies do physicians use to implement telemedicine in rural areas? The review of the literature begins with an overview of systems theory and a discussion of why the theory is applicable to telemedicine. Reviewed are summaries of telemedicine accessibility in rural and remote areas. I included information on regulations and licensing issues in telemedicine, the effects that arose from a shortage of health care workers in rural and underdeveloped landscapes, and the need to show how telemedicine technology could alleviate the shortages and disparities. The results showed how telemedicine could benefit people in the rural community and how physicians could increase profits. The review of the literature included the topics of telemedicine equipment, information technology infrastructures, telemedicine adoption challenges, and privacy and ethical issues in the field.

The chosen design of the research study included the exploration of the qualitative perceptions of how physicians could adopt telemedicine in the United States. A review of the professional and academic literature may help readers assess the need for this technology. Four areas of literary contributions (i.e., professional, academic, government, and industrial) make up the large portion of the relevant information for the study, which includes the most recent trends facing the industry.

Academic Sources Used to Conduct the Review

The Walden University Library was the primary source location for the content used to establish the literary framework for this study. I used business, management, and

health sciences databases because of the dual contextual focus of the research study, including Business Source Complete/Premier, ABI/Inform Complete, Emerald Management Journals, Sage Premier, and LexisNexis Academic. Queried was the National Bureau of Economic Research database to identify the business aspects of the research study. Health Sciences databases such as MEDLINE, PubMed, and Science Direct identified the health care aspects of the research study. Articles excluded were from newspapers, magazines, and trade publications because of the potential perception of bias. The following are key words and terminologies used in the query format for each of the aforementioned databases: *health-e-access*, *internet-based telemedicine*, *telemedicine*, *telestroke*, *telehealth*, and *tele-icu technology*. There were 82 articles that I used for citations in my review of the literature. Seventy-five of the articles, or 91.5%, were peer reviewed and 66, or 88%, were published within the past 5 years.

Conceptual Framework

I identified in the conceptual framework a critical analysis of systems theory, which is a set of unique agents with rules that govern the behavior within a multifaceted, structured system that produce an evolving pattern for the whole system. Health care systems are highly complex systems and have many interconnections with feedback loops (Boustani et al., 2010). Technological tools such as telemedicine provide electronic access to a patient's medical records, which helps provide patients, especially people who reside in rural areas, with timely and affordable medical care. The complex adaptive system theory was appropriate to show the interrelationships that health care practitioners must address when practicing telemedicine.

Telemedicine and Systems Theory

A fundamental principle of systems theory is the structure of a system gives rise to its behavior (Sterman, 1994). Physicians make different decisions as the state of the system changes in complex health care systems. Links in feedback loops that might affect decision-making could weaken because of a variety of structures. Some of these are physical features of the environment where people live and work, which could reduce opportunities and prevent patients from thinking about new solutions to problems. Some of these structures relate to mental processes that are consequences of one's culture, group, and inquiry skills. Making correct inferences about the dynamics of complex nonlinear systems might prove a challenging task for leaders in almost any type of business (Sterman, 1994).

Effective management is difficult in a world of high dynamic complexity for modern health care managers. Management decisions may create unanticipated side effects and delayed consequences. Attempts to stabilize a system may destabilize the operation. Decisions may provoke reactions by other professionals seeking to restore the balance that was upset. Decisions may move the system into a new realm of behavior where unexpected and unfamiliar dynamics arise because the dominant feedback loops have changed (Forrester, 1972).

Defining the various sets of elements within a complex adaptive system and documenting the level of interactions within the system present enormous challenges for health care managers (Paina & Peters, 2012). Adaptability is a function of transformation of each element within the system to a coherent whole. Stacy (2011) explained the health

care industry is a complex adaptive system. The business contains different sets of interdependencies and emerging behaviors, which are revolutionary in nature. Such interdependencies within the complex adaptive system depend on a set of rules that require revisions because of changes that occur within the internal and external health care environment.

Burns et al. (2012) correlated a system integration model between physicians and patients within a larger construct regulated by the industry. The health care system is highly complex and the rules that govern the system change on a reoccurring basis in the United States (Bourtani et al., 2010). The myriad of interrelated activities require control, regulation, guidance, and compromise based on conditions that may affect the health care environment and the community. Physicians and medical practitioners are part of the health care system; both controlled by internal and external factors. Guided by the Patient Protection and Affordable Care Act (2010), practitioners must comply with legislation, which regulates the interactions and treatment of the people (Kaspar, 2012). Health care organizations are part of an interconnected adaptive system, one that is vibrant, erratic, and distinctive in nature and forms the baseline conceptual framework for the telemedicine exploration (Greenfield, Nugus, Fairbrother, Milne, & Debono, 2011).

The government mandates regulations for the betterment of citizens, such as groups of interrelated individuals including patients, providers, and different policy makers. Paina and Peters (2012) asserted that the application of a complex adaptive system theory in health care organizations is valuable in assisting policy evaluators and analysts in developing approaches that would allow hospital leaders to implement

practices to meet state requirements. Bourtani et al. (2010) explained that the existing health care environment consists of disjointed entities, which are diverse and mutually independent. The behaviors exhibited among patients and providers change constantly because of regulatory authorities that affect all stakeholders within the health care system.

Policy evaluators and analysts are responsible for efficient services to the community using different methods, which require continuous monitoring, adaptation, innovation, and creativity (Greenfield et al., 2011). The lawmakers of the Patient Protection and Privacy Act of 2010 presented opportunities for advances in telemedicine through the integration of inpatient care, including intensive care units of hospitals and critical care specialists. The lawmakers encouraged representatives working for Medicare and Medicaid to explore and use remote monitoring technology of patients across different settings, especially in underserved populations (Kaspar, 2012). Physicians utilize telehealth technology to meet requirements by electronically following up on a patient's recovery. The advancement shows physicians the benefits of creating a centralized and integrated payment mechanism system (American Telemedicine Association, 2012). The complex adaptive system theory is appropriate to show the interrelationships that health care practitioners must address when practicing telemedicine.

Telemedicine and Accessibility in Health Care

One of the most critical issues in rural populations is the lack of accessibility to health care because of the lack of physicians and dentists (Heath et al., 2009). Heath et al.

(2009) studied telemedicine in rural areas and addressed the accessibility to medicine.

Three percent of pediatricians care for 21% of the adolescent population in rural locations within the United States. The researchers applied a pediatric telemedicine program in 10 rural emergency departments (EDs) and completed 63 conferences, which included preliminary diagnoses, acute care, and training and support. The findings from the study showed that patient care improved 89%. Heath et al. concluded that telemedicine was feasible for urgent care of children in underserved rural locations.

Setia and DelliFraine (2010) assessed the practicality of introducing telemedicine in eight rural day care centers in Pennsylvania. The average number of children in the centers was 76 (ranging from 20 to 150). Staff at the centers sent an average of 4.7 children home each month because of illness. The researchers assessed the need for telemedicine, one's ability to use the knowledge, and the means for implementing the technology using telephone and semistructured interviews (Setia & DelliFraine, 2010). Most day care center managers were willing to learn how to use the technology. Setia and DelliFraine noted that some centers had limited space for the equipment, although most locations were adequate. Setia and DelliFraine concluded that adopting the technology in rural day care centers might save parents time and money while improving health care for children in rural areas.

Krakoff (2011) stressed the importance of using telemedicine in the effective control of hypertension and other cardiovascular risk factors. Krakoff noted that home blood pressure monitoring devices used by physicians improved risk factors for hypertensive patients. Krakoff's study concluded telemedicine used by physicians

improved the control of hypertension. George et al. (2012) noted that telemedicine may heighten the access for specialty care treatment for populations living in metropolitan areas, yet researchers have limited knowledge as to the acceptability among residents. George et al. explored the perceptions about the technology to understand the demand among urban African Americans and Latino groups. George et al. used data from 10 focus groups consisting of African American and Latino participants who spoke English and Spanish.

The result of the research showed that both groups supported the use of the technology because telemedicine increased provider access to several medical professionals and reduced patient wait-times. Latinos were less concerned than African Americans about confidentiality and the lack of personal contact from one's physician (George et al., 2012). The absence of trust from African Americans may result from a history of past abuse from the medical community compared to Latinos who may not have faced the same experience (George et al., 2012). George et al. (2012) offered marketing strategies for hospital administrators to promote telemedicine in the African American and Latino populations.

Perle and Nierenberg (2013) reported that mental health experts must create new strategies to influence people who experience difficulties related to location and time constraints to seek medical care. Perle and Nierenberg asserted that with the high incidence of mental illness and the posited future increase, telehealth capabilities are an innovative alternative to traditional psychiatric therapy. The authors explained that the promising opportunities exist, such as the utilization of computer tablets, which are

available to physicians to integrate telehealth into a patient's treatment plan. Perle and Nierenberg noted the data supported telehealth as an actual approach of treatment for patients who are unable to secure traditional mental health services. They concluded training for mental health professionals is vital if practitioners are to use telehealth and alleviate mental health burdens. The recommendations were consistent with the findings of other researchers (Heath et al., 2009).

Arora et al. (2011) claimed that a significant percentage of the estimated 32 million Americans who live in underserved areas, and who might benefit from health care coverage under the Affordable Care Act, might forgo needed health care. A new model of health care education and delivery known as Project ECHO (Extension for Community Healthcare Outcomes) showed an improvement in primary and specialty care services to residents living in New Mexico (Arora et al., 2011). Arora et al. added that, with telehealth technology and case-based learning, project ECHO providers would enable experts at the University of New Mexico Health Sciences center to pool resources with primary care clinicians. The partnership might show providers how to provide specialty care to patients living in underserved areas plagued with chronic health conditions, such as hepatitis C, asthma, diabetes, HIV/AIDS, and psychological disorders. Arora et al. concluded that 298 Project ECHO teams from New Mexico collaborated on more than 10,000 health care specialists' discussions regarding chronic diseases such as hepatitis C.

In a study by Raza, Joshi, Schapira, and Agha (2009), 314 patients (684 visits) received telemedicine consultations between 1998 and 2004 because of conditions such as atypical radiology (38%), chronic obstructive pulmonary disease (COPD; 26%), and

dyspnea (13%). Nurses or respiratory therapists executed assessments of patients by engaging in telemedicine in 90% of the visits. Telemedicine implemented by appropriate professional saved patients approximately 300,000 miles of travel during the study (Raza et al., 2009). Raza et al. concluded the provision of a telemedicine facility enabled a remote, underserved rural population to have improved access to health care services. The findings of the study showed the role that telemedicine could provide where physicians would have access to patients' medical records for treatment in rural populations.

Garrelts, Gagnon, Eisenberg, Moerer, and Carrithers (2010) examined the effect of telepharmacy in a multispecialty hospital health system. Hospital leaders implemented telepharmacy services at five Catholic hospitals. Seven pharmacists working at the health system provided telepharmacy services to patients. The pharmacists used hospital servers to connect to a virtual private network. Garrelts et al. explained the benefit of routing calls automatically to the telepharmacist as order-processing time improved 14.4 minutes for routine orders while the period for processing urgent orders improved almost 3 minutes. Intervals exceeding 1 hour became relatively nonexistent (Garrelts et al., 2010). Garrelts et al. concluded that adopting telepharmacy services in a multispecialty hospital setting extended operating hours, shortened the time pharmacists needed to complete prescription orders, improved services to patients, and avoided unnecessary costs for the pharmacy.

Zanni (2011) noted telemedicine allows caregivers to provide health services and medical information to patients who might not otherwise receive treatment because of the

distance between their home and the clinic. Telemedicine includes the potential to increase patient access by allowing physicians to monitor remotely, diagnose, and treat patients. Telemedicine is still evolving, and physicians must identify problems, such as how to manage the facilities standard of care and patient compensation strategies to increase the use of the technology (Zanni, 2011).

Telemedicine in Other Countries and Cross-National Application

Many countries consist of rural areas with similar accessibility gaps found in the United States. Johansson and Wild (2010) adopted a variant of telemedicine known as telestroke in the treatment of patients with stroke in rural locations as these areas lack the resources for adequate acute stroke care. Moffatt and Eli (2011) realized that rural inhabitants in Australia benefitted from introducing the telehealth that results in faster access to health care and lowers cost. Aneja et al. (2011) studied the distribution of U.S. cardiologists between 1995 and 2007, and documented the imbalance between patients in rural and urban areas. The results of the study showed the inequity and improved accessibility to patients who lived in urban areas.

Talukdar and Reddy (2012) noted that in India, almost 70% of people still live in villages, even after 60 years of independence. Few patients have access to appropriate health care. Talukdar and Reddy initiated a rural health care project to reduce cost-effective gastrointestinal care to the rural inhabitants. Talukdar and Reddy adapted a bus into a mobile unit furnished with required diagnostic equipment including a customized endoscopy unit. A van, furnished with electronic communication equipment, accompanied the mobile unit and transmitted data back to the main telemedicine center.

Talukdar and Reddy concluded that the combination of the mobile device and van allowed physicians to perform over 30,000 endoscopic procedures for patients who would otherwise not receive treatment. Rural occupants and the medical staff reported a high level of satisfaction (Talukdar & Reddy, 2012).

Sinha, Tiwari, and Kataria (2012) reported that, in India, telecommunication technology is developing rapidly in medical information and services, particularly in neurosurgical emergencies. Neurosurgical specialists work primarily in urban settings leaving a void in rural areas. Sinha et al. (2012) recommended nations with insufficient health care access, as in India where even the most basic health care requires development, could integrate telemedicine technologies in the delivery system. Sinha et al. asserted that issues pertaining to security, privacy, maintaining standards and legal aspects are relevant. Leaders established guidelines for adopting telemedicine and periodically updated the procedures to sustain the growth of telemedicine (Sinha et al., 2012).

Verdon, Wilson, Smith-Tamaray, and McAllister (2011) reported results of the relationship between patient access and speech-language pathologists (SLP), and the perception of patients utilizing the communication technology for the dissemination of speech-language pathology services. Verdon et al. used surveys, followed by semistructured interviews, with a subset of participants who completed the questionnaire as the data collection strategy. Verdon et al. received survey responses from 10 out of 43 residents and 4 out of 49 pathologists. The results showed a discrepancy between rural inhabitants' and access to a pathologist, and attitudes towards the use of information and

communication technologies for speech-language pathology service delivery (Verdon et al., 2011). Rural occupants depicted a favorable response regarding the use of the speech-language communication technology and noted the knowledge gained might necessitate more research into the development of a telespeech-language pathology tool.

Vinekar (2011) described his experience working at one of the leading private eye care providers in India where he developed the first tele-ophthalmology initiative to prevent infant blindness. Karnataka Internet-assisted diagnosis of retinopathy of prematurity (KIDROP) framework uses trained technicians, rather than physicians, to detect and analyze images of retinas in infants for a condition that may cause blindness, called retinopathy of prematurity (Vinekar, 2011). Vinekar added that the uploaded images arrived at a computer or smart phone, which allowed experts to remote-in and view images immediately. The technology is the first public-private intervention in India to combat infant blindness. A study of this nature is relevant to my research because it further reveals how the adoption of this technology could save the lives of the inhabitants through the prevention of blindness.

Rampersad and Troshani (2013) evaluated the potential influence of high-speed Internet access to society because of the substantial investment people pay in utilizing the technology. Rampersad and Troshani found that significant sectors including education, health and community development, should critically assess patients across relevant dimensions in evaluating the social impact. The results of the structure show the significance because managers and policy makers adopt strategies to leverage high-speed broadband opportunities in critical sectors, and monitor the performance of such actions

(Rampersad & Troshani, 2013). The study is relevant to my investigation because the literature extends beyond the organizational level of telemedicine towards a framework that explores the post-adoption impact of telemedicine.

The Role of Telemedicine in Bridging the Gap

The lack of accessibility to health professionals and medical facilities in rural areas is experiencing a gap in the quality of health care. Telemedicine could bridge the gap in many areas. Fanale and Demaerschalk (2012) noted that a gap exist in managing acute stroke practices in Arizona and the authors proposed a telemedicine solution to alleviate the disparity between the rural and urban health care delivery imbalance. Fanale and Demaerschalk evaluated the emergency stroke resources, which are available at Arizona hospitals by using web sites to identify all eligible institutions. Fanale and Demaerschalk formulated a 5-year stroke telemedicine plan for Arizona rural residents. Researchers selected 35 hospitals based on predefined criteria, and 90% of hospital leaders participated in a statewide telemedicine initiative. Fanale and Demaerschalk concluded that stroke patients living in rural areas could benefit from the use of telemedicine.

Haozous et al. (2012) claimed the goal of the research was to determine the feasibility of using telemedicine to provide pain management training to health care providers in rural communities. Haozous et al. provided four educational sessions to health care providers using videoconferencing technology for pain experts at the University of Washington. Haozous et al. reported that 52 providers from 11 sites attended the educational sessions. The participants approved of the videoconferencing

technology and stated that telehealth is a feasible option to deliver pain management education to rural health care providers.

Styne (2010) noted an epidemic of obesity exists among American Indian youth compared with other ethnic groups in the United States. Styne stated, before age 10, almost 50% of Indian children need to lose weight. Results showed that parents and guardians who provide healthy foods and encourage increased physical activity improved the child's body mass index. Styne stressed that a long-term approach to maintaining a healthy lifestyle is necessary to improve the health of Indian children. Improving accessibility to a network of nutritionists using telemedicine technology could help set programs and provide education to help combat the long-standing problem of childhood obesity among Native American communities (Styne, 2010).

Cardiovascular medicine. Aneja et al. (2011) claimed that cardiovascular medicine must consist of a strong workforce. The theme of their investigation centered on the high level of disparity between urban and rural areas. Aneja et al. supported their claim by examining respondents who were 65 and older. Large segments of the U.S. population who live in poor neighborhoods continue to have a lower than average number of cardiologists available, despite the amount of practitioners working in the United States (Aneja et al., 2011). Bowles et al. (2011) studied the effects of telemedicine on cardiac patients to reduce hospital readmissions. Telemedicine consists of tools, which enable providers to check -in on patients at home through telecommunication technologies. Physicians using telemedicine reduces home health visitations by 45%.

Telepharmacy. Sorensen, Dyb, Rygh, Salvesen, and Thomassen (2014) examined telepharmacy practices in rural hospitals. Sorensen et al. conducted semistructured, telephone interviews with the board of pharmacy directors that implemented telepharmacy programs. Questions included how pharmacists dispense medications to meet regulations mandated by the National Association of Boards of Pharmacy (NABP) and the American Society of Health System Pharmacists (Sorensen et al., 2014). The results varied by states with respect to regulations and licenses.

Point-of-care. Beyette, Kost, Gaydos, and Weigl (2011) stated the global focus on health care issues continue to underline the importance of the point-of-care technology, which provides cost effective solutions to meet unmet health care needs. Beyette et al. explained the current crisis in health care critically underscores the need for research and development into this effective method of delivering health care. Using point-of-care technology provides doctors with the patient's medical history such that a physician manages the patient's care remotely (Beyette et al., 2011). Beyette et al. suggested that the point-of-care technology could bring prompt test results, streamline clinical interventions, and increase access to populations that might not otherwise receive medical care, especially patients who are unable to travel.

Telepsychiatry. Jacob, Larson, and Craighead (2012) noted that one approach used in solving mental health care disparity issues in rural areas is through use of a children's telepsychiatry consultation practice in which psychiatrist's use videoconferencing technology. The provider issues a treatment plan for the child's primary care physician and family. Jacob et al. used a 2-session telepsychiatry

consultation protocol consisting of a psychiatric evaluation and recommendation session for patients located in rural Georgia. The findings of the study showed that establishing a child telepsychiatry consultation practice is necessary for rural areas because of the benefits aimed for the patients. Yellowlees et al. (2013) examined the feasibility of conducting psychiatric consultations using video-based technology from 60 nonemergency adult patient assessments. The recordings lasted 20 to 30-minutes and uploaded to an Internet application along with the patient's medical record. Yellowlees et al. discovered that psychiatrists treated patients remotely for mood and anxiety disorders and substance abuse.

Telerehabilitation. Kim et al. (2012) claimed the current wheelchair selection and evaluation processes are time-consuming, often requiring cumbersome assessments and subsequent reviews of frequently changing wheelchair products and manufacturers. Kim et al. further noted tele rehabilitation is an emerging field that complements the current in-person evaluation for selecting an appropriate wheeled mobility and seating piece of equipment in underserved areas. Medicare and Medicaid must include data relative to the specifications of the wheeled mobility device and the patient's medical limitations to determine reimbursement eligibility (Kim et al., 2012).

Web-based telemedicine. Chun, Patterson, Jacobs, and Soares (2012) explained telemedicine has emerged as a useful tool for providing health care services to the elderly living in rural areas, which have fewer medical resources and specialists available. Chun et al. proposed a web-based telemedicine solution as a viable means to provide the elderly population with the required health care resources because this group has limited

knowledge in the use of Internet technology. Chun et al noted a web design that would make the technology more user friendly for the elderly. Chun et al. suggested web-based telemedicine is an effective tool physicians could adopt to provide home health care services, which are more practical in rural areas. The death rate is high for elderly patients living in rural locations because of the inability to receive timely medical care yet most patients have treatable chronic diseases.

Epstein et al. (2011) showed the benefits of using web technology for patients with attention-deficit, hyperactivity disorder (ADHD) living in rural communities. Epstein et al. viewed electronic medical records of patients diagnosed with ADHD over 6 months. Caretakers, such as parents, teachers, and pediatricians accessed an ADHD portal to document patient behaviors. Physicians compiled a treatment plan based on the information collected. The study results concluded that Internet technology might significantly improve the quality of ADHD care in rural settings (Epstein et al., 2011).

Galvez and Rehman (2011) reported that advances for Internet technology include innovative opportunities for physicians to provide consultation services to rural residents prior to surgery. Telemedicine could help hospital leaders reduce costs and alleviate the increasing economic pressures on health care delivery systems. Galvez and Rehman indicated the need for anesthesiology telemedicine services emerged from a preoperative evaluation process in which physicians tried to improve postoperative and critical care management. Galvez and Rehman found that physicians could also benefit from the technology where anesthesiologists had the opportunity to learn and test the effectiveness of communications systems.

McFarland et al. (2012) implemented a remote Internet-based application to provide dermatology care to veterans living in rural areas of the United States. McFarland et al. developed a teledermatology educational program for imaging specialists and primary care providers working in rural areas. McFarland et al. tested participants and assessed competencies in dermatology procedures, such as biopsies, excisions, and cauterization, during the 2-year project. McFarland et al. realized that participation in a comprehensive education program developed the participant's knowledge of dermatology diagnosis and treatment care plans. McFarland et al. concluded that 71% of the dermatologists and 56% of imaging specialists passed the necessary training and acquired new dermatology skills.

Shortage of Rural Health Care Workers and the Role of Telemedicine

The gap in health care accessibility, which manifests the disparity between urban and rural areas, leads to the shortage of health care professionals in the rural areas. Physicians using telemedicine could alleviate the deficiency between urban and rural areas to a measurable degree. Conger and Plager (2012) revealed how the inadequate number of health care providers in some disciplines, such as geriatric care, increases the present insufficient access to health care for rural residents. Conger and Plager aimed to organize and prepare nurses in the Advanced Practice Nurses (APNs) program to work in rural areas (Conger & Plager, 2012). Individual interviews and focus groups enveloped with participants who worked in the APN program for 1-year (Conger & Plager, 2012). Rural connectedness versus disconnectedness emerged as the theme from the interviews. Codes depicting rural connectedness included networking, interactions with urban health

care centers, local community outreach programs, and support through electronic means (Conger & Plager, 2012). Rural disconnectedness resulted from a lack of interactions with other health care providers, lack of support from mentors or community partners, and the absence of electronic support.

Hitchcock (2011) noted that physician shortages arise especially in developing countries because some physicians are not willing to relocate. Some doctors of medicine might not have the knowledge to treat patients. A lack of training could lead to delays in diagnosis or misdiagnoses of patients, and harm patients worldwide as diseases spread. The introduction of telepathology into countries with inadequate health care resources could help alleviate the problem (Hitchcock, 2011). Telepathology is the electronic transmission of microscopic digital images of tissues and cells. The technology includes slides showing how to repair and maintain equipment, and the needs of training. Hitchcock concluded telepathology might produce assortments of digital images, which could show the need to train uninformed pathologists in their nations.

Faust et al. (2011) noted a disparity exists between physician availability and the need for physicians especially in developing countries. People living in rural areas have limited access to affordable health care facilities (Faust et al., 2011). Increasing the number of practitioners and medical clinics or hospitals, or integrating advanced medical technologies in rural locations might not show a viable option, particularly in emerging countries. Faust et al. stressed the need to organize science and technology to control this difficult problem. Faust et al. suggested a collaborative approach where team expert's

work on both technical and nontechnical aspects of the health care provision can resolve the problem.

Bodenheimer and Pham (2010) described the investigation as the need for better recruitment of primary care physicians. The Medicare Payment Advisory Commission suggested that finding a primary care physician is difficult for patients. Poor reimbursement rates and rising operating costs forced primary physicians to accept fewer patients with Medicare and Medicaid insurance. The ratio of primary care physicians to populations in urban areas is nearly double than in rural areas (Bodenheimer & Pham, 2010). Changes in the physical distribution of primary care services, where a tremendous shortage of primary care physicians exists. Bodenheimer and Pham suggested that primary care physicians should work additional evening and weekend hours, and institute electronic and phone visits. Medical schools should take students from rural areas, and primary care physicians should incorporate tuition reimbursement policies into their operations.

Schneider et al. (2010) claimed that hospital administrators project physician shortages for most medical specialties worldwide and that emergency medicine shows a major workforce shortage despite the demand for emergency care. Ginde et al. (2010) revealed that emergency room facilities must have adequate staff to meet the needs of patients requiring urgent care. Schneider et al. asserted a shortage of emergency care providers would continue for the near future. The inadequate volume of emergency physicians, nurses, and other resources is generating a crucial problem for patients seeking medical treatment. Even though many physicians enter the workforce each year,

an increase in physicians does not fill the available vacancies, especially in rural areas, which may require incentives to lure practitioners into rural areas (Ginde et al., 2010; Schneider's et al., 2010). Schneider's et al. concluded that more training incentive opportunities are necessary for health care professionals, which could entice people to relocate into rural settings.

Kirch, Henderson, and Dill (2012) also noted that significant shortages of primary care physicians and medical specialists could take place in the United States by the year 2020. Millions of Americans are living without health insurance coverage, and the population could generate additional demands (Kirch et al., 2012). Data results revealing why shortages occur could help leaders find solutions to learn what factors influence change (Kirch et al., 2012). Physicians using telemedicine could offer a solution to meet the projected need. The data results illuminate the problem of the shortages of health care workers, especially in the United States as the basis for adopting telemedicine.

Telemedicine and Quality of Health Care

Although telemedicine is a viable solution to access health care in a rural setting, quality assessments must continue. Garg and Brewer (2011) noted telemedicine is a technology-based alternative to traditional health care delivery, but without tight security measures, the application could pose a risk to expose patients' protected health information. Garg and Brewer reviewed, coded, and analyzed 58 journal articles evaluating the security risk of telemedicine. Seventy-six percent of the article results showed the security problem, while 47% illuminated a research question pertaining to security (Garg & Brewer, 2011). Garg and Brewer further noted that 61% of the data

results offered a plan to address the problem of security, and only 20% of the research tested the proposed security solutions. Garg and Brewer confirmed inadequate reporting of methodology in telemedicine research.

Kohl et al. (2012) led an observational study of patient outcomes in a hospital's intensive care units. Employees working in the surgical intensive care unit (SICU) used electronic medical records to record patient care information while the medical ICU (MICU) personnel used traditional methods of recording data. Kohl et al. reviewed 246 patient surgical intensive care and 220 medical intensive care records for a 1-year period before the use of telemedicine, 1499 surgical records, and 285 medical records after implementation for the same duration. Kohl et al. compared the patient's length of stay to mortality rates. Kohl et al. showed a significant reduction in the patient's hospital stay and mortality rate because of the use of electronic records in the surgical intensive care unit, but the researchers could not prove the reduction was a result of the technological intervention.

Romig, Latif, Gill, Pronovost, and Sapirstein (2011) evaluated how physicians could use telemedicine to promote employee and staff satisfaction. The intent of Romig et al.'s experiment was to explore the satisfaction levels of intensive care nurses and the views on the quality of patient care in the unit. Romig et al. used survey responses, measured on a 5-point Likert scale, to understand if telemedicine could improve staff satisfaction and communication in a highly stressful work setting.

Krier, Kaltenbach, McQuaid, and Soetikno (2011) noted that patients often experience delays in receiving an appointment with a chronic care specialist. Participants

constituted a sample of 34 patients with Chron's and colitis diseases. The population scheduled 57 visits within 9 months. Krier et al. randomly assigned the diagnosed patients into two groups. Patients in the first group received medical treatment remotely, and patients in the second, or control, group received provider care from a specialist in a medical clinic. Krier et al. recorded patient satisfaction using appointment duration, wait-time, and quantity metrics. The two groups rated the overall experience as excellent. Participants expressed their satisfaction pertaining to patient concerns and the physician's skill level and personal care. Krier et al. concluded that no significant difference occurred for patients treated for chronic conditions through either telemedicine or direct care.

Barriers to Telemedicine Adoption in Clinical Settings

Physicians using telemedicine can provide a workable solution for rural residents to access care (Wade & Elliott, 2012). Adoption of the technology is low in the U.S. South. Thus, Martin et al. (2012) examined implementation barriers between rural and primary care providers in this region. Martin et al. surveyed four rural hospitals as part of the data collection technique. Questions included planning, implementation, disaster recovery, and adequacy of telemedicine. The results of a response rate of 50% showed telemedicine is a viable solution for bridging the gap in a variety of specialty care facilities between geographic location and patient access. The results of the study concluded by revealing hospitals located in rural areas appeared ready to embrace facilities that successfully implement telemedicine and follow their examples in their implementation strategy.

Wade and Elliott (2012) noted that proponents of telehealth are passionate individuals who endorse the use of the technology. Wade and Elliott interviewed 39 participants residing in Australia as part of a qualitative study exploring the participant's views regarding the convenience and sustainability of the technology. The results indicated that proponents initiated most services, and the role of the telehealth promoter is an important factor in continued operations.

Zanaboni and Wootton (2012) revealed a debate about why telemedicine adoption has not progressed. Zanaboni and Wootton stressed that apart from tele radiology, which is a variant of telemedicine, application of this technology in other areas is still in the early stages of development. The theme of the research was to attain an in-depth understanding of adopting best practices in the field of telemedicine, to assist people trying to move applications from the pilot stage to routine delivery. Zanaboni and Wotton's findings are that the widespread adoption of telemedicine is a major challenge that needs strengthened through new research directions. Zanaboni and Wootton formulated four hypotheses, which require further experimental verification because the researchers believed that more data regarding the adoption of telemedicine is necessary.

Singh, Mathiassen, Stachura, and Astapova (2010) examined the perceptions of 19 managers and six health care providers in the adoption of telehealth in a rural community between 1988 and 2008 in the state of Georgia. Singh et al. used semistructured interviews, field observations, and published papers and other written materials. The findings included strong collaboration within the district and local community, and energized external partners including telehealth clinical outreach

members. Singh et al. concluded that building strong internal and external relationships and a combination of technology could sustain rural telehealth innovations.

Licensing, Legal, and Regulatory Issues in Telemedicine

Organizations that adopt telemedicine technology must include technical, regulatory, licensing, and legal issues. Bandyopadhyay and Hayes (2009) explained health care leaders working in the U.S. ignored matters such as competition, patient safety, increasing health care and liability insurance costs and Medicare and Medicaid payer reimbursement changes. Government regulation officials control remote medical care technology (Silberman & Ciark, 2012). Silberman and Ciark (2012) used a questionnaire survey for their study and formulated a framework for continuous improvement in health care management policies and for understanding the impact of U.S. government oversight. Bandyopadhyay and Hayes (2009) noted as the competition between organizations intensified; operational issues became more widespread, which resulted in many hospitals closing. Bandyopadhyay and Hayes stressed that hospital leaders have become aware of how the consequences of such uncontrolled operating practices could jeopardize even a large business' landscape. Measures to improve hospital procedures to meet the needs of its stakeholders and the expectations of patients might help physicians deliver affordable and quality patient care.

Silberman and Ciark (2012) claimed health care would require continued development of technology-based applications. Physicians can use mobile health (m-health) hardware or software to deliver wireless health care services. M-health is a term applied to hardware or software technology permitting physicians to deliver health care

wirelessly. M-health includes patient and provider-oriented medical applications. Online medical records store information such that patients could manage health care needs by scheduling doctor's appointments, reviewing test results, and renewing prescriptions online. The appropriate personnel can use medical hardware devices to send health readings back to the patient's physician (Silberman & Ciark, 2012). The field of mobile health care is a growing opportunity for hardware and software application developers.

Ethical, Confidential, and Privacy Issues in Telemedicine

Blumenthal and Tavenner (2010) purported the use of electronic health medical records could pose a potential ethical and confidentiality breach, which providers must address. Hu, Chen, and Hou (2010) explained that lawmakers enacted the Health Insurance Portability and Accountability Act (HIPAA), which set privacy and security regulations for health care organizations to abide. A hybrid public key infrastructure solution complies with HIPAA regulations. The infrastructure is a security access platform for use by the medical service provider during the contract period (Hu et al., 2010) with the intent of protecting patient's sensitive health information. The strong written computer code use by the appropriate person is to verify, allocate, store, and transmit sensitive medical information securely.

Arriaga et al. (2010) researched privacy, legal, and potential use of telemedicine in a neurological practice, which includes a full-time audiologist, a nurse practitioner, and an ear nose and throat doctor, where physicians were only available 3 days a month. Physicians used telemedicine to evaluate patients residing in Baton Rouge, Louisiana while the examining neurologist connects through a secure, remote server in Pittsburgh,

Pennsylvania. Physicians helped 450 patients using telemedicine technology during the first year of operation and doubled the on-site visits. Telemedicine is a practical model for neurology care delivery (Arriaga et al., 2010).

Gros, Veronee, Strachan, Ruggiero, and Acierno (2011) described a situation where a U.S. soldier fighting in the Afghanistan war suffered from post-traumatic stress disorder (PTSD). Gros et al. presented a research trial where a patient received psychological treatment at home using telehealth. The study participant experienced severe suicidal tendencies and required emergency hospitalization. Through evidence gathered from communication between the patients, the patient's family, and the treatment team, the physician was able to assess the patient's symptoms and develop an intervention plan, which included admitting the patient to a hospital (Gros et al., 2011). Gros et al. demonstrated the value of telehealth in identifying and treating severe psychiatric symptoms while supporting the safety of these procedures to address suicide prevention.

Sarhan and PGDip (2009) noted that using telecommunication technologies by the appropriate personnel could facilitate the delivery of health care to patients living in remote areas and enable the exchange of information with health care professionals. Sarhan and PGDip suggested that an aging population needs a refined clinical intervention, one that maintains the patient's safety and confidentiality. The use of telemedicine by the appropriate personnel could provide a more cost efficient opportunity for physicians to deliver health care services to people living in remote locations.

Physicians using technological advances do not replace the personal interaction between a patient and their health care professional (Sarhan & PGDip, 2009).

Spaulding, Belz, DeLurgio, and Williams (2010) explained that insufficient research exists on the costs of pediatric telemedicine services because the technology is underreported, which leads researchers to surmise that telepediatric costs are comparable to traditional services. Spaulding et al. examined the costs of providing basic health services for patients at the University of Kansas Medical Center in Crawford County, Kansas over a 6-month period in 2006. Spaulding et al. developed cost estimates for using the pediatric telemedicine service for all patients, notwithstanding travel and related costs from a sample of 26 patient–parent pairs. The results showed if patient’s deducted travel costs from the provider’ invoice, because this expense is feasible for on-site appointments, a telepsychiatry consult would cost \$30.00 (Spaulding et al., 2010). Spaulding et al. suggested future researchers should replicate the study over a longer period, with more patients. The results might show more data that could capture marginal costs of services.

Telemedicine and Mortality Rate Reduction in Remote and Rural Areas

Gorman (2011) found the use of telemedicine shows an advantage to saving lives. Rural occupants sometimes live hours away from emergency room services, which put people at an additional risk in not receiving timely treatment. Mortality rates among rural occupants changed significantly, by 36% in rural areas, with a form of telemedicine, called tele-ICU technology. Anker, Koehler, and Abraham (2011) conducted research on patients with chronic heart failure. Anker et al. asserted that by getting patients involved

in their health care management practices with technology and communication tools, a reduction in morbidity and mortality rates among patients could occur. Anker et al. concluded observing data early would allow doctors to detect medical conditions and intervention plans that might help alleviate unfavorable outcomes. Some patients chose to decline any form of treatment during end-stage heart failure, and supporting the decision of patients to live without treatment is difficult. The use of tele-ICU technology by physicians could provide some patients with an alternative treatment plan. The tele-ICU alternative is more appropriate from a clinical and economic basis as physicians could become complacent as to only focus on patient death rates and not consider other options (Anker et al., 2011).

Computer Equipment Costs, Training, and Education in Telemedicine

The use of telemedicine includes high costs and training for health professionals who service rural areas. Adelstein (2013) presented information on information supplied by the United States Rural Utility Service of the U.S. Department of Agriculture regarding the Distance Learning and Telemedicine Grant Program. Adelstein used innovative technological services, such as telecommunications and computer networks, to advance the knowledge gained from distance learning capabilities for rural areas. Mackert, Guadagno, Donovan, and Whitten (2014) recounted more than 40 years of the telemedicine service that advanced organizational leaders in their aim to improve patient access. Mackert et al. asserted that the use of telemedicine could decrease the number of health challenges throughout the world, and improve the health access problems facing society.

Brownlee, Graham, Doucette, Hotson, and Halverson (2010) explained that recent advances in communication technologies illuminate challenges in rural areas such as in a lack of professional resources and development. Brownlee et al. interviewed 37 social workers while conducting a qualitative study to explore developments in communication technologies. Brownlee et al. found that telehealth and telepsychiatry appear to mitigate some problems of accessing rural and northern Canadian psychiatric patients. However, telehealth and telepsychiatry technologies could remove the limitation of distance for health care professionals working in rural communities.

Kaczmarek et al. (2012) discussed telerounding, which is a subset of telemedicine. Physicians use laptop computers to access patient information in database applications. Telerounding results showed improvements in how practitioners access patients' data. Stampehl, Call, Pope, Hartwig, and Jessison (2012) implemented a rural outpatient heart failure management system, and heart failure nursing outreach program, using telehealth technologies. Stampehl et al. enrolled patients at the time of their discharge and monitored the participants for 90 consecutive days with respect to the behavior as measured in terms of dietary sodium, fluid restriction education, medication reconciliation, and attrition. Hospital personnel observed the patients through landline, blue tooth, PCS mobile and interactive voice response systems, which transmitted data to ensure accessibility to all subjects. Stampehl et al. concluded that rural outpatient heart failure management might simplify health monitoring through this technology.

Rauh, Wadsworth, Weeks, and Weinstein (2013) explained the benefit of cost layering in the health care system. Rauh et al. mentioned that lack of management's

attention creates the inability to implement substantial cost saving initiatives. Cost saving initiatives that do not significantly increase revenue, negatively affect the bottom line, and warrant a review (Rauh et al., 2013). High costs do not correlate to high quality of care. Rauh et al concluded that hospitals must adopt cost saving initiatives to reduce overall utilization rate and eliminate waste as the U.S health care system is shifting from volume to a value base reimbursement structure.

Transition and Summary

Section 1 included information on the need to explore how practitioners could profit from the technological advantages of telemedicine in rural areas to understand what actions might yield positive change within the health care industry. The qualitative, single site study design was appropriate for the study (Yin, 2012) that may aid practitioners through the various challenges that health care practitioners and venture capitalists need to overcome. The information in the literature review included the investment of other practitioners realizing and adopting technology through cost saving initiatives. A review of the literature also revealed that people living in rural communities could benefit from the advantages of the technology by the early diagnoses and treatment of their health concerns. Section 2 included a detailed explanation of the chosen study configuration and data collection strategy.

Section 2: The Project

A review of the professional and academic literature substantiated the general business problem to understand what strategies physicians could adopt to implement telemedicine in their practice. As improvements have continued to take place in the health care industry in rural areas, researchers have noted similar progress in the Midwestern part of the United States. A telemedicine platform may facilitate this needed growth. I examined the challenges in adopting telemedicine technology by health care practitioners. The outcomes in the study may show health care providers the benefits of implementing this technology to ease the distance barrier in urban locations; thereby, combating health care worker shortages in rural communities. The results of the research show how the government aids in regulating health care for the rural population.

The following section includes my rationale for choosing the selected research and design methods, identifies the participant selection process, and defines my role as a researcher. The section illustrates the techniques used to develop and collect research data.

Purpose Statement

The purpose of this qualitative, single site case study was to explore the strategies that physicians use with the technological advantages of telemedicine in rural markets (Burns et al., 2012; Feldstein, 2012). A qualitative, exploratory, single site study was best suited for discovering how this innovative field could help physicians expand health care access to the rural population. A purposeful sample of four physicians from a clinic in

Ohio who used telemedicine participated in semistructured interviews. I used follow-up interviews and member checking to ensure data saturation from the interviews conducted.

The results of the findings might provide opportunities for health care practitioners, venture capitalists, community leaders, and government officials to evaluate and initiate cost-effective solutions to combat the challenges faced in implementing telemedicine. The increase in the number of physicians who use this technology could improve the business environment, thereby improving patient health. The findings from this study might contribute to social change by increasing health care access to patients living in rural locations.

Role of the Researcher

The role of the researcher in this study was to collect, analyze, and present research data in a format that meets academic and professional standards for conducting research in an ethical fashion. Meeting professional standards required that I maintained an objective stance when interviewing participants and mitigated bias by limiting engagement with the participants in the study (Patterson & Morin, 2012).

Leech and Onwuegbuzie (2011) reported that investigators who do not identify and manage their biases might influence the responses of participants in studies corrupting the data collection and analysis processes. To reduce bias, the investigator needs to recognize and express attitudes about the research topic that may affect the assembly and analysis of data (Hofmeyer, Scott, & Lagendyk, 2012). Although I am a member of the American Telemedicine Association, I had no direct reporting relationship with any potential contributor used in the study and held no position of authority within

the organization. My interest lay in understanding the predicaments and opportunities encountered by health care practitioners while implementing telemedicine and in uncovering what solutions I could offer to new entrants supporting this technology.

Rubin and Rubin (2012) stated that investigators might encounter unusual experiences resulting from the different functions assigned to them by their participants. Defining an appropriate role at the beginning of the research is important. My role as a researcher, perhaps resulting from my shared interest in this technology, might have come from a common connection with health care practitioners who are also interested in the well-being of their patients. The intent of this study was to explore optimal strategies for implementing telemedicine technology in rural populations.

In my role as a researcher, eliciting the cooperation of the physician supervisors was essential for the time release of the physicians for interviews as participants in this study. I met with the physician staff from a single clinic in Ohio and did a presentation on the background, purpose, and procedures of the study, including informed consent, face-to-face interviews, and the data collection process as well as confidentiality and the voluntary nature of the study.

In addition to the aforementioned preparation, my role as the researcher was to eliminate barriers to capture the genuine voice of the four participants by following the ethics of research as enumerated in The Belmont Report (1979). The ethics of research as spelled out in The Belmont Report were based on the principles of respect of persons, beneficence, and justice. Respect of persons (i.e., to acknowledge autonomy and to protect those with diminished autonomy) is the concept that all people deserve the right

to exercise their autonomy and to make choices. Beneficence (i.e., to treat others in an ethical manner by respecting their decisions and protecting them from harm, and making efforts to secure their well-being) is a concept that researchers should have the welfare of the research participant as a goal of their research study. Justice (i.e., to prevent an injustice from occurring when some benefit to which a person is entitled is denied without good reason or when some burden is imposed on individuals in an undue fashion) is the concept that all people are treated fairly and that food, shelter, and medical services should be distributed to meet an individual's basic needs (Belmont Report, 1979).

Ensuring that the environment was safe, comfortable, private, and relatively free of interruption was important. The dialogue with the participants included a statement that no physical risks would take place during the study and that participants were welcome to leave the study at any time. Participation was voluntary on the part of the participants. The dialogue included a clear definition of commitment of the participants and the importance of a signed consent before the collection of any information.

After the face-to-face interviews, I transcribed the interviews and identified themes through my lens as the primary instrument of this study. I then shared the draft text with the participants and followed up with them as needed to ensure credibility. I remained available to provide help if any of the participants had difficulty reading or understanding the consent form. Adherence to confidentiality and ethical research practices occurred during this doctoral study to protect the participants and data credibility. I used a fireproof safe to secure and store hard copy data for a minimum of 5 years. A password-protected Apple laptop with encryption was used to secure

electronic data. Paper, electronic, and clouded documents would be shredded or deleted at the end of this of the 5-year period, which would complete the security and protection of the data (Reardon, Basin, & Capkun, 2013).

In my role as the researcher, I maintained rigorous adherence to ethical guidelines, member checking, follow-up on interviews if needed, observations, and reviewing other documents related to the issues discussed mitigated the risks of bias when conducting the research within an area where one had an interest (Hofmeyer et al., 2012). During the interviews, I made sure my body language was appropriate and would encourage participants but would not express any opinion on their responses (Miles & Huberman, 1994).

Participants

The eligibility criteria for study participants were as follows: they needed to be licensed physicians practicing telemedicine for at least 1 year with patients who lived in rural locations. Physicians from a single clinic in Ohio agreed to participate in the study when I attended their presentations at the American Telemedicine Association's Annual Meeting in Austin, Texas in May of 2013. The sessions provided me with the opportunity to gain access to practitioners who used this technology. I was able to establish a working relationship with suitable participants that allowed me to conduct this research in a suitable fashion with knowledgeable telemedicine practitioners.

I used purposeful sampling to achieve the necessary data for analysis in this qualitative study. Patton (1990) noted that purposeful sampling is a means to select information-rich cases. To understand the phenomenon, Van Der Velde and El Emam

(2013) used purposeful sampling to conduct semistructured interviews of 20 hospital patients between the ages of 12 and 18 to discover how teenage patients maintain their confidentiality when using social media sites.

Garg and Brewer (2011) used purposeful sampling to explore the perceptions of 127 people regarding the security, safety, and confidentiality of an adult monitoring system for patients plagued with ill health who resided in India. Rubin and Rubin (2012) maintained that the quality of the sample is more important than the sample size in qualitative research. O'Reilly and Parker (2012) suggested that the sample size needs sufficiency for participants to provide quality answers to the research questions. Francis et al. (2010) explained that in their 10+3 rule theory for saturation achievement; interviews must persist pending a period when three interviews fail to offer fresh or new information. For this single site case study, a sample size of four participants proved sufficient to achieve data saturation (i.e. redundancy in data). Following the direction of Francis et al., if data saturation was not achieved after interviewing four participants, the interviews would have continued with the physician supervisor or physician manager until saturation was achieved. Data saturation means that interviews would continue until the same answers kept appearing with little or no variation or until no new information or themes emerged from the data (O'Reilly & Parker, 2012).

The face-to-face interviews of the licensed physicians who had been practicing telemedicine for at least 1 year with patients who lived in rural locations took place in an office setting where the participants were assured of privacy and should have been comfortable at all times. Although I am a member of the American Telemedicine

Association, which is my only known attachment with potential participants, no direct reporting relationships existed with any potential conflicts of interest.

Study participants received a consent form via e-mail prior to their interview, and a review of the document commenced at the onset of our discussion. I advised the participants that my intention was not to share their data with any individual, agent, or external entity. The consent form also indicated how the participants might withdraw from the study at any time. This declaration served as a pivotal point in gaining their trust and acceptance, and fostered a relationship where participants should have provided honest and fair feedback. Participants understood that all electronic and printed data would remain secure. Pursuit to the requirements of Walden University, during the conduct of the exploration and for 5 years after the conclusion of this research, all data would reside on an encrypted, password-protected storage device or in a locked cabinet when not in use (Reardon et al., 2013).

Research Method and Design

The choice of a research method had a direct impact on the data compilation and examination necessary to conduct the study. This decision also affected the research inquiry (Yin, 2012).

Research Method

Researchers use a quantitative approach to examine if a statistical significance exists between two or more variables or to test hypotheses (Watkins, 2012). Experiments or nonexperimental procedures, such as surveys, are the means by which researchers analyze a numeric description of the data (Denzin & Lincoln, 2011). Quantitative data are

ideal if the intent of the study is to examine the cause and effect of relationships or to test hypotheses (Watkins, 2012).

Denzin and Lincoln (2011) suggested that the participative approach of the qualitative method provides readers a real life account of the phenomenon under exploration. Coelho (2011) used a qualitative research method of inquiry in a study with the intent to increase collaboration between primary care physicians using e-referral technology and specialty care providers. Stahl, Tremblay, and LeRouge (2011) used a qualitative approach when evaluating the use of focus groups in the data collection process of their research.

I chose a qualitative method of inquiry and a single site design because my intent was to explore, in-depth, the perceptions of physicians working in a telemedicine clinic in Ohio who had implemented telemedicine technology in their practice. The following criteria were used in selecting a qualitative method: (a) the desire to gain an in-depth understanding of the group of physicians using telemedicine-providing services and (b) the ability to develop a detailed description of the phenomena (Yin, 2014). In addition, the selection of a qualitative method of inquiry included the ability to explore and address intangible phenomena such as thinking, beliefs, and reasoning with semistructured open-ended questions (Yin, 2014).

After evaluating all three research approaches to collect my data, I decided to use a qualitative method to explore the in-depth perceptions and experiences of physicians in the adoption of telemedicine technology. The justification for the qualitative approach involves addressing participants in their natural setting, where the researcher is the key

instrument (Kahn, 1990). A quantitative method was not appropriate to address the central research question, for my intent was not to assess the level of association between variables or to test any hypotheses. Considering that the mixed method requires a quantitative portion, it was not a required approach for my study.

Research Design

All three types of research designs—that is, exploratory, descriptive, and explanatory—are widely used in other types of qualitative studies (Yin, 2012). Under these research designs, the investigators usually employ qualitative and quantitative research approaches (Taneja, Taneja, & Gupta, 2011). The research design used for this study was an exploratory case study. The research question was what strategies do physicians use to implement telemedicine in rural areas? Watkins (2012) suggested that a case study design includes a systematic procedure when conducting interviews. Such research forms an unbiased understanding of observations, interviews, and documentation (Yin, 2012).

Yin (2014) suggested that in case study research, investigators chose to describe, explain, or explore a participant's experience and perceptions. Singh et al. (2010) used a case study approach to examine telehealth technology in a rural community in Georgia. The intention of the researcher was to gain an in-depth understanding of how the technology became sustainable in that community. Mullen-Fortino et al. (2012) used a case study design to explore nurses' experiences working in three critical care units and their perceptions of the use of telemedicine, support for its use, and what factors hindered the expansion of the technology. The single site study design, which involves the use of

multiple sources of data, utilizes a theoretical lens to view opinions and feedback from different perspectives.

In qualitative case study research, strategies that guide explorers on how to collect data depend on the participants' setting. In narrative research, investigators embed themselves into the daily life of a participant, over a long period, such that the participant describes his or her story and relives the experience of his or her past (Yin, 2012). The narrative design was not suitable for my research because, in a narrative design, individuals recount stories of their lives, such as from a historical perspective, or war, as an example. When researchers wish to explain the quintessence of experience, as recounted from interviewing several participants experiencing the same phenomenon, such as a natural disaster, a phenomenological approach to data collection results (Marshall & Rossman, 2011).

The narrative design does not support gathering data from multiple document and observation sources. Other qualitative research designs were also not feasible in illuminating the rich exploration intended for the study. An ethnographic study design is fitting for exploring the principles of culture and groups (Marshall & Rossman, 2011), an emphasis not linked to the study of telemedicine. Case study researchers intend to understand the phenomenon while at the same time holding a universal, yet expressive vision of facts. A case study research design was the most appropriate design for this study to explore what was happening with physicians who had implemented telemedicine programs to solve an applied business problem of providing services to rural patients.

Population and Sampling

The population for the study included medical practitioners who have already adopted telemedicine in their clinical setting to provide medical services to patients who live in rural locations. I recruited participants using purposeful sampling from a single clinic site in Ohio who are providing telemedicine in a rural clinic. Patton (1990) noted that purposeful sampling is a means to select information-rich cases to understand the phenomenon. Van Der Velden and El Emam (2013) used purposeful sampling consisting of semistructured interviews of 20 hospital patients between the ages of 12 and 18 years old to know how teenage patients maintain their confidentiality when using social media sites. Garg and Brewer (2011) used purposeful sampling to explore the perceptions of 127 people regarding the security, safety, and confidentiality of an adult monitoring system for patients plagued with ill health who reside in India.

I used purposeful sampling when recruiting participants by following up on contacts made at the American Telemedicine Association's Annual Meeting in Austin, Texas in May of 2013. Two physicians expressed an initial interest in participating in the study when I attended their presentation at this conference. The sessions provided me the opportunity to gain access to practitioners who use this technology. I was able to establish a preliminary working relationship with suitable participants that allowed me to conduct the research with knowledgeable telemedicine physicians.

Rubin and Rubin (2012) maintained that the quality of the sample is more important than the sample size in qualitative research. O'Reilly and Parker (2013) suggested that the sample size needs to be strong enough to answer the research

questions. Francis et al. (2010) explained that in their 10+3 rule theory for saturation measurement that interviews must persist pending a period when three interviews fail to offer fresh or new information. For this case study, a sample size of four participants remained sufficient to achieve data saturation. I did follow up member checking interviews to ensure that I had correctly interpreted the participants' responses.

In justifying the sample size chosen, Rubin and Rubin (2012) purported that in conducting a qualitative study, a small sample size should not detract from the legitimacy of the study. The sample size of participants chosen needs sufficiency in the knowledge and experience with telemedicine to answer the research question under exploration (O'Reilly & Parker, 2013). The interview setting was appropriate for this study and occurred using in- person interviews and in-person member checking follow-up interviews.

Ethical Research

Ethical consideration is at the forefront of all honest researchers' actions (Denzin & Lincoln, 2011). Mitigating risks includes open and trustworthy communication with participants. Different modes of damage are possible, which range from divulging a participant's identity directly or through inference (Marshall & Rossman, 2011). To protect the confidentiality of the participants, researchers must decrease the likelihood that readers would surmise the identity of the participant by redacting all information associated with the contributors distinctiveness prior to distribution of their work (Damianakis & Woodford, 2012).

Critical to the study were informed consent and the preservation of confidentiality to maintain the ethicality of the research (Miles & Huberman, 1994). The participants received a hard copy of the consent agreement and then signed and returned another copy of the informed consent agreement before the start of the study (see Appendix B). The identity of the clinic and the participants remained anonymous in this study. To maintain the participant's confidentiality, Participant 1, Participant 2, or Participant 3, identified each participant in the files. Each participant had separate folders designated by their assigned number to store the information. The folders included the participant's signed informed consent, interview notes, and observation notes. The name of the facility would remain confidential and not mentioned in my study. I took leadership and supervisory responsibilities to ensure that all aspects of the doctoral study maintained ethical integrity, validity, and reliability for future research. My Institutional Review Board (IRB) approval number for this study is 05-21-15-0301989. The essence of IRB approval is to ensure the guidelines, procedures, and protection of the participants of the study met federal regulations in human rights, and ethical treatment.

I followed the guidelines in the Belmont protocol from the National Institute of Health (NIH), including fundamental ethical principles (a) respect for beneficence, (b) justice, and (c) fairness to all persons. As the investigator, I fully disclosed knowledge of the sponsoring institution (Walden University) that supported the doctoral study to assist in building trust and credibility with the participants. To provide consistent recruitment communication with the physician group, a scripted dialogue included (see Appendix C) background, purpose, and procedures as well as the signing of an informed consent for

the study. Scripts are one avenue to prompt the facilitator expertise and organize information into clear and manageable sections that are consistent with each group (Hovmand et al., 2012). A scripted dialogue did not include the in-person member checking done on a follow up basis.

I informed the contributors of the intent of the study, identified potential emotional or physical risks, and outlined the benefits of participating in this research. Participants had the opportunity to ask questions at any time during the study (Marshall & Rossman, 2011). Participants may have chosen not to answer any question, for this study was a voluntary one. Study participants could withdraw from the research at any time by indicating they wanted to withdraw from the study (see Appendix C). Participants did not receive an incentive for taking part in the research. All participants understood that all electronic and printed data were secure. Reardon et al. (2013) showed all data should remain in a safe location with security procedures in place. All data from this study would reside in an encrypted password-protected device in a locked cabinet in my home when not used. I conducted the research under Walden University's IRB.

Data Collection

Marshall and Rossman (2011) revealed that using different information sources contributes to a detailed understanding of the phenomenon explored. This section includes the basis for selecting an instrument, and collecting and organizing the data. Research is the writing that originates from such disciplines and flows throughout the processes (Yin, 2012).

Denzin and Lincoln (2011) stated that researchers are the main instrument in qualitative case studies. Karlsson, Friberg, Wallengren, and Öhlén (2014) also noted that researchers were the main instrument in their study and presented an analysis of how to create fieldwork observations to document a patient's end of life care experience. Brooks (2010) referred to herself as an instrument as she evaluated voice recognition software for transcribing interviews. In the study, I became the primary data collection instrument. I followed an interview protocol and used an audio recorder to capture the participant's conversation and responses from the semistructured interviews. A semistructured interview allows participants the freedom to express their views on their own terms.

Singh et al. (2010) used semistructured interviews to examine the adoption of telehealth in rural public health district in Georgia between 1988 and 2008. Singh et al. collected data from 19 leaders and six health care professionals. Findings showed that extensive internal and external collaboration, and a combination of technology push and opportunistic exploitation, enables a sustainable rural telehealth innovation.

Mullen-Fortino et al. (2012) conducted semistructured interviews with 179 participants in three critical care units to understand if nurses who have experience in the use of telemedicine support its use within their clinical setting, and to learn what factors hinder the expansion of the technology. I collected data using semistructured interviews of four medical professionals or physicians. These participants provided an in-depth account of how they successfully adopted telemedicine in their organization. I enhanced the reliability and validity of the data collection instrument/process by member checking, transcript review, review of relevant documents, and follow-up interviews as

recommended by Denzin and Lincoln (2011). All data would remain stored in an information system for keeping track of information, emerging understandings such as research logs, reflective journals with my notes in them, and cataloging and labeling systems. The information system also included the interview recordings from the participants and information from the in-person member checking follow-up interviews with the participants.

I did follow-up member checking interviews to enhance the rigor, reliability, and validity of my study findings. I scheduled a return visit to the clinic to meet with each of the doctors who participated in the interview process. I asked them to verify if the information was the correct information that they wanted me to have, and whether or not the participants agreed with the themes that I identified from the interviews.

Data Collection Technique

The data collection techniques included face-to-face interviews that were open-ended (Rubin & Rubin, 2012; Yin, 2014). The advantage of semistructured interviews is the ability to pre-plan the questions in advance allowing the interviewer to prepare, present competently to the participant, and provide the opportunity for the participant to express their views (Rubin & Rubin, 2012).

To capture the entire interview, I recorded all interviews unless the participant did not consent to audio recording on a laptop. The laptop had encryption and password protection to secure the information. To build trust with the staff and facility leadership, I accurately communicated the intent of and process for the doctoral study.

Communications included (a) an e-mail with the details of the study, (b) a copy of the

facility consent form, (c) a copy of the interview questions, (d) a copy of the participant's consent form, and (e) a list of policies needed for review. Before the start of the data collection, I presented the doctoral study to the potential participants at a staff meeting.

I then scheduled volunteers for their interviews, conducted the interviews, and collected and secured the data from the participants for review. Utilization of an interview protocol (see Appendix B) provided me with a standard for data collection to ensure credibility and validity of the data. Scripted presentations remained available for anyone missing the meeting to ensure enough volunteers existed to obtain a saturation level for the study. The expected length of the scripted presentation of the study was approximately 10 minutes (see Appendix C). Utilization of a scripted dialogue supported consistency of information shared and the expectations of the participants and the researcher.

I collected data from other secondary sources while I was visiting the clinic. Denzin and Lincoln (2011) recognized that multiple sources of data, such as observations, interviews, and document assessment identify case study research. My observation plan was to use direct observation while physicians are practicing telemedicine in the clinic. Yin (2014) suggested that researchers take notes immediately after each interview and throughout all stages of data collection process to ensure vital information is not forgotten or lost. Karlsson et al. (2014) created fieldwork observations to document a patient's end of life care experience. White and Oelke (2012) included field notes as a strategy in collecting analyzing data in a nursing facility. Notes assisted me in obtaining additional information that might have emerged during the conduct of the

interviews and observations of the physicians practicing telemedicine in the clinic. The observation plan was to use direct observation while physicians were practicing telemedicine in the clinic.

Data Organization Techniques

Rubin and Rubin (2012) defined coding as a function of organizing the surface level of information, ideas, or themes as a challenging task. Prior to coding, researchers must understand the concepts and various definitions involved in this process to establish relevance in the data output. Marshall and Rossman (2011) endorsed the use of an information system to store material rising from the voluminous data collected during the conduct of qualitative research. I used information systems for keeping track of data, emerging understandings such as research logs, reflective journals with my notes in them, cataloging, and labeling systems.

I transcribed the interview recording from the participants, which might have helped ease the process of the next phase of the research, which was to code and analyze the collected data. All data resided on an encrypted password-protected device or information from document reviews, observations, and notes would remain in a locked cabinet when not in use (Reardon et al., 2013). Redacting the participant's private information prior to study completion can preserve the confidentiality of the research contributors. The practice is destroying all data 5 years after the close of this research.

Data Analysis Technique

The central research question is what strategies physicians use to implement telemedicine in rural areas. During the data analysis process, I transcribed the interviews

to address this question and then returned the information to the participants to determine if the information was accurate. The participants might have changed the information presented or requested a follow-up interview to clear up any anomalies. Atlas.ti software is a tool researcher's use to code and analyze their data (Yin, 2012). The output generated by the software included an analysis for common words, phrases, and themes and was organized using a minimum code frequency threshold and rate of code co-occurrence technique. Marshall and Rossman (2011) suggested that researchers ask the participants during the interviews for their feedback as to the credibility of the interview summaries. Nicholas et al. (2011) evaluated the use of videophone technology for hospitalized children and their families. Nicholas et al. contacted a portion of their study participants to review the themes for accuracy prior to data collection.

Davis et al. (2014) used member checking after completing four in-depth interviews from primary care physicians working in rural communities to determine if remote monitoring technologies is useful in small practices. I used the member checking method during the interviews by restating or summarizing information and then questioned the participants to determine accuracy. Member checks after the interviews were completed by sharing all of the findings with the participants involved to establish credibility in the analysis of my collected data. I also followed up with in-person member checking to make certain that the participants were in agreement with my data analysis and the identification of themes.

I used methodological triangulation, which involves using more than one method to gather data, such as interviews, observations of the physicians practicing telemedicine,

and review of clinic documents (Denzin & Lincoln, 2011). By combining multiple methods, I hoped to overcome the weakness or intrinsic biases and the problems that come from single method, single-observer and single-theory studies. As an investigator, I could feel more confident with a result if different interview protocol methods led to the same result or to the same findings. I used an interview protocol (see Appendix B: Interview Protocol) and interview script (see Appendix C: Script) as the guide to ensure that proper procedures were followed throughout the process of gathering data, organizing data, and analyzing data.

Reliability and Validity

Unlike experimental research that focuses on explanations, qualitative research includes internal and external factors that may provide reasonable interpretative options (Yin, 2012). A lack of trust for the researcher may result in skewed results as opposed to the actual representation of the data (Rubin & Rubin, 2012). I intended to build confidence with the physicians by explaining the benefit of adopting telemedicine in rural areas in the United States, such that the quality of the lives of their patients would improve. The timely intervention of modern technology could also increase their organization's business growth.

Reliability is the quality of the measurement, the consistency, and the ability to repeat that measure. The trustworthiness of the study is important in developing and maintaining the integrity of data collection and the findings of the study (Denzin & Lincoln, 2011; Marshall & Rossman, 2011). The following criteria need to support trustworthiness: (a) creditability, (b) transferability, (c) dependability, and (d)

confirmability (Miles & Huberman, 1994). Although the criteria are often difficult to measure, they do support the qualitative method through the use of techniques such as member checking (Marshall & Rossman, 2011), triangulation (Denzin & Lincoln, 2011), and case study review (Yin, 2014). Reliability is the consistent account of the truth that the investigator is presenting. Credibility is the investigator's account of the truth outlined.

Creditability

Miles and Huberman (1994) and Patton (2012) indicated that creditability occurs when the participants' perceptions align with the investigators' portrayal of them. Evidence in support of credibility can take several forms such as clarifying up front bias the researcher may have, the researcher's experience in that particular field of research, and triangulation of various data (Bloomberg & Volpe, 2008). I used member checking and triangulation during data collection to help ensure the credibility of my research.

Dependability

Denzin (2011) reported that qualitative investigators establish the trustworthiness of their research through a focus on dependability rather than reliability. Dependability is a significant consideration during the study design phase, and qualitative investigators include mechanisms for ensuring dependability in the design of their studies to safeguard the integrity of collected data and findings (Marshall & Rossman, 2011). Investigators can use case study protocols and case study databases to demonstrate case study dependability to minimize the effect of the investigator's prejudice and misunderstandings (Yin, 2014).

To support the dependability of the information data collection process, a designated space was available for interviews. The designated space was separate from the physician's work area. Privacy helped in the prevention of interruptions, so the participants were not distracted. Such privacy supported confidentiality and ensured the flow of information during the interview. The validated summary of the interview notes through member checking then confirmed for me the accuracy of the data collected. Following a consistent approach in implementing the research method and design throughout a study supports the dependability of the research (Radley & Chamberlain, 2012).

The case study protocol is for reference purposes to ensure that, if another investigator uses the same procedures in the future, the same results and conclusions may come for the same type of study (Yin, 2014). The standard protocol used for the face-to-face interview with open-ended questions, along with the member checking mentioned in the design of the study and data collection techniques enhanced consistency. The significant role of the investigator in the qualitative research process is to identify barriers and address any concerns over the impact on the data or analysis. Verification of the data analysis concerns the generalizability, the reliability, and the validity of the findings.

Transferability

Although qualitative researchers do not expect their findings as generalizable to all other settings, the lesson learned in one setting might prove useful to other researchers (Bloomberg & Volpe, 2008). The transferability is not whether the study includes a representative sample but rather how well the study made it possible for the readers to

decide whether similar processes can succeed in their own setting and culture by understanding in-depth how it occurred at the research site. The richness and level of the amount of detail about the background and the context of the findings helps the reader make these decisions (Bloomberg & Volpe, 2008).

Confirmability

Denzin and Lincoln (2011) indicated that the concept of confirmability corresponds to the notion of objectivity in quantitative research. The implication is the findings are the results of the research, rather than an outcome of the biases and subjectivity of the researcher. Similar to dependability, one of the vital elements that are part of an effective confirmability is the maintenance of the audit trail (Bloomberg & Volpe, 2008).

The interviewing of four participants ensured that adequate data saturation occurred in this study (Francis et al., 2010). Data saturation arises when no new relevant data occurs in the data collection process. I reviewed the study data to make sure that no additional outliers existed. Walker (2012) supported the position that saturation occurs when no redundancy of collected data occurs.

Enhancing the validity in a study is achieving convergence through information collected from multiple sources (Yin, 2014). The importance of validity in the context of a qualitative study is the credibility, integrity, transferability, and thus defensible when challenged (Venkatesh, Brown, & Bala, 2013). At the elementary level, the research data must be of high reliability and quality (Ali & Yusof, 2012). Ali and Yusof advocated the

qualitative validity must achieve a litmus test of auditability, creditability, and trustworthiness.

The doctoral study had the methods to demonstrate the study's validity (a) researcher bias identification, (b) data triangulation, (c) review of the policies that affect the work of telemedicine in the work environment and practice, and (d) member checking. To ensure that the study's credibility, integrity, and transferability, the research protocol contained inclusion and exclusion criteria to support validity (Denzin & Lincoln, 2011; Marshall & Rossman, 2011).

Yin (2014) suggested that a qualitative research report should contain information regarding any personal and professional factors that could affect data collection, analysis, and interpretation, either negatively or positively. To participate in this study, the physician needed to have his or her medical license, be over the age of 24 and have worked at the clinic during the past year. Thomas and Magilvy (2011) emphasized that qualitative researchers steering qualitative case studies determine the transferability of studies by providing well-defined descriptions of the basis for study population selections, demographics, and the study contexts. I followed a case study protocol to ensure the dependability of the study (see Appendix B).

Radley and Chamberlain (2012) emphasized the significance of using case study protocols during the conduct of qualitative case studies in order to ensure study dependability. Analytical validity signifies how well qualitative data were collected and analyzed so that the findings are dependable, consistent, and plausible (Venkatesh et al., 2013). Rubin and Rubin (2011) suggested that the use of coding enables the researcher to

develop concepts about the interview data. The utilization of consistent coding methodologies across the study ensures study data is accurate and uniform. The use of consistent coding provides external validation of the study by third parties to demonstrate the researcher operates in a uniform manner.

Utilization of an applied triangulation approach to data collection helped support this qualitative study. The benefits of triangulation increased confidence in the data (Denzin & Lincoln, 2011). Yin (2014) asserted that triangulation reveals unique findings and creates groundbreaking ways of understanding an issue or concern. Triangulation consequently leads to a stronger grasp of the problem, gaining perception into multifaceted occurrences (Denzin & Lincoln, 2011). Houghton, Casey, Shaw, and Murphy (2013) similarly argued that using more than one method of data collection could improve triangulation within the method to enhance the findings. Data from the face-to-face interviews and the facilities policies aided in the triangulation of this data for analysis. To strengthen the findings from the data, reflection and discussion, along with triangulation, help achieve validity in a study (Pringle, Drummond, McLafferty, & Hendry, 2011).

Marshall and Rossman (2011) indicated that member checking is a process in which investigators offer study participants with particular data products and draft findings and conclusions and ask the participants to comment on the accuracy of the materials provided. Before leaving the interview session, the participant validated the transcription of interview notes for accuracy, to prevent bias (Whiteley, 2012).

Comparing the evidence from the data gathered with existing literature in the data

analysis phase aided in validation and delineated contributions within the scope and limitations of this research.

Rubin and Rubin (2012) maintained that the quality of the sample is more important than the sample size in qualitative research. O'Reilly and Parker (2013) suggested that the sample size be strong or sufficient to achieve satisfaction from the interviews. Saturation occurs when new interviews fail to offer fresh or new information. Francis et al. (2010) explained that in their 10+3 rule theory for saturation measurement, interviews must continue pending a period when three interviews fail to offer fresh or new information. A sample size of four participants is sufficient to achieve data saturation. Following the direction of Francis et al. allowed me to select my initial participants and add additional contributors if needed until no new information or themes emerged from the data.

Within the bounds of quantitative research, investigators generalize their findings from a sample to the population. Conversely, qualitative researchers employ transferability by providing an in-depth analysis of decisions the researcher made in conducting their study, such as by doing a thorough job of describing the research context and the assumptions that were central to the research (Yin, 2012). From a qualitative perspective, transferability is primarily the responsibility of the one doing the generalizing (Guba & Lincoln, 1994). Inherent in the research was an opportunity to understand a shared business problem. Investigators could share, or transfer, the information to advance further research.

Transition and Summary

The purpose of this qualitative, single-site case study was to explore the barriers encountered by physicians while implementing telemedicine in their clinical settings. Data collected using semistructured interviews of four medical professionals, or physicians provided an in-depth account of how they have successfully adopted telemedicine in their organization. The participants constituted a purposeful sample of health care practitioners. Protecting the participant's confidentiality is of utmost importance. Steps taken included presenting the data in a summarized manner to help guard each participant's identity. My intention was not to share the raw data with any individual, agent, or external entity. I included codes and themes generated from the data in the appendices. Section 3 shows the outcome of the findings and recommendations for future advancement of telemedicine in rural areas.

Section 3: Application to Professional Practice and Implications for Change

The purpose of this qualitative case study was to explore the barriers encountered by physicians in telemedicine implementation. The findings of this study came from data analysis obtained from interviewing physicians in a clinical setting, observations during the interview, and document review. This section addresses the study application to telemedicine professional practice and implications for social change. The recommendations might have the potential to provide the groundwork for future research that will improve the understanding of the challenges encountered by physicians in telemedicine implementation in clinical settings.

Overview of the Study

I conducted a qualitative case study to identify the barriers physicians encountered in telemedicine implementation in Ohio. The overarching research question was the following: What strategies do physicians use to implement telemedicine in rural areas? Based on the facts collected, evaluated, and construed, physicians encountered different barriers while implementing telemedicine in their clinical settings. Themes identified comprised (a) application use, (b) application platform and equipment support networking, (c) benefits to implementation, (d) barriers to implementation, (e) building relationships, (f) costs and marketing, and (g) legal.

The key barriers to telemedicine implementation were equipment malfunctioning during the process of diagnosis, Internet failure, and various costs associated with billing for the services provided. The top three challenges noted by the participants were (a) costs and marketing, (b) application platform and equipment and network support, and (c)

application usage. The majority of the physicians proposed developing a training plan that can help mitigate the risk from system crashes, Internet disruptions, and security breaches.

Presentation of the Findings

In this section, I discuss the themes that emerged from my interviews of the participants, documentation reviews, and observations related to the challenges encountered by physicians in their telemedicine implementation in the appropriate subsections. My discussion of the themes describe (a) the identification of the seven themes, (b) how the respondents answered interview questions, (c) how the data are applicable in addressing the central research questions, (d) the alignment between my findings and existing research, and (e) the choice of complex adaptive system theory as the conceptual framework for this investigation. With the use of semistructured interviews, documentation reviews, and observations, I was able to identify the various barriers encountered by physicians in telemedicine implementation.

Theme 1: Application Use

The application use theme centers on how the physician uses telemedicine in the field. Respondents provided both positive and negative aspects to the technology. Participant 1 noted the technology was useful to those who did not have wide access to direct care, but his practice did not simply focus on the rural community nor target specific demographics. Physicians or hospitals that chose to adopt telemedicine did so by developing goals to show how the technology would benefit the patients and the facility. The landscape of the use of telemedicine is expanding. Facial plastic surgery,

neuroethology, laryngology, and pediatric ENT specialists have been able to see the use of the technology increasing in use versus treatment from physicians located in a traditional brick and mortar establishment. Participant 2 suggested he would increase the use of the technology further on in his practice; however, the contributor did not elaborate as to how the technology would expand in the practice.

Participant 3 did not support the use of telepharmacy because the process of dispensing controlled substances was difficult. Participant 4, however, was optimistic that more practitioners would adopt telemedicine technologies. This participant shared an example where perhaps patients could have the opportunity to receive care for surgical procedures using a secured, network interface. Participant 4 showed that the telemedicine technology ranges from videoconferencing to cell phone technology using Skype or FaceTime applications. Of course, hospitals that adopt telemedicine have been investing in the research, development, and deployment of the technology. Cellphone and computers are the first step in applying the tools needed to connect to patients, especially in rural areas. Internet connectivity remains the immediate roadblock and concern for adopting telemedicine technology (Participant 3).

High quality and timely submissions of images is important so knowledgeable professionals can quickly assess the patient's medical condition and form a diagnosis for a treatment plan. The use of the platform helps patients connect with a service provider in the comfort of their homes. Patients have the opportunity to gain advice and clarity and build relationships with the provider even before the first in-person meeting. Patients are not restricted to their hometown, for example. Patients can seek out the most notable

surgeon or specialist while saving money. The patient population the surgeon dealt with seemed to be perceptive of the use of technology.

The surgeon's general population of patients who chose to participate in acquiring information from the use of computer applications was well informed and equipped to navigate the software. The patients seemed to prefer the first or second interaction with the physician using telemedicine rather than incur additional costs of travel. If patients reside in rural locations, another option to gain patient access is that staff could travel to the client's site and connect back into the hospital setting with the patient's images for diagnosis and treatment options. Participant 4 had patients from several cities in Ohio and Michigan, spanning remote areas throughout United States.

Group doctor's visits are also expanding where a doctor provides medical advice to patients with similar ailments over a secured network. Another trend in telemedicine is telestroke technology (Participant 3). Research results showed patients who suffered a stroke and who received timely diagnosis and treatment realized the best outcome for survival and rehabilitation (Fanale & Demaerschalk, 2012). Telestroke technology is for allowing emergency medical personnel the opportunity to upload patients vital signs and images directly to a physician's computer, perhaps located in a local emergency room, such that physicians can direct treatment at the scene and continue to assess the patient's medical condition as paramedics transport a patient to the hospital.

Telemedicine is the wave of the future to help patients, especially in rural areas, gain needed health care. Practitioners can implement the technology for a reasonable cost and save on real estate, utilities, and other related expenses. Participant 4 was excited

about the new technologies and indicated that implementing telemedicine had shown rewarding opportunities to expand business and develop good business relationships.

Theme 2: Application Platform

Participant 1 had adopted telemedicine primarily through engaging with patients through social media, although the usage was currently limited. Participant 1 accessed Skype and FaceTime technology to interact with patients in a real-time setting. The technology allowed patients living in other parts of the country who were interested in rhinoplasty surgery the opportunity to interview physicians anticipating to change appearance or correct functionality, such as a deviated septum. The technology allowed the physician to conduct two-dimensional, face-to-face interviews and provided an opportunity to address patients concerns.

Participant 2, a board-certified head and neck surgeon working in a remote location in the U.S. Midwest, used telemedicine technology to consult with potential patients for surgical readiness. The application technology employed was primarily FaceTime where referring physicians provided contact information and patients scheduled appointments and discussed medical options from a cellphone or computer. Participant 3, however, noted the organization had been developing a tele-ENT program for almost 2 years, but the technology was still in the early stages of development. Although the facility had not fully implemented telemedicine in the practice, the technology has been emerging through the use of smartphones and a software platform called Cell scope, which remotely transmits ear, nose, and throat images.

Illuminating a physician's struggle to adopt the use of software applications in the field shows the downside of the technology. Participant 1 discussed technical difficulties when adopting telemedicine technology. This participant revealed routine software issues. These issues involved the Internet provider's inability to maintain service or insufficient computer memory, the latter of which made downloading software applications difficult. Participant 1 contracted to a local outside IT group to monitor, upgrade, and resolve computer network issues specific to his practice. However, the application was not one that was dedicated to telemedicine. Therefore, the problem created a potential communication barrier with patients (Participant 4).

Access is only as good as the extent to which the patient has it. Internet connections could appear slow, unavailable, or not connected because of power outages or Internet supplier difficulties. Although a video image is a useful tool, face-to-face communications still seem the preferred interface method, especially with the aging population. Patients must adapt by understanding what other means are available, especially in a rural setting. Some possible solutions include the use of computers at libraries or educational facilities (Participant 2).

Participant 2 realized that simply using a cellular or computer device to connect with patients does not meet the true requirements of telemedicine. The true measure of adopting the technology is to ensure protection of the information using an encrypted format. Participant 2 suggested plans to investigate further inclusion of the process within the practice in the next year. The participant planned to gain information from other physicians to determine best practices of adopting the full use of the technology.

Developing a training plan can help mitigate the risk from system crashes, Internet disruptions, or security breaches. The training initiative could show steps required to prepare the organization to help prevent outages (Participant 4). Ensuring the hospital acquires reliable servers and has knowledgeable IT professionals will help maintain a smooth transition from brick and mortar to virtual communication services. The telemedicine technology becomes more reliable once technology experts can improve start-up connectivity, software, and equipment issues (Participant 3).

Theme 3: Benefits to Implementation

The benefits to implementation theme showed the participants' view illuminating the success or failure of telemedicine technology specific to the physicians' practical applications. Participants 1 and 3 purported the use of the technology could save customers in terms of time and travel expenditures. The benefit for the practitioner is that telemedicine is used for access to a wide range of potential clients located in a specific geographical location and beyond. Similarly, benefits for the use of technology also allows patients access to a wide range of physicians and less wait-time than a traditional setting (Participant 3).

The physician has the opportunity to evaluate the client's case for a potential surgical intervention. Participant 1 realized the effective use of telemedicine where a significant amount of consultations turned to surgical patients. This participant discussed the concept of auto-conversation rates where high measurements progress showing the number of consultations using telemedicine technology compared to the number of new patients. Critical procedures must remain in place to confirm a patient's identity. Using

face-to-face technology protects patients' confidentiality in accordance with HIPPA regulations.

Participant 1 noted benefits in serving rural versus urban communities, such as reaching underserved populations. Benefits to patients using telemedicine technology include cost savings associated with traveling to well-known hospitals located across the United States, such as Ohio, Florida, San Francisco, or Las Vegas. Participant 1 noted the recognition of several hospitals across the country specializing in human conditions, such as Parkinson's, urology, and heart disease, where the use of telemedicine allowed more access. This participant recognized the significant costs savings for family members by gaining valuable knowledge relative to chronic conditions using advances in technology. Gathering information at the onset of the diagnosis and evaluating the correct course of action are especially valuable.

Theme 4: Barriers to Implementation

The barriers to implementation theme centers on the obstacles the physician faced while implementing the technology notwithstanding adopting applications in a rural setting. One of the most critical barriers to adopting telemedicine was unreliable Internet connections and landlines (Participant 4). Participant 3 noted barriers to implementation included networking connectivity and system integration. Transmitting encrypted images to remote locations while still maintaining high-quality images is a major obstacle. Patients living in rural locations may need to upgrade services to acquire needed bandwidth, such as upgrading to a DSL or high-speed Internet platform (Participant 4).

Theme 5: Building Relationships

A theme emerged that showed relationships formed as physicians adopted the technology, especially for clients residing in a rural setting (Participant 4). Establishing a partnership between the doctor and a restricted community helps to ensure the relationship is a good match between the patient's goals and the physician's diagnosis and treatment plan. Physicians depend on other physicians to acquire patients through referrals. Telemedicine helped doctors reach prospective patients who live in rural and urban areas, but offered wider access with technological tools (Participant 2).

Another benefit to the platform is that patients are not restricted to acquiring treatment from practitioners in their hometown. Patients can seek out the most notable surgeon while saving money in terms of travel costs. Participant 4 had patients from several cities in Ohio and Michigan, spanning remote areas throughout United States. Participant 2 did not use the technology as a marketing tool or as a means to solicit new patients. The use of the technology simply offers a platform to allow the physician the capacity to address potential clients' questions and fears in a real-time environment, thereby helping patients feel comfortable in one's treatment plan (Participant 2).

Participant 4 shared his vision of collaborating with other practitioners who have successfully adopted telemedicine technology such that learning knowledge is acquired prior to implementation in one's practice. Benefits of gaining first-hand knowledge include having a better understanding of the decisions required. Good advice can help develop a solution to benefit the patients and the practitioner. The technology helps practitioners build relationships between patients and clients. Equally important,

however, is the building of working relationships between technology support personnel, administrators, and users. The knowledge gained from the experiences shared from other professionals who have adopted the technology can help novice specialists plan for potential disasters.

Theme 6: Costs and Marketing Strategies

Costs associated with the adoption of telemedicine technology vary depending on a small private practice versus a large hospital or group practice (Participant 2). Planned or unplanned costs incurred in the development, implementation, and use of the technology vary by the type of application used. Participant 1 did not identify any cost, billing, or licensing issues. Participant 1 noted that seemingly free implementation software applications are widely accessible through cell phones and computers already purchased, so no additional expenses to adopt the technology occurred. Participant 2 noted that the increase in institutional challenges might occur because of costs associated with telemedicine technology. Fees for encryption software, specialized equipment, and appropriate office space are significant cost considerations. Patients must also invest in costly software applications that help protect their confidentiality. Costs normally associated with encryption fees for telemedicine technology were not a problem for Participant 2. The hospital would pay any encryption fees, but his experience was limited to telephone and FaceTime applications, which do not require additional costs to the practice.

Further information delved into the participant's views as to the costs incurred for physicians to establish the technology in a start-up medical practice. Participant 1 noted

telemedicine is the wave of the future to help patients, especially in rural areas, gain needed health care. Practitioners can implement the technology for reasonable costs and save on real estate, utilities, and other related expenses. The physician has not incurred virtually no additional costs to implement the technology because the platforms used are necessary to conduct business, so the surgeon did not have to acquire additional equipment, software, or tools (Participant 1). Participant 1, however, cautioned for an increase in costs in rural areas, especially in medical disciplines such as internal medicine or endocrinologist, for practitioners who perhaps have a limited specialty. Participant 3 could not account for equipment costs. However, this participant estimates a range from \$10,000 to \$15,000 to start depending on the levels of equipment selected, such as new computer equipment, standard versus high-definition equipment or ENT scopes used for optics (Participant 3).

Participant 4 noted the importance of funding opportunities to help defray potential equipment and implementation costs, such as marketing strategies to bring awareness to the community. Building community support is central to a successful endeavor. Participant 3 has not implemented marketing strategies, but does support the premise of displaying high quality, high-standard technology to attract potential patients. Word-of-mouth and direct mail communications are still viable means to promote the use of interactive tools. Participant 3 had not invested in any marketing strategies to promote the use of the technology because the patients primarily come from other physicians or some patients have located the participant by conducting an Internet search.

How government and private insurance companies processes charges derived from telemedicine is unclear. Assuming the process should begin with governing agencies, developing appropriate codes so hospital personal can bill for charges stemmed from telemedicine diagnosis and treatment (Participant 3). Participant 1 does not charge patients for his initial consultation-using telemedicine, but realizes the potential revenue should a Medicare or Medicaid code be developed to allow for reimbursement under the current government structure. Participant 2 suggested the consultation is a no-cost option to the patient and did not have any experience in billing through Medicare, Medicare, or insurance companies for the service. Billing of Medicare, Medicaid, and insurance companies fell outside of the goals and scope of my research study. Participant 1 shared the process of initiating charges for services, which occur at the time of the in-person evaluation leading through all of the steps to surgery and recovery. The participant does not charge clients for telemedicine consultations and thus did not comment on any billing process for telemedicine services.

Human resources costs also could appear as a factor. Participant 3 noted an increase in costs for activities in recruiting professionals who are responsible for the real-time interaction with patients. Hiring professionals, such as an otolaryngologist, is costly in terms of recruiting, salary, and benefits. Participant 1 noted the potential for an increase in costs in rural areas, especially in medical disciplines such as internal medicine or endocrinologist who perhaps do not have a limited specialty.

Additional costs to the hospital include equipment and IT support. These planned expenses must appear in the project costs to determine the feasibility of implementing the

technology. Hospital administrators should look into the possibility of retaining operational professionals for a year or two to minimize turnovers costs (Participant 3). Hospital personnel should plan for the incremental costs to the operation and perform cost and benefit analysis so the professional is still retained a year or two after implementation of the technology in an effort to minimize turnover costs (Participant 3).

Final comments from Participant 3 included the perspective that compiling data to analyze results is important. Administrators could perform a statistical analysis on data obtained comparing results from a traditional setting, where patients visit a hospital or doctor's office versus data received from the use of telemedicine technology. The analysis will allow physicians and hospital administrators the ability to project the best strategy to assess a patient's condition and provide the optimal course of action by comparing the two forms of data acquisition strategies.

Theme 7: Legal Implications

Protection of participant's rights is central to the legal ramifications in this theme. Licensing issues and Medicare and Medicaid billing practices are factors to consider when embarking on implementing telemedicine. Health care administrators must consider all factors relating to legal liability concerns. Several promising bills in Congress exist to help regulate provider reimbursement strategies, malpractice, and multi-state licensures for those infiltrating telemedicine (American Telemedicine Association, 2012). Participant 4 has not experienced billing or reimbursement issues because Medicaid, Medicare, or private health insurance does not provide reimbursement because his specialty is cosmetic; whereas, reconstructive and restorative procedures only carry

limited health care coverage in cases deemed medically necessary rather than elective procedure.

Legally, a physician has a duty to ensure patient safety. Offering advice or treatment options is a dynamic endeavor, which requires acute follow-up care. The use of telemedicine technology will aid a physician in accessing patients. Physicians must carefully portray information as opinions and not provide specific medical advice until a thorough examination of the patient occurs (Participant 1). Physicians are liable for any advice he or she would provide to a patient and must protect a patient's rights in any type of environment.

The use of telemedicine technology does not inherently exhume additional terms of liability (Participant 2). Potential legal issues could arise with the use of the technology in some cases. Participant 1 had some exposure to other physicians working in larger institutions where legal challenges exist. Institutional setbacks occurred where communication between a physician and a patient was not well documented when conducted on the phone or by teleprompter consultations.

Militating against the legal risks associated with disseminating information on social media is critical. Participant 1 did not have protected software applications specific to medical devices or software applications, which would require executing legal documents. Employees administer and control legal documents and service agreements between Internet providers and the hospital. Physicians are not responsible for Internet service contracts (Participant 2). The lack of legal documents, however, illuminated the

physician's need to consider adopting service level agreements in the future granting access to patients accessing copyrighted telemedicine technology.

The categorization strategies aimed at mitigating barriers encountered in adopting telemedicine technology in rural markets was consistent with the study findings and the literature review. Telemedicine is a pivotal role in generating cost savings for hospitals and clinics (Grawboski & O'Malley, 2014), and cost savings measures are geared to encourage health care workers to think of innovative programs that take rural inhabitants into consideration when establishing their practices (Conger & Plager, 2012). These findings relates back to the conceptual framework which explains the importance of using tools such as telemedicine in reducing barriers to health care access.

Applications to Professional Practice

The application of this study to professional practice is that physicians will use the facts in these outcomes to appreciate the various barriers encountered by the physicians who have implemented telemedicine in their clinical settings, and prepare them for what to expect, before venturing to Telemedicine application. Using appropriate risk mitigation strategies, physicians can effectively plan for the best ways to overcome the impending challenges that lies ahead of them while planning for telemedicine introduction in their hospitals or clinical practices. Physicians can use the discoveries in this study to implement appropriate strategies with respect to cost and benefits in telemedicine implementation.

Telemedicine is the trend of the future to help patient's, especially in rural areas, gain needed health care access. From the knowledge gained in this study, practitioners

will know the best way to implement the technology at a reasonable cost, and make many considerable savings on other associated expenses. Physicians can discover vital approaches for a range of possibilities in telemedicine implementation. This exploration was crucial in understanding the challenges to telemedicine implementation before the adoption. I established confirmation that aligned with other literature showing the benefits of using telemedicine technology that brings the benefits of accessibility, flexibility, collaboration between physicians and patients, and reflectiveness as a resourceful means of health care delivery (Zanaboni, Knarvik, & Wootton, 2014). Physicians who face limited financial resources, and would like to adopt telemedicine in their clinical settings can use the findings in this study as a roadmap in planning their implementation strategies. Last but not the least, venture capitalists, practitioners and stakeholders may find this study useful through assessing the challenges, and benefits of their capital investment versus health care savings and accessibility.

Implications for Social Change

The future of medicine to reach out to rural inhabitants and countless number of people in telemedicine is important to realize. Telehealth and its variants such as teleradiology, telerehabilitation, telepharmacy to mention a few, has the ability to shorten the distance between physicians and patients, enable data about patients shared among physicians on a timely basis, bring an early diagnosis of disease, and prevent hazardous health challenges that patients may develop, especially in rural areas (Fanale & Demaerschalk, 2012).

Through this investigation, aspiring physicians could plan to integrate telemedicine into their practices by constructively evaluating the barriers those physicians who have already implemented telemedicine in their clinical settings. Physicians could also reduce their telemedicine adoption through learning from other practitioners who have successfully adopted the technology, to reduce the problems they might encounter in their endeavor to follow a similar path.

Telemedicine adoption brings about improvement in health care accessibility because patients can communicate directly with physicians at the comfort of their homes on a timely basis. Through this medium, trust can develop between the physicians and members of their family and the physician which has the tendency to improve overall health care provision to patients, especially those who live in rural and remote locations. The wide disparity between the demand and supply of physicians in the rural areas could receive a high reduction because of telemedicine implementation. In addition, patients will not have to travel far distances to seek the medical care they need. All of these improvements will lead to an improved health care of the general population, reduced cost, and low mortality rate (Arora et al., 2011).

Recommendations for Action

Many barriers exist in implementing telemedicine. These barriers include application usage, cost and marketing, and legal matters, to mention a few. Few investigations have been carried out in evaluating the costs of setting up telemedicine practices and measuring the economic benefits derived from such implementation. Other

researchers must investigate the perception of physicians in telemedicine adoption to their clinical or hospital settings.

This research scope is applicable to all aspects of telemedicine such as teleradiology, telepathology, telepharmacy, telehomecare, or any form of telehealth. Physicians, health care practitioners, venture capitalists, and stakeholders must understand the barriers to telemedicine implementation. Thorough comprehension of the various barriers that other who have implemented telemedicine in their clinical settings would be vital before applying any cost metrics geared at calculating value or medical benefits of the implementation. I will contact the American Telemedicine Association, and share the findings of this study with physicians, health care practitioners, government agencies, scholars, stakeholders, venture capitalist, and other stakeholders with interest in health care accessibility, especially in the rural communities. The results of the study encapsulated are shown in Figure 1.

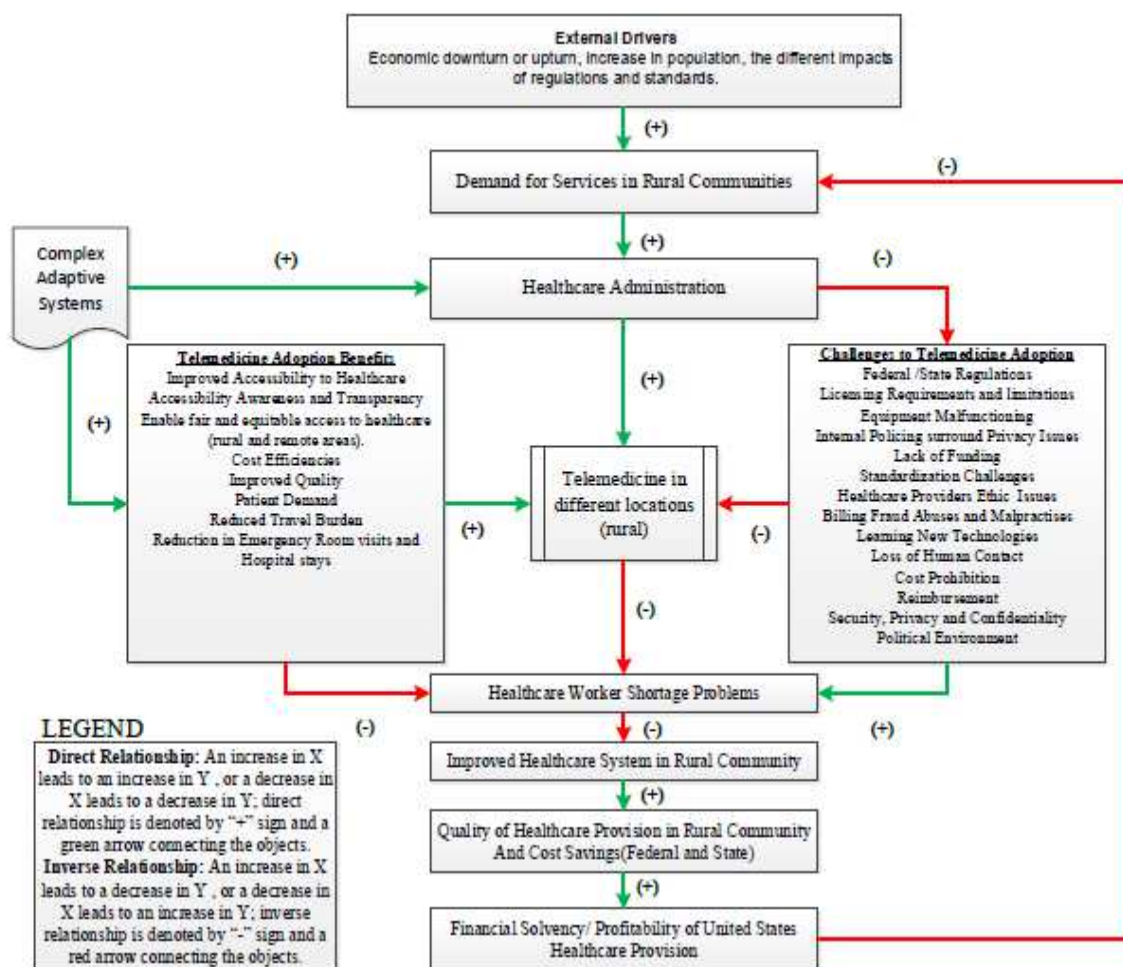


Figure 1. The bidirectional impact model for telemedicine services in rural locations. Obikunle, O., Scott, J., and Gossett, J. (2014). Adapted from "Learning in and About Complex Systems," by J. Sterman, 1994, *System Dynamics Review*, 10(2-3), pp. 291-329.

The summary of this study may further contribute to discussions among physicians, philanthropists, and international agencies such as World Health Organization, who could use the information in improving global health, especially in the rural and remote areas of the World, where health care accessibility poses major problems. The incidences of diseases and health care crises could receive alleviation with the introduction of telemedicine to a wider audience of physicians in their hospitals,

clinics, and private offices. When such changes take place, overall health care improves across the globe.

I will use different dissemination channels to increase the visibility of this study to a wider population of physicians. Through the publication of my approved research in the ProQuest database, where students, scholars, physicians, venture capitalists, government agencies, and other stakeholders who are interested in telemedicine implementation can have direct access to the content. Moreover, the summary of study findings will receive dissemination to all the physicians who participated in the research. Finally, an article will be published centered on the research findings in a journal (peer-reviewed), and would seek to discuss the research content at conferences such as the American Telemedicine Association, and other health care related workshops or seminars in the United States or anywhere around the world.

Recommendations for Further Research

The implications and discussions narrated in this study provide the groundwork for futures research that will improve understanding of telemedicine. Researchers can use a qualitative case study approach to conduct an explorative study with physicians in their clinical settings. Future research needs to focus on the comparison of two or three clinical settings within two or more locations within the same state or different states. In addition, other studies might involve interviewing physicians that practice telemedicine in different locations, to solicit the challenges they have encountered during the course of their telemedicine implementation.

Limitations exist in this study regarding the number of participants and the lack of physicians' knowledge of equipment used and costs involved in setting up their practices. Still, these limitations do not lessen the contributions of this investigation to social change. Future exploration would determine how practitioners can transfer what they have learned to other establishments like hospitals and governmental health care institutions. The focus of my enquiry was on the barriers to telemedicine implementation by physicians. Future scholars can focus their study in looking at the relationship between variables such as cost involved in setting up a telemedicine practice, and the benefits derived by physicians.

Other future researchers might focus on the various economic benefits of telemedicine implementation that is related to a particular aspect of telemedicine like tele radiology, telepharmacy, telerehabilitation, or telestroke. The possibility exists of focusing a future study on addressing telemedicine implementation as a vehicle to encourage more physicians to focus on rural inhabitants. In addition, future studies may be geared towards understanding various telemedicine equipment, and the cost of setting up a telemedicine practice, coupled with detailed information of the advanced equipment used in various hospitals or clinical settings across different geographical locations. Last but not the least, there should be a quantitative investigation that examines how the training a physician obtains affects willingness to adopt telemedicine, while using other dependent variables such as age of the physician, cost of set up, and other related factors as measures of telemedicine adoption.

Reflections

As a result of my experience with this study, I have discovered the various challenges physicians encountered in telemedicine implementation. The theory of complex adaptive systems, which included the interactions between various entities and their subsystems was both interesting to learn about and applicable to the study. Therefore, the work on the study was interesting in noting the various interrelationships between physicians and patients in the clinical subsystems that operate within the whole system of the health care environment to provide services to individuals who live in rural settings. Physicians acknowledged that they cannot provide the exact cost involved in their telemedicine set up, rather they were just providing guess estimates that may not really reveal true set up costs. In addition, the physicians interviewed were not as knowledgeable as they wanted to be about modern telemedicine equipment that they could recommend to other practitioners embarking on telemedicine implementation.

The development of themes, coding, and interpretation turned out to be more difficult task than I originally planned, which was why it took longer than expected in my timeframe to understand the software tool used in developing the themes. An explorative case study of this nature where physicians gave interviews in their clinical settings enabled me to obtain a firsthand knowledge of the various challenges explained, along with reasonable observations of what went on in their work environment. The face-to-face interviews provided a more detailed insight to understand the expressions and nonverbal communication of the physicians as opposed to either sending them a questionnaire or talking to them by way of telephone.

Carrying out a case study interview met my goal of seeing what goes on in the physician settings and improved my confidence in addressing physicians practicing telemedicine. I was able to obtain sincere and unbiased responses from the participants for all the questions that were asked them. In addition, the documents provided by the participants and my personal observations validated business literature that mentioned that some challenges were involved in the telemedicine set up. At the completion of my interviews, transcripts of the interviews were made available to the participants to ensure that all of their responses had been recorded accurately without any omission or misrepresentation of facts or opinion. The findings from this study showed that telemedicine adoption is feasible for aspiring physicians who are considering entering into this field. Planners for a project like this need to address fears that physicians might have that their set up costs may be too exorbitant or unavoidable to make a project like this feasible for them.

Summary and Study Conclusions

I have provided data sources and information that established that telemedicine is an emerging field that improves accessibility to health care, reduces the transportation barriers that usually prevents rural inhabitants from seeking appropriate treatment, and identified how the understanding of the barriers in telemedicine implementation can assist new physicians to adopt the technology in their clinical settings. The initial phase in telemedicine implementation was to understand the barriers that physicians who have implemented this technology encountered in their clinical settings. When physicians have an understanding of the barriers they will face, they will have a balanced view of what

they need to avoid when venturing into this field at the onset. I have identified seven themes that have direct relationships with telemedicine implementation (a) application use, (b) application platform, (c) benefits to implementation, (d) barriers to implementation, (e) building relationships, (f) costs and marketing, and (g) legal.

The complex adaptive systems theory proposed for this study was highly applicable to the understanding of the barriers encountered by physicians in their quest for telemedicine implementation. Complex adaptive systems include a set of unique agents with rules that govern the behavior within a multifaceted, structured system that produce an evolving pattern for the whole system. Consistent with the findings of the study, health care systems are highly complex, and they involve many interconnections between physicians, patients, stakeholders, and other functionaries that interplay within the various subsystems to form a whole system. Technological tools such as telemedicine deliver electronic access to a patient's medical record or physician, which helps provide patients, especially people who reside in rural areas, with timely and affordable care.

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Appendix A: Sample Letter of Cooperation

Date _____

Dear _____:

My name is Olatunji Obikunle and I am a Doctor of Business Administration (DBA) candidate at Walden University. I am conducting a doctoral study project to examine the barriers encountered by physicians while implementing telemedicine. My study is intended to explore the following question: what are the major barriers to implementing effective telemedicine practices in rural areas, how could these barriers be addressed to improve productivity and profitability for health practices, and how could the social benefits of an effective telemedicine practice be used to attract more practitioners to rural areas.

Based on your experiences with the administration, provision, or regulation of practicing medicine in the United States, I would like to interview you in order to gather information about the challenges you encountered while implementing telemedicine in your practice.

The interview will require one hour of your time. I will conduct this interview in-person at a location that is most convenient for you during your lunch period so that we can get away from the clinic. I am also inviting you to share with me any e-mail messages, administrative documents, reports, and/or memoranda that you feel may provide additional information about current limitations in telemedicine implementation. However, I note that the provision of any documents on your part is voluntary. If you do

not wish to provide documents, I am still asking that you participate in the study as an interviewee.

Your participation in my study will be instrumental in ensuring that I gather data from a range of Physicians in the United States who have direct experience with telemedicine implementation in their practice. If you decide to participate in my study, I will give you an informed consent form for your review and signature. This informed consent form provides background information on the study and outlines your rights during the interview process. Please let me know if you have any questions or require additional information.

I thank you in advance for your consideration and your support of my study, which is a topic of national significance.

Sincerely,

Olatunji Obikunle

Walden University policy on electronic signatures: An electronic signature is just as valid as a written signature as long as both parties have agreed to conduct the transaction electronically. Electronic signatures are regulated by the Uniform Electronic Transactions Act. Electronic signatures are only valid when the signer is either (a) the sender of the email, or (b) copied on the email containing the signed document. Legally an "electronic signature" could be the person's typed name, their email address, or any other identifying marker. Walden University staffs verify any electronic signatures that do not originate from a password-protected source (i.e., an email address officially on file with Walden).

Appendix B: Interview Protocol

1. Attend the general staff meetings.
2. At the staff meeting, describe the study, (use the script Appendix C).
3. Solicit volunteer participants for the study and set up interview date and time.
4. Create a folder for each participant (folder to include informed consent, copy of interview questions).
5. Arrive at the designated location ten minutes ahead of interview schedule time.
6. Review the study with participant,
7. Provide informed consent (answer any questions the participant may have)
8. Receive back the signed informed consent
9. Assign a number to the participant
10. Provide privacy and comfort of the participant
11. Reinforce:
 - That participant can stop at any time,
 - Information is confidential
 - If a participant does not understand the question, the participant can ask for clarification
12. Take notes on the interview template interview
13. Transcribe notes
14. Participants to sign notes for validation after transcription
15. Information to go into assigned folder
16. Information entered in the Atlas.ti.7 software program

Appendix C: Script

Hello, my name is Ola Obikunle. I am a doctoral student at Walden University in the Business Administration program with concentration on Healthcare Administration. I am presently preparing my doctoral study that is focusing on a qualitative study involving the use of telemedicine to explore themes for providing medical services successfully to residents who live in rural locations.

The purpose of this qualitative, single site study is to explore the strategies practitioners can use with the technological advantages of telemedicine in rural markets (Burns et al., 2012; Feldstein, 2012). A qualitative, exploratory, single site study is best suited for discovering how this innovative field could help physicians expand health care access to the rural population. A purposeful sample of four physicians who use telemedicine, from a clinic in Ohio will participate in semistructured interviews in rural locations in the U.S. Midwest. I will use follow-up interviews and member checking to ensure that I reach data saturation.

These findings might provide opportunities for health care practitioners, venture capitalists, community leaders, and government officials to evaluate and initiate cost effective solutions to combat the challenges faced in implementing telemedicine. The increase in the number of physicians who use this technology could improve the business environment, thereby improving patient's health. The findings from this study might contribute to social change by increasing health care access to patients living in rural locations.

Your help is needed. In this doctoral study, you will provide the necessary data to help create social change in the long-term environment. The data will support program development that would reduce the financial cost to facilities, improve consistent assignments for quality life measures for patients, and as well improve satisfaction for staff and patients. These outcomes support the traditional bottom line of long-term facilities promoting a positive image of quality delivery of care by compassionate individuals.

- Sign and date a consent form.
- Complete a face-to-face interview with open-ended, semistructured questions for 30 minutes
- Validate the data that obtained during the face-to-face interview.

Note: No physical risk involved in the study to the participants.

Review Confidentiality

Confidentiality of the participants will be maintained during the study or any result published. Information will be in a secure fireproof safe and in a password-protected laptop. The researcher will be the only person that will access to the information. Information collected will be stored for 5 years, and then destroyed by shredding or deleting from the computer and cloud system. My central research question is what strategies physicians use to implement telemedicine in rural areas.

If you have any questions or need more details, I am happy to answer any questions you may have. My cell number is XXX-XXX-XXXX