

PERCEPTION AND UTILIZATION OF TELEHEALTH SERVICES AMONG
HOME HEALTH CARE AGENCIES: A NATIONAL SURVEY

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A DISSERTATION

in

Social Welfare

Presented to the Faculties of the University of Pennsylvania

in

Partial Fulfillment of the Requirements for the

Degree of Doctor of Philosophy

2017

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DEDICATION

I would like to first praise God for his faithfulness and love, not just for the past five years of the doctoral program but also for my entire life. Through ups and downs, God is always with me and gives me strength to pass them in peace and joy (*“Those who hope in the LORD will renew their strength. They will soar on wings like eagles; they will run and not grow weary, they will walk and not be faint” -Isaiah 40:31-*). I would like to thank my dad (Jeongseok Kim), mom (Soonae Kim) and younger brother (Yohan Kim) for their loving support and prayer! Love you all! Additionally, I would like to thank my deceased grandparents (JaeSu Kim, Yangsoon Seol & Jeomseok Kim) and also maternal grandmother (Eunja Jeong) for their sacrificial love and continuous support! I would like to especially dedicate this work to my grandfather, Jeomseok Kim, who passed away in 2015 and wanted to attend my graduation. His faith in God and belief in honest work over shrewd success inspired my life. Without my family’s prayers and support, living and studying away from my home would have been much harder. Life is not without much challenges, but, I am thankful that God has surrounded me with people to accompany this journey.

As I continue with my career and life, I prayerfully hold onto this verse from the bible: “Trust in the LORD with all your heart and lean not on your own understanding; in all your ways acknowledge him, and he will make your paths straight.” – Proverbs 3:5-6 -

ACKNOWLEDGMENT

I would like to first thank my advisor and dissertation chair, Dr. Gellis for his genuine advice and patient support for the past five years! I would like to also thank in advance for his mentorship and our collaborative work in the upcoming years. I would like to thank Dr. Kenaley and Dr. Bradway for their dedicated support as dissertation committee. Special thanks for Dr. Iversen, Dr. Bourjolly, and Dr. Solomon for their continuous encouragement and support. Additionally, I would like to thank dean, faculty and administrative staff at the School of Social Policy & Practice. I sincerely appreciate the mental support from my fellow doctoral program friends who helped me stay on track! I would like to thank Richard Brennan and Val Halamandaris from the National Association for Home Care & Hospice (NAHC) for their collaboration in this national survey. Additionally, I would like to thank Pennsylvania Homecare Association for their collaboration in the pilot study that was crucial for developing this national study. Last but not least, I would like to thank all of my study participants who are home health care staff across the nation. Without their participation, this study would not have been possible.

ABSTRACT

PERCEPTION AND UTILIZATION OF TELEHEALTH SERVICES AMONG HOME HEALTH CARE AGENCIES: A NATIONAL SURVEY

Eun hae Kim

Despite the widely known effectiveness of telehealth services in screening and treating both chronic disease and depression in older adults, their adoption among home health care agencies has been slow. Furthermore, there is a lack of empirical research on telehealth use, barriers, and facilitators of adoption in the home health sector. For these reasons, this study examined home health care staff perceptions and use of telehealth for chronic disease and depression care among older patients. Five hundred and sixteen staff from member home health care agencies of the National Association for Homecare and Hospice (NAHC) completed an online survey. The national survey comprised of 33 questions and was informed by the Unified Theory of Acceptance and Use of Technology Model (Venkatesh et al., 2003) and Bobni' Innovation Culture paradigm. Twenty staff also participated in a 45-minute qualitative telephone interview. The qualitative interview questions focused on telehealth experience and perceived barriers and facilitators to telehealth adoption. Among HHC agencies that reported using telehealth, telephone (63%) and remote-monitoring devices (56%) were the most utilized telehealth technology. Telehealth services included monitoring of health services (64%), chronic disease management (58%), and patient health education (43%). Telehealth was the least used for depression counseling (15%). Overall, there was a positive perception towards

telehealth for patient care. However, telehealth was perceived more positively for chronic disease management (90.7%) than for depression care (53%). A majority (74%) perceived themselves as having the knowledge necessary to use telehealth for chronically ill patients while only 32% did for depressed patients. Results suggest that although there is a positive perception towards telehealth for patient care, there are other factors (e.g., lack of resources and reimbursement, training and buy-in from staff or patients) that affect HHC agencies' adoption and use of telehealth. Therefore, further education is needed to support telehealth use for depression care. Additionally, there needs to be a reimbursement for telehealth visits by HHC agencies, as well as policies and regulations that ensure the quality of care provided by telehealth services. Future studies may consider comparing existing telehealth programs and identifying policies and regulations that are supportive of such programs.

Keywords: telehealth, home health care, chronic disease management, depression care, geriatric care, unified theory of acceptance and use of technology, survey

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CHAPTER 1: PROBLEM STATEMENT & SIGNIFICANCE

Telehealth services are an innovative, potentially effective, and low-cost intervention. Telehealth increases medication adherence and quality of life and supports independent living for older adult patients (Finkelstein et al., 2006; Onor et al., 2008). For instance, LaFrambois et al. (2003) have shown improvements in depression and functioning among chronically ill patients utilizing an in-home messaging device. Despite these potential benefits of telehealth services and the rapid advancement of the telehealth industry, its implementation has not kept up with home health care (HHC) agencies (Bensink et al., 2006; Whitten et al., 2011). Only 21% of HHC agencies offer telehealth services for chronic disease management, and at this point, there is no data on HHC agencies use of telehealth for depression care.

This study explores how HHC agencies use and perceive telehealth in patient care. This is important as HHC agencies could greatly benefit from utilizing telehealth for chronic disease and comorbid depression care, both public health issues among older adult patients. Although people of all ages are vulnerable, the risk of chronic disease is greatest among older adults, aged 65 and older. Approximately 91% of older adults live with one chronic disease while 73% live with at least two (CMS, 2012). These illnesses have negative consequences, such as pain, disability, home-boundness, loss of independence, and death (CDC, 2009). Additionally, studies have shown chronic diseases to be associated with depression in older adults (Fiest et al., 2011; Gellis, 2009). A 12-month major depressive disorder prevalence rate, ranging from 6.4% to 16%, among home health care patients has been reported (Gellis et al., 2010; Pickett et al., 2012;

Wilson et al., 2007). Depressed older adults suffer from a greater functional disability and an increased likelihood of falls and hospitalization when compared to those without depression (Byers et al., 2008; Gellis, 2009). Telehealth is an intervention that could be used by HHC agencies to address both depression and chronic disease in older adult patients.

In addition to its health benefits, telehealth could be helpful for addressing the lack of a labor force able to meet the rapidly increasing needs for services among home health patients as the population ages and many more will become homebound. In the home health arena, there is approximately one nurse for every 20 older adult patients and even fewer physicians (“Basic Statistics about Home Care”, 2008). With the rapid increase in the older adult population in the U.S., more will need services from HHC agencies for chronic diseases and depression. As baby boomers age and the average life expectancy improves, 72.1 million or more than one in five Americans are predicted to become older adults by 2030 (Administration on Aging, 2009). In addition, only 4% of older adults live in long-term care facilities. Older adults tend to desire to age-in-place in their homes.

HHC agencies are perfectly positioned to provide services for both depressed and chronically ill older adults aging in their homes and to utilize telehealth technology in providing these services. However, it is unclear why telehealth has not been readily adopted and utilized among HHC agencies yet. The proposed study is designed to address this gap, that is, to examine the barriers to and facilitators of telehealth adoption among those agencies. This study particularly aims to explore the adoption and perception at the provider level, an underexplored but crucial area. Direct service nurse providers in HHC

agencies have been found to be the most significant initial gatekeepers that could affect telehealth services use (Whitten & Mackert, 2005). Therefore, this study explores how HHC staff perceive and utilize telehealth services, using a nationwide sample.

CHAPTER 2: REVIEW OF LITERATURE

2.1 Home Health Care Agency's Roles in Older Adult Care

Home health care agencies are appropriate places to address both chronic disease and depression, prominent public health issues among older adult patients. Out of approximately 1.46 million home health patients, more than one million (68.7%) are older adults with an average of 4.2 diagnoses (Caffrey et al., 2011). Chronic diseases among these patients have detrimental consequences. They come with high health care costs, consuming approximately 66% of the total health care budget (CMS, 2012). Additionally, Medicare spending is predicted to increase significantly from \$555 billion (2011) to \$903 billion (2020), as more adults age and are diagnosed with chronic diseases (CMS, 2012). Older adult patients with chronic diseases also face significant burdens beyond those of finances and disability. For example, prolonged medical disabilities tend to deteriorate their quality of life by diminishing their ability to execute essential activities of daily living, both at home and in the community (CMS, 2012).

Depression is a prominent comorbid condition among chronically ill older adult patients (Fiest et al., 2011; Gellis et al., 2009; Katon, 2011). Diagnosable depression in older adults residing within the community is 1% to 5%; however, the rate rises to 6.4% to 16% among the home health care patients (SAMHSA, 2011). In fact, depression is one of the most prevalent mental illnesses in the home health context (Gellis et al., 2007; Gellis & Kenaley, 2008). Up to 25% of cancer patients and 60% of Parkinson's disease patients suffer from depression (CMS, 2012). Untreated depression increases the chance of developing chronic diseases and deters recovery. Notably, older adults with chronic

disease and depression may further restrict their social involvement by reducing their interests in pleasurable and meaningful activities (Steptoe et al., 2013). Chronically ill older adults tend to have limited mobility which results in the loss of their ability to care for themselves, and leading to a lack of independence (Ozturk et al., 2011).

In addition to high medical costs, decreased quality of life and functionality, unidentified and untreated depression has detrimental consequences for older adults, especially in terms of mortality (Gellis, 2009; Gellis et al., 2010). In the U.S., depression is the cause of more than two-thirds of reported suicides annually, and up to two-thirds of older adults' suicides are attributable to untreated or misdiagnosed depression (CDC, 2008). In fact, depression is the most significant cause of suicide for older adults (Conwell et al., 2011; NIMH, 2011). In 2011, the suicide rate among older adults was more than 50% higher than the rate for the general population (General population: 12.3 deaths per 100,000; Older adults: 18.6 per 100, 000) (CDC, 2011).

However, depression is a treatable and preventable illness with prompt and ongoing care. Studies have shown that once diagnosed, approximately 80% of the depressed patients can be treated (NAMI, 2009). Depression is treatable by antidepressant medications or psychotherapy. A meta-analysis of 23 randomized controlled trials revealed psychosocial interventions, such as Cognitive Behavioral Therapy (CBT), to be effective in improving depression (Gould et al., 2012). Antidepressants, such as selective serotonin reuptake inhibitor (SSRI) medications, are safe and effective in treating depressed older adults (Barkin et al., 2000; Chemali et al., 2009; Salzman et al., 2002). However, medication non-adherence among older adult patients is a notable concern (Grenard et al., 2011). Among Medicare beneficiaries with

chronic obstructive pulmonary disease (COPD) using maintenance medication, depressed patients have a lower medication adherence than not depressed patients (Qian et al., 2013).

With the rapid increase in the older adult population in the U.S., more older adults will need services from home health care agencies for chronic diseases and depression. As baby boomers age and the average life expectancy improve, 72.1 million or more than one in five Americans are predicted to become older adults by 2030 (Administration on Aging, 2009). In addition, only 4% of older persons live in long-term care facilities. Older adults tend to desire to age-in-place in their homes. The federal and state policy developments have been increasingly supportive of home-based care (Harris-Kojetin et al., 2013; Wiener, 2013). Telehealth services that address both physical and mental health needs are an innovative, effective, and low-cost intervention for home health care agencies.

2.2 Telehealth as an Intervention

Telehealth services refer to the provision of care from a distance, using electronic mediums, such as a telephone, monitoring devices and the internet (Jennett et al., 2003; McLean et al., 2010). For the purpose of this study, telehealth services include 1) caregiver health education & consultation, 2) case management, 3) chronic disease management, 4) depression counseling, 5) monitoring of health status, 6) monitoring of prescribed medication adherence, 7) patient health education and consultation, 8) rehabilitation, and 9) supportive counseling delivered by telehealth technologies. Telehealth technologies considered in this study are 1) automatic remote patient

monitoring (electronic devices to transmit health information), 2) manual remote patient monitoring, 3) store & forward technologies (electronic devices to transmit pre-recorded images and videos), 4) telephone, 5) video-conferencing (live, interactive video consultation), and 6) web-based interventions.

Telehealth has been commonly used since the 1990s (Bashshur, 1980; Covery, 1978; Cunningham, 1978; Dwyer, 1973). For instance, individuals in underserved areas such as sailors at sea were treated through video-conferencing (Late, 1998; Noel & Vogel, 2000). Even though the early programs in the U.S. were more visible in the military and space science domains, telehealth has been also utilized in the field of health care (Bashshur, 1980). It has been utilized in psychiatry (Covey, 1975), pediatrics (Cunningham, 1978) and communication, for example, between a teaching hospital and a medical center at the airport (Dwyer, 1973). Indeed, the majority of telehealth services has been provided by nurses (50%), followed by physicians (10%) and mental health professionals (8%) (Bensink et al., 2006).

With the advancement of more sophisticated technology, however, it is only in the recent decade that research and interest in telehealth have significantly increased. Telehealth has been increasingly used in screening and treating both physical and mental health conditions. The U.K.'s "*3 Million Lives*" and the initiatives of the U.S. Veterans Administration illustrate the trend among developed countries to utilize telehealth (Brewster et al., 2013; Department of Health, 2011; U.S. Department of Veterans Affairs, 2011). The campaign, "*3 Million Lives*" was launched with support from the U.K. Department of Health. It supports the telehealth industry and encourages telehealth adoption among health care providers. Its work includes providing online resources and

presentations to the health care professionals and advocating strategic and service improvements (3millionlives.co.uk). Since 2003, the Veterans Health Administration (VHA) in the U.S. has been a leading health care system that has actively provided telehealth services. The VHA provides various telehealth services using video-conferencing (e.g., teleREhab), home-based applications (e.g., blood glucose monitoring) and store-and-forward (e.g., teleRetinal Imaging) (VHA, 2011). Since 2010, the VHA telehealth services have grown by 70%, bringing significant cost reductions (VHA, 2011).

One of the ways in which telehealth offers cost effective services is by delivering services promptly and accordingly to each patient's needs. Thus, it has a high potential to cut health care costs and eliminate significant barriers to care, especially those in secluded or medically underserved communities (Finkelstein et al., 2006; Noel et al., 2004; Watanabe et al., 2013). For example, a telehealth application allows older home health care patients to self-monitor and transmit health measurements to their health care providers, and be educated and monitored by video-conference (AHRQ, 2002). Acknowledging these potentials of telehealth services, the U.S. Secretary of Health and Human Services has been authorized to pay for telehealth services for Medicare beneficiaries in certain rural regions (P.L. 106-554 Dec.21, 2000).

2.3 Effectiveness of Telehealth for Chronic Disease

Telehealth has been tested and reported to be particularly beneficial for various chronic diseases – diabetes (Chumbler et al., 2005; Chumbler et al., 2009; Shea et al., 2009), heart disease (Gellis et al., 2012; Morguet et al., 2008; Soran et al., 2008; Shea et

al., 2009), asthma (McLean et al., 2010; Shegog et al., 2001), chronic obstructive pulmonary disease (COPD) (Koff et al., 2009; Trappenburg et al., 2008) and other diseases (Darkins et al., 2008). Its effectiveness has been increasingly studied since the 1990s. For instance, Ahring et al. (1992) Randomized Control Trial (RCT) study showed that the group using a home blood sugar monitoring device had significantly greater HgbA1C improvement than the control. Friedman et al. (1996) revealed that blood pressure and medication adherence improved for the group receiving an automated patient monitoring or telephone counseling. A recent study by Gellis et al. (2012) reported that depression and health-related self-efficacy significantly improved for homebound older adults who received integrated telehealth services, consisting of telemonitoring, problem-solving therapy and care management. Additionally, telemonitoring was found to be effective in improving systolic blood pressure among hypertensive older adults (Magid et al., 2011).

Evidence from various studies exists for different mediums of telehealth (Haily et al., 2002; Hersh et al., 2002; LaFramboise et al., 2009; Roine, Ohinmaa & Hailey, 2002; Whitten & Mickus, 2007). Cognitive status and hemoglobin A1C level improved for the older adult veterans with chronic heart failure, COPD and/or diabetes who utilized telephone-based telehealth units (Noel et al., 2004). In general, cell phone-based applications and reminders have been found to significantly improve the hemoglobin A1C level (Quinn et al., 2008). Medication adherence in older adults with chronic heart failure also improved with the use of telehealth (Fulmer et al., 1999; Williams et al., 1998).

Telehealth provides chronically ill patients early health warnings and; thus, allows them the possibility to circumvent adverse health consequences. Blood pressure

telemonitoring can encourage patients with hypertension to alter their diet and exercise patterns (Van den Berg et al., 2012; Zullig et al., 2013). Patients also become more interested in, aware of, and confident in hypertension management, and have trust towards their health care providers when using telehealth (Abdullah & Othman, 2011). Additionally, telehealth prevents or delays admission to more intensive care, such as hospitals and nursing facilities (Finkelstein et al., 2006). In Finkelstein study (2006), the group that received telehealth services reported significantly lower rates of admission to intensive care (video-conferencing: 21%, telemonitoring: 15%) than those receiving in-home skilled nursing care (42%). In addition to the benefits for patients, telehealth such as a mobile phone-based application may assist health care providers in decision-making and data organizing (Quinn et al., 2008).

2.4 Effectiveness of Telehealth for Depression

Telehealth services are effective in treating and managing mental health conditions, such as depression and anxiety disorder (Andersson, 2005; Christensen et al., 2004; Hilty et al., 2004; Hailey et al., 2008; Mohr et al., 2005). Furthermore, telehealth services have been found to be effective in improving the quality of life among chronically ill patients (Botsis & Hartvigsen, 2008; Greenwood et al., 2014; Hirani et al., 2014; Wootton, 2012). Telehealth also decreases emergency department visits, hospitalizations, and depressive symptoms for older adults (Gellis et al., 2012; Gellis et al., 2014). An in-home messaging device and telemonitoring are effective in improving the quality of life and functional status of depressed older adults with chronic diseases (Gellis et al., 2012; Gellis et al., 2014; LaFramboise et al., 2003). Three systematic

reviews (Hersh et al., 2002; Hersh et al., 2006; Monnier et al., 2003) acknowledged video-conferencing to be effective in providing accurate screenings and improving mental health. For example, a review of 68 studies on telehealth for mental health care supported that telehealth improves clinical status, provides a reliable clinical assessment and is a potentially cost-effective intervention (Monnier et al., 2003). A more recent review by Hilty et al. (2013) based on 70 studies revealed that telehealth is as effective as face-to-face care for mental health care across age and ethnic groups. It also showed that telehealth is effective in diagnosing and assessing mental health conditions in various settings, including the home health sector (Hilty et al., 2013).

Improvements in mental health due to telehealth have been shown to be long-lasting. Depression improved significantly at three and six months for home-bounded older adults receiving an integrated telehealth care that consisted of telemonitoring, problem-solving therapy and disease care management (Gellis et al., 2014). Fortney et al.'s (2007) randomized controlled trial on telehealth for moderately depressed outpatients showed higher medication adherence and treatment response rates. Fortney's patients also showed greater mental health and life quality improvements at 6 and 12 months after treatment. Other longitudinal studies have shown that with improved depression, health utilization and expenditures decline in the long-term for patients with comorbid physical conditions (Gellis et al., 2014; Simon et al., 2000; Simon et al., 2002; Simon et al., 2006).

Studies have shown telehealth to be as good as face-to-face treatment. According to Ruskin et al. (2004), patients receiving depression treatment through telehealth technology significantly improved, revealing decreased depression and improved

medication and medical appointment adherence - all of which were equivocal to those receiving face-to-face treatment. Additionally, in a psychiatric clinic, video-conferencing resulted in outcomes that were as good as face-to-face treatments, but with a minimum of 10% lower cost for each patient (Monnier et al., 2003).

2.5 Health Care Cost Savings from Telehealth Services

Since the late 1990s, many studies have supported telehealth's potential in providing substantial health care savings (Barker et al., 2004; Dansky et al., 2001; Monnier et al., 2003; Stensland et al., 1999). Recently, there have been many peer-reviewed studies on telehealth's cost effectiveness with large samples using scientifically rigorous methods (Baker et al., 2011; Cusack et al., 2007; Cyer et al., 2011; Darkins et al., 2008; Darkins et al., 2014; Finkelstein et al., 2006; Jackson et al., 2008; Rojas & Gagnon, 2008; Rosenberg et al., 2012). The average cost per visit was \$22.11 for CHF and COPD patients utilizing video-conferencing, \$35 for telemonitoring and compared to a face-to-face visit which on average costs \$48.27 (Finkelstein et al., 2006). According to the systematic review of 23 studies conducted by Rojas and Gagnon (2008), telehealth decreased not only cost per visit but also the total treatment cost per patient. The VA saved \$1,999 per patient by utilizing telehealth while empowering 41,483 patients to reside independently within their communities rather than in long-term care facilities (Darkins et al., 2008). These reduced costs may be attributable to decreases in re-hospitalizations (Finkelstein et al., 2006; Myers et al., 2006), hospital admission (Darkins et al., 2008; Darkins et al., 2014; Steventon et al., 2012), length-of-stay in hospitals (Cryer et al., 2011), emergency room visits (Gellis et al., 2014; Rahimpour et al., 2008;

Whitten et al., 2009), and diagnostic and laboratory tests (Cryer et al., 2011). The hospital admissions for the VA patients receiving telehealth services decreased by 30% and bed-days by 53% (Darkins et al., 2008). Cryer et al. (2011) indicated that telehealth services resulted in a 19% cost savings, mainly resulting from shortened length-of-stay and fewer diagnostic tests.

Few U.S. studies conducted comprehensively have found significant cost savings from telehealth in the home health care settings (Finkelstein et al., 2006; Myers et al., 2004; Noel et al., 2004; Pagan et al., 2011; Pare et al., 2004; Woods et al., 2013). Analyses of 699 Medicare beneficiaries showed that the probability of hospitalization for telehealth home health patients was about one-third of that of non-telehealth users (Pagan et al., 2011). A review of studies on telehealth for chronic heart failure patient care concluded that telehealth can be as effective as in-home services with identical or lower costs (Grustam et al., 2014).

2.6 Adoption of Telehealth in Health Care Settings

Various communication technologies such as email (Robinson & Serfaty, 2001), online communications (Castelnuovo et al., 2001) and video-conferencing (Bynum et al., 2003; Gagnon et al., 2006; Gellis et al., 2014; Shepherd et al., 2006; Simms et al., 2011; Sorensen, 2008) have been increasingly endorsed in mental health care (Molyneaux et al., 2008). Adoption and use of new technologies like telehealth may be associated with patients' geographical location, age, familiarity with other technologies and socioeconomic status (Venkatesh et al., 2003). Patients in geographically remote areas, of

a younger age, with higher incomes and familiarity with other technologies, are most likely to adopt a new technology (Shaw et al., 2008).

Agency organizational factors are also significant. For-profit home health care agencies with fewer than 50 patients were less likely to adopt telehealth than those with a greater number of patients (Bercovitz et al., 2013). Most of the agencies that did adopt telehealth scheduled appointments via telephone and technology related to the Outcome Assessment Information Set (OASIS) (Bercovitz et al., 2013). There has been a rise in video-conferencing to assess and treat mental health conditions, especially among patients in rural areas (Hage et al., 2013). Nonetheless, the telehealth adoption rate has not been in accordance with its technological advancements (Bensink et al., 2006; Zamaria, 2008). In 2007, only 28% of home health care and hospice agencies used the early technologies such as the electronic medical records (National Home and Hospice Care Survey, 2007). A more recent study reported the usage rate to be between 20% and 27% for telehealth adoption in chronic disease management, among home health care agencies (Gellis et al., 2012). Many telehealth programs are pilot programs and they often failed to continue or be integrated as a part of the routine (Giordano et al., 2011; Lamothe et al., 2006). Such failure to continue to use was due to reasons such as lack of funding and structural support, and negative attitude of professionals (Yarbrough & Smith, 2007; Zanaboni & Wooton, 2012). Unfortunately, no data exist on telehealth adoption for depression care in home health care agencies prior to our pilot study with home health care agencies in Pennsylvania (Kim, Gellis & Hoak, 2015). Details of telehealth use and adoption among those agencies in our pilot study will be discussed in 3.4.

2.7 Patients' Perceptions of Telehealth Services

Many studies have been published on patient and family/lay caregiver perceptions of telehealth (e.g., Brodey et al., 2000; Gellis et al., 2014; Gustke et al., 2000; Janca et al., 2000; Palmas et al., 2008; Shea et al., 2007; Trief et al., 2008; Tudiver et al., 2007). Patients report relatively high satisfaction toward telehealth use (Allen & Hayes, 1995; Dick, Filler & Pavan, 1999; Greenwood, Chamberlain & Parker, 2004; Gustke, 2000; Valero, 2000). For example, the Kaiser tele-home health quasi-experimental research project (May 1996- October 1997) showed telephone telehealth care and video interactions to be received with great satisfaction among chronically ill older adult patients (Johnston et al., 2000). Another study carried out by Quinn et al. (2008) reported forty-one percent of patients being satisfied with telehealth and 91% being satisfied with telehealth's ability to provide feedback messages and save time (Quinn et al., 2008). Even those who reported a lower satisfaction with telehealth at the beginning of their care showed a greater satisfaction with telehealth later on.

When telehealth is specifically used to treat anxiety or depression, these same trends apply. Numerous studies have indicated that telehealth is perceived as an appropriate alternative to face-to-face services for mental health conditions such as depression and anxiety disorder (Dobscha et al., 2005; Grubaugh et al., 2008; Hilty et al., 2007; Swinton et al., 2009). For example, outpatients who have received psychiatric treatments through video-conferencing reported the same satisfaction levels as good as face-to-face consultations (O'Reilly et al., 2007). Nesbitt and colleagues (2000) reviewed 1,000 consultations from the University of California, Davis telehealth service data. The

review revealed a high satisfaction among both the patients and the primary care physicians, especially for video-conferencing in rural clinics.

2.8 Health Care Providers' Perceptions of Telehealth

Physicians, psychiatrists, and nurses tend to also report moderate to high satisfaction with telehealth for treating both physical and mental health conditions for patients (Hilty et al., 2006; Hilty et al., 2007). One reason for this is that telehealth data is perceived as useful in making face-to-face office visits more efficient and well organized (Quinn et al., 2008; Richards et al., 2005; Shea et al., 2007). Health care providers tend to be eager to use telehealth in providing mental health care when they perceive telehealth as improving patient access to care (Swinton et al., 2009).

Despite strong empirical evidence for the use of telehealth and general satisfaction with the technology, some providers do have concerns about telehealth use in patient care (Fleming, Edison & Pok, 2009; Johansen et al., 2004; Parker-Oliver & Demiris, 2006; Whitten & Love, 2005). Some providers have reported that telehealth has increased their overall workload and visit duration, and required considerably more mental effort (Krousel-Wood et al., 2001). Some have addressed concerns over the provider-patient alliance, which is defined as *“the affectional bond between the patient and the provider”* (Martin et al., 2000, p. 438). However, studies have shown no significant difference in the patient-provider alliance in face-to-face versus telehealth contact (Ghosh et al., 1997; Jerome & Zaylor, 2000; Lingely-Pottie & McGrath, 2006). Research has indicated that these alliances do not suffer when telehealth is used,

especially when mediums such as video-conferencing are utilized (Glueckauf et al., 2002).

2.9 Potential Barriers to Telehealth Adoption in Health Care

According to Grigsby et al., (2007), barriers to telehealth adoption at the macro level, such as fiscal policy, lack of standards and resources, have been often emphasized. However, these issues alone do not sufficiently explain the slow adoption of telehealth. Insufficient training and negative perceptions toward telehealth may be associated with low telehealth adoption (Eedy & Wootton, 2001; Lam & Mackenzie, 2005; Sanberg et al., 2009). Some mental health providers report that telehealth does not adequately establish a good rapport with their patients because of lack of physical proximity (Gibson et al., 2009; Jameson et al., 2011; Wagnild et al., 2006). Similarly, nurses report distance as an obstacle to their interactions with patients (Giordano et al., 2010; Oudshoorn, 2009). Another obstacle is that some health care providers worry that the patients may not adhere to their recommendations, or that they would not be able to efficiently detect some of the patients' behaviors such as substance use (Wagnild et al., 2006). Additionally, other practitioners were concerned about the fit between telehealth and their current practice techniques and services (Lehoux et al., 2002; May et al., 2011; McLaren, 2003).

Negative perception may be a significant barrier, especially for telehealth adoption in treating mental health conditions. For example, some health care providers perceived that telehealth will increase their workload and restrict their autonomy (Boydell et al., 2006). In addition, they reported that telehealth may take away unique

advantages of face-to-face interaction, such as creating a sense of anonymity by taking the patients away from their community (Boydell et al., 2006). Other reasons may include lack of trust in safety and reliability of the technology (Mair et al., 2007; Sharma et al., 2010). Even those who had previously adopted telehealth but had a discouraging experience were less likely to continue using it (Mair et al., 2008).

Lack of training is another major factor that may influence the providers' eagerness to either use or refer their patients for telehealth services (Brooks et al., 2013). For example, Mitchell and his researchers (2003) indicated that deficient training in using video-conferencing technology and lack of a chance to use telehealth routinely determined how confident and willing the mental health service providers' were in employing telehealth in their practice (Doarn et al., 2013; Jameson et al., 2011; Richardson et al., 2009). Studies have frequently pinpointed training as a significant facilitator of telehealth adoption. Training enhances the providers' confidence in using telehealth and strengthens collaboration between the patients and other health care providers (Giordano et al., 2011; Hibbert et al., 2003; Mair et al., 2008).

2.10 Telehealth Policies

Unfortunately, at the federal level, there is no reimbursement for telehealth use among HHC agencies. Telehealth services are not reimbursable for HHC agencies under the current Medicare Prospective Payment System. Limited reimbursements are provided through Medicare Part B to restricted eligible providers such as hospitals, rural health clinics, and federally qualified health centers. Additionally, reimbursable telehealth services are to be exclusively provided by health care professionals such as physicians,

nurse practitioners, and clinical social workers. Even for those eligible providers, there are various restrictions in types of technologies, types of services, and geographical locations of the beneficiary covered. For instance, services delivered by interactive audio and video technologies are reimbursable. However, Medicare does not reimburse services delivered by asynchronous store-and-forward and remote patient monitoring services, except for demo programs in Alaska and Hawaii. To be eligible for reimbursement, telehealth services 1) must substitute for an in-person encounter, 2) demonstrate clinical benefit to the patient, and 3) be reserved for rural regions, Health Professional Shortage Areas (HPSAs) or in a county outside of any Metropolitan Statistical Area (MSA).

Meanwhile, Medicaid may reimburse HHC agencies for telehealth services provided for its chronically ill patients. However, beneficiary eligibility and services covered vary by state. For instance, Alaska and California have less restrictive policies, covering a wider range of medical conditions and telehealth technologies. Meanwhile, Idaho has a more restrictive policy, reimbursing services for limited mental health conditions and developmental disabilities. Like Medicare, Medicaid programs tend to solely reimburse for live video interactions. Only a handful of programs reimburses for telehealth store-and-forward technology and remote patient monitoring technologies. Additionally, many states are strict with types of services, and location of the beneficiary and the provider covered.

However, within the past five years, several states have been promoting more telehealth inclusive policies. Since 2013, six states have begun to reimburse for remote patient monitoring services. Additionally, under the California Telehealth Advancement Act 2011, California loosened its restrictions to reimburse any type of telehealth

technologies. Now, California Medicaid beneficiaries from any location are eligible to receive telehealth services by any state-licensed health professionals. New York has recently passed legislation for reimbursing store-and-forward technology to be taken effect in January 2016. In addition to Medicaid, Pennsylvania, and South Dakota reimburse for remote patient monitoring technology through their department of aging services.

2.11 Study Contribution to Research

This study aims to fill several research gaps. The majority of studies on telehealth services focuses on understanding the patients' perception of a particular telehealth technology. Koch's (2005) systematic review revealed the general trend of studying patients' perceptions in telehealth research. However, there are few studies that examine the home health providers' perception of telehealth. Miller et al. (2003) reported out of 455 studies that explored patients' satisfaction as one outcome, none had solely examined health care provider attitudes or satisfaction with telehealth (Miller et al., 2003). Similarly, in a recent systematic review, Brewster et al. (2013) reported that there is little focus on provider perception of telehealth for treating chronic disease (Brewster et al., 2013).

Among the few studies focused on health care provider's perceptions of telehealth, most are conducted from non-home health settings, such as primary care clinics and VA hospitals, and are restricted to the perceptions of physicians and hospital affiliated nurses (Brooks et al., 2012; Choi et al., 2013; Kohnke et al., 2013; Radhakrishnan et al., 2012). Findings from these settings may not be representative of

how telehealth is perceived in home health care. Furthermore, nurses with HHC agencies may have different perceptions of telehealth than hospital affiliated nurses.

To date, no studies have examined provider use and perception towards telehealth with a representative home health care sample. This is significant since front line workers in home health agencies are key players in patient access to and adoption of telehealth (Joseph et al., 2011). In fact, Joseph and his colleagues have identified skepticism about telehealth from front-line providers (e.g., nurses) as one of the significant barriers to implementing telehealth (Joseph et al., 2011). For example, a provider's contrary view and lack of enthusiasm in using telehealth may discourage patients away from the technology (Whitten et al., 2004). Existing studies have shown that without support from providers, pilot programs tend to discontinue and not advance further (Williams, May & Esmail, 2001). Consequently, the home health care staff perception of telehealth can complement data on patient perceptions in informing both current and future telehealth programs.

The dearth of studies on health care provider perceptions of using telehealth to treat depression is even more extreme. The studies that exist tend to be limited in scope. For instance, Simms et al. (2011) looked at mental health provider perceptions of the benefits and ease of use in video conferencing; however, this was an exploratory study with a very small sample size.

CHAPTER 3: STUDY CONCEPTUAL FRAMEWORK

The UTAUT model developed by Venkatesh et al. (2003) (Figure 1), the ‘attitude toward behavior’ construct by Davis et al. (1989) and ‘Innovation Culture’ construct from Bobni (2008) frame this study. This chapter entails three sections. First, the UTAUT model is discussed. The second section describes innovation culture-innovation intention and its relevance. The last section consists of demographic factors that are important in explaining intention to use telehealth and current use of telehealth.

3.1 The Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The UTAUT model consists of four core constructs – 1) performance expectancy; 2) effort expectancy; 3) social influence; and 4) facilitating conditions that affect users’ behavioral intention, which in turn determines use behavior (Cimperman & Trkman, 2013). Constructs are defined in Table 1. These four primary constructs are moderated by demographic factors such as user’s gender, age, and experience.

Since its development, the UTAUT model has been widely used to assess and comprehend the factors associated with a technology’s adoption, diffusion, and effectiveness (Burton-Jones & Hubona, 2005; Leong, 2003). Studies have established its validity (AlAwadhi et al., 2008; Anderson et al., 2004; Finch et al., 2006; Khoja et al., 2013; Leon et al., 2012; Zhou et al., 2010). For instance, Keeton’s (2012) study of acceptance of employee portal technology by the healthcare center employees reported effort expectancy ($\beta=0.22, p=0.03$), social influence ($\beta=0.19, p=0.02$), and facilitating conditions ($\beta=0.35, p=0.00$) as the significant predictors of intention to accept the technology. According to Venkatesh et al. (2003), the model explains 70 percent of

intention to accept a technology while alternative models explain about 40 percent. For the purpose of this study, the UTAUT (Figure 1) has been modified according to the pilot study results. Figure 2 is the modified model for this study.

Figure 1: The Original UTAUT Model

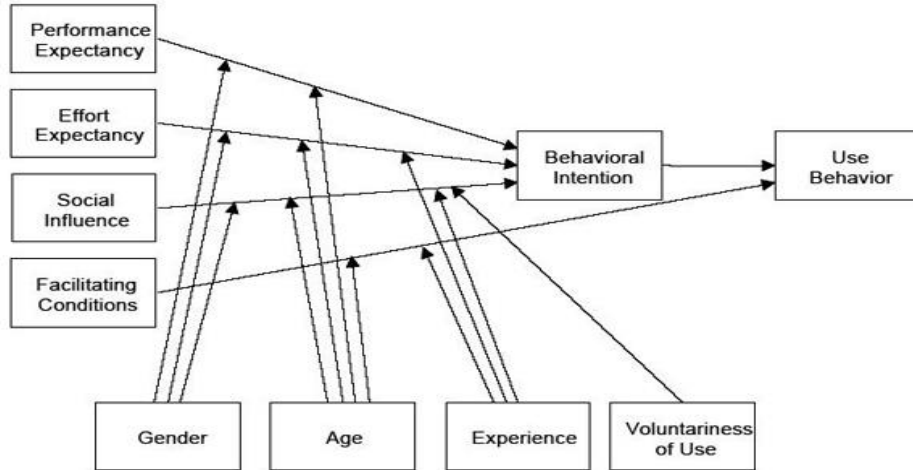


Figure 2: The Modified UTAUT Model for the Study

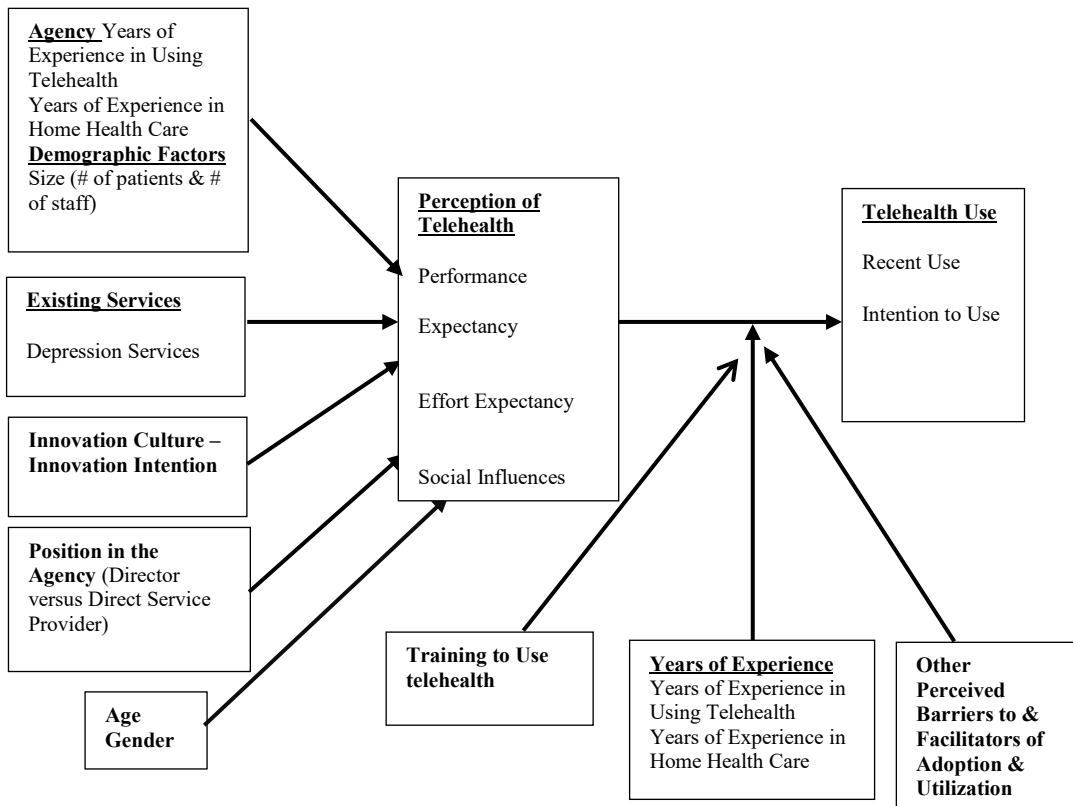


Table 1: Definitions of the Study’s Main Constructs

Constructs from the UTAUT	UTAUT Original Definition The degree to which...	Study’s Definition The degree to which...
Performance Expectancy	“ an individual believes that using the system will help him, or her attain gains” (Pfeffer, 1982)	Each home health staff believes using telehealth assists his/her job.
Effort Expectancy	“ a person believes that using a particular system would be free of effort” (Radner & Rothschild, 1975)	Each home health staff believes telehealth requires low effort.
Social Influence	“ an individual perceives that important others believe he or she would use the system” (Venkatesh et al., 2003)	Each home health staff perceives that the important others (e.g., managerial staff, coworkers, patients) believe he or she would use telehealth.
Facilitating Conditions	“ an individual believes that an organizational and technical infrastructure exists to support use of the technological system” (Venkatesh et al., 2003)	Each home health staff perceives the agency’s infrastructure is available to support telehealth.
Current use	“‘how often’ and the volume of system use (‘how much’) by the user” (Davis et al., 1989)	The number of days and types of telehealth each home health staff has provided over the past 30 days.
Intention to Use	“ the measure of the strength of one’s intention to perform a specified behavior” (Malhotra, Y 1999).	The strength of each home health staff intention to use or continue to use telehealth in the next twelve months.
Innovation Culture – Innovation Intention	“ degree to which the organization has an internally established architecture to develop and sustain innovation, and employees are engaged in the innovation imperative ”(Martins & Terblanche, 2003)	The degree to which each home health staff perceives the agency as supportive of innovation and is equipped with the environment to implement telehealth.

Performance Expectancy is defined as the degree to which each home health care staff member believes using telehealth assists his/her job. Performance expectancy is supported by studies (Kohnke et al., 2013; Sundaravej, 2010) as a direct predictor of intention to use a technology. Several studies support significant effects of performance expectancy on intention to use a technology (Agarwal & Prasad, 1999; Chau & Hu, 2001; Davis et al., 1989; Pikkarainen et al., 2004; Rmayah et al., 2003; Tan & Teo, 2000; Venkatesh, 1999; Venkatesh, 2000; Venkatesh & Morris, 2000). When individuals perceived a technology to be useful, their likelihood of accepting and using it rises (Diaz, et al., 2002; Finch et al., 2006; Holden & Karsh, 2010; Jimison et al., 2008; Klein, 2007; Kohnke et al., 2013; Venkatesh et al., 2003). According to Sharma et al. (2010) nurses who perceived telehealth as not helpful in reducing their workload and as technically difficult were less likely to accept and be engaged with it. Also, doctors who perceived telemedicine technology to be useful were more likely to accept its use (Chau & Hu, 2003). In fact, several studies have shown that performance expectancy can predict the use of a technology, and perceived usefulness influences individuals to underrate the technology difficulties (Adams et al., 1992; Bhattacharjee, 2002; Venkatesh, 2000). These findings may imply that home health care staff are more likely to accept and use telehealth in their patient care if they perceive telehealth as useful.

Effort Expectancy refers to the degree to which each home health care staff believes telehealth requires low effort. According to Venkatesh et al. (2003), similar to performance expectancy, effort expectancy has been widely verified. Previous studies have provided evidence for the significant effect of effort expectancy on intention to use

or the current use of a technology (Agarwal & Prasad, 1999, Davis et al., 1989, Hong et al., 2001; Hung, 2004; Jackson et al., 1997; Venkatesh, 1999; Venkatesh, 2000; Venkatesh & Morris, 2000; Ramayah 2006; Ramayah & Aafaqi 2004). Several studies have also found both effort expectancy and performance expectancy to determine an individuals' intention to utilize a technology (Gefen et al., 2003; Heijden, 2003; Hong et al., 2001; Venkatesh et al., 2003). For instance, Wang et al. (2009) showed that older adults' use of a mobile computing technology was significantly determined by effort expectancy, meaning a technology perceived as easy to use was more likely to be used. In addition, effort expectancy and performance expectancy determine individuals' likelihood to continue to use a technology (Guriting and Ndubisi, 2006; Ignatius and Ramayah, 2005; Ramayah et al., 2005; Ramayah, 2005, 2006a, 2006b; Ramayah & Jantan, 2004). Several studies have shown effort expectancy to mediate the impact of performance expectancy on intention to use a technology (Davis et al., 1989; Kleijnen et al., 2004; Wang et al., 2003). A technology perceived as easy to use is more likely to be perceived to perform well, and thus increases the likelihood of its usage. For example, mental health providers who viewed telehealth as easy to use were more likely to use telehealth on a regular basis compared with providers who viewed telehealth as difficult to use (Simms et al., 2011). Based on these studies, it could be suggested that home health care staff are more likely to have a greater intention to adopt telehealth technology and utilize it when they perceive it to be easy to use.

Social Influences refer to the degree to which each home health care staff member perceives the important others (e.g., managerial staff, coworkers, patients) as using telehealth. Through a number of studies, social influence was supported as a significant

determinant of acceptance and use of a technology (Moore, 1991; Taylor & Todd, 1995; Venkatesh et al., 2000). For example, physicians' probability of adopting a personal digital assistant system was determined by how important others, including their supervisor and coworkers, viewed the technology (Yi et al., 2006). Social influences have an even stronger impact when important others can either reward or penalize non-compliance with a behavior (Warshaw, 1980). This is particularly true in the early stages of experiencing a technology (Venkatesh & Davis, 2000). According to Rhodes' (1983) meta-analytic review, older employees tend to have greater affiliation needs, and thus place more importance on the influences of others; such influences decrease with experience with telehealth (Venkatesh & Davis, 2000). The above findings may suggest that the individuals perceived as important by home healthcare staff, such as the directors, can affect staff use of telehealth.

Facilitating Conditions are defined as the degree to which each home health care staff member perceives the agency's infrastructure as available to support telehealth. Facilitating conditions predict individuals' acceptance and use of a technology (Mathienson, 1991; Taylor & Todd, 1995). For instance, resources and support such as technical assistance and teaching on how to resolve technical problems determine acceptance and the continuous use of a technology (Johnston & Weatherburn, 2010, Sharma et al., 2010). Training for employees facilitates acceptance of the technology by improving their confidence. Some studies indicated a lack of training as one of the barriers, and an availability of individual training as a facilitator of acceptance of a technology (Giordano et al., 2011; Hibbert et al., 2003). Based on these studies, it can be

assumed that staff acceptance of the technology is influenced by facilitating training and resources.

Intention to Use is defined as the strength of the home health provider's intention to use or continue to use telehealth in the next twelve months. The link between individuals' intention to use a technology and the current use has been tested and accepted widely by various studies (Chen et al., 2002; Morris & Dillon, 1997; Suh and Han, 2002; Teo et al., 1999). Individual beliefs and perceptions of a telehealth technology influence their intention to use it.

3.2 Innovation Culture – Innovation Intention

In line with Broderick and Lindeman's (2013) statement, implementation of technologies, such as telehealth, is a social process. This suggests that the context and setting in which the providers make decisions and think about telehealth matter. However, the UTAUT model lacks a consideration of these contextual and organizational factors such as innovation culture. This study is particularly interested in the relationships among perceived innovation intention in the home health care organization, current use, intention to use telehealth, and the UTAUT constructs. Innovation intention is a dimension of innovation culture and defined as the *“degree to which the organization has an internally established architecture to develop and sustain innovation, and employees are engaged in the innovation imperative”* (Bobni, 2008, p. 551). For the purpose of this study, innovation culture refers to the degree to which home health providers perceive the agency as supportive of innovation and environmentally equipped to implement telehealth. Innovation intention may influence how an agency adopts innovations such as

telehealth (Johnson, 1996; Judge et al., 1997; Tesluk et al., 1997; Tushman & O'Reily, 1997). For instance, hospitals that appraised flexibility, teamwork, and quality, promoted adoption of innovative technology, such as telehealth (Luu & Venkatesh, 2010).

Hospitals with successful communication between management and direct service providers were more likely to efficiently adopt a technological innovation (Arad et al., 1997). This research also suggests that adoption of innovation like telehealth is positively related to the perceived sense of having a voice in decision-making (Arad et al., 1997).

In contrast, rigidity, hierarchical work systems, control, and consistency are associated with a delayed adoption of innovation (Arad et al., 1997). For instance, in hospitals where the physicians and nurses rigidly controlled the management, lower level providers reported feeling inhibited to take risks and adopt innovations (Judge et al., 1997). An organization that endorses productivity hinders innovation; those that endorse innovation tend to encourage an acceptance of new technology and systems (Giordano et al., 2011; Shattow, 1996). Shattow (1996) indicated that an agency's supportive environment of a technology promotes more positive beliefs about a technology that, in turn, encourages its acceptance. Therefore, a positively perceived innovation intention in home health agencies may be associated with the providers' positive perception of telehealth usefulness, ease of use, and their current use of telehealth and intention to use it in the near future.

3.3 Demographic Factors

Demographic factors such as gender, age and years of experience are the significant moderators of variables in this study, including performance expectancy and

effort expectancy that directly impact an individuals' intention to use a technology (Brown et al., 2002; Howard & Smith, 1986; Venkatesh et al., 2003; Venkatesh & Davis, 2000). Studies have shown that effort expectancy (Venkatesh & Morris, 2000), and social influence (Miller 1976; Venkatesh et al., 2000) have more effect on the intention for women, but this impact is reduced with greater experience with the system. Furthermore, research has demonstrated men are more task-oriented, and thus place more importance on performance expectancy, emphasizing accomplishing tasks (Minton and Schneider, 1980). Age also has been shown to be associated with effort expectancy and intention to use a technology. For instance, some studies reported that older adults tend to feel less comfortable utilizing technologies and, therefore, are less likely to accept and use them (Compeau & Higgins, 1995; Mead et al., 2003; Morris & Venkatesh, 2000; Parasuraman & Igarria, 1990; Sharit & Czaja, 1998). Those who have used telehealth frequently for mental health care are more likely to recognize it as useful and easy to use.

Training and years of experience in the field, especially in providing mental health care have been identified as associated with the provider's intention to use (Simms et al., 2011). Those who were trained and had more years of experience in mental health care were more likely to have a positive perception of the usefulness of telehealth and to use telehealth more regularly (Simms et al., 2011). In addition to the characteristics of staff, agency characteristics, such as size and location, may be important. Gagnon et al. (2004) have shown greater adoption and use of telehealth in hospitals located in remote areas. Hospitals that depend on other centers for services tend to have positive attitudes toward telehealth as they tend to have an insufficient number of or access to specialists.

On the other hand, independent hospitals perceived telehealth as threatening their autonomy (Gagnon et al., 2004, 2005). Therefore, above agency demographic factors (e.g., size, telehealth training) and individual factors (e.g., age, gender, years of experience) have informed the study model.

3.4 Pilot Survey Study 2014

The present study was built on a pilot survey in Pennsylvania that was conducted from June to July 2014 in collaboration with the Pennsylvania Home Care Association (PHA). The core purpose of this pilot was to determine the reliability and validity of the survey content. The pilot was an important step for the proposed study, especially since the question items had been modified for applicability to home health care agencies. As such, new Cronbach's alpha estimates were needed to test survey item internal consistency. Convenience sampling was used to recruit agency directors from the PHA. They received an email with a survey web-link. Seventy-three directors and 13 direct service providers completed the survey. Modifications to the question items for the national survey were made according to the pilot survey results. For instance, the distribution of responses was observed for questions that explored the types of care nurses provided. The original questions had a long list of answer options, and this analysis helped narrow down the list.

Sample Characteristics. Eighty-six home health staff (73 directors and 13 direct service providers) participated in the survey. The response rate was approximately 18%. As reported in Appendix A, about 80% of the participants were female, 96.50% were white/Caucasian, and 2.50% were African Americans. Over 67% of them were registered

nurses, and the majority (approximately 98%) was full-time staff. The mean age was 53.6 years, ranging from 26 to 78 years. On average, the directors had 29.4 years of professional experience and 18.9 years of home health work experience. The direct service providers had 21.8 years of professional experience and 14 years of experience in home health. The direct service providers had an average of 5.8 years of telehealth experience during their professional career and 4.3 years of telehealth experience at the current agency.

Use & Perception of Telehealth. Among the participants that reported using telehealth, 45% reported utilizing a telephone; 32% used remote patient monitoring at their agencies. Meanwhile, only 3% used video-conferencing. About 67% reported providing services for depression. However, among agencies that addressed depression, 68% made referrals to either primary or specialty care, whereas only 17% provided in-home individual counseling. 12% provided telephone counseling, and 2% provided video-conferencing for depression care. On average, the direct service providers offered depression services for approximately 13 days out of the previous 30 days. Telehealth services were provided about 21 days out of 30 days.

While over half of the participants (57%) strongly agreed that telehealth is useful for chronic disease, only a little more than one-tenth (14%) indicated the same for depression. The majority of the participants had a neutral opinion about the statement, “people who influence my behavior at work (e.g., patient, managerial staff) think that it is good to use telehealth for depressed patients.” However, more than half showed a positive view towards the similar statement for chronically ill patients. While more than

74% perceived themselves as having the knowledge necessary to use telehealth for chronically ill patients; only 31% did for depressed patients.

Survey Items Test. According to the Shapiro-Wilk test of normality, intention to use (Stat: 0.941, Sig: .001), and core variables (Performance Expectancy (PE): 0.968, 0.290; Social Influence (SI): 0.966, .022; Facilitating Condition (FC): 0.966, 0.022; Innovation Culture (IC): 0.942, 0.001) were not normally distributed, except Effort Expectancy (EE). The Shapiro-Wilk test has been used instead of Kolmogorov-Smirnov test since the sample size was smaller than 200. The Cronbach’s alpha value of 0.795, measuring internal consistency reliability, was reported. The test of multicollinearity had shown the variables not to be collinear with VIF values smaller than 3.

Table 2: Spearman’s Rho Coefficients of UTAUT variables

	PE	EE	SI	FC	IU	ICU
EE	0.6**	1				
SI	0.6**	0.6**	1			
FC	0.4**	0.4**	0.5**	1		
IU	0.3*	0.5**	0.5**	0.6**	1	n/a
ICU	0.4*	0.1	0.7**	0.4*	n/a	1

* $p < 0.05$, ** < 0.01 , *** < 0.001

PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influences, FC: Facilitating Conditions, IU: Intention to use telehealth, ICU: Intention to continue to use telehealth

Correlation Analyses. Just as the Unified Theory of Acceptance and Use of Technology (UTAUT) model suggested, the core variables were moderate to highly correlated with the participants' intention to use telehealth (PE: Spearman's Rho Coefficient 0.399**; EE: 0.512**; SI: 0.704**; FC: 0.610**). However, unlike the prediction, Innovation culture had a weak relationship with intention to use (Stat: 0.171, Sig: 0.126), and, instead, had a strong correlation with the current use (0.753*) for the direct service providers. Innovation culture was found to moderate the relations between the UTAUT constructs and intention to use. However, the sample size for the direct service providers (n=13) was small, so these correlations were not final and needed to be investigated further in the national survey. In addition, the number of patients served and the number of staff involved were found to be weak moderators to the UTAUT variables. The participants who reported serving a greater number of patients were more likely to have a high-performance expectancy towards telehealth. Also, there was a statistically significant difference (t: -3.9201***) on intention to use scores between the directors and the direct service providers. The direct service provider, on average, reported a higher score, indicating a greater performance expectancy of telehealth.

CHAPTER 4: HYPOTHESES & RESEARCH QUESTIONS

4.1 Specific Aims

The overall aim of this study was to identify factors that are associated with HHC agency staff current use and intention to use telehealth services for chronic physical illness and depression care.

Quantitative Survey Phase.

- 1) To examine associations among staff perception of telehealth, innovation culture, intention to use, and current use of telehealth services for chronic disease and depression care.
- 2) To compare the patterns of telehealth utilization by home health care agencies and the organizational characteristics (e.g., budget, size, legal status) of those agencies.

Qualitative Interview Phase.

- 1) To explore HHC agency staff emic perspective of barriers to and facilitators of telehealth adoption for chronic disease and depression care among home health care staff.
- 2) To explore staff and their perceptions about patients' telehealth use experiences for chronic disease and depression care.
- 3) To determine strategies that could encourage agency adoption of telehealth.

4.2 Research Questions

Quantitative Survey Phase.

- 1) What are the relationships between staff acceptance of telehealth use and their current use of telehealth or intentions to use it in the future?
- 2) What are the predictors of acceptance of telehealth use?
- 3) What are the predictors of telehealth use or intentions to use it in the future?
- 4) What are the characteristics of home health care agencies that utilize telehealth for chronic disease and depression care, compared to non-users?

Qualitative Interview Phase.

- 1) What barriers and facilitators to adopting telehealth are described by home health care staff?
- 2) What are home health care staff experiences using telehealth?
- 3) What are strategic and policy recommendations for telehealth adoption in the home health sector?

4.3 Hypotheses

H1: A greater acceptance of telehealth use is correlated with a greater telehealth use in the past 30 days.

H2: A greater acceptance of telehealth use is correlated with a greater intention to use/continue to use telehealth in next 12 months.

H3: A greater acceptance of telehealth use is predicted by a) a greater innovation culture, b) size of the agency (the number of patients and staff), c) staff position in the agency (director versus direct service provider), d) existence of depression services in the agency, and e) gender.

H4: Telehealth intention to use/continue to use is predicted by a) training to use telehealth, b) years of experience in using telehealth.

CHAPTER 5: METHODS

5.1 Setting

The National Association for Home Care and Hospice (NAHC) is one of the largest and most respected associations in the home health field. It has been dedicated to the interests of vulnerable populations, including those suffering from chronic diseases and disabilities, as well as the home health care and hospice agencies serving these patients. NAHC members consist of providers, corporations (multi-entity providers), businesses, state associations, and nonprofits. Currently, more than 33,000 home health care and hospice agencies are members of the NAHC. The NAHC database has information on the agency contact information (e.g., phone number, address, primary contact information including email) and characteristics (e.g., legal status, agency type, Medicare certification). The NAHC shared the database as a part of our collaboration. Appendix K is the supporting letter from the NAHC president.

5.2 Quantitative Survey

Participants. The sampling frame was all directors and direct service nurse providers (e.g., registered nurse, social worker) of home health care agencies that were members of the NAHC and Medicare-certified.

Sample Size. A sample of at least 380 staff (from 380 agencies) for analysis was recommended for this survey study based on Krejcie & Morgan's (1970) sampling table guidelines for sample size decisions. Considering the pilot study's response rate of approximately 18%, the survey was distributed to at least 2112 participants (from 2122 agencies) across the U.S.

Sampling Procedure. Convenience sampling was used. All agencies from the NAHC list from the nine census geographical regions were potential participants. Surveys were administered with Qualtrics survey software and distributed by e-mail to the directors and direct service providers.

Survey Administration. The survey was administered online, using the Qualtrics system as a central resource for coding, processing, and managing data. First, a letter introducing the survey and requesting participation was sent to the directors (Appendix D). One week later, the survey link was emailed to the directors of the agencies to be completed. In the email, they were also requested to forward the survey link to a direct service provider at their agencies (Appendix E). Surveys were collected over a two-month period during which participants could complete the survey at a convenient time. In an effort to increase participation, state associations affiliated with the NAHC were contacted to collaborate by either forwarding the study announcement email to the list serve or posting on the newsletter. Twelve state associations agreed to do so. Each survey had an individual identification number which was used only for research purposes by the investigators. At the end of the survey, the participants could volunteer to participate in an interview by sharing their email addresses. In order to encourage participation, random draws of three e-gift cards of \$30, \$20, and \$10 were offered for those willing to share their email addresses at the end of the survey. Email addresses were securely saved as a password-protected document file on a password-protected computer in a locked office. Only the study investigators had access to the document.

5.3 Qualitative Interviews

Sample. A sample of 20 participants completed the in-depth interview. The researcher interviewed 12 directors from Telehealth adopting HHC agencies and 8 directors from non-adopters. Participants were recruited until theoretical saturation (Strauss, 1987) was achieved.

Sampling Procedure. The purposive sampling was employed where at least one director from a telehealth adopting agency and one from a non-adopting agency were recruited from each geographical census region. The interview participants were recruited from the group of the survey participants who voluntarily entered their email addresses and indicated their interest at the end of the online survey. In the instances where more than one potential participants volunteered, the first person was selected.

Administration of Qualitative Interview. Initially, the investigator contacted the volunteer participant by email to introduce the interview and arrange a time for a 45-minute telephone interview (Appendix G, H). At the beginning of the telephone interview, the investigator read the informed consent (Appendix J) and answered any questions the participant might have. After providing verbal consent, participants were asked a series of open-ended questions regarding their experiences and perceptions of telehealth services in their agencies. With permission, the interview was recorded using an audio recorder. Questions were designed to examine home health staff perceptions of telehealth service, barriers to providing and receiving those services for chronic disease and depression care, and policy and strategy recommendations. The questions were open-ended, and the interviewer used probes to obtain more in-depth answers. At the end of the interview, the participants were requested to contact the investigator by email if they had

any additional information they would like to share. As a small token of appreciation for their time, each participant was emailed a \$20 e-gift card. After the interview, the responses were typed into a password-protected computer that was secured in a locked office. Once typed, the recording file was deleted permanently.

Methods to Enhance Rigor. The interview questions were reviewed by a group of fifteen home health professionals (e.g., registered nurse, social worker, telehealth provider) in an educational session during the National Association for Home Care and Hospice Annual Conference 2014. Their feedback was considered in shaping the questions, acknowledging the importance of the provider's concerns. In addition, in order to assure the accuracy of the coding, another Ph.D. student coded two interviews (10%). The Ph.D. student and the investigator cross-checked and compared their coding strategies, coding, and data interpretation to assure an acceptable inter-rater reliability (Cohen's Kappa > 0.60). Any differences in coding were discussed, and then necessary adjustments were made to the final coding. For this study, the interview participants were not requested to read the transcription for member-checking. It places considerable demands on the participants' time, and it would be difficult to maintain confidentiality.

5.4 Survey Instrument

The survey was developed based on the Unified Theory of Acceptance and Use of Technology (UTAUT) questionnaire by Venkatesh et al. (2003) and Bobni's Innovation Culture questionnaire (2003). The UTAUT questionnaire is a 19-item instrument with five subscales, measuring performance expectancy, effort expectancy, social influence, facilitating condition and intention to use. The items in the UTAUT model, including

performance expectancy and effort expectancy, have been well tested (Venkatesh et al., 2003; Oshlyansky, 2007; Kohnke et al., 2013). The model has been validated across different cultures (Oshlyansky, 2007) and fields, explaining adoptions of various technologies, including telehealth. For instance, Kohnke et al. (2013) studied the predictors of acceptance of telehealth equipment among patients and health care providers. They reported significant Cronbach's alpha values for Performance Expectancy (0.9770), Effort Expectancy (0.9682) and Social Influence (0.8836). The UTAUT questions were modified to be appropriate for assessing staff telehealth perceptions (Appendix B). The pilot study (Gellis & Kim, 2015) showed the modified items to be reliable with a Cronbach alpha of 0.88. Different questions were asked, depending on staff role (directors versus direct service provider) in order to answer the study questions described in this protocol. For example, to answer the questions, direct service providers were asked to think of their interactions with patients while the directors thought about the agency experiences. Bobni's Innovation Intention subscale consists of 22 items with a good Cronbach's Alpha around 0.73. As Nunnally (1978) recommended, items with the coefficient alpha smaller than 0.70 were dropped, 11 items were extracted and then pilot tested. The pilot study reported a Cronbach alpha of 0.78. In this study, survey questions were modified to be applicable to the participants who are using and not using telehealth in their agencies (Appendix B). Again, variations of the questions were asked, depending on the role of staff (directors versus direct service providers) and the status of telehealth adoption.

The following variables were measured in the survey.

Performance Expectancy was measured by a 7-item self-report informed by the UTAUT model. Home health care staff rated each of the items on a scale of 1 (strongly disagree) to 7 (strongly agree). For instance, a sample item is: “telehealth is useful for depression care.”

Effort Expectancy was measured using a 5-item self-report from a modified version of the UTAUT model’s items that fit the participant population. Each home health care staff rated the items on a scale of 1 (strongly disagree) to 7 (strongly agree). For example, a sample item is: “Telehealth makes my job more interesting than in-home service delivery.”

Social Influence was measured by a 5-item self-report with modifications made to the UTAUT model’s original items. The participants rated each item from 1 (strongly disagree) to 7 (strongly agree). For example, a sample item is: “The administration of my agency has not been supportive of the use of telehealth for chronically ill patients.”

Facilitating Conditions were measured with a 5-item self-report with similar modifications as other constructs made from the UTAUT model. The participants gave a score from 1 (strongly disagree) to 7 (strongly agree) for each item. For example, a sample item is: “A specific person/group is not available for technological difficulties”.

Innovation Culture was measured by an 11-item self-report informed by Bobni’s questionnaire where the participants rated each item on a scale of 1 (strongly disagree) to 7 (strongly agree). For instance, a sample item is: “As staff, I feel enabled to generate ideas.”

Intention to use Telehealth was measured by a 5-item self-report informed by the UTAUT model where a home health staff rated each of the items on a scale of 1 (strongly disagree) to 7 (strongly agree). For example, the participants were asked to rate their intention to use or continue to use telehealth over the next 12 months for depressed patients.

Current Use of Telehealth was measured by home health staff member's self-report on the number of days telehealth had been provided over the past 30 days for depression or chronic disease care. All participants were asked to indicate different mediums of telehealth that they were using by checking off either yes or no for each. From the list of different potential services provided through telehealth, such as health education, participants identified services they had provided over the last 30 days.

Demographic variables at the agency level and the staff level were measured. Variables such as age, years of experience in using telehealth, years of experience in home care, and gender of staff were collected. In addition, general demographics on the agencies' characteristics including the size, legal status, funding size and payment sources were collected.

5.5 Qualitative Interview Questions

In-depth interviews were conducted for the qualitative section of the study. Each interview lasted about 45 minutes and consisted of 10 to 15 questions. Relevant questions were asked depending on the adoption status of the agency. Appendix C is the list of interview questions. The interview questions complemented the online survey by allowing a deeper understanding of how home health staff perceived telehealth services.

Relevant questions were asked depending on the adoption status of the agency and the role of staff. The first set of questions are targeted to explore telehealth adopters and non-adopters' perceived barriers and facilitators to adoption. These questions assisted in identifying factors that influence telehealth adoption which was not addressed in the survey. The first set of questions were asked to all of the participants while the second and the third sets were only asked the directors of agencies that adopted telehealth.

The second set of questions examines both the staff member's perception of telehealth use and the staff member's perception of patients' attitude towards telehealth. Questions in the second set are crucial for understanding staff experiences on a deeper level by requesting examples of experience with telehealth. The third set of questions is on telehealth training. These items were added because of the NAHC's interest in them, and they could help us examine the level of adoption. The fourth set of questions were asked regarding home health care staff recommendations on strategies and policies that could stimulate the adoption of telehealth in home health care agencies. These sets of questions were asked to all of the participants. At the end of the interview, demographic information such as age, gender, years of experience in home health and telehealth use were collected (Appendix A).

5.6 Human Subjects

This was conducted with the IRB approval from the University of Pennsylvania prior to the beginning of participant recruitment. All participants provided either a verbal or a written consent and were given the opportunity to drop out from the study at any time. Below is detailed human subject related information.

Risks/discomforts. Risks were minimal for involvement in this study. However, the participants might feel emotionally uneasy for some questions both in the on-line survey and interview, and could choose to skip them.

Benefits. There were no direct benefits for participants. However, it was hoped that through their participation, researchers and ultimately home health care providers would learn more about the adoption of telehealth services in the home health care agencies for patient care.

Subject Confidentiality & Privacy. All data obtained from participants was kept confidential. The email addresses were not linked to the survey data and the survey data was de-identified. If the information from this study was published or presented at conferences, it would only be reported in an aggregate group. Computer-based files were only made available to the investigators involved in the study through the use of access privileges and passwords. Precautions were in place to ensure the data was secure by using passwords and encryption. Qualtrics automatically created a back-end database designed to store the data that was recorded for the research. The investigators could delete the data anytime, and upon request to Qualtrics, information on all accounts could be permanently erased (Qualtrics.com). If there was any abnormal activity such as intrusion of the account, an automated alert informed the investigators. In addition, the front-end firewall systems were loaded with anti-virus software that checks all incoming packets in real-time. Participants' identities were not released to anyone else except the

study investigator, Eun hae, Kim (eunhaek@sp2.upenn.edu) and IRB at the University of Pennsylvania as required.

Data Protection. The following precautions were made to protect the data. Participants' information was reviewed only in a designated secure office setting and saved as a password protected document. Only the study investigators had access to the data. Each participant was assigned an individual ID number and an agency ID number for analyses. No identifiers, including name, date of birth or the name of the agency were collected. The list of participants' ID numbers and the transcripts of the interviews were saved as password protected documents with restricted access by the study investigators. To ensure security, the transcripts were permanently deleted when the study was completed. The survey was de-identified by detaching email addresses from it. Email addresses of participants were saved as a password protected document on a password secure computer and were deleted permanently at the end of the study, at which point the last E-gift cards were sent. Investigators used the office at 3815 Walnut Street, Philadelphia to distribute surveys and encode data on computers equipped with SPSS, SAS and R. A printer, copier and office supplies were available at the office. The computers were password-protected and securely locked in an office located in the building, with access limited by the university ID and prior approval from the School of Social Policy and Practice.

CHAPTER 6: ANALYSES

6.1 Quantitative Survey

Data was analyzed using SPSS version 22 and SAS 9.4. Descriptive statistics (e.g., standard deviations, means, frequencies, and normality) were calculated for all the survey items. Cronbach's alphas were estimated to determine the internal consistencies of items for each construct. Pearson and Spearman's Rho correlations were calculated to determine the associations between home health care agencies, participant characteristics, and intention to use telehealth. Independent t-tests were calculated to examine, for instance, if there were significant differences in means between the directors and the direct service providers for continuous variables (e.g., performance expectancy score). To examine if there were significant differences in categorical variables (e.g., type of agency, legal status) between adopters and non-adopters, Chi-squares were conducted.

Hierarchical multiple regressions were conducted to examine the simultaneous effects of participant variables (e.g., years of experience in using telehealth), age, gender, race, and agency variables (e.g., telehealth training, budget) on 1) perception of telehealth, 2) current telehealth services use, and 3) intention to use/continue to use telehealth. The independent variables were entered in the following order. The first block consisted of the control variables such as age, gender, and race. The second block of participant variables included years of experience in the profession, years of experience in home health care, years of experience in using telehealth, innovation culture and participant profession. The third block of predictor variables included telehealth training for staff/patients, depression service, the number of professional staff, the number of

patients served, the agency type, the organizational type, the agency legal status, and the agency annual budget. Regression results are reported in Tables 20-24.

6.2 Qualitative Interview

Twenty interviewed were collected via purposive sampling. NVivo (11.4.1) software was used to store and classify the interview data. Qualitative analysis for this study was based on the grounded theory approach (Glaser & Strauss, 1967). The grounded theory does not aim to validate any specific hypothesis but looks for patterns and identifies common themes and categories to produce theoretical perspectives. It focuses on generating more abstract concepts based on the data. Based on this approach, concepts/themes/categories need to be re-evaluated at varying stages to achieve saturation. Those themes and categories form eventually into hypotheses through selective coding, which attempts to integrate the contexts of the participants and create a case of their particular issue.

The audio recordings of interviews were transcribed verbatim. Then, the written transcripts were reviewed for accuracy and notes were made on general themes. This stage is known as ‘open coding’ (Berg, 1989); categories are freely generated at this stage. First, four interview responses were read and reviewed for accuracy by comparing the investigator’s coding with a Ph.D. student’s. Adjustments to the final coding were made based on the similarities and differences between the investigator and the candidate. The investigator read all the transcripts again and assigned codes base on emergent themes and concepts (Strauss & Corbin, 1998). Codification nodes were generated and organized in a logical tree. Axial coding – ‘creating subcategories and

associating these with properties and dimensions’ (Strauss & Corbin, 1998, p. 123), and selective coding –‘integrating and refining the theory’ (p.143) were analyzed. The constant comparative method (Strauss & Corbin, 1998) was used to “to identify variations within those concepts and to identify broader categories of phenomena”. Responses that did not fit into the specific topic but seemed to offer useful information were then moved to a more appropriate spot under a different question or put into an additional category.

CHAPTER 7: RESULTS

7.1 Quantitative Survey Results

7.1.1 Survey Participant Characteristics.

Table 3 presents survey participant characteristics by staff role (directors versus direct service providers). Five hundred and sixteen HHC staff completed the study, 448 of which were directors and 68 were direct service providers. Overall, the participants were predominantly female (87%) and white/Caucasian (93.60%). The same pattern holds for both directors and direct service providers. Overall, the sample age range was from 24 years of age to 75 years of age, with a mean age of 53.32 (Standard Deviation (SD): 9.79). On average, directors were almost five years older than direct service providers. As expected, the most common profession among these participants was a registered nurse (79.70%) and following that, administrative professionals (12.80%). Only nine participants (1.70%) were social workers. The participants predominantly maintained full-time status (98.40%). Years of experience in the profession ranged from 1 year to 55 years of experience, with a mean of 26.85 years of experience (SD:11.33). On average, directors had about five more years of experience in their professions than direct service providers. Additionally, years of experience in home health care ranged from less than 1 year to 49 years of experience, with a mean of 18.21 years (SD: 9.54) of experience. On average, directors had almost eight more years of experience in HHC than direct service providers.

Table 3: Survey Participant Demographic Characteristics

Participant Characteristics	Overall (N=516)	Directors (N=448)	Direct Service Providers (N=68)
Age (years)	Mean (SD)		
	53.32 (9.79)	53.94 (9.17)	49.21 (12.48)
Gender	N (%)		
Female	449 (87.00)	386 (86.20)	63 (92.60)
Male	67 (13.00)	62 (13.80)	5 (7.40)
Race	N (%)		
White/Caucasian	483 (93.60)	418 (93.30)	65 (95.60)
Black/African American	17 (3.30)	16 (3.60)	1 (1.50)
Hispanic	7 (1.40)	7 (1.60)	0 (0.00)
Asian American/Pacific Islander	4 (0.80)	3 (0.70)	1 (1.50)
Native American	1 (0.20)	0 (0.00)	1 (1.50)
More than One	2 (0.40)	2 (0.04)	0 (0.00)
Profession	N (%)		
Social Worker	9 (1.70)	6 (1.30)	3 (4.40)
Registered Nurse	411 (79.70)	350 (78.10)	61 (89.70)
Physical Therapist/ Occupational Therapist	15 (2.90)	14 (3.10)	1 (1.50)
Administrative	66 (12.80)	66 (14.70)	0 (0.00)
Other	15 (2.90)	12 (2.70)	3 (4.40)
Employment Status	N (%)		
Full-time	508 (98.40)	446 (99.60)	62 (91.20)
Part-time	8 (1.60)	2 (0.40)	6 (8.80)
Years of Experience in Profession	Mean (SD)		
	26.85 (11.33)	27.55 (10.87)	22.21 (13.16)
Years of Experience in Home Healthcare	Mean (SD)		
	18.21 (9.54)	19.20 (9.20)	11.63 (9.16)

7.1.2 Survey Participant Agency Characteristics.

Table 4 presents agency characteristics. Information from five hundred and sixteen agencies was collected from the nine U.S. Census regions. The greatest number of recruited agencies was from the South Atlantic region (n=95, 18.40%) followed by the East North Central region (n=90, 17.40%). The smallest number of agencies was from the East South Central region (n=22, 4.30%) and the Mountain region (n=28, 5.40%). Over seventy percent of (n=365) agencies served patients in rural areas while a little more than half service patients in urban (n=276, 53.50%) or suburban areas (n=282, 54.70%). Two-fifths of the agencies reported serving the Medically Under-Served Areas/Populations (MUA/P), while one-fifth served the Health Professional Shortage Areas (HPSA). About seventy percent of agencies (n=371) reported having access to hospital patient records. Participant agencies were predominately providing home health care only (n=297, 57.60%) or both home health care and hospice (n=206, 39.90%). The most common organization type was the community-based agency (n=294, 56.90%) and then hospital-based agencies (n=195, 37.80%). About seventy percent (n=358) were non-profit agencies while a little over 29% were for-profit agencies. The most common annual budget range was more than 6 million (n=149, 28.90%). However, almost half of agencies had an annual budget ranging from \$1 million to \$6 million. The number of professional staff (2-2,000) and patients served ranged greatly (38-500,000), which is related to the organizational size. While sixty percent of agencies (n=330) provided services in other languages, only a little more than 10% (n=54) percent of agencies provided services for immigrants and/or refugees.

Table 4: Survey Participant Agency Demographic Characteristics

Agency Characteristics	Overall (N=516)
Agency Location by Census Region	N (%)
New England	75 (14.50)
Middle Atlantic	46 (8.90)
East North Central	90 (17.40)
West North Central	82 (15.90)
South Atlantic	95 (18.40)
East South Central	22 (4.30)
West South Central	43 (8.30)
Mountain	28 (5.40)
Pacific	35 (6.80)
Areas Served	N (%)
Urban	276 (53.50)
Suburban	282 (54.70)
Rural	365 (70.70)
Agency Serving Medically Under-Served Areas/Populations (MUA/P)	N (%)
	213 (41.30)
Agency Serving Health Professional Shortage Areas (HPSA)	N (%)
	120 (23.30)
Access to Patient Hospital Records (yes/no)	N (%)
	371 (71.90)
Agency Type	N (%)
Home Health Care	297 (57.60)
Hospice	13 (2.50)
Both	206 (39.90)

Organization Type	N (%)
Rehab-based	8 (1.60)
Hospital-based	195 (37.80)
Community-based	294 (56.90)
Other (e.g., city government)	19 (3.70)
Legal Status	N (%)
Non-profit	358 (69.40)
For-profit	152 (29.50)
Government	3 (0.60)
Mixed	2 (0.40)
Annual Budget	N (%)
Less than \$1Million (M)	68 (13.20)
\$1M to \$2.9M	121 (23.40)
\$3M to \$6M	108 (20.90)
More than \$6M	149 (28.90)
Number of Professional Staff	Mean (SD) Range
	129.65 (205.78) 2-2,000
Number of Patients Agency Served in Past Year.	Mean (SD) Range
	5,825.35 (29,839.53) 38-500,000
Agency Providing Services in Other Languages (yes/no)	N (%)
	330 (64.00)
Agency Providing Services for Immigrants and/or Refugees (yes/no)	N (%)
	54 (10.50)

7.1.3 Depression Services Provided by Agencies.

Table 5 presents information on depression services provided by the agencies. Over seventy percent of agencies (n=371) reported that they provide depression services; however, those services predominantly included either referral to primary care (n=342, 66.30%) or referral to specialty care (n=312, 60.50%). Almost one-fourth of agencies (n=197) reported providing in-home individual counseling while about one-sixth of agencies (n=85) reported providing telephone counseling. However, only six agencies reported providing video counseling via telehealth and twelve providing online support group. The predominant evidence-based depression intervention provided was the Problem Solving Therapy (n=145, 28.10%) and following that, the Cognitive Behavioral Therapy (n=140, 27.10%). Among depression service provider agencies, on average, depression services were provided for seven days in the past month.

Table 5: Depression Services Provided by Agencies

Agency Providing Depression Services (yes/no)	N (%)
	371 (71.90)
Depression Services Provided	N (%)
Referral to Primary Care	342 (66.30)
Referral to Specialty Care	312 (60.50)
In-home Individual Counseling	197 (38.20)
Telephone Counseling	85 (16.50)
Telephone Counseling via Telehealth	27 (5.20)
Video Counseling via Telehealth	6 (1.20)
Online Support Group	12 (2.30)
Face-to-face Support Group	10 (1.90)
Social Work/Community Services	11 (2.10)
Psychoeducation	8 (1.60)
Other	7 (1.40)
Evidence-based Depression Interventions Provided	N (%)
Cognitive Behavioral Therapy	140 (27.10)
Problem Solving Therapy	145 (28.10)
Interpersonal Therapy	120 (23.30)
Behavioral Activation	90 (17.40)
Days Provided Depression Services in Past Month	Mean (SD)
	7.48 (8.90)

7.1.4 Telehealth Services Provided by Agencies.

Table 6 presents on the type of telehealth services provided by agencies. More than two-thirds of agencies (n=371, 71.90%) reported providing telehealth services. The predominant technology utilized was telephone (n=325, 63%) followed by automatic remote patient monitoring (n=290, 56.20%). Meanwhile, only sixty-two agencies (12%) provided store-and-forward technologies, and forty-seven (9.10%) provided video-conferencing. The greatest number of agencies reported their intention to provide telephone (n=219, 42.40%) within the next 12 months, and following that, automatic remote patient monitoring (n=199, 38.60%). Additionally, one-fifth of agencies intended to provide store and forward technologies (n=103, 20%), and a quarter of agencies intend to provide video-conferencing (n=130, 25.30%) within the next 12 months. On average, agencies had a little over four years of experience using telehealth, ranging from 0 to 20 years.

Among telehealth providing agencies, telehealth services were provided, on average, about 24 days in past month. Various telehealth technologies were utilized to provide a wide range of services with monitoring of health status (n=319, 62.50%) as the predominant type of service provided. At least one-third of agencies reported providing patient health education and consultation (n=222, 43.50%), case management (n=203, 39.80%), monitoring of prescribed medication adherence (n=195, 38.20%) or caregiver health education and consultation (n=193, 37.80%). Equally large percentages of agencies provided telehealth training for staff (n=329, 63.80%) or patients (n=326, 63.20%).

Table 6: Telehealth Services Provided by Agencies

Agency Providing Telehealth Services (yes/no)	N (%)
	383 (74.20)
Telehealth Services Provided Currently	N (%)
Automatic Remote Patient Monitoring	290 (56.20)
Manual Remote Patient Monitoring	195 (37.80)
Store & Forward Technologies	62 (12.00)
Telephone	325 (63.00)
Video-conferencing	47 (9.10)
Web-based	106 (20.50)
Telehealth Services Intend to be Provided	N (%)
Automatic Remote Patient Monitoring	199 (38.60)
Manual Remote Patient Monitoring	144 (27.90)
Store & Forward Technologies	103 (20.00)
Telephone	219 (42.40)
Video-conferencing	130 (25.20)
Web-based	115 (22.30)
Years of Experience Using Telehealth	Mean (SD)
Agency-level	4.44 (4.87)
Provided During Professional Career	2.07 (3.78)
Provided by the Current Agency	4.14 (4.26)
Days Provided Telehealth Services in Past Month (by Telehealth providing agencies)	Mean (SD)
	23.56 (9.43)
Types of Telehealth Service Provided in Past Month	N (%)
Caregiver Health Education & Consultation	193 (37.80)
Case Management	203 (39.80)
Chronic Disease Management	298 (58.40)
Monitoring of Health Status	319 (62.50)
Monitoring of Prescribed Medication Adherence	195 (38.20)
Patient Health Education & Consultation	222 (43.50)
Rehabilitation	38 (7.50)
Supportive Counseling	74 (14.50)
Other (e.g. testing devices; acute post-op recovery)	12 (2.40)
Agency Providing Training for Telehealth Services (yes/no)	N (%)
For Professional Staff	329 (63.80)
For Patients	326 (63.20)

7.1.5 Reliability of Instrumentation.

Table 7 reports variables with the number of items for each dimension, coefficient alpha, means, and standard deviations. Cronbach's alpha of all variables ranged from .79 to .94, indicating acceptable reliability test scores (George & Mallery, 2003).

Table 7: Summary of Survey Instrument Reliability

Items		Overall (N=516)		Director (N=448)		Direct Service Provider (N=68)		Test for Group Differences
		Alpha	Mean (SD)	Alpha	Mean (SD)	Alpha	Mean (SD)	F-test (p-value)
<i>Independent Variables (a=0.83)</i>								
Perception of Telehealth Variables (a=0.89)								
PE	7	0.79	4.97 (1.10)	0.80	4.92 (1.09)	0.69	5.25 (0.89)	5.59 (0.02)*
EE	6	0.92	5.19 (1.30)	0.93	5.12 (1.28)	0.86	5.64 (0.93)	10.11 (0.00)***
SI	6	0.89	4.77 (1.20)	0.89	4.72 (1.17)	0.82	5.07 (0.95)	5.55 (0.02)*
FC	6	0.85	4.66 (1.30)	0.86	4.61 (1.34)	0.79	4.99 (1.17)	4.82 (0.03)*
Innovation culture (a=0.86)								
	11	0.86	5.81 (0.90)	0.86	5.81 (0.87)	0.83	5.78 (0.95)	0.09 (0.77)
<i>Dependent Variables (a=0.94, 0.85)</i>								
IU	5	0.94	3.38 (1.60)	0.95	3.42 (1.63)	0.85	2.92 (1.31)	0.90 (0.34)
ICU	5	0.85	5.24 (1.20)	0.86	5.16 (1.27)	0.77	5.65 (0.98)	7.73 (0.00)***

* $p < 0.05$, ** < 0.01 , *** < 0.001

PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influences, FC: Facilitating Conditions, IU: Intention to use telehealth, ICU: Intention to continue to use telehealth

7.1.6 Correlations among Core Constructs.

Bivariate analyses were conducted to examine the associations among telehealth acceptance, telehealth use, intention to use or continue to use telehealth, innovation culture, and agency size. Pearson's correlations were used for interval data and are reported in Table 8.

H1 predicted that a greater acceptance of telehealth use is correlated with greater telehealth use in the past 30 days. This prediction was supported by moderate correlations (EE: 0.38**, SI: 0.43**, FC: 0.37**) between the acceptance variables and agencies' telehealth use. In addition, there were moderate correlations between years of experience using telehealth at the current agency and telehealth acceptance variables (PE: 0.20**, EE: 0.35**, SI: 0.36**, FC: 0.36**). Agencies with a greater number of years of experience using telehealth were reporting a greater acceptance of it. There were also moderate correlations between types of telehealth-provided in past month and telehealth acceptance variables (PE: 0.34**, EE: 0.41**, SI: 0.49**, FC: 0.48**). For instance, agencies that utilized a greater variety of telehealth technology types perceived telehealth as more useful and easy to use.

H2 predicted that a greater acceptance of telehealth use is correlated with a greater intention to use/continue to use telehealth in the next 12 months. This prediction was supported with moderate to strong correlations. Intention to use telehealth was moderately correlated with each of the telehealth acceptance variables (PE: 0.50**, EE: 0.56**, SI: 0.60**, FC: 0.55**). For instance, those who perceived telehealth as positively perceived by important others, had a greater intention to use telehealth within

the next 12 months. Additionally, intention to continue to use telehealth was moderate to strongly correlated with each of telehealth acceptance variables (PE: 0.55**, EE: 0.64**, SI: 0.72**, FC: 0.37**). Those who perceived telehealth as easy to use had a greater intention to continue to use telehealth within the next 12 months.

H3A predicted that a greater acceptance of telehealth use is associated with greater innovation culture. This was supported by moderate correlations between innovation culture and each of telehealth acceptance variables (PE: 0.20**, EE: 0.27**, SI: 0.32**, FC: 0.40**). Participants who reported a greater innovation culture score also reported a greater acceptance of telehealth use for patient care.

H3B predicted that a greater acceptance of telehealth use is associated with the size of the agency (number of professional staff & patients served). This hypothesis was not supported. There were weak correlations (<0.3) between the approximate number of professional staff at the agency and telehealth acceptance variables. There were also weak correlations (<0.3) between the approximate number of patients agency served in past year and telehealth acceptance variables. Age did not have a significant correlation with telehealth acceptance variables.

Table 8: Pearson's Product-moment Coefficients among the Variables Evaluated

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 PE	1													
2 EE	0.70**	1												
3 SI	0.69**	0.78**	1											
4 FC	0.53**	0.69**	0.72**	1										
5 IC	0.20**	0.27**	0.32**	0.40**	1									
6 IU	0.50**	0.56**	0.60**	0.55**	0.13	1								
7 ICU	0.55**	0.64**	0.77**	0.72**	0.37**	n/a	1							
8 TELEDY	0.23	0.38**	0.43**	0.37**	0.01	n/a	-0.06	1						
9TELEYR	0.20**	0.35**	0.36**	0.36**	0.23**	0.24**	0.22**	0.31*	1					
10TELETYP	0.34**	0.41**	0.49**	0.48**	0.27**	0.43**	n/a	-0.01	0.47**	1				
11 STF	0.17**	0.23**	0.20**	0.25**	0.11*	0.04	0.20**	-0.01	0.14**	0.25**	1			
12 PTS	0.05	0.05	0.05	0.11**	-0.05	0.08	0.07	0.33*	0.02	0.06	0.34**	1		
13 BDG	0.26**	0.34**	0.32**	0.35**	0.21**	0.18	0.32**	.00	0.29**	0.35**	0.43**	0.10*	1	
14 AGE	-0.05	-0.02	-0.6	-0.3	-0.03	-0.01	-0.09	0.09	0.22**	-0.08	-0.08	-0.03	0.19**	1

PE: Performance Expectancy, EE: Effort Expectancy, FC: Facilitating Conditions, SI: Social Influences, IC: Innovation Culture, IU: Intention to Use telehealth, ICU: Intention to Continue to use telehealth, TELEDY: Days provided Telehealth services in past month, TELEYR: Years of experience using Telehealth at the current agency, TELETYP: Types of Telehealth provided in past month, STF: Approximate number of professional staff at the agency, PTS: Approximate number of patients agency served in past year, BDG: Agency Annual Budget

General Linear Regression: Multivariate Analysis of Variance (MANOVA)

MANOVAs (Bock & Haggard, 1968) were conducted to examine overall group differences on dependent variables. To correct negative skewness/left-skewness of data, performance expectancy, effort expectancy, social influences, facilitating conditions, innovation culture, and intention to continue use telehealth were squared which resulted in normally distributed data suitable for regression analyses. Intention to use was not transformed as it was normally distributed.

7.1.7 Perception of Telehealth.

Hypothesis 3e: Gender Differences in Perception of Telehealth

H3e predicted that gender moderates the relationship between perception of telehealth and telehealth use. Table 9 presents means, standard deviations, and analyses that assess this hypothesis. This prediction was not supported by the analysis. Overall, there were no significant differences between males and females on the perception of telehealth. Additionally, there were no significant differences between genders for each subscale of perception of telehealth.

Table 9: MANOVA Comparisons of Gender on Perception of Telehealth

Gender	Male (N=67)	Female (N=449)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p- value)
Performance Expectancy	4.90 (1.01)	4.97 (1.08)	0.31 (0.58)
Effort Expectancy	5.05 (1.13)	5.21 (1.27)	1.13 (0.29)
Social Influences	4.68 (1.18)	4.78 (1.14)	0.66 (0.42)
Facilitating Conditions	4.47 (1.31)	4.69 (1.33)	1.57 (0.21)
Wilks' Lambda (4,514)=0.99, 0.77			

p<0.05, **<0.01, *<0.001*

Hypothesis 3C: Staff Position Differences in Perception of Telehealth

Hypothesis 3C predicted differences in telehealth perception between directors and direct service providers. Table 10 reports means, standard deviations, and analyses that assess this hypothesis. Performance expectancy, effort expectancy, social influences, and facilitating conditions differed significantly between directors and direct service providers. Overall differences between the groups reached significance and supported Hypothesis 3C (Wilks' Lambda: 0.98, p-value: 0.04*). The greatest difference between directors and direct service providers, on average, was in the variable effort expectancy. The smallest difference was in performance expectancy with both groups reporting a positive perception of telehealth usefulness. Meanwhile, direct service providers reported a greater ease of use and usefulness of telehealth than directors.

Table 10: MANOVA Comparisons of Directors and Direct Service Providers on Perception of Telehealth

Staff Position in the Agency	Directors (N=448)	Direct Service Providers (N=68)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Performance Expectancy	4.92(1.09)	5.25(0.89)	5.11(0.02)*
Effort Expectancy	5.12(1.28)	5.64(0.93)	9.86(0.00)*
Social Influences	4.72(1.17)	5.07(0.95)	5.28(0.02)*
Facilitating Conditions	4.61(1.34)	4.99(1.17)	4.44(0.04)*
Wilks' Lambda (4,516)=0.98, 0.04*			

* $p < 0.05$, ** < 0.01 , *** < 0.001

Hypothesis 3D: Depression Service Status Differences in Perception of Telehealth

Hypothesis 3D predicted that perception of telehealth would be different between agencies that provide depression services and those that did not. Table 11 shows means, standard deviations, and analyses that assess this hypothesis. Overall differences between depression service providing agencies and non-providing agencies were not significantly different and thus, hypothesis 3D was not supported (Wilks' Lambda: 0.99, p-value: 0.30). However, there was a significant difference in perceived facilitating conditions between depression service providing agencies and non-providers (F: 4.36, p-value: 0.03*).

Table 11: MANOVA Comparisons of Depression Service Providing Agencies and Non-Providing Agencies on Perception of Telehealth

Depression Services	Depression Service Providing Agencies (N=370)	Depression Service Non-Providing Agencies (N=144)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Performance Expectancy	5.01(1.07)	4.84(1.08)	2.61(0.09)
Effort Expectancy	5.24(1.24)	5.06(1.28)	2.06(0.13)
Social Influences	4.81(1.18)	4.65(1.06)	2.25(0.06)
Facilitating Conditions	4.74(1.32)	4.47(1.32)	4.36(0.03)*
Wilks' Lambda (4,514)=0.99, 0.30			

* $p < 0.05$, ** < 0.01 , *** < 0.001

Hypothesis 3E: Telehealth Training Status Differences in Perception of Telehealth

Hypothesis 3E predicted differences in telehealth perception between agencies that provide telehealth training and those did not. Table 12 reports means, standard deviations, and analyses to assess this hypothesis. Overall differences between telehealth staff training providing agencies and non-providing agencies were significantly different and thus, hypothesis 3E was supported (Wilks' Lambda: 0.86, p-value: 0.00**). In general, agencies that provided telehealth staff training had more positive perceptions toward telehealth. The greatest difference between groups was in the facilitating conditions score, with a greater score reported among agencies that provided telehealth training for staff. Meanwhile, the smallest difference between groups was in performance expectancy score with a greater score reported among agencies that provided telehealth training for staff. Similar patterns held true for telehealth patient training providing agencies and non-providing agencies. Overall differences between these groups were significantly different and thus, hypothesis 3E was supported (Wilks' Lambda: 0.89, p-value: 0.00**). In general, telehealth patient providing agencies had a more positive score toward telehealth. The greatest difference between groups was in facilitating conditions with the greatest score reported among agencies that provided telehealth training for patients. On the other hand, the smallest difference between groups was in performance expectancy scores.

Table12: MANOVA Comparisons of Telehealth Training Providing Agencies and Non-Providing Agencies on Perception of Telehealth

Telehealth Training	Telehealth Training Providing Agencies (N=370)	Telehealth Training Non-Providing Agencies (N=144)	Test for Group Differences
<i>Telehealth Training for Staff</i>			
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Performance Expectancy	5.23(0.98)	4.63(1.20)	19.50(0.00)**
Effort Expectancy	5.59(0.94)	4.64(1.45)	41.92(0.00)**
Social Influences	5.17(0.89)	4.08(1.32)	63.69(0.00)**
Facilitating Conditions	5.13(1.07)	3.88(1.40)	62.19(0.00)**
Wilks' Lambda (4,386)=0.86, 0.00*			
<i>Telehealth Training for Patients</i>			
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Performance Expectancy	5.22(0.90)	4.69(1.21)	15.80(0.00)**
Effort Expectancy	5.60(0.94)	4.66(1.44)	42.07(0.00)**
Social Influences	5.15(0.92)	4.25(1.29)	43.01(0.00)**
Facilitating Conditions	5.12(1.08)	4.02(1.44)	47.67(0.00)**
Wilks' Lambda (4,384)=0.89, 0.00**			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Hypothesis 1: Telehealth Adoption Status Differences in Perception of Telehealth

Hypothesis 1 predicted that there are differences in telehealth perception between agencies that provide telehealth services and those that do not. Table 13 reports means, standard deviations and analyses to assess this hypothesis. There was a significant difference (p-values: 0.00**) in telehealth perception between telehealth service providing agencies and non-providers. On average, there was a significant difference in facilitating conditions with telehealth service providing agencies reporting a significantly great score compared to agencies that did not provide telehealth (F-test: 80.97, p-value: 0.00**). Overall differences between telehealth service providing agencies and non-providing agencies were significant and thus, hypothesis 1 was supported (Wilks' Lambda: 0.85, p-value: 0.00**)

Table13: MANOVA Comparisons of Telehealth Service Providing Agencies and Non-Providing Agencies on Perception of Telehealth

Telehealth Services	Telehealth Service Providing Agencies (N=381)	Telehealth Service Non-Providing Agencies (N=126)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Performance Expectancy	5.13(0.97)	4.49(1.20)	36.54(0.00)**
Effort Expectancy	5.44(1.10)	4.44(1.42)	67.46(0.00)**
Social Influences	5.00(1.04)	4.06(1.18)	72.10(0.00)**
Facilitating Conditions	4.95(1.33)	3.81(1.31)	80.97(0.00)**
Wilks' Lambda (4,507)=0.85, 0.00**			

* $p < 0.05$, ** < 0.01 , *** < 0.001

Comparisons by Agency Type in Perception of Telehealth

Table 14 reports means, standard deviations and analyses. There was a significant difference in the perception of telehealth between HHC only agencies and HHC & Hospice agencies. Agencies with both HHC and hospice services reported a more positive perception of telehealth (PE: 5.17, EE: 5.39, SI: 5.00, FF: 4.86).

Table14: ANOVA Comparisons of Different Agency Types on Perception of Telehealth.

Agency Types	Home Health Care (N=294)	HHC & Hospice (N=206)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Performance Expectancy	4.85 (1.09)	5.17 (1.03)	6.08 (0.00)**
Effort Expectancy	5.10 (1.26)	5.39 (1.21)	5.58 (0.00)**
Social Influences	4.65 (1.15)	5.00 (1.08)	9.20 (0.00)**
Facilitating Conditions	4.56 (1.36)	4.86 (1.26)	5.94 (0.00)**

* $p < 0.05$, ** < 0.01 , *** < 0.001

Comparisons by Agency Legal Status in Perception of Telehealth

Table 15 reports means, standard deviations and analyses. Overall, there was a significant difference in the perception of telehealth among agencies with different legal status (Wilks' Lambda: 0.94, p-value: 0.00**). Non-profit agencies reported a more positive perception of telehealth on average versus for-profit agencies. Additionally, non-profit reported a greater score for each subscale. For instance, non-profit agencies had a more positive perception toward performance expectancy of telehealth.

Table15: MANOVA Comparisons of Different Agency Legal Status on Perception of Telehealth

Agency Legal Status	Non-profit (N=358)	For-Profit (N=152)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Performance Expectancy	5.07 (1.03)	4.73 (1.14)	3.70 (0.01)**
Effort Expectancy	5.34 (1.20)	4.83 (1.32)	6.45 (0.00)***
Social Influences	4.92 (1.09)	4.41 (1.21)	8.40 (0.00)***
Facilitating Conditions	4.85 (1.25)	4.22 (1.38)	9.02 (0.00)***
Wilks' Lambda (4,515)=0.94 0.00***			

* $p < 0.05$, ** < 0.01 , *** < 0.001

7.1.8 Intention to Use/Continue to Use Telehealth.

Comparisons by Staff Position in Intention to Use Telehealth

There was no significant difference (F-test: 0.90, p-value: 0.34) in intention to use telehealth between directors and direct service providers. Meanwhile, there was a significant difference (7.73, 0.00**) in intention to continue to use telehealth between directors and direct service providers. Direct service providers reported a greater intention to continue to use telehealth when compared to directors. Both directors and direct service providers reported scores lower than the midpoint (4 out of 7), leaning toward low intention.

Table 16: ANOVA Comparisons of Directors and Direct Service Providers on Intention to use/Intention to continue to use Telehealth

Position in the Agency	Directors (N=117)	Direct Service Providers (N=10)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Intention to Use Telehealth	3.43 (1.63)	2.92 (1.31)	0.90 (0.34)
Position in the Agency	Directors (N=330)	Direct Service Providers (N=58)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Intention to Continue to Use Telehealth	5.16 (1.27)	5.65 (0.98)	7.73 (0.00)**

* $p < 0.05$, ** < 0.01 , *** < 0.001

Hypothesis 4A: Telehealth Training Status Differences in Intention to Continue to Use Telehealth

Hypothesis 4A predicted that there are differences in intention to continue to use telehealth between agencies that provide telehealth training for staff/patients and those that do not. Table 15 reports means, standard deviations and analyses to assess this hypothesis. There was a significant difference (F-test: 61.05, p-value: 0.00**) in intention to continue to use telehealth between staff telehealth training providing agencies and non-providers. Additionally, there was a significant difference (56.43, 0.00**) in intention to continue to use telehealth between patient telehealth training providing agencies and non-providers.

Table 17: ANOVA Comparisons of Telehealth Training Providing Agencies and Non-Providing on Intention to Continue to Use Telehealth

Telehealth Training	Staff Telehealth Training Providing Agencies (N=329)	Staff Telehealth Training Non-Providing Agencies (N=58)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Intention to Continue Use	5.47(1.02)	3.93(1.58)	61.05(0.00)**
Telehealth Training	Patient Telehealth Training Providing Agencies (N=329)	Patient Telehealth Training Non-Providing Agencies (N=58)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Intention to Continue to Use	5.45(1.02)	4.11(1.66)	56.43(0.00)**

*p<0.05, **<0.01, ***<0.001

7.1.9 Current Telehealth Use.

Comparisons by Depression Service Status in Current Telehealth Use

There was a significant difference in the number of types of telehealth services currently utilized by depression service providing agencies versus non-providers (F-test: 9.20, p-value: 0.00**). Agencies that provide depression services reported a greater mean number of types of telehealth services currently provided.

Table18: ANOVA Comparisons of Depression Service Providing Agencies and Non-Providing Agencies on the Number of Types of Telehealth Services Currently Provided.

Depression Services	Depression Service Providing Agencies (N=367)	Depression Service Non-Providing Agencies (N=141)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Number of Types of Telehealth Services Currently Provided	2.14 (1.63)	1.65 (1.59)	9.20 (0.00)**

* $p < 0.05$, ** < 0.01 , *** < 0.001

Comparisons by Telehealth Training Status in Current Telehealth Use

There was a significant difference in the number of types of telehealth services currently provided between agencies providing staff telehealth training versus non-providers (F-test: 66.62, p-value: 0.00)***. Additionally, there was a significant difference in the number of types of telehealth services currently provided between agencies providing patient telehealth training and non-providers (F-test: 57.44, 0.00***).

Table 19: ANOVA Comparisons of Telehealth Training Providing Agencies and Non-Providing Agencies on the Number of Types of Telehealth Services Currently Provided.

Telehealth Training	Staff Telehealth Training Providing Agencies (N=325)	Staff Telehealth Training Non-Providing Agencies (N=59)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Number of Types of Telehealth Services Currently Provided	2.86 (1.29)	1.42 (0.95)	66.62 (0.00)***
Telehealth Training	Patient Telehealth Training Providing Agencies (N=322)	Patient Telehealth Training Non-Providing Agencies (N=62)	Test for Group Differences
Variables	Mean (SD)	Mean (SD)	F-test (p-value)
Number of Types of Telehealth Services Currently Provided	2.86 (1.31)	1.53 (0.99)	57.44 (0.00)***

* $p < 0.05$, ** < 0.01 , *** < 0.001

Predictors of Perception of Telehealth

Hierarchical regression analyses were conducted to examine the simultaneous effects of control variables, participant variables, and agency variables on the perception of telehealth. The regression analyses accounted for 33% of the variance in perception of telehealth (Table 20). Two of the blocks of independent variables resulted in a significant change in the model R^2 . The most powerful individual predictor of staff perception of telehealth was innovation culture. Meanwhile, the most powerful agency predictor of staff perception of telehealth was the presence of telehealth training of staff. Using the stepwise procedure, at the 5 percent level of significance, 6 variables (Innovation culture, staff training for telehealth, budget, years of experience in using telehealth at the current agency, profession, access to hospital records) were identified as key predictor variables of perception of telehealth (R^2 :0.33, Adj.: 0.29, p-value: 0.000***).

Table 20: Summary of Hierarchical Regression Analysis for Variables Predicting Perception of Telehealth

	Variables	B	SE B	B
Step 1	Control Variables			
	Age	-0.07	0.09	-0.01
	Gender	-0.43	1.43	0.02
	Race	-0.23	0.72	-0.02
R²: 0.02, Adjusted R²: 0.01				
Step 2	Participant Variables			
	Years of Experience in Profession	-0.02	0.08	-0.03
	Years of Experience in Home Health Care	-0.02	0.07	-0.02
	Years of Experience in Using Telehealth	0.28	0.12	0.13*
	Innovation Culture	0.29	0.05	0.30***
	Profession	-1.26	0.59	-0.12*
R²: 0.23***, Adjusted R²: 0.21				
Step 3	Agency Variables			
	Training of Staff	4.28	2.00	0.17*
	Training of Patients	0.48	2.00	0.02
	Depression Service Provided	0.40	1.03	0.02
	Number of Professional Staff	0.00	0.00	0.08
	Number of Patients Served	0.00	0.00	0.07
	Agency Type	-0.04	0.47	-0.00
	Organizational Type	0.30	0.50	0.03
	Legal Status	-0.43	1.03	-0.02
	Budget	1.26	0.52	0.15*
	Access to Hospital Records	2.23	1.08	0.11*
Provide Services in Other Language	-2.00	1.00	-0.10*	
R²: 0.33***, Adjusted R²: 0.28				

* $p < 0.05$, ** < 0.01 , *** < 0.001

Predictors of Intention to Use Telehealth

Hierarchical regression analyses were conducted to examine the simultaneous effects of control variables, participant variables, agency variables, and perception of telehealth on intention to use telehealth. The regression analyses accounted for 58% of the variance in intention to use telehealth (Table 21). Using the stepwise procedure, at the 5 percent level of significance, 3 variables (Years of experience in using telehealth at the current agency, social influences, and facilitating conditions) were identified as key predictor variables of intention to use telehealth (R^2 : 0.48, Adj.: 0.49, p-value: 0.00***).

Table 21: Summary of Hierarchical Regression Analysis for Variables Predicting Intention to Use Telehealth

	Variables	B	SE B	B	
Step 1	Control Variables				
		Age	-0.06	0.13	-0.05
		Gender	-5.61	2.29	-0.18*
		Race	0.37	1.03	0.03
R²: 0.02, Adjusted R²: -0.01					
Step 2	Participant Variables				
		Years of Experience in Profession	0.03	0.13	0.03
		Years of Experience in Home Health Care	-0.00	0.13	-0.00
		Years of Experience in Using Telehealth	1.43	0.65	0.18
		Innovation Culture	0.04	0.10	0.03*
		Profession	-0.40	1.00	-0.04
R²: 0.12, Adjusted R²: 0.05					
Step 3	Agency Variables				
		Depression Service Provided	-1.23	1.65	-0.05
		Number of Professional Staff	-0.00	0.01	-0.02
		Number of Patients Served	0.00	0.00	0.04
		Agency Type	-0.87	1.05	-0.06
		Organizational Type	-0.22	0.96	-0.02
		Legal Status	-0.27	1.77	-0.01
		Budget	0.30	1.10	0.03
		Access to Hospital Records	0.50	1.95	0.02
		Provide Services in Other Language	-1.08	1.87	-0.05
R²: 0.19, Adjusted R²: 0.04					
Step 4	Perception of Telehealth				
		Performance Expectancy	0.26	0.15	0.24
		Effort Expectancy	-0.13	0.14	-0.14
		Social Influences	0.36	0.15	0.29*
		Facilitating Conditions	0.53	0.12	0.43*
R²: 0.58***, Adjusted R²: 0.48					

* $p < 0.05$, ** < 0.01 , *** < 0.00

Predictors of Intention to Continue to Use Telehealth

Hierarchical regression analyses were conducted to examine the simultaneous effects of control variables, participant variables, agency variables, and perception of telehealth on intention to continue to use telehealth. The regression analyses accounted for 68% of the variance in intention to continue to use telehealth (Table 22). Using the stepwise procedure, at the 5 percent level of significance, 3 variables (Staff training of telehealth, social influences, and facilitating conditions) were identified as key predictor variables of intention to continue to use telehealth (R^2 : 0.67, Adj.:0.67, p-value: 0.000***).

Table 22: Summary of Hierarchical Regression Analysis for Variables Predicting Intention to Continue to Use Telehealth

	Variables	B	SE B	B
Step 1	Control Variables			
	Age	-0.12	0.08	-0.10*
	Gender	0.46	1.27	0.01
	Race	0.04	0.65	0.00
R²: 0.02*, Adjusted R²: 0.01				
Step 2	Participant Variables			
	Years of Experience in Profession	0.08	0.07	0.07
	Years of Experience in Home Health Care	-0.01	0.06	-0.01**
	Years of Experience in Using Telehealth	-0.01	0.11	-0.01***
	Innovation Culture	0.05	0.05	0.04***
	Profession	0.86	0.53	-0.06
R²: 0.22***, Adjusted R²: 0.19				
Step 3	Agency Variables			
	Training of Staff	2.67	1.81	0.09***
	Training of Patients	2.89	1.78	0.09*
	Depression Service Provided	1.12	0.92	0.04
	Number of Professional Staff	-0.00	0.00	-0.01
	Number of Patients Served	0.00	0.00	0.05
	Agency Type	-0.11	0.43	-0.01
	Organizational Type	0.77	0.45	0.06
	Legal Status	-0.80	0.92	-0.30
	Budget	0.53	0.47	0.05*
	Access to Hospital Records	-0.02	0.97	-0.00
	Provide Services in Other Language	-0.15	0.89	-0.01
R²: 0.36***, Adjusted R²: 0.31				
Step 4	Perception of Telehealth			
	Performance Expectancy	0.08	0.06	0.07
	Effort Expectancy	-0.01	0.06	-0.01
	Social Influences	0.50	0.08	0.41***
	Facilitating Conditions	0.32	0.06	0.31***
R²: 0.68***, Adjusted R²: 0.65				

* $p < 0.05$, ** < 0.01 , *** < 0.001

Predictors of Current Telehealth Use

Hierarchical regression analyses were conducted to examine the simultaneous effects of control variables, participant variables, agency variables, and perception of telehealth on current telehealth use. The regression analyses accounted for 33% of the variance in the number of types of telehealth currently used (Table 23). Using the stepwise procedure, at the 5 percent level of significance, 4 variables (Innovation culture, staff telehealth training, patient telehealth training, and budget) were identified as key predictor variables of the number of types of telehealth currently used (R^2 : 0.23, Adj.:0.22, p-value: 0.000***).

Table 23: Summary of Hierarchical Regression Analysis for Variables Predicting the Number of Types of Telehealth Services Currently Provided

	Variables	B	SE B	B
Step 1	Control Variables			
	Age	-0.01	0.01	-0.08
	Gender	-0.45	0.22	-0.11*
	Race	0.05	0.11	0.02
R²: 0.02, Adjusted R²: 0.01				
Step 2	Participant Variables			
	Years of Experience in Profession	0.00	0.01	0.02
	Years of Experience in Home Health Care	-0.01	0.01	-0.08
	Years of Experience in Using Telehealth	0.02	0.02	0.05
	Innovation Culture	0.01	0.01	0.05
	Profession	0.10	0.10	0.06
R²: 0.14***, Adjusted R²: 0.12				
Step 3	Agency Variables			
	Training of Staff	0.33	0.31	0.09
	Training of Patients	0.74	0.30	0.20*
	Depression Service Provided	0.23	0.16	0.07
	Number of Professional Staff	0.00	0.00	0.01
	Number of Patients Served	0.00	0.00	-0.02
	Agency Type	0.07	0.07	0.05
	Organizational Type	0.11	0.08	0.07
	Legal Status	-0.15	0.16	-0.05
	Budget	0.15	0.08	0.12
	Access to Hospital Records	0.21	0.17	0.07
	Provide Services in Other Language	0.16	0.15	0.06
R²: 0.29***, Adjusted R²: 0.24				
Step 4	Perception of Telehealth			
	Performance Expectancy	0.01	0.01	0.07
	Effort Expectancy	-0.01	0.01	-0.08
	Social Influences	0.02	0.01	0.14
	Facilitating Conditions	0.01	0.01	0.12
R²: 0.33***, Adjusted R²: 0.27				

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7.2 Agency Director Qualitative Interview Results

Twenty agency directors were interviewed between June and July 2014. Twelve directors from agencies that adopt telehealth and eight directors from agencies did not adopt telehealth at the point of the interview participated. Interviews were recorded and then transcribed verbatim by the investigator. Transcribed data was analyzed according to the grounded theory, and organized by reoccurring themes with NVivo (11.4.1). Table 25 provides the description of participant demographic information. The mean age of the interview participants was 48.50 years old. The majority was female (80%) white/Caucasian (100%) with nursing (85%) as their profession. On average, the participants had 29.40 years of experience in their profession and 18.08 years of experience in the home health care setting.

Table 24: Interview Participant Demographic Information

Participant Characteristics (N=20)	Mean (SD)
Age	48.50
Gender	N (%)
Female	16 (80)
Male	4 (20)
Race	N (%)
White/Caucasian	20 (100)
Years of Experience in Profession	Mean (SD)
	29.40 (8.98)
Years of Experience in Homecare	Mean (SD)
	18.08 (7.50)
Agency Telehealth Adoption Status	N (%)
Adopters (Yes)	12 (60)
Non-Adopters (No)	8 (40)

Thematic Analyses

The first part of this thematic analyses section includes core themes identified from the responses to the question, “What barriers and facilitators to adopting telehealth are described by home health care staff?” The second section includes the summary of perception of telehealth in patient care. Additionally, factors associated with perception were identified. The last section includes responses to the question, “What are strategic and policy recommendations for telehealth adoption in the home health sector?” Responses were categorized into two levels – patient and staff.

7.2.1 Barriers & Facilitators to Telehealth Adoption & Use.

Factors that affected the HHC agencies’ telehealth adoption and use were identified and categorized into the following four core themes: 1) agency-related characteristics, 2) patient home environment, 3) reimbursement and cost-related factors, and 4) buy-ins.

- 1) **Agency-related characteristics** identified included a) the size of the agency, b) rural location of the agency and the patients, and c) leadership initiation and involvement.
 - a) **The Size of the Agency:** Four of the participants reported that the small size of the agency as a key deterrent to telehealth adoption at their HHC agencies. Meanwhile, three participants acknowledged that because of the relatively large size of their agency, with multiple branches, they could bear the cost and administer pilot programs. This may be because more resources and staff were available at the larger agencies. One participant claimed that her hands were

full in terms of managing existing programs and she did not have staff and resources to implement and support a new program. Meanwhile, four participants felt that telehealth may not be as cost effective for smaller agencies. For instance, one participant stated,

“I would think that because we are smaller agencies, I am not sure if we could bear the cost. I am not sure for small agencies like we are telehealth could be cost effective. I do not know if mileage and time for travel would be cost saving for our size agencies and community. It might be actually cost effective for us to get in a vehicle and see the patients.”

Another director reported, *“We are a small agency. We are a couple of minutes from our patients and not a rural agency so the nurse would make visits anyway, so I do not think the technology really decrease skill nurse visits in the house.”*

Additionally, some perceived that with a smaller agency serving a smaller area, it may have been easier to get to know the agency and to develop a sense of trust with the patient community when face-to-face. One reported,

“Since we are in a small county, it would be advantageous for our HHC nurses to be seen in the community. It is because people get to know who we are easier when one-on-one. The nurses are visiting different businesses within small communities, eating at the local restaurants, trying to get to know the patients and they can develop a

sense of trust over that. That I do not know if you could do that over telehealth.”

- b) **Rural Location:** Six participants reported that the agency that served rural areas might be more willing to adopt telehealth because of the greater mileage spent in covering patients during face-to-face, suggesting that telehealth could bring about cost savings from reduced traveling. One participant viewed telehealth as a cost saving in a long run stated, *“Some nurses take an hour and a half drive out there just to make a visit in the rural area. If we can do telehealth for them then we can get a lot of data without driving which would be cheaper for us then paying us to get there in a long run.”*

Additionally, telehealth could be useful for patients in rural areas who often have limited access to health care because of transportation issues. For instance, one participant stated, *“Right now in our state, HHC agencies sometimes have to reject patients outside of their driving range, especially the ones in the central part of the state. Telehealth could be beneficial for them.”*

Despite these perceived needs for telehealth in serving rural areas, half of those participants were unable to serve their patients because of the limited or nonexistent internet or cellular coverage in the area. One participant reported,

“One of the big impairments in the rural area is an access to a good communication system. We have patients that have no internet and no cell phone coverage. They may have an old phone line that is not good for some of the high-tech telehealth and does not handle the data being transmitted (e.g., cannot send a fax, connect to phone).”

c) **Leadership Initiation & Involvement:** Five of the participant agencies' telehealth programs were initiated by managerial leadership, who also played a key role in implementing and sustaining the telehealth program. In one agency, the director came upon the information on telehealth at a convention and then introduced it to the agency, which eventually decided to take a chance on it. Similarly, another participant reported,

“It all started when our current director started with us. She had the program in other state and they had telehealth. She came to our program and said we need to get this technology and utilize it so they went to get a grant and got the monitors.”

In another agency, the corporate office decided to go with telehealth which then was enforced on other branches, and initiated a deal with the telehealth manufacture. Additionally, two of the participants who were directors hired grant writers and wrote grants themselves in an effort to sustain or expand their telehealth programs. For instance, an agency director had been pushing for telehealth since the late 1990s and has been applying for grants at both the state and the federal level. Another director had been actively involved in getting buy-in throughout the agency. She had been continuously communicating the benefits of telehealth in staff meetings and had initiated incentives for telehealth use among nurses. In addition, she had purposely located the telehealth rooms near her office to observe the monitors frequently. Two of the director participants were even involved with training

staff during the new staff orientation or they organized one-on-one meetings, and they completed a certification course through a university.

- 2) **Patient Home Environment.** Five of the participants identified safety and sanitary conditions of the patient home environment to be discouraging their agencies from utilizing telehealth. It was especially important that the patient's home was sanitary since the equipment had to be shared with other patients. One participant reported that some of their patients' houses were so infested that they could not have the expensive monitors installed there. Additionally, the safety of the patients' neighborhoods had deterred some participant agencies from delivering a telehealth equipment. For instance, one stated,

“Sometimes technology being in the certain environment, having staff to physically carry the stuff to certain areas is dangerous. I have staff in a county with different demographic. They have a security guard that brings the monitoring to the patients at their home. I know that sometimes physicality of it, like if you do not have a parking spot. It sounds like a simple thing but when you have to walk two blocks with the equipment in those areas, it is risky.”

Another participant had a similar concern and stated,

“We work in the poorest areas of the city so carrying an equipment that is cellular or not does not matter. As long as it looks like a valuable, companies can be reluctant and patients can be reluctant to have it in their homes. There can be family members in the homes, performing illegal activities and not wanting anybody to come into their homes with

the equipment. There is not a lot we can do to make them feel more comfortable with the safety component. If someone has a son who is a drug addict and decides to take the equipment and sell it, then there isn't much we can do about that."

Another agency could not provide telehealth because some of its patients did not even have homes and lived in projects. Its staff was concerned about safety. There could be guns and drugs so some of the manufacturers did not want to deliver the equipment.

3) Reimbursement & Cost-related Factors. All of the participants identified a lack of reimbursement (e.g., through Medicare or Medicaid) as the major deterrent to adopting telehealth or expanding their telehealth program. For example, one participant claimed, *"We do not get paid for it. There is no payer source for telehealth. We do not bill privately to patients and we provide it as a service so we do not get reimbursed for telehealth."* Another had a similar concern saying, *"We literally were being paid less than five years ago by Medicare, although all of our expenses have gone up. There are not going to be many innovations in home health unless we can get grants or team up with some other facility."* One participant stated,

"Many of our patients are geriatric patients and do not have internet access. If you are going to give them a device you also need to give them the internet so the cost of that is running in the neighborhood between \$35 and \$50 a month for internet access. And then you would also have to buy

the device although you can use it for several different patients. Our episodes for Medicare patients are 60-days so if you would turn it over every 60-days six times a year, then it will cost you \$100 for an episode. You can probably depreciate that cost over three years and it would not be quite as expensive. But it is expensive because Medicare does not reimburse any telehealth issues at this point.”

Additionally, the majority of the participants claimed that they would be interested in adopting or expanding telehealth if there was some sort of reimbursement. At this point, Medicare does not necessarily recognize a telehealth visit as a reimbursable visit. For Medicaid, every state has a different way of looking at how they fund home health care and most of them pay on per visit cases. Considering such lack of reimbursement, several participants gave specific recommendations for how it might be done. For example, one participant stated,

“I would make it something that it can be directly reimbursable through Medicare part B or something that the National Institute of Health writes direct grants to enable especially rural based agencies to buy the equipment. It might be that Medicare would make it under Accountable Care Organization where HHC agencies team up with a clinic, a hospital or a doctor. There could be a fifty-fifty cost split in buying the equipment. Kind of a co-sponsorship.”

Perceived high telehealth-related costs, including setup costs and monthly fees, deterred the majority of telehealth non-adopting agencies although they perceived it as effective in patient care. One participant stated, *“There is a monthly cost for monitors and communication fee that we have to pay for each monitor. Whether the monitor is being used or not, we are being charged a fee. If there is a way of reimbursing for the monitors that are being used, then I think that will help support motives. Because that is a reason why agencies are deterred from using it. It is a cost factor that they see as a money going out but no money coming in.”*

- 4) **Buy-in.** Thirteen of the participants identified buy-in from the patient, the health professionals or the family member/caregiver as the key determinant in adopting and continuing to use telehealth in their agencies. Buy-in from the health professionals, direct service professionals (e.g., nurses, social workers) was pinpointed by nine participants as the key factor that influenced the agency’s decision to adopt. For instance, one reported,

“Key drivers are bedside clinical practice and primary care providers. They are key at advocating and utilizing technology because all successful programs start with the adoption and buy-in at those levels. You can have the best plans but if you don’t have the buy-in and the support, then the program do not thrive and survive.”

Their buy-in was associated with several factors that are discussed in the next section.

7.2.2. Perception of Telehealth

Overall: The participants had a positive view toward telehealth in chronic disease management. Ninety-five percent of the patients in an agency's telemonitoring program gave a positive feedback on the agency satisfaction survey. In another agency, more than 90% of patients were happy with telehealth services and would recommend it to friends. In fact, five agencies had specific plans to expand their telehealth program within a year, either in purchasing more monitors or providing services for additional diagnoses. For example, one agency intended to use new monitors with video capability to serve its cardiac pulmonary patients starting a week from the interview. Additionally, based on the participants' encounters and satisfaction survey, patient and staff perception of telehealth inpatient care was reported. All participants reported that the majority of patients had a positive perception toward telehealth.

Meanwhile, the HHC staff had a more mixed feeling. Initially, there tended to be resistance toward adopting telehealth. However, once they utilized it and thus saw its benefits in patient care and managing their work, the HHC staff became supportive of telehealth use. One participant stated that she had the most pushback initially from staff as they did not believe it would work. Now, they are the ones who come to her door first thing in the morning asking how the patients are doing. Below are the main factors that formulated such perceptions.

Perceived Effectiveness of Telehealth: Overall, there was a positive perception of the effectiveness of telehealth in improving patient health outcomes and managing chronic disease. Telehealth was perceived to be effective in 1) reducing readmission and re-hospitalization rates, 2) establishing better communication, 3) bringing cost savings, 4) providing additional support systems and 5) establishing a sense of control/independence.

- 1) **Reduced Readmission & Re-hospitalization.** A majority of the participants perceived that telehealth had been or will be effective for reducing readmission and re-hospitalization. For instance, one participant reported, *“There was one gentleman who is no longer alive who before was on the telehealth program. He went into hospital frequently prior to the telehealth program. Once he got onto the program, we kept him out from the hospital for seven years until he passed away. Another person who is still a user of telehealth has stayed away from the hospital since he started.”* Another participant reported, *“Although it varies from the quarter by quarter, usually there has been a significant reduction, 25% decrease in re-hospitalization for telehealth patients.”* One of the telehealth adopters supported its effectiveness, saying, *“It has been really successful. For the first year, we had decreased re-hospitalization by 30% and the second year by 60%, and the third year did not have any re-hospitalization which is quite incredible to think about.”* Additionally, telehealth non-adopting participants also had a positive view. For instance, one participant stated,

“Prevention of re-hospitalization would be a facilitator to telehealth adoption. To be able to be proactive with our clients and catch them

before full blown illness so we can treat them early. We are currently looking at how we can be more efficient in the computer and technology standpoint in hopes that we can build a platform to add telehealth within the next five to seven years. Monitors are being looked at.”

- 2) **Better Communication.** According to staff participants, the patients knew that their nurses were looking at their data daily and were being connected to their health care team. For example, one reported,

“Telehealth prevents unnecessary ER visits by educating better communication with doctors. For instance, instead of calling the doctor’s office saying I cannot breathe, we try to have the patients explain more specifically. Like yesterday I was able to stand at the sink and do the dishes, but today when I got up I became short of breath for ten minutes. That paints a different picture for the doctor and may be treated with a simple intervention as opposed to going into an emergency room.”

Another reported,

“The doctors need as much contact with the patients as much as possible to make the best care decisions. We know that and we want to provide that kind of assistance but just cannot in those situations. When a patient comes into a doctor’s office there is a snapshot in time. The problems they are having at home may not be evident when they are in the doctor’s office for the brief amount time so telehealth enables you to get a bigger picture for doctors in the home environment. How blood pressures are doing at different times and how they are responding, how their vital signs are

fluctuating and changing throughout the day. It gives a doctor a much better picture of what is going on with the patient.”

Some felt that telehealth was an effective way to communicate with patients, especially those who may not really need hands on care but more communication.

- 3) **Cost Savings.** Several participants reported cost savings from reduced visits as the major facilitators of telehealth use. For instance, a participant indicated that telehealth allowed HHC agencies to make telehealth visits based on demonstrated need and not anticipated need. Thus, when the nurses had to make home visits, they could be purposeful and fewer visits were needed which in turn brought cost savings. Additionally, if agencies were successful in managing patients through telehealth, they could increase referrals to the HHC agencies as the providers know and want the agency’s team to manage their patients. Even though it was not a direct billing for the service, if it was done right, the participants thought agencies could make telehealth work in terms of cost. One participant reported,

“There is no reason why a person should need to travel to a primary care and wait for twenty to thirty minutes to have a brief conversation about their blood pressure and it costs all of us a fortune. And that is often usually all that they are getting. There are so many possibilities if people are willing to sit down and think about it. In order to deliver cost-effective, efficient care, the newer interactive video is especially the solution.”

- 4) **Support Systems.** Several participants perceived telehealth as providing an additional support network. A participant stated,

“Our experiences from the past, connecting with people, one of the fabulous things about it is that our patients would dress up. We had a 90-year-old gentleman who would wear different holiday costumes. He was very isolated in the rural area and hard to get to the senior center and people tend to not visit. He was in and out of hospital every other week and once we put in telehealth, he was in and out of the hospital twice in two years until unfortunately, he passed away. It just made such difference for him. He would wear rabbit ears for Easter. Patients really looked forward to connecting with their health care professionals. I think that the social aspect improved and medication piece improved because we can talk to them and ask them to show us medication and food they eat without us physically being there.”

On the other hand, one participant perceived that telehealth lacked personal connection and evaluation through touch and smell, and was more mechanical than personalized. However, the majority of nurses at other agencies perceived that telehealth allowed them to establish long-term relationships with patients, especially those who were isolated or home-bound.

- 5) **A Sense of Control/Independence.** Overall, the participants reported that their patients had been happy with telehealth because it gave them independence and a sense of control in managing their chronic disease. Seven participants mentioned

telehealth as giving a sense of control. For instance, one participant stated,

“Having those daily contacts with patients has shown that it is a good way to educate the patients about the disease and what they need to do to care for themselves, and help them to become independent and to control disease rather than let the disease control them.”

In addition, telehealth was perceived to provide patients something to structure their care around and give them a base to work on. One participant claimed,

“The more structures are obtained, there are better outcomes. Patients know at some point they have to weigh and measure their blood pressure because if they don’t do that we are going to call and check. I think it provides a structure that is much needed in the chronic condition.”

Telehealth was also perceived as allowing patients to remain in the community and function independently and be part of the community again. For instance, one participant reported, *“We have been able to keep them at home. They liked to see their vital signs and liked the fact that it was being looked at by their nurses and found that comforting”*. Nurses also indicated that telehealth gave them independence and it was a good tool for the patients to learn how their health care decisions affect how they feel. According to one participant, *“We felt that the patients needed to be more independent in managing their own chronic disease. And by virtue of putting this device in the home, they were able to take more control and be responsible for themselves.”*

Fear of Unknown. Initially, because of fear of unknown and technology, some patients and staff were resistant to telehealth adoption. One participant stated, *“I will have at least one that will always want to be face-to-face with patients as staff has been always like that and it is not in her comfort zone to see and assess patient over electronic modes.”* However, those participants also reported that once staff used it and could see that telehealth could be successful, they would then have a more positive response. Although eighteen out of twenty participants perceived telehealth as effective in caring for depression among their home health patients, they indicated caution and hesitancy in adopting. This was because the participants felt that they did not know much about telehealth and depression care because of lack of education and training. Additionally, they were not exactly sure how to use or implement telehealth for depression care. One participant stated, *“I am not really sure about telehealth for depression as we haven’t used any program for depression. I know there is literature out that it could be effective. I think it has a place in certain extent.”*

Age. Four of the participants thought that age of the nurses had an impact on how telehealth was perceived. Younger nurses at those agencies loved telehealth and thought a lot can be done without sending them out. Even among participants from HHC agencies yet to adopt telehealth indicated that younger nurses would be excited and more open to utilizing telehealth because it was becoming high cutting edge for many doctors’ offices and clinics. One participant claimed, *“The generation that is coming out from nursing school are grown up with and are used to having devices at their hands all the time. It is just a next*

evolution for them. But for nurses who graduated in the seventies and eighties, this is brand new so they were little hesitant.” Another participant stated, “We also have older nurses who are going to want to see the patients and not wanting to depend on the machine. I think we will meet some resistant there. Overall, no one likes change.”

However, considering the ease of use of telehealth technology, the majority of the participants perceived that the age of the patients was no longer a barrier to telehealth use. For instance, one participant director reported,

“If there is a stable system they know it is going to work, then without much difficulty they will be readily adopting. I have seen some of our elderly patients do well with computers and electronic documents and it doesn’t bother them. For the younger patients we have, for some of them, electronics have been parts of their lives so would have problem adopting. I do not think either age or social status is not a problem. Accessibility nowadays is so wide for exposure to electronics such as computers at the library, doctor’s office and so on. It is becoming more of a norm.”

Five participants reported that older patients, too, were also exposed to technologies and expecting to see it in care. For example, one participant stated,

“Now you just cannot get away from seeing the technology in the hospital so if you don’t see in the home. I think now patients are saying gosh these people are backward. They are stone-age. I think the attitude and expectations of patients are that nurses have laptops and smartphones, and the possibility of telemedicine devices put into the homes are much

more. It is an expectation now as supposed to ten years ago I have been wow that's kind of crazy if I want to do this that attitude. I think those barriers have come way down almost to the point of if you don't have technology the patients might think you are the second rate."

Implications for Staff Roles. Initially, when telehealth was first adopted, some perceived it as threatening in terms of what kind of impact it might have on their jobs. Physicians, who were connected with an agency, were afraid that they might be losing their patients to other health professionals from another state, taking their revenues. Nurses from an agency feared that telehealth was going to replace them although it was not the case. A participant from an agency that paid their nurses on a per visit basis instead of salary, reported that their nurses were worried that telehealth could decrease their pay by reducing in-home visits necessary. The most frequent concern from physicians was that telehealth might be bothersome, adding just more responsibility to their already busy schedule. A participant reported,

"Having telehealth may require physicians to be more involved because if telehealth nurses get abnormal findings then, physicians have to participate more actively. A lot times with brittle diabetic patients with erratic blood sugar, it is hard to stabilize so the patients are usually noncompliant with diet. It becomes an annoyance to the physicians when the patients are no onboard with the plan of care and are on telehealth program because they are getting frequent abnormal readings. HHC agencies are alerted any time their abnormal readings and are required to

act when they get that information. At times blindness could be a wonderful thing. It is not good for the patients but telehealth could create an added burden for the physicians”

Although nurses liked having their patients monitored, nurses were very busy so at times they felt overwhelmed by the communications from telehealth staff because there was another person calling them and emailing them and telling them their patients need contacts.

7.2.3 Strategies for Addressing Barriers

Strategies for addressing barriers to telehealth adoption and use were categorized into the following two levels: 1) patient and 2) staff.

- 1) **Patient-Level.** In an effort to address patients’ fear of technology, agencies provided coaching and education of the patients on telehealth use and benefits either by going through a booklet or having a trained telehealth nurse/installer from the manufacturer demonstrate. For instance, one participant stated,

“We have a manual, user guides, it is a recommendation from the company we have purchased the device from. We also have a competency checklist that the patients need to sign that they are confident in using the device. I deal with troubleshooting of the monitors and a lot of times I can talk through with the patients over the phone. If we cannot fix it over the phone, then we contact the monitor company that has a tech support group that can assist either over a phone call or sends someone in. Whenever we set the monitor up, we train the patients and they have to

demonstrate how to use the equipment and they could use safely.

Everything is gone through together with the patients and also their families if they are there when we set it up.”

Two participant agencies gave patients who were reticent, an option to try and see how they do while emphasizing voluntariness and providing one-on-one support. One participant emphasized that her agency had been trying to arrange things around what worked for the patient and play the detective to work with the patients and the family on how to best use it. Another participant went through each piece of the equipment just to show the patients exactly how it worked so that they patients would feel comfortable. One participant and her staff had gone to the community to educate and promote telehealth. She stated, *“We went to all the meetings and we have been out in the community for education programs. We really promoted it. And now it is like a second nature that everybody is in favor of.”* Meanwhile, in response to housing sanitary issue that deterred telehealth delivery, one agency gave the patient some kind of casing so those people still have access to the valuable health care in spite of their living arrangement.

- 2) **Staff-Level.** In an effort to gain buy-in from staff, HHC agencies attempted not adding too much workload and gaining the trust of nurses by designating a telehealth person. With designated telehealth staff, visiting nurses and telehealth nurses each did their own work and communicated with each other. One participant indicated, *“We have burnt out a couple of nurses. It was because they not only had regular home health patients to meet but also had to set up the patient telehealth and monitor themselves and it was too much for them. It was*

not until somebody was totally in charge of it that nurses were more willing to utilize telehealth.” Another agency established a 24/7 call center where a registered nurse monitored and managed data, and did not have the nurse install the equipment. Instead, the agency purchased vehicles and hired telehealth technicians and non-nurses delivering, testing and installing the equipment.

Additionally, HHC agencies had been responding to staff’s specific needs. For example, some physicians’ complained stating that *“you are sending us report of two weeks’ trends, but I cannot read it because it is too wordy and small. I cannot read it off the fax.”* In response to such need, the participant created a graph instead and sent it to the physicians, and they had a positive response saying that was what they needed. It was again a matter of finding what the issues were and then finding a solution. Agencies also had been educating staff how to be an advocate for telehealth, teaching them the benefits of it and how to articulate that to their patients. Agencies found it effective in getting buy-in. One participant reported,

“In the beginning, staff were like ‘oh no, it is something else to do. What do I have to do?’” It was a bit of resistance to change. I think the best thing we did is to go to all staff meetings and little sessions so they can learn about it, and working with supervisors. They were probably tired after a while but we had weekly meetings and gradually it did work. Even within our organization, our branch has the best reception than some other locations.”

In addition, in an effort to help staff remember the benefits of using telehealth, one agency gave gift cards, incentives and bought lunches to whoever referred the greatest number for telehealth program by the end of the week. The agency director stated, *“We really tried to keep them in front of them to remember and it worked and they have the habit of knowing. And from there we basically built that into our performance review that this is the agency’s standard to provide telehealth to patients who can benefit and it is part of their measurable performance review.”*

In summary, the participants perceived that small-sized HHC agencies lacked resources and staff to adopt telehealth for patient care, and telehealth would likely not be cost effective. Although agencies serving rural areas may benefit from telehealth, lack of access to internet or cellular coverage might also deter HHC agencies from using telehealth. In addition to these agency-related characteristics, the agency leadership initiation and involvement played a key role in implementing and sustaining telehealth programs. Even when telehealth was perceived positively, HHC agencies were discouraged from using telehealth at times because of safety and sanitation issues in the patient’s home environment. All of the participants perceived lack of reimbursement, and high start-up and maintenance fees as the greatest reasons why some agencies had not adopted telehealth. Last but not least, buy-in from the patient, the health professionals, and the family member/caregiver was crucial in motivating HHC agencies to either adopt or continue providing telehealth. Buy-in was associated with several factors such as perceived effectiveness of telehealth. A majority of the participants viewed telehealth as

effective in reducing re-admission and re-hospitalization, bringing cost savings, and establishing better communication between the health professionals and the patients. Additionally, telehealth may provide a support system and a sense of control and independence for the patients.

Despite the perceived benefits of telehealth, there was initial resistance to telehealth adoption, especially among older nurses. This was due to fear of the unknown and the perceived implications for staff roles. For instance, some nurses feared that it would place more work on them or take away their jobs. However, HHC agencies had been planning to address such barriers to telehealth adoption both at the patient and the staff levels through education and strategies for specific needs.

CHAPTER 8: DISCUSSION AND CONCLUSIONS

8.1 Findings

8.1.1 Telehealth Service Use

In line with the previous pilot study results, remote patient monitoring continued to be the most utilized telehealth technology among HHC agencies in patient care. Automatic remote patient monitoring was utilized more than manual remote patient monitoring. Telephonic intervention continued to be the second most used technology. In comparison, about nine percent provided video-conferencing, and a little over twenty percent provided a web-based intervention for patient care.

Telehealth was the most frequently used for monitoring health status and managing chronic disease. It was also used by about one-fourth of agencies to provide either patient or caregiver health education and consultation. The study findings showed that more than half of participants intended to provide remote patient monitoring within the next 12 months. About one-fourth of participants intended to adopt video-conferencing while over one fifth of participants intended to utilize web-based telehealth services.

Monitoring systems tend to be not reimbursable yet can be connected by a phone line and may be more beneficial to patients with particular conditions that need consistent monitoring. Despite the lack of reimbursement for monitoring devices, they have been the most provided telehealth technologies by HHC agencies. This may be potentially explained by the relative simplicity of the technology that is provided via telephone versus video conferencing and web-

based intervention needing an internet connection. For HHC agencies that served patients in rural areas Medicaid provides limited but some form reimbursement; however, it may be hard for them to access internet connections.

In addition, the study findings for depression services provided by HHC agencies were similar to that of the pilot study. A majority of participants reported providing depression services; however, the majority referred their patients to either primary care or specialty care. Less than one-fourth of agencies addressed depression with in-home individual counseling as the predominant service. Telephone counseling was the next most provided direct care for depressed patients, followed by an online support group. It can be inferred that although HHC agencies have begun to use telehealth for depression, telehealth had been predominantly used to address physical conditions such as chronic diseases among HHC agencies. HHC staff perception of telehealth use might explain this difference in care for chronic disease versus depression.

8.1.2 Telehealth Perception

One of the study aims was to explore HHC agencies' perception of telehealth in chronic disease management and depression care. Overall, there was a positive perception of telehealth inpatient care among both the survey and the interview participants. These study findings were similar to the previous pilot study results. A majority perceived telehealth as useful and easy to use for patient care. Additionally, the majority perceived important others to have a high acceptance of telehealth and perceived its agencies to be equipped with resources

to provide telehealth in patient care. For instance, interview participants perceived telehealth to be effective in reducing re-admission and re-hospitalization rates by intervening before the full blown illness. In addition, the interview participants also reported that telehealth enabled better communication between the health professionals and the patients, and also among the health professionals. Telehealth was seen as useful in providing a support system especially necessary for isolated or home-bounded patients.

However, there were differences in how telehealth was perceived for chronic disease management versus depression care. On average, the participants viewed telehealth to be more useful and easier to utilize for chronic disease management than depression care. For example, interview participants were uncertain about using telehealth for depression care because staff lacked knowledge and training. Participants tended to view their agencies as lacking the resources to provide telehealth for depression. They saw a great need in addressing mental health among their home health patients and potential benefits of telehealth but tended to feel that it was beyond their capacity. One of the reasons was the lack of psychiatric nurses in the home health arena.

8.1.3 Factors Associated with Perception

Another aim was to identify factors that predict participants' perception of telehealth. Factors that proved to be predictive of HHC agencies' intention to use telehealth patient care are: 1) agencies' perceived innovation culture, 2) telehealth

training provided for staff, 3) agencies' annual budget, 4) years of experience using telehealth, 5) participants' profession and 6) access to hospital records.

First, participants with a more positive innovation culture at their agencies also had a more positive perception of telehealth. A positive innovation culture within agencies implies "giving employees opportunities to explore and experiment, whereas the management provides support through active encouragement of the employee's innovative behaviors (Streets & Boundary, 20014; Ismail & Abdmajid, 2007)". Thus, such agencies are more open to adopting innovation- a new idea, methods or goods (Rogers & Kim, 1985)-such as telehealth technologies.

Second, a participant from HHC agencies with telehealth training for staff had a more positive view on telehealth. This may be because telehealth training was provided by agencies that already had a positive toward telehealth. Third, those from HHC agencies with a greater annual budget and years of experience in using telehealth had a more positive view toward telehealth in patient care. For instance, interview participants from small agencies with a smaller annual budget felt that it might be more cost effective for the nurses to just get in a vehicle and see the patients instead. They thought the setup and maintenance fee when there was no reimbursement would not be affordable for them.

Fourth, agencies with more years of experience in using telehealth had a more positive view. This may be because agencies saw benefits of telehealth with use and telehealth program became more established and structured. Fifth, there were significant differences in how directors and direct service providers

perceived Telehealth with direct service providers reporting a more positive view. For instance, this may be because the direct service providers were the ones who benefited the most from reduced home visits and from assistance from a telehealth personnel. However, according to the interviews, initially, there was some resistance from direct service providers, especially among older nurses. Older nurses were afraid of trying something new and the implications telehealth might have on their jobs. For example, they fear that telehealth would just be another thing for them to do on top of their already heavy workload. However, with time and educational effort from the leadership, their attitude changed and became more positive.

Sixth, agencies with access to patient hospital records had a more positive perception toward telehealth. It could be inferred from the interviews that agencies with direct patient hospital records tend to be also associated with a hospital system. Through such association, agencies could split the cost of using telehealth and receive more referrals.

In addition, factors that influenced the perception of telehealth by patients and staff were identified in the interviews with HHC agency directors. 1) Perceived effectiveness of telehealth, 2) fear of the unknown, 3) age of staff, and 4) implications for staff roles were reported to be associated with agencies' telehealth use.

First, the overall perception on telehealth for patient care was determined by perceived effective of telehealth in a) reducing readmission and re-hospitalization, b) establishing better communication, c) reducing costs, d) giving

a sense of control/independence and e) providing support systems. For instance, those who perceived telehealth to be effective in reducing re-admission and re-hospitalization among its high-risk patients were also the ones who indicated a great intention to continue to use or even expand their telehealth programs. Second, initially, some patients and staff were resistant to using telehealth because of fear of the unknown, what telehealth was and what telehealth adoption entailed. Third, younger nurses had a more positive view of telehealth and were more open to using it in patient care when compared to older nurses. Similarly, older patients were also hesitant to use telehealth in the beginning. However, once they were exposed to telehealth and started utilizing, they had a more positive view of telehealth. Lastly, how staff perceived implications of using telehealth on staff roles impacted their perception on telehealth for patient care. For instance, some thought that telehealth would increase their workload and was another thing for them to be responsible with. Meanwhile, some physicians thought that telehealth was potentially threatening in that they might lose their patients to other health providers.

8.1.4 Predictors of Telehealth Use

The study aimed to pinpoint factors that predicted participants' intention to use Telehealth and were similar to factors influencing perception. These factors include: 1) innovation culture, 2) social influences, and 3) Facilitating Conditions. Agencies with a more positive innovation culture not only had a more positive perception of telehealth, but also a greater intention to use or continue to use

telehealth within a year. Participants with a more positive view of important other's perspective on telehealth also had a greater intention to use telehealth. For instance, some directors reported that buy-in from important others - staff, patients and family member/caregiver- was a key determinant of telehealth adoption. Additionally, participants who perceived that their agencies were better equipped with Facilitating Conditions such as resources, staff and budget had a greater intention to use telehealth. Surprisingly, effort expectancy and performance expectancy were not predictive of agencies' intention to use Telehealth in patient care.

Meanwhile, factors that predicted agencies' intention to continue to use telehealth were: 1) telehealth training provided for staff, 2) social influences, and 3) Facilitating Conditions. First, participants from agencies that had telehealth training for staff had a greater intention to continue to use telehealth. This aligns with one of participant's claim that lack of structured training and standard were two of factors that discouraged her agency from continue utilizing telehealth. Second, if a participant perceived that important others had a positive view on telehealth, she/he also had a great intention to continue to use telehealth. Third, participants who had a positive perception of Facilitating Conditions in their agencies had a greater intention to continue to use telehealth. In contrast to the hypotheses, effort expectancy and performance expectancy were also not significant predictors of agencies' intention to continue to use telehealth. In short, it can be inferred that for telehealth adopting agencies who already had a positive view of telehealth use, their continual use would be most influenced by external

factors such as important others' perception and agencies availability of resources.

8.2 Limitations to the Design

There were several limitations to this study. First, since this is a cross-sectional study and not a longitudinal one, the causal relations among variables may not be inferred. However, the relation between intention to use and use behavior has been well established in studies (Venkatesh et al., 2003), and thus we can make indirect inferences about the relations between use behavior and staff perception. Also, some of the questions depended on participant recall. For instance, the direct service provider had to recall his/her use of telehealth services within the previous 30 days. In order to assist recall, probing questions on types of telehealth services provided were asked.

Additionally, there was a lack of participant diversity in terms of gender, race, and profession. The study participants were from a homogenous group, primarily Caucasian females from nursing backgrounds. However, the study demographics reflected the United States' predominately female and Caucasian distributions of home health care agency professionals. Also, there were unequal groups of directors and staff providers. This was because online surveys frequently have a time deadline impacting recruitment and staff providers were recruited through directors. Thus, there is a need for a future study with a larger representative sample of staff providers, which may be achieved through collaboration with associations such as the Visiting Nurse Association.

8.3 Implications

These findings have some practical and policy implications. First, they showed that there was a need for training and education on telehealth use. Some of the participants felt that there was not enough training and education provided for staff. A typical training entailed going through each piece of the equipment with the telehealth manufacturer and a booklet or a manufacturer provided manual. However, the participants felt that there was a need for more guidance, for example, in terms of how to communicate with the patients over telehealth, how to establish therapeutic alliance over an electronic medium and how to encourage the patients to comply with the plan of care.

Second, the study showed that there was a need for depression care training and education among HHC agency staff. Despite HHC's great position to addressing depression, considering its staff frequent contacts with the patients; it does not provide direct service to care such as counseling. Currently, HHC agencies are only required to screen patients for depression as part of the OASIS and they would refer their patients to a primary care provider or a specialty care providers. Although the participants saw the potential effectiveness of telehealth in treating depression, they believed that they lacked knowledge and training to do care for it. Additionally, even those who perceived telehealth to be useful in addressing depression thought that their agencies did not intend to adopt telehealth because of uncertainty about how it would work.

There were several policy implications of this study. This study showed changes are needed in reimbursement policies for telehealth. Although some states like California have been adopting policies that are encouraging telehealth services, there is restricted reimbursement for telehealth. Currently, there is no reimbursement by Medicare and

limited reimbursement by Medicaid for HHC agencies. Most of the study participants pointed reimbursement policies as the major barrier to telehealth adoption and use in patient care. Considering the potential effectiveness of telehealth in patient care and willingness of HHC agencies in adopting telehealth, there needs to be reimbursement in place to support such motives. Since HHC agencies are currently reimbursed through Medicare part B, either an increase in the overall payment per 60-day episode or a separate payment per telehealth visit would be helpful. Extra reimbursement may be necessary especially for agencies serving rural areas to pay for cellular coverage and installing internet connection. In the state level, more grants with transparent and reasonable eligibility are needed. One of the participants reported not receiving the grant due to having two of its service regions not falling into particular school zones. With such reimbursement, there is a need for standard and regulation. For instance, performance measurements can ensure the quality of care provided through telehealth.

8.4 Application to Social Work Practice

This study raised some fundamental questions for social workers, not only the ones in the home health arena but also in other applicable fields. First, we need to consider the potential roles of technology in patient care and the concerns to be addressed along with it. For instance, what regulatory guidelines are necessary for terms of confidentiality/privacy? One of the participants who had yet to adopt telehealth showed concern about the legal liability of home health care agencies having the data.

Thus, clinical social workers need to consider: the steps that could be taken to strengthen confidentiality and privacy (e.g., Where will data be stored? Who would have

access to such data?). Those in managerial and administrative roles should also think about necessary structural and regulatory elements (e.g., Interoperability between data systems, standardized training and education). Additionally, social workers who are using or consider using technology in patient care need to think about implications for interacting with a patient in an electronic medium. There were mixed opinions from the participants about the impact of telehealth on establishing a therapeutic alliance. While some perceived telehealth to be as effective in establishing relationships with patients, especially isolated individuals, some thought telehealth lacked personal connection.

8.5 Areas for Further Research

First, it will be important to do a follow-up in a year and explore any changes made, especially regarding telehealth technologies staff intended to be implemented. Through such follow-up, we will be able to observe the trend in telehealth adoption and impact of any policy changes. It will be also crucial to understand strategies that HHC agencies have utilized to overcome barriers to telehealth adoption and implementation. Additionally, a study with a greater representative sample of direct service providers will be necessary. Although this study did survey direct service providers, the majority of whom were nurses, it would also be necessary to understand telehealth adoption and implementation from the perspective of other health care professionals involved such as social workers, physical therapists and case managers.

Second, studies on comparative telehealth program and supporting policies will be needed. Telehealth is being utilized more widely in European countries and Canada. It will be helpful to examine elements of their policies that are supporting telehealth use

among the HHC agencies and in providing integrative care of chronic disease and depression. Through such comparisons, we will be able to brainstorm strategies that would support and advocate for adopting technologies in patient care. Also, in critiquing different telehealth programs across countries, we will be able to determine elements that make a successful telehealth program. For instance, some of the questions to consider are: What are different models of home health care (e.g., pros and cons of each model)? How do the reimbursement policies for HHC agencies affect innovation adoption? What are roles and impact of HHC agencies in the health care, especially in terms of depression care?

Third, the next arena for research would be self-help applications and programs, and e-health communities such as self-health monitoring systems (e.g., Fitbit) and mobile-based health consultations (e.g., Opinion). Self-help resources have been increasingly utilized for both health and mental health care. For instance, the iTunes store has over four thousand health and fitness applications with names that start with A and with many variations in content and quality. Thus, it would be crucial to come up with specific guidelines and standards to ensure the quality of existing applications and programs. Additionally, it would be necessary to study how those applications are being utilized, the factors that determine patients' decision-making as consumers (e.g., perception on pros and cons, self-efficacy) and the impacts of such self-help resources on patients' health behaviors.

Appendix A: Demographic Information of the Pilot Study

Individual Characteristics (N=86)		Frequency (#)	Percent (%)
Gender	Overall	69	80.20
	Female	17	19.80
	Male		
	Managerial/Director		
	Female	57	78.10
	Male	16	21.90
	Direct Service Provider		
	Female	13	100
	Male	0	0
Race	White/Caucasian	83	96.50
	African American	2	2.40
	Other (Asian)	1	1.20
Profession	Overall		
	Registered Nurse	58	67.40
	MSW Social Worker	2	2.30
	Psychiatric Nurse	1	1.20
	Other	25	29.10
	Managerial/Director		
	Registered Nurse	47	64.40
	MSW Social Worker	2	2.70
	Other	24	32.90
	Direct Service Provider		
	Registered Nurse	11	84.60
	Psychiatric Nurse	1	11.10
	Other	1	11.10

Agency Characteristics (N=73)		Frequency (#)	Percent (%)
Agency Type	Community-Based	39	53.40
	Hospital-Based	17	23.30
	Rehab-Based	1	1.40
	Other	16	21.90
Medicare Certified	Yes	72	98.80
	No	1	1.20
Serving MUA & P	Yes	21	28.80
	No	29	39.70
	Don't Know	23	31.50
Serving HPSA	Yes	6	8.20
	No	39	53.40
	Don't Know	28	38.40
Legal Status	Non-profit	43	58.90
	For-profit	30	41.10
Annual Budget	Less than \$1M	6	8.20
	\$1M to \$2.9M	19	26.00
	\$3M to \$6M	23	31.50
	\$6M+	24	32.90
	Missing	1	1.40
		Mean (SD)	Range (Min. Max.)
Professional Staff		258 (801.27)	4994 (6-5000)
Patients served	Managerial/Director (Past year)	8332 (27386.67)	199975 (25-200000)
	Direct Service Provider (Past month)	208.36 (525.659)	1775 (15-1790)

Appendix B: Online Survey

Construct	The Original Question Items	Modified Question Items for this Survey (1: Strongly Disagree, 2: Disagree, 3: Slightly Disagree, 4: Neither Agree Nor Disagree, 5: Slightly Agree, 6: Agree, 7: Strongly Agree)
Performance Expectancy	<ul style="list-style-type: none"> ● I would find the system useful in my job ● Using the system enables me to accomplish tasks more quickly ● Using the system increases my productivity ● If I use the system, I will increase my chances of getting a raise 	<ul style="list-style-type: none"> ● Telehealth is useful for chronic disease care ● Telehealth is useful for depression care ● Telehealth for chronic disease is as effective as in-home services ● Telehealth for depression is as effective as in-home services ● In general, use of telehealth enables tasks to be accomplished more quickly ● In general, use of telehealth has not effect on job performance ● In general, use of telehealth increases job productivity
Effort Expectancy	<ul style="list-style-type: none"> ● My interaction with the system would be clear and understandable ● It would be easy for me to become skillful at using the system ● I would find the system easy to use 	<ul style="list-style-type: none"> ● My interaction with the telehealth system would be clear and understandable ● It would be easy for me to become skillful at using the telehealth system for providing chronic disease care ● It would be easy for me to become skillful at using the

	<ul style="list-style-type: none"> ● Learning to operate the system is easy for me 	<p>telehealth system for providing depression care</p> <ul style="list-style-type: none"> ● I would find the telehealth system easy to use for providing chronic disease care ● I would find the telehealth system easy to use for providing depression care ● Learning to operate the telehealth system is easy for me
Social Influence	<ul style="list-style-type: none"> ● People who influence my behavior think that I should use the system ● People who are important to me think that I should use the system ● The senior management of this business has been helpful in the use of the system ● In general, the organization has supported the use of the system 	<ul style="list-style-type: none"> ● Patients think that it is good to use telehealth for chronic disease management ● Patients think that it is good to use telehealth for depression care ● My coworkers think that it is good to use telehealth for chronic disease management ● My coworkers think that it is good to use telehealth depression care ● My agency board/administration think that telehealth is good to use for chronic disease management ● My agency board/administration think that telehealth is good to use for depression care ● The administration of my agency has been supportive in the use of telehealth for chronically ill patients

		<ul style="list-style-type: none"> ● The administration of my agency has not been supportive of the use of telehealth for depressed patients ● In general, my agency has supported the use of the system
Facilitating Conditions	<ul style="list-style-type: none"> ● A specific person (or group) is available for assistance with system difficulties ● The system is not compatible with other systems I use ● I have the resources necessary to use the system ● I have the knowledge necessary to use the system 	<ul style="list-style-type: none"> ● A specific person/group is available for technological difficulties ● Telehealth is not compatible with other systems I use ● I have the resources necessary to use telehealth for chronic disease care ● I have the resources necessary to use telehealth for depression care ● I have the knowledge necessary to use telehealth for chronic disease care. ● I have the knowledge necessary to use telehealth for depression care.
Intention to Use	<ul style="list-style-type: none"> ● I intend to use the system in the next <n> months ● I predict I would use the system in the next <n> months ● I plan to use the system in the next <n> months 	<ul style="list-style-type: none"> ● I anticipate that I/my agency will use/continue to use telehealth over the next 12 months for chronically ill patients ● I anticipate that I/my agency will use/continue to use telehealth over the next 12 months for depressed patients ● I/my agency intend to use/continue to use telehealth in my patient care and

		<p>management when it becomes available in my department</p> <ul style="list-style-type: none"> ● I/my agency intend to use/continue to use telehealth to provide chronic disease services to patients as often as needed ● I/my agency intend to use/continue to use telehealth to provide depression care services to patients as often as needed
<p>Innovation Culture/ Innovation Intention</p>	<ul style="list-style-type: none"> ● My contributions are valued by my fellow employees ● I understand how I contribute to innovation in our organization ● We have metrics to measure the effectiveness of our innovation initiatives ● As an employee, I feel enabled to generate ideas ● There are trust and mutual respect currently between management and employees ● We have an effective environment for collaboration within 	<ul style="list-style-type: none"> ● My contributions are valued by my fellow staff ● I understand how I contribute innovation in my agency ● My agency has metrics to measure the effectiveness of our innovation initiatives ● I feel enabled to generate ideas ● There is no trust between management and staff ● There is mutual respect between management and staff ● My agency has an effective environment for collaboration within and between departments ● Innovation is an underlying culture and not just a word ● Our senior managers are able to effectively cascade the

	<p>and between departments.</p> <ul style="list-style-type: none"> ● Innovation is an underlying culture and not just a word ● Our senior managers are able to effectively cascade the innovation message throughout the organization ● We have an innovation vision that is aligned with projects, platforms, or initiatives ● Innovation is a core value in this organization 	<p>innovation message throughout the agency</p> <ul style="list-style-type: none"> ● My agency has an innovation vision that is aligned with projects, platforms or initiatives ● Innovation is a core value in this agency
Current Use	<ul style="list-style-type: none"> ● Not Indicated 	<ul style="list-style-type: none"> ● Do you/your agency provide any of the following telehealth services for patients (choose from the list) ● Looking back over the previous 30 days, on average, how many days have you/your agency provided telehealth services? ● Looking back over the previous 30 days, what telehealth services have you/your agency provided?
Experience	<ul style="list-style-type: none"> ● Not Indicated 	<ul style="list-style-type: none"> ● How many years of experience do you have in your profession?

		<ul style="list-style-type: none"> • How many years of experience do you have in home health care?
Training to use telehealth		<ul style="list-style-type: none"> • Have you/your agency received training to use telehealth? • Have you/your agency provided training to use telehealth for the patients?
Demographic Factors	<ul style="list-style-type: none"> • Individual: Age, gender, experience, voluntariness of use 	<ul style="list-style-type: none"> • Individual: Birth year, gender, race, profession, position in the agency, employment status, number of patients served in the past month • Agency: Medicare certified, agency type, legal status, annual budget, payment type, number of professional staff, number of the patients served in the past year, depression services

Appendix C: Interview Questions

Perceived barriers & facilitators *Ask for examples	
Telehealth Adopters	<ul style="list-style-type: none"> ● What do you believe are some of the barriers and facilitators to adopting and using telehealth services for patient care? ● Have you/your agency made any changes to address these barriers or enhance the facilitators you have mentioned? ● If yes, what changes/adaptations have been made? ● If no, what are some potential changes/adaptations/strategies that your agency would make in the future?
Telehealth Non-adopters	<ul style="list-style-type: none"> ● Have you/your agency considered adopting telehealth services? ● If yes, what are some of the factors that determined your/your agency's decision? ● If no, what are some of the factors that would determine your/your agency's decision?
Telehealth Use Experience *Ask for examples	
Adopters	<ul style="list-style-type: none"> ● Describe your/your agency's experience in caring for the patients with chronic disease and/or depression using telehealth? ● What are your perceptions of your patients' general attitude toward telehealth? ● When telehealth was instituted in your agency, how did staff respond? ● Would you suggest other staff/agency use telehealth? Why or why not?
Non-adopters	<ul style="list-style-type: none"> ● What are your perceptions of your patients' general attitude toward telehealth? ● What are your thoughts about/experiences with how staff at your agency might respond to the idea of telehealth? ● Would you suggest other staff/agency use telehealth? Why or why not?

Training *Ask for examples	
Adopters: Directors	<ul style="list-style-type: none"> ● What role did/does training play in the telehealth program? ● Does your agency provide any training on telehealth for staff and/or patients? ● If yes, what are some of the goals and contents of the training? ● If no, what are the reasons? What are your thoughts on it?
Adopters: Direct service providers	<ul style="list-style-type: none"> ● Have you received any training on telehealth technology from the agency? ● If yes, what were some of the goals and content of the training? How did you perceive the training? ● If no, what are the reasons? What are your thoughts on it?
Strategy & policy recommendations	
All	<ul style="list-style-type: none"> ● What are some policy and strategy recommendations that you would give to promote telehealth adoption and use among home health care agencies? ● Do you perceive any other areas that telehealth could be utilized in addition to chronic disease and depression care?
Is there anything else you would like me to know?	
Demographic information	
All	<ul style="list-style-type: none"> ● When is your birth year? ● What is your gender? ● What is your race? ● What is your profession? ● How many years of experience do you have in your profession? ● How many years of experience do you have in home care?

Appendix D: Initial Letter to the Directors



Date

Dear __ Name _____,

We are writing to request your participation in a survey study focused on Telehealth use among home health care agencies. This study is supported and in partnership with the National Association for Homecare and Hospice (NAHC).

The purpose of this study is to explore the perceptions of home health care directors and staff on telehealth for chronic disease and/or depression care. This is for BOTH agencies that have and have not adopted telehealth. On **DATE** you will receive an email from eunhaek@sp2.upenn.edu (UPENN-NAHC) study, you will be asked about your general thoughts about telehealth services for patients with chronic disease and/or depression.

Please complete one for yourself AND forward to one direct service provider (e.g., registered nurse, psychiatric nurse or social worker) from your agency. It is very crucial that we would understand both perspectives from you and your staff.

This easy online survey will take approximately 15 minutes to complete. At the end of the survey, if you are interested, you may wish to share your email address to enter three random draws of e-gift cards worth \$30, \$20 or \$10. Email address will be used for communication only for such purposes and will be kept confidential and not be shared with others.

This study has been approved by the University of Pennsylvania Institutional Review Board and the NAHC. Your participation will have a valuable contribution to a new and growing body of knowledge about the benefits and challenges of utilizing innovative technologies like Telehealth for patients.

Individual agencies will not be named in research reports or publications, and any identifying information will be changed to protect the confidentiality of the agency. Your participation in this study is entirely voluntary.

Sincerely,

Eun hae Kim Ph.D. Candidate eunhaek@sp2.upenn.edu
The University of Pennsylvania, School of Social Policy & Practice

Appendix E: Initial Email to the Directors



Dear __ Name _____,

Several days ago, you have received a letter requesting participation in a survey study focused on Telehealth use among home health care agencies.

The purpose of this study is to explore the perceptions of home health care directors and staff on telehealth for chronic disease and/or depression care. In the **online survey link below**, you will be asked about your general thoughts about telehealth services.

This easy online survey will take approximately 15 minutes to complete. At the end of the survey, if you are interested, you may wish to share your email address to enter three random draws of e-gift cards worth \$30, \$20 or \$10. Email address will be used for communication only for such purposes and will be kept confidential and not be shared with others.

Please remember to forward this email to at least one direct service provider (e.g., registered nurse, psychiatric nurse or social worker) from your agency. It is very crucial that we would hear from both perspectives from you and your staff.

This study has been approved by the University of Pennsylvania Institutional Review Board and the National Association for Homecare & Hospice (NAHC). Your participation will have a valuable contribution to a new and growing body of knowledge about the benefits and challenges of utilizing innovative technologies like Telehealth for patients.

Individual agencies will not be named in research reports or publications, and any identifying information will be changed to protect the confidentiality of the agency. Your participation in this study is entirely voluntary.

Please click on the **link below** to complete a brief survey.

In advance, thank you for your time and consideration.

https://jfe.qualtrics.com/preview/SV_6GAAqqiqdJRySHz?Preview=Survey&BrandID=upenn

Sincerely, Eun hae Kim Ph.D. Candidate eunhaek@sp2.upenn.edu

The University of Pennsylvania, School of Social Policy & Practice

Appendix F: Reminder Postcard



**UPENN-NAHC Telehealth Survey Reminder
Dear Director,**

If you have completed the survey, I have emailed to you on _____, please accept my thanks. If you have not responded yet, it is not too late!

Your participation in this study is valuable. We appreciate you taking the time from your busy schedule to help us learn about your perception on telehealth for patient care.

It will take approximately 15 minutes to complete and will be closed on _____.

[Address, City, ST ZIP Code]

[Date and Time Heading]



[Recipient Address]
[City, ST ZIP Code]

Appendix G: Initial Email to Potential Interview Participants



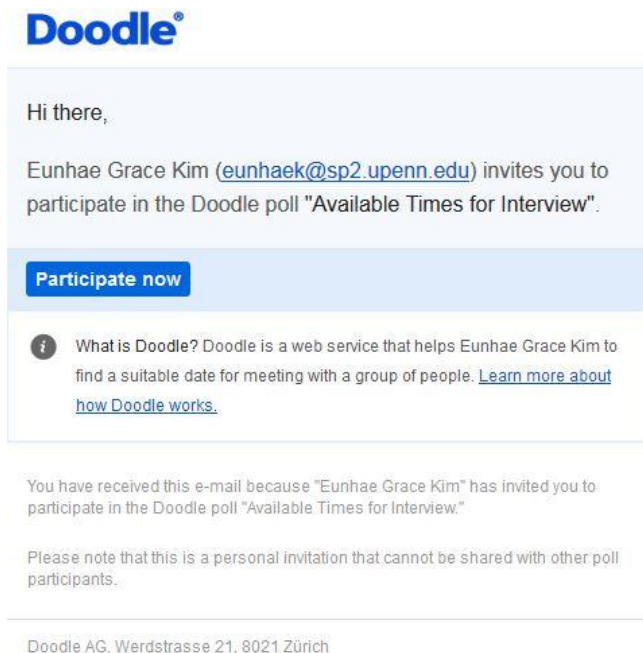
Dear __ Name _____,

Thank you for recently completing the survey on telehealth use among home healthcare agencies! We are contacting you because you have indicated at the end of the survey that you may be interested in participating in an interview.

The purpose of this interview is to explore further perceived barriers and facilitators to the adoption of telehealth for chronic disease and/or depression care. The interview will take approximately 45 minutes. As a small token of appreciation for your time, you will receive a \$20 e-gift card at the end of the interview.

In the **link below**, please indicate your availabilities and a phone number that we could reach you. Your contact information will be only used for such purposes and will be discarded after the interview.

This study has been approved by the University of Pennsylvania Institutional Review Board and the NAHC. Your participation will have a valuable contribution to a new and



growing body of knowledge about the benefits and challenges of utilizing innovative technologies like Telehealth for patients. Individual agencies will not be named in research reports or publications, and any identifying information will be changed to protect the confidentiality of the agency. Your participation in this study is entirely voluntary.

Please click on the **link below** <**Participate Now**> to indicate your availabilities.

Sincerely,

Eun hae Kim Ph.D. Candidate
eunhaek@sp2.upenn.edu

The University of Pennsylvania, School of Social Policy & Practice

Appendix H: Interview Appointment Confirmation Email



Dear _____,

Thank you for volunteering to participate in this important interview! You are scheduled for an interview on DATE at _____ am/pm. Please expect to receive a call from the following number _____.

I look forward to talking to you. Again, thank you for your precious time and contribution!

If you would like to make any changes to your decision, it would be greatly appreciated if you would let us know as soon as possible.

Best

Eun hae Kim Ph.D. Candidate

eunhaek@sp2.upenn.edu

The University of Pennsylvania, School of Social Policy & Practice

Appendix I: Survey Consent Form

You are being asked to take part in a research study. Please read the following consent form.

What is the purpose of the study?

The purpose of the study is to learn more about the perception of home health staff on the utilization of telehealth for chronic disease and depression care.

What am I asked to do in the study?

You are being asked to complete a one-time survey about your perception and use of telehealth services. The survey should take about 15 minutes to complete.

What are the risks/discomforts?

Risks are minimal for involvement in this study. However, you may feel emotionally uneasy for some questions.

How will I benefit from the study?

There are no direct benefits for participants. However, it is hoped that through your participation, researchers and ultimately home health care providers will learn more about the adoption of telehealth services in home health care agencies for patient care.

What other choices do I have?

Your alternative choice is to not participate in the study.

What happens if I do not choose to join the research study?

Your participation is voluntary. There is no penalty if you choose not to participate in the research study. You will lose no benefits or advantages that are now coming to you or would come to you in the future. You may choose to discontinue at any time without penalty or loss of benefits, to which you are otherwise entitled.

When is the study over? Can I leave the study before it ends?

This is a one-time survey. The survey will be closed as soon as the necessary number of participants for analysis has completed the survey and all the information has been collected.

How will confidentiality be maintained and my privacy is protected?

This is an anonymous survey. All data obtained from participants will be kept confidential. If information from this study is published or presented at conferences, it will only be reported in an aggregate group format. No one other than the study investigators listed below will have access to the data. The data collected will be stored as a password protected document in a locked office.

Will I have to pay for anything?

There is no cost associated with your participation in this study.

Will I be paid for being in this study?

At the end of the survey, you may voluntarily choose to enter your email address for random draws of \$30, \$20, \$10 e-gift cards. Email addresses will be only used for such purpose and deleted after the draw.

Who can I contact with questions, complaints or if I'm concerned about my rights as a research subject?

If you have questions, concerns or complaints regarding your participation in this research study or if you have any questions about your rights as a research subject, you should contact the study investigator, Eunhae, Grace Kim (eunhaek@sp2.upenn.edu). If a member of the research team cannot be reached or you want to talk to someone other than those working on the study, you may contact the Office of Regulatory Affairs at the University of Pennsylvania (215-898-2614_ with any question, concerns or complaints regarding the study.

- Yes, I give my consent to participate in the study.
- No, I am not willing to participate in the study. Please remove me from the contact list.

Appendix J: Interview Consent Form

You are being asked to take part in a research study. Please read the following consent form.

What is the purpose of the study?

The purpose of the study is to learn more about the perception of home health care agency staff on the utilization of telehealth for chronic disease and depression care.

What am I asked to do in the study?

You are being asked to complete a one-time in-depth interview about your perception and experiences of telehealth services. The interview should take about 45 minutes to complete.

What are the risks/discomforts?

Risks are minimal for involvement in this study. However, you may feel emotionally uneasy for some questions.

How will I benefit from the study?

There are no direct benefits for participants. However, it is hoped that through your participation, researchers and ultimately home health care providers will learn more about the adoption of telehealth services in home health care agencies for patient care.

What other choices do I have?

Your alternative choice is to not participate in the study.

What happens if I do not choose to join the research study?

Your participation is voluntary. There is no penalty if you choose not to join the research study. You will lose no benefits or advantages that are now coming to you or would come to you in the future. You may choose to discontinue at any time without penalty or loss of benefits, to which you are otherwise entitled.

When is the study over? Can I leave the study before it ends?

This is a one-time survey. The survey will be closed as soon as the necessary number of participants for analysis has completed the survey and all the information has been collected.

How will confidentiality be maintained and my privacy is protected?

This is an anonymous interview. All data obtained from participants will be kept confidential. If information from this study is published or presented at conferences, it will only be anonymous. No one other than the study investigators listed below will have access to the data. Your interview will be audiotaped for transcription purpose only. The audiotape will be transcribed without any information that could identify you. The tape will then be erased. The transcribed data collected will be stored as a password protected document in a locked office.

Will I have to pay for anything?

There is no cost associated with your participation in this study.

Will I be paid for being in this study?

At the end of the survey, a \$20 e-gift card will be emailed to you. Email addresses will be only used for such purpose and deleted after the e-gift card is sent.

Who can I contact with questions, complaints or if I'm concerned about my rights as a research subject?

If you have questions, concerns or complaints regarding your participation in this research study or if you have any questions about your rights as a research subject, you should contact the study investigator, Eunhae, Grace Kim (eunhaek@sp2.upenn.edu). If a member of the research team cannot be reached or you want to talk to someone other than those working on the study, you may contact the Office of Regulatory Affairs at the University of Pennsylvania (215-898-2614) with any question, concerns or complaints regarding the study.

Statement of your consent

I have read the above description of this research study. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I have been assured that any future questions I may have will also be answered by a member of the research team. I voluntarily agree to take part in this study.

- Yes, I give my consent to participate in the study.
- No, I am not willing to participate in the study.

Statement of your consent to be audio taped

- I understand that audio recordings will be taken during the study.
- I understand that audio recordings will be destroyed following transcription and that no identifying information will be included in the transcription.

Appendix K: Letter from the NAHC



Andrea L. Devoti, MSN, MBA, RN
Chairman of the Board

NATIONAL ASSOCIATION FOR HOME CARE & HOSPICE
228 Seventh Street, SE, Washington, DC 20003 • 202/547-7424 • 202/547-3540 fax

Val J. Halamandaris, JD
President

November 24, 2014

Zvi D. Gellis, Ph.D.
Professor & Director
Center for Mental Health & Aging
School of Social Policy & Practice
University of Pennsylvania
3701 Locust Walk
Philadelphia, PA 19104

Dear Dr. Gellis:

On behalf of the National Association of Home Care & Hospice (NAHC), I am writing to express my support for your proposed study titled, "Perception and Utilization of Telehealth Services among Home Health Care Agencies: A National Survey."

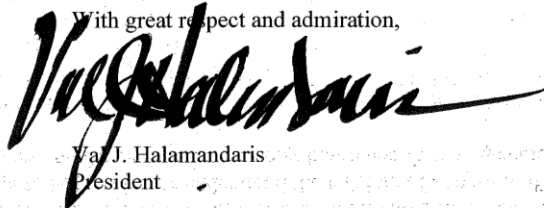
We look forward to collaborating with you, your doctoral candidate Eunhae Grace Kim and the University of Pennsylvania to help us better understand the barriers of adoption of telehealth services for chronic illness and depression care among home health care agencies.

We admire the collaborative research that you have contributed over the past two decades in collaboration with home healthcare agencies on the aging population and believe that this current study will also add value to your important work. Your proposed study is both timely and critical because older patients lack access to care due to isolation or lack of transportation and telehealth services is one strategy to provide more efficient and effective coordinated care.

NAHC will support the study by providing connections to member agencies across the country for your proposed online survey and interviews. We will provide a list of potential participating agencies from our member database, provide a letter-of-support and study description our member agencies and promote the study through NAHC Report, our e-newsletter.

We look forward to working with you and your highly talented team of researchers in moving this forward.

With great respect and admiration,



Val J. Halamandaris
President

Representing the Nation's Home Health Agencies, Home Care Aide Organizations and Hospices

BIBLIOGRAPHY

- Abdullah, A. & Othman, S. (2011). The influence of self-owned home blood pressure monitoring (HBPM) on primary care patients with hypertension: A qualitative study. *BioMed Central Family Practice, 12*, 143.
- Administration on Aging (2009). *A profile of older Americans*. Retrieved from: http://www.aoa.gov/aoaroot/aging_statistics/Profile/2009/4.aspx
- Ahring, K.K., Ahring, J.P., Joyce, C., & Farid, N.R. (1992). Telephone modem access improves diabetes control in those with insulin-requiring diabetes. *Diabetes Care, 15*, 971-975.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211.
- Allen, A., & Hayes, J. (1995). Patient satisfaction with tele-oncology: A pilot study. *Telemedicine Journal, 1*(1), 41-46.
- Andersson, G., Bergström, J., Holländare, F., Carlbring, P., Kaldö, V., & Ekselius, L. (2005). Internet-based self-help for depression: Randomized controlled trial. *The British Journal of Psychiatry, 187*(5), 456-461.
- Arad, S., Hanson, M.A. & Schneider, R.J. (1997). A framework for the study of relationships between organizational characteristics and organizational innovation. *The Journal of Creative Behavior, 31*(1), 42-58.
- Attewell, P. (1992). Technology diffusion and organizational learning: The case of business computing. *Organizational Science, 3*, 1-19.

- Baker, L.C., Johnson, S.J., Macaulay, D. & Birnbaum, H. (2011). Integrated telehealth and care management program for Medicare beneficiaries with chronic disease linked to savings. *Health Affairs*, 30, 91689-91697.
- Barker, G.P., Krupinski, E.A., Schellenberg, B. & Weinstein, R.S. (2004). Expense comparison of a telemedicine practice versus a traditional clinical practice. *Telemedicine Journal of e-health*, 10, 376-380.
- Barkin, R., Schwer, W., & Barkin, S. (2000). Recognition and management of depression in primary care: A focus on the elderly. A pharmacotherapeutic overview of selection process among the traditional and new antidepressants. *American Journal of Therapeutics*, 7, 205-226
- Barret, D. I., & Wallis, A. (2013). Nurses' attitudes towards telehealth: the Royal College of Nursing eHealth survey. *International Journal of Integrated Care*, 7.
- Bartels S., Blow, F., Brockman, L. & Van, C.A. (2005). A substance abuse and mental health care among older Americans: The statue of the knowledge and future directions. Rockville, MD: WESTAT.
- Bashshur, R.L., Shannon, G. & Krupinski, E.A. & Grigsby, J. (2013). Sustaining and realizing the promise of telemedicine. *Telemedicine Journal of E-health*, 19, 339-345.
- Bensink, M., Hailey, D., & Wootton, R. (2006). A systematic review of successes and failures in home telehealth: Preliminary results. *Journal of Telemedicine and Telecare*, 12(3), 8-16.

- Bercovitz, A. R., Park-Lee, E., & Jamoom, E. (2013). Adoption and Use of Electronic Health Records and Mobile Technology by Home Health and Hospice Care Agencies. *National Health Statistics Reports*, 66.
- Bobni, C. B. (2008). Measuring innovation culture in organizations: The development of a generalized innovation culture construct using exploratory factor analysis. *European Journal of Innovation Management*, 11(4), 539-559.
- Bodenheimer, T., Lorig, K., Holman, H. & Grumbach, K. (2002). Patient self-management of chronic disease in primary care, *Journal of the American Medical Association*, 288(19), 2469-2475.
- Bordin, E.S. (1979). The generalizability of the psychoanalytic concept of the working alliance. *Psychotherapy: Theory, Research and Practice*, 16, 252-260
- Botsis, T. & Hartvigsen, G. (2008). Current status and future perspectives in telecare for elderly people suffering from chronic diseases. *Journal of Telemedicine and Telecare*, 14(4), 195-203.
- Bouchard, S., Paquin, B., Payeur, R., Allard, M., Rivard, V., Fournier, T. & Lapie (2004). Delivering cognitive behavior therapy for panic disorder with agoraphobia in video conference. *Telemedicine Journal and e-Health*, 10(1), 13-25.
- Bowles, K.H., Hanlon, A.L., Glick, H.A. et al. (2011). Clinical effectiveness, access to, and satisfaction with care using a telehomecare substitution intervention: A randomized controlled trial. *International Journal of Telemedicine and Applications*, 12.

- Boydell, K.M., Pong, R.W., Volpe, T., Tilleczek, K., Wilson, E. & Lemieux, S. (2006). Family perspectives on pathways to mental health care for children and youth in rural communities. *Journal of Rural Health, 22*(3), 182-188.
- Bratton, R.L. (2001). Patient and physician satisfaction with telemedicine for monitoring vital signs. *Journal of Telemedicine & Telecare, 7*, 72-73.
- Brenner, B. (2003). Is the provision of laboratory results via the Internet acceptable to patients? A survey of private patients in a large, specialist gynecology practice. *New Zealand Medical Journal, 116*(1187).
- Brewster, L., Mountain, G., Wessels, B., Kelly, C. & Hawley, M. (2013). Factors affecting front line staff acceptance of telehealth technologies: A mixed-method systematic review. *Journal of Advanced Nursing, 70*(1), 21-33.
- Broderick, A., & Lindeman, D. (2013). Scaling telehealth programs: Lessons from early adopters. New York, NY: Commonwealth Fund.
- Brodey, B. B., Claypoole, K. H., Motto, J., Arias, R. G., & Goss, R. (2000). Satisfaction of forensic psychiatric patients with remote telepsychiatric evaluation. *Psychiatric Services, 51*(10), 1305-1307.
- Brooks, E., Manson, S.M., Bair, B., Daley, N. & Shore, J.H. (2012). The diffusion of telehealth in rural American Indian communities: A retrospective survey of key stakeholders. *Telemedicine Journal of E-health, 18*, 60-66.
- Buist, A., Coman, G., Silvas, A. et al. (2000). An evaluation of the telepsychiatry programme in Victoria, Australia. *Journal of Telemedicine and Telecare, 6*, 216-221.
- Burrell, G. & Morgan, G. (1979). *Sociological Paradigms and Organizational analysis*.

Aldershot: Gower.

- Burton-Jones, A., & Hubona, G. S. (2005). Individual differences and usage behavior: revisiting a technology acceptance model assumption. *ACM Sigmis Database, 36(2)*, 58-77.
- Byers, A.L., Sheeran, T., & Mlodzianowski, A.E. (2008). Depression and risk for adverse falls in older home health care patients. *Research in Gerontological Nursing, 1*, 245-251.
- Bynum, A.B., Cranford, C.O., Irwin, A.A. & Denny, G.S. (2003). Participant satisfaction in an adult telehealth education program using interactive compressed video delivery methods in rural Arkansas. *Journal of Rural Health, 19(3)* 218-222.
- Caffrey et al. (2011). Home health care and discharged hospice care patients: United States, 2000 and 2007. *National Health Statistics Reports*. Hyattsville, MD: National Center for Health Statistics.
- Callahan, E. J., Hilty, D. M., & Nesbitt, T. S. (1998). Patient satisfaction with telemedicine consultation in primary care: comparison of ratings of medical and mental health applications. *Telemedicine Journal, 4(4)*, 363-369.
- Cartwright W (1992). Objective measurement of anxiety in hypertensive pregnant women managed in hospital and in the community. *British Journal of Obstetrics and Gynecology, 99*, 182-185.
- Castelnuovo, G., Gaggioli, A. & Riva, G. (2001). Cyberpsychology meets clinical psychology: The emergency of e-therapy in mental health care, In G. Riva & Galimberti Eds., *Towards cyberspsychology: Mind cognition and society in the internet age*, IOS Press, Amsterdam, 229-252.

Catwright, M., Hirani, S.P., Rixon, L. et al. (2013). Effect of telehealth on quality of life and psychological outcomes over 12 months (Whole Systems Demonstrator telehealth questionnaire study: Nested study of patient-reported outcomes in a pragmatic, cluster randomized controlled trial. *BMJ*, 346, f653.

Centers for Disease Control and Prevention-CDC. (1999). Ten great public health achievements-United States, 1900-1999. *MMWR. Morbidity and mortality weekly report*, 48(12), 241.

Centers for Disease Control and Prevention-CDC (2003). *Chronic Disease*, 16 (1).

Centers for Disease Control and Prevention-CDC (2008). Web-based Injury Statistics and Query Reporting System (WISQARS) (Online). National Center for Injury Prevention and Control Retrieved from: <http://www.cdc.gov/ncipc/wisqars/>

Centers for Disease Control and Prevention-CDC (2009). The power to prevent, the call to control. Retrieved from: <http://www.cdc.gov/chronicdisease/resources/publications/AAG/chronic.htm>

Centers for Disease Control-CDC (2013). The state of aging and health in America 2013. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services. Retrieved from: http://www.cdc.gov/features/agingandhealth/state_of_aging_and_health_in_america_2013.pdf

Centers for Medicare and Medicaid Services (CMS). Health care financing administration national health expenditures projects: 1998-2008.

Centers for Medicare and Medicaid Services-CMS (2012). Chronic conditions among medicare beneficiaries. Chartbook 2012 Edition. Retrieved from:

<http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Chronic-Conditions/Downloads/2012Chartbook.pdf>

- Chae, Y.M., Lee, J.H, Ho, S.H., Kim, H.J, Jun, K.H. & Won, J.U. (2001). Patient satisfaction with telemedicine in home health services for the elderly. *International Journal of Medical Informatics*, 61, 167-173.
- Chau, PYK & Hu, PJ-H. (2002). Investigating healthcare professionals' decisions to accept telemedicine technology: An empirical test of competing theories. *Information and Management*, 39, 297-31.
- Chaudhry, S.I., Mattera, J.A., Curtis, J.P. et al. (2010). Telemonitoring in patients with heart Failure. *New England Journal of Medicine*, 363, 2301-2309.
- Chellappa, R.K. & Pavlou, PA. (2002). Perceived information security, financial liability and consumer trusts in electronic commerce transactions. *Logistics Informatics Management*, 15, 358-368.
- Chemali, Z., Chahine, L., & Fricchione, G. (2009). The use of selective serotonin reuptake inhibitors in elderly patients. *Harvard Review of Psychiatry*, 17(4), 242-253.
- Chen, et al. (2002). Enticing online consumers: an extended technology acceptance perspective. *Information & management*, 39(8), 705-719.
- Christensen, H., Griffiths, K. M., & Jorm, A. F. (2004). Delivering interventions for depression by using the internet: Randomized controlled trial. *British Medical Journal*, 328(7434), 265.
- Chumbler, N. R., Neugaard, B., Kobb, R., Ryan, P., Qin, H., & Joo, Y. (2005). Evaluation of a care coordination/home telehealth program for veterans with

- diabetes health services utilization and health-related quality of life. *Evaluation & the health professions*, 28(4), 464-478.
- Chumbler, N. R., Chuang, H. C., Wu, S. S., Wang, X., Kobb, R., Haggstrom, D., & Jia, H. (2009). Mortality risk for diabetes patients in care coordination, home-telehealth program. *Journal of Telemedicine and Telecare*, 15(2), 98-101.
- Ciechanowski, P.S., Katon, W.J. & Russo, J.E. (2000). Depression and diabetes: Impact of depressive symptoms in adherence, function, and costs. *Archives of Internal Medicine*, 160, 3278-3285.
- Cilliers, L. & Flowerday, S.V. (2013). Health information systems to improve health care: A telemedicine case study. *SA Journal of Informatics Management*, 15 (5).
- Clark, R.A., Yallop, J.J., Piterman, L. et al. (2007). Adherence, adaptation, and acceptance of elderly chronic heart failure patients to receiving healthcare via telephone-monitoring. *European Journal of Heart Failure*, 9, 1104-1111.
- Collins, K., Nicoson, P. & Bowns, I. (2000). Patient satisfaction in telemedicine. *Health Informatics Journal*, 6, 81-85.
- Compeau, D.R. & Higgins, C.A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189-211.
- Conner, K. O., Copeland, V. C., Grote, N. K., Koeske, G., Rosen, D., Reynolds III, C. F., & Brown, C. (2010). Mental health treatment seeking among older adults with depression: the impact of stigma and race. *The American Journal of Geriatric Psychiatry*, 18(6), 531-543.
- Conwell, Y., Van Orden, K., & Caine, E. D. (2011). Suicide in older adults. *Psychiatric Clinics of North America*, 34(2), 451-468.

- Coupland, C., Dhiman, P., Morriss, R., Arthur, A., Barton, G., & Hippisley-Cox, J. (2011). Antidepressant use and risk of adverse outcomes in older people: population based cohort study. *BMJ*, 343.
- Craven, M. & Bland, R. (2006). Better practices in collaborative mental health care: An analysis of the evidence base-The Canadian Collaborative Mental Health Initiative, Mississauga, Ontario, Canada. *Canadian Journal of Psychology*, 51(1).
- Cryer, L., Shannon, S.B., Van Amsterdam, M. & Leff, B. (2012). Costs for 'Hospital at Home' patients were 19 percent lower, with equal or better outcomes compared to similar in patients. *Health Affairs*, 31, 61237-61243.
- Currell, R., Urquhart, C., Wainwright, P., & Lewis, R. (2000). Telemedicine versus face to face patient care: effects on professional practice and health care outcomes. *Cochrane Database Systematic Review*, 2(2).
- Cusack CM, Pan E, Hook JM, Vincent A, Kaelber DC, Bates DW, et al. (2007). The value of provider-to-provider telehealth technologies. Boston, MA: Center for Information Technology Leadership.
- Dansky, K.H., Palmer, L., Shea, D. & Bowles, K.H. (2001). Cost analysis of telehomecare. *Telemedicine Journal of e-Health*, 7, 225-232.
- Darkins, A.W. & Cary, M.A. (2000). Telemedicine and telehealth: Principles, policies, performance and pitfalls. London, UK: Free Association Books.
- Darkins, A., Kendall, S., Edmonson, E., Young, M., & Stessel, P. (2014). Reduced Cost and Mortality Using Home Telehealth to Promote Self-Management of Complex Chronic Conditions: A Retrospective Matched Cohort Study of 4,999 Veteran Patients. *Telemedicine and e-Health*, 21(1), 70-76

- Darkins, A., Ryan, P., Kobb, R., Foster, L., Edmonson, E., Wakefield, B., & Lancaster, A. E. (2008). Care coordination/home telehealth: the systematic implementation of health informatics, home telehealth, and disease management to support the care of veteran patients with chronic conditions. *Telemedicine and e-Health*, *14*(10), 1118-1126.
- Davis, A. & Newman, S. (2010). Evaluating telecare and telehealth interventions: *WSDAN Briefing Paper*. London. Retrieved from:
<http://www.kingsfund.org.uk/sites/files/kf/Evaluating-telecare-telehealth-interventions-Feb2011.pdf>.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*, 319-340.
- Davis, F.D., Bagozzi, R.P. & Warshaw, P.R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, *22*(14), 1111-1132.
- Day, S.X. & Schneider, P.L. (2002). Psychotherapy using distance technology: A comparison of face-to-face, video and audio treatment. *Journal of Counseling Psychology*, *49*(4), 499-503.
- Delaney, C. & Apostolidis, B. (2010). Pilot testing of a multicomponent home care intervention for older adults with heart failure: An academic clinical partnership. *Journal of Cardiovascular Nursing*, *25*(5), E27-E40.
- De Lusignan, S., Wells, S., Johnson, P., Meredith, K., Leathame, E. (2001). Compliance and effectiveness of 1 year's home telemonitoring. *European Journal of Heart Failure*, *3*, 723-730.

- Department of Health (2011). 3 Million Lives. Retrieved from: <http://3millionlives.co.uk/>
- Deshpande, R. & Webster, F.E. (1989). Organizational culture and marketing: Defining the research agenda. *Journal of Marketing*, 53, 3-15.
- Dick, P. T., Filler, R., & Pavan, A. (1999). Participant satisfaction and comfort with multidisciplinary pediatric telemedicine consultations. *Journal of pediatric surgery*, 34(1), 137-142.
- Dinesen, B., Andersen, S.K., Hejlesen, O. & Toft, E. (2011). Interaction between COPD patients and healthcare professionals in a cross-sector telerehabilitation programme. *Studies in Health Technology and Informatics*, 169, 28-32.
- Doarn, O.R., Shore, J., Ferguson, S., Jordan, P.J., Saiki, S. & Poropatich, R.K. (2012). Challenges, solutions, and best practices in telemental health service delivery across the Pacific Rim: A summary. *Telemedicine Journal of e-health*, 18, 654-660.
- Dobscha, S.K., Corson, K. & Solodsky, J. (2005). Use of video conferencing for depression research: Enrollment, retention, and patient satisfaction. *Telemedicine Journal of e-health*, 11(2), 84-89.
- Doughty, K., Lewis, R. & McIntosh, A. (2000). The design of a practical and reliable fall detector for community and institutional telecare. *Journal of Telemedicine & Telecare*, S150-S154.
- Doze, S. & Simpson, J. (1999). Evaluation of a telepsychiatry pilot project. *Journal of Telemedicine & Telecare*, 5, 38-46.

- Dunnebeil, S., Sunyaev, A., Blohm, I., Leimeister, J.M. & Krcmar, H. (2012). Determinants of physician's technology acceptance for e-health in ambulatory care. *International Journal of Medical Informatics*, 81, 746-760.
- Dwyer, T.F. (1973). Telepsychiatry: Psychiatric consultation by interactive televisions. *American Journal of Psychiatry*, 130, 865-869.
- Eedy, D.J & Wootton, R. (2001). Teledermatology: A review. *British Journal of Dermatology*, 144(4), 606-707.
- Fairbrother, P., Pinnock, H., Hanley, J. et al. (2012). Continuity, but at what cost? The impact of telemonitoring COPD on continuities of care: A qualitative study. *Primary Care Respiratory Journal*, 21(3), 322-328.
- Fairbrother, P., Pinnock, H., Hanley, J. et al. (2013). Exploring telemonitoring and self-management by patients with chronic obstructive pulmonary disease: A qualitative study embedded in a randomized controlled trial. *Patient Education and Counseling*, 93(3), 403-410.
- Fairbrother, P., Ure, J., Hanley, J. et al. (2013). Telemonitoring for chronic heart failure: The views of patients and healthcare professionals: a qualitative study. *Journal of Clinical Nursing*, 23(1), 132-144.
- Fiest, K. M., Currie, S. R., Williams, J. V., & Wang, J. (2011). Chronic conditions and major depression in community-dwelling older adults. *Journal of affective disorders*, 131(1), 172-178.
- Finkelstein, S.M., Speedie, S.M., Potthoff, S. (2006). Home telehealth improves clinical outcomes at lower cost for home health care. *Telemedicine Journal of e-Health*, 12, 128-136.

- Ellis, A.R., Konrad, T.R., Thomas, K.C. (2009). County-level estimates of mental health professional supply in the United States. *Psychiatric Services, 60*, 1315-1322.
- Finch, T., Mair, F. & May, C. (2006). Teledermatology in the UK: Lessons in service innovation. *British Journal of Dermatology, 156*, 521-527.
- Finkelstein, S.M., Speedie, S.M. & Potthoff, F. (2006). Home telehealth improves clinical outcomes at lower cost for home health care. *Telemedicine Journal and e-Health, 12*, 128-136.
- Fleming D, Edison K, Pok H. (2009). Telehealth Ethics. *Telemedicine Journal and e-Health, 15*(8):797–803.
- Fortney, J. C., Maciejewski, M. L., Tripathi, S. P., Deen, T. L., & Pyne, J. M. (2011). A budget impact analysis of telemedicine-based collaborative care for depression. *Medical care, 49*(9), 872-880.
- Fortney, J. C., Pyne, J. M., Edlund, M. J., Williams, D. K., Robinson, D. E., Mittal, D., & Henderson, K. L. (2007). A randomized trial of telemedicine-based collaborative care for depression. *Journal of General Internal Medicine, 22*(8), 1086-1093.
- Foster, M. V., & Sethares, K. A. (2014). Facilitators and Barriers to the Adoption of Telehealth in Older Adults: An Integrative Review. *Computers, informatics, nursing: CIN*.
- Friedman, R.H., Kazis, L.E., Jette, A., Smith, M.B., Stollerman, J., Torgerson, J. & Carey, K. (1996). A telecommunications system for monitoring and counseling patients with hypertension: Impact on medication adherence and blood pressure control. *American Journal of Hypertension, 9*, 285-292.
- Fulmer, T.T., Feldman, P.H., Kim, T.S. et al. (1999). An intervention study to enhance

- medication compliance in community-dwelling elderly individuals. *Journal of Gerontological Nursing*, 25, 6-14.
- Gagnon, M.P., Duplantie, J., Fortin, J.P. & Landry, R. (2006). Implementing telehealth to support medical practice in rural/remote regions: What are the conditions for success? *Implementation Science*, 1(18), 1-8.
- Gale, N & Sultan, H. (2013). Telehealth as 'peace of mind': Embodiment, emotions and the home as the primary health space for people with chronic obstructive pulmonary disorder. *Health Place*, 21, 140-147.
- Gammon, D., Bergvik, S., Bergmo, T. et al. (1996). Videoconferencing in psychiatry: A survey of use in northern Norway. *Journal of Telemedicine and Telecare*, 2, 192-198.
- Gaynes, B. N., Burns, B. J., Tweed, D. L., & Erickson, P. (2002). Depression and health-related quality of life. *The Journal of nervous and mental disease*, 190(12), 799-806.
- Gellis, Z.D. (2009). Evidence-based practice in older adults with mental health disorders. In A. Roberts (Ed). *Social workers desk reference*, New York: Oxford University Press.
- Gellis, Z. D. (2010). Depression screening in medically ill home care elderly. *Best practices in mental health*, 6(1), 1-16.
- Gellis, Z. D., & Kenaley, B. (2008). Problem solving therapy for depression in adults: A systematic review. *Research on Social Work Practice*, 18, 117-131.

- Gellis, Z.D., McGinty, J., Horowitz, A., Bruce, M. & Misener, E. (2007). Problem solving therapy for late life depression in home care: A randomized field trial. *American Journal of Geriatric Psychiatry*, 15(11), 968-978.
- Gellis, Z.D., Kenaley, B., McGinty, J., Bardelli, E., Davitt, J. & Have, T.T. (2012). Outcomes of a Telehealth intervention for homebound older adults with heart or chronic respiratory failure: A randomized controlled trial. *The Gerontologist*, 52(4), 541-552.
- Gellis, Z. D., Kenaley, B. L., & Have, T. T. (2014). Integrated Telehealth Care for Chronic Illness and Depression in Geriatric Home Care Patients: The Integrated Telehealth Education and Activation of Mood (I-TEAM) Study. *Journal of the American Geriatrics Society*, 62(5), 889-895.
- George, D., & Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th Ed.). Boston: Allyn & Bacon.
- Ghosh, G. J., McLaren, P. M., & Watson, J. P. (1997). Evaluating the alliance in video-link teletherapy. *Journal of Telemedicine and Telecare*, 3, 33–35.
- Gibson, K., Simms, D., O'Donnell, S. & Molyneaux, H. (2009). Clinicians' attitudes toward the use of information and communication technologies for mental health services remote and rural areas. *National Research Council Canada*, Retrieved from: <http://nparc.cisti-icist.nrc-cnrc.gc.ca/npsi/ctrl?action=rtdoc&am=15073198>.
- Giordano, R., Clark, M. & Goodwin, N. (2011). Perspectives on telehealth and telecare: Learning from the 12 Whole System Demonstrator Action Network (WSDAN) Sites. London. Retrieved from: <http://www.kingsfund.org.uk/sites/files/kf/Perspectives-telehealth-telecare-wsdan-paper.pdf>

- Glaser, B.G., Strauss, A. L., Strutzel, E. (1968). The discovery of grounded theory; Strategies for qualitative research. *Nursing Research*, 17(4), 364.
- Glueckauf, R.L., Fritz, S.P., Eckland, J., Eric, P., Liss, H.J. & Dages, P. (2002). Videoconferencing-based counseling for rural teenagers with epilepsy: Phase 1 findings. *Rehabilitation Psychology*, 47, 49-72.
- Goh, K.Y., Lam, C.K. & Poon, W.S. (1997). The impact of teleradiology on the inter-hospital transfer of neurosurgical patients. *British Journal of Neurosurgery*, 11, 52-56.
- Gould, R. L., Coulson, M. C., & Howard, R. J. (2012). Cognitive Behavioral Therapy for Depression in Older People: A Meta-Analysis and Meta-Regression of Randomized Controlled Trials. *Journal of the American Geriatrics Society*, 60(10), 1817-1830.
- Greenhalgh, T., Wood, G. W., Bratan, T., Stramer, K., & Hinder, S. (2008). Patients' attitudes to the summary care record and HealthSpace: qualitative study. *BMJ*, 336(7656), 1290-1295.
- Greenwood, D. A., Young, H. M., & Quinn, C. C. (2014). Telehealth Remote Monitoring Systematic Review Structured Self-monitoring of Blood Glucose and Impact on A1C. *Journal of diabetes science and technology*, 1932296813519311.
- Greenwood, J., Chamberlain, C., & Parker, G. (2004). Evaluation of a rural telepsychiatry service. *Australasian Psychiatry*, 12(3), 268-272.
- Grenard, J., Munjas, B., Adams, J., Suttorp, M., Maglione, M., McGlynn, E., & Gellad, W. (2011). Depression and medication adherence in the treatment of chronic

- diseases in the United States: A meta-analysis. *Journal of General Internal Medicine*, 26 (10), 1175-1182.
- Grigsby, B.A., Brega, A.G., Bennett, R.E., Devore, P.A. et al. (2007). The slow pace of interactive video telemedicine adoption: The perspective of telemedicine program administrators on physician participation. *Telemedicine and e-Health*, 13(6), 645-656.
- Grigsby, J., Rigby, M., Hiemstra, A., House, M., Olsson, S. & Whitten, P. (2002). The diffusion of telemedicine. *Telemedicine Journal of e-Health*, 8, 79-94.
- Grubaugh, A.L., Cain, G.D., Elhai, J.D., Patrick, S.L. & Freuh, C. (2008). Attitude toward medical and mental health care delivered via telehealth applications among rural and urban primary care patients. *Journal of Nervous and Mental Disease*, 196 (2), 166-170.
- Grustam, A. S., Severens, J. L., van Nijnatten, J., Koymans, R., & Vrijhoef, H. J. (2014). Cost-effectiveness of telehealth interventions for chronic heart failure patients: A literature review. *International journal of technology assessment in health care*, 30(01), 59-68.
- Guillen, S., Arredondo, M. T., Traver, V., Valero, M. A., Martin, S., Traganitis, A., & Robinson, S. (2002). User satisfaction with home telecare based on broadband communication. *Journal of Telemedicine and Telecare*, 8(2), 81-90.
- Gustke, S.S., Balch, D.C., West V.L. & Rogers, L.O. (2000). Patient satisfaction with Telemedicine. *Telemedicine Journal*, 6(1), 5-13.
- Hailey, D., Roine, R. & Ohinmaa, A. (2002). Systematic review of evidence for the benefits of telemedicine. *Journal of Telemedicine and Telecare*, 8, S1-S30.

- Hailey, D., Roine, R. & Ohinmaa, A. (2008). The effectiveness of telemental health applications: A review. *Canadian Journal of Psychiatry*, 53(11), 769-778.
- Harris-Kojetin, L., Sengupta, M., Park-Lee, E. & Valverde, R. (2013). Long-term care services in the united states: 2013 overview. Hyattsville, MD: National Center for Health Statistics.
- Henderson, C., Knapp, M., Fernandez, J.L. et al. (2013). Cost effectiveness of telehealth for patients with long term conditions (Whole Systems Demonstrator telehealth questionnaire study): Nested economic evaluation in a pragmatic, cluster randomized controlled trial. *BMJ*, 346, f1035.
- Hardiker, N. R., & Grant, M. J. (2011). Factors that influence public engagement with eHealth: a literature review. *International Journal of Medical Informatics*, 80(1), 1-12.
- Herbert, M.A., Brant, R., Hailey, D. & Van der Pol, M. (2006). Potential and readiness for video-visits in rural palliative home care: Results of a multi-method study in Canada. *Journal of Telemedicine & Telecare*, 12(3), 43-45.
- Hersh, W., Helfand, M., Wallace, J. et al. (2002). A systematic review of the efficacy of telemedicine for making diagnostic and management decisions. *Journal of Telemedicine and Telecare*, 8(4), 197-209.
- Hersh, W.R., Helfand, M., Wallace, J., Kraemer, D., Patterson, P., Shapiro, S. & Greenlick, M. (2001). Clinical outcomes resulting from telemedicine interventions: A systematic review. *BMC Medical Informatics and Decision Making*, 1(1), 5

- Hersh, W.R., Hickam, D.H., severance, S.M. et al. (2006). Telemedicine for the Medicare population: Update. U.S. Department of Health and Human Services. Rockville, MD: Agency for Healthcare Research and Quality,
- HHS (2013). What is long-term care? HHS. Washington: DC, Retrieved from: <http://longtermcare.gov/the-basics/what-is-long-term-care>.
- Hibbert, D., Mair, F.S., Angus, R.M., May, C., Boland, A., Haycox, A., Roberts, C. Shiels, C. & Capewell, S. (2003). Lessons from the implementation of a home telecare service. *Journal of Telemedicine and Telecare*, 9 (Suppl 1), S55-S56.
- Hibbert, D., Mair, F.S., May, C.R., Boland, A., O'Connor, J., Capewell, S. & Angus, R.M. (2004). Health professionals' responses to the introduction of a home telehealth service. *Journal of Telemedicine & Telecare*, 10(4), 226-230.
- Hilty, D. M., Ferrer, D. C., Parish, M. B., Johnston, B., Callahan, E. J., & Yellowlees, P. M. (2013). The effectiveness of telemental health: a 2013 review. *Telemedicine and e-Health*, 19(6), 444-454.
- Hilty, D.M., Marks, S.L., Urness, D., Yellowlees, P.M. & Nesbitt, T.S. (2004). Clinical and educational telepsychiatry applications: A review. *The Canadian Journal of Psychiatry*, 49(1), 12-23.
- Hirani, S. P., Beynon, M., Cartwright, M., Rixon, L., Doll, H., Henderson, C & Newman, S. P. (2014). The effect of telecare on the quality of life and psychological well-being of elderly recipients of social care over a 12-month period: the Whole Systems Demonstrator cluster randomised trial. *Age and ageing*, 43(3), 334-341.
- Hogenbirk J.C., Montgomery, Phyllis, Boydell K.M., Pong, R.W. & Cudeny, D.C. (2006). Using telehealth to augment delivery of mental health services by family

health teams: Potential barriers and possible solutions, Ontario Ministry of Health and Long-Term Care & Ontario Mental Health Foundation, Centre for Rural and Northern Health Research.

Horton, K. (2008). The use of telecare for people with chronic obstructive pulmonary disease: implications for management. *Journal of Nursing Management*, 16(2), 173-181.

Ismail, W. K. W., & Abdmajid, R. (2007). Framework of the culture of innovation: A revisit. *Journal Kemanusiaan*, 9.

Jameson, J.P., Farmer, M.S., Head, K.J., Fortney, J. & Teal, O.R. (2011). VA community mental health service providers' utilization of and attitudes toward telemental health care: The gatekeeper's perspective. *Journal of Rural Health*, 27, 425-432.

Janca (2000). Telepsychiatry: An update on technology and its implications. *Current Opinion in Psychiatry*, 13, 591-597.

Janz, B.D. & Hennington, A. (2007). Information systems and health XVI: Physician adoption of electronic medical records: Applying the UTAUT model in a healthcare context. *Communications of the Association for Information Systems*, 19, 60-80.

Jennett, P.A., Hall, L.A., Hailey, D., Ohinmaa, A., Anderson, C., Thomas, R., Young, B., Lorenzetti, D. & Scott R.E. (2003). The socio-economic impact of telehealth: A systematic review. *Journal of Telemedicine and Telecare*, 9, 311-320.

Jerome, L. W., & Zaylor, C. (2000). Cyberspace: Creating a therapeutic environment for telehealth applications. *Professional Psychology: Research and Practice*, 31, 478-483.

- Johansen, M. A., Wootton, R., Kimble, R., Mill, J., Smith, A., & Hockey, A. (2004). A feasibility study of email communication between the patient's family and the specialist burns team. *Journal of telemedicine and telecare*, 10(Suppl 1), 53-56.
- Johnson, M.M. (1996). Finding creativity in a technical organization. *Research Technology Management*, 3a (5), 9-11.
- Johnston, B., Wheeler, L., Deuser, J., & Sousa, K. H. (2000). Outcomes of the Kaiser Permanente tele-home health research project. *Archives of Family Medicine*, 9(1), 40.
- Johnston, G. & Weatherburn, G. (2010). Automated weight monitoring in chronic heart failure: the excluded majority. *Journal of Telemedicine and Telecare*, 16(4), 173-181.
- Joseph, V., West, R.M., Shickle, D.Keen, J. & Clamp, S. (2011). Key challenges in the development and implementation of telehealth projects. *Journal of Telemedicine and Telecare*, 17(2), 71-77.
- Judge, W.Q., Fryxell, G.E. & Dooley, R.S. (1997). The new task of R&D management: Creating goal-directed communities for innovation. *California Management Review*, 39(3), 72-85.
- Kates, N., Crustolo, A.M., Farrar, S. et al. (2001). Integrating mental health services into primary care: Lesson learned, Families. *Systems & Health*, 19(1), 5-12.
- Kates, B., Crustolo, A.M., Farrar, s. et al. (2002). Counsellors in primary care: Benefits and lessons learned. *Canadian Journal of Psychiatry*, 42, 955-959.
- Katon, W. J. (2011). Epidemiology and treatment of depression in patients with chronic medical illness. *Dialogues in clinical neuroscience*, 13(1), 7.

- Keeton, C. (2012). 'Measuring the impact of e-health', *Bull World Health Organisation* 90, 326–327.
- Kessler, D., Lewis, G., Kaur, S., Wiles, N., King, M., Weich, S., Sharp, D.J., Araya, R., Hollinghurst, S. & Peters, T.J. (2009). Therapist-delivered Internet psychotherapy for depression in primary care: A randomized controlled trial. *Lancet*, 374(9690), 628-634.
- Khoja, S., Durrani, H., Scott, R., Sajwani, A. & Piryani, U. (2013). Conceptual framework for development of comprehensive e-Health evaluation tool. *Telemedicine & e-Health*, 19, 48-53.
- Kim, E.H., Gellis, Z.D. & Hoak, V. (2015). Telehealth utilization for chronic illness and depression among home health agencies: A pilot survey, *Home Health Care Services Quarterly*, 34(3-4), 220-231.
- Kim, J., Kim, S., Kim, H. et al. (2012). Acceptability of the consumer-centric e-health services for patients with chronic obstructive pulmonary disease. *Telemedicine Journal and e-health*, 18(5). 329-338.
- Kirby, M. & LeBreton, M. (2002). The health of Canadians-The federal role, Standing Senate Committee on Social Affairs. Ottawa, Ontario: Science and Technology.
- Koch, Sabine (2005). Home telehealth-Current state and future trends. *International Journal of Medical Informatics*, 75, 565-576.
- Koff, P. B., Jones, R. H., Cashman, J. M., Voelkel, N. F., & Vandivier, R. W. (2009). Proactive integrated care improves quality of life in patients with COPD. *European Respiratory Journal*, 33(5), 1031-1038.

- Kohnke, A., Cole, M. L., Bush, R., Ellis, M. S., Hagan, M., & Cruz, J. (2013). Incorporating UTAUT Predictors for Understanding Home Care Patients' and Clinician's Acceptance of Healthcare Telemedicine Equipment. *Lawrence Technological University*.
- Krousel-Wood, M. A., Re, R. N., Abdoh, A., Bradford, D., Kleit, A., Chambers, R., & Gomez, N. (2001). Patient and physician satisfaction in a clinical study of telemedicine in a hypertensive patient population. *Journal of Telemedicine and Telecare*, 7(4), 206-211.
- LaFramboise, L.M., Woster, J., Yager, A. & Yates B.C. (2009). A technological life buoy: Patient perceptions of the healthy buddy. *Journal of Cardiovascular Nursing*, 24, 216-224.
- Lai, Y. H., Huang, F. F., & Yang, H. H. (2012). The Acceptance of Telehealthcare Technology in Taiwan: A Case Study of Arrhythmia Monitoring System. *Communications of the ICISA*, 45.
- Lam, D.M & Mackenzie, C. (2005). Human and organizational factors affecting telemedicine utilization within U.S. military force in Europe. *Telemedicine and e-Health*, 11(1), 70-78.
- Lehoux, P., Sicotte, C., Denis, J.L. Berg, M. & Lacroix, A. (2002). The theory of use behind telemedicine: How compatible with physicians' clinical routines? *Social Science & Medicine*, 54, 889-904.
- Leon, N. Schneider, H. & Daviaud, E. (2012). Applying a framework for assessing the health system challenges to scaling up mHealth in South Africa. *BMC Medical Informatics Decision Making*, 12, 123.

- Leong, L. (2003). Theoretical models in IS research and the technology acceptance model (TAM). *Technologies & methodologies for evaluating information technology in business*, 1-31.
- Lessing, K. & Blignault, I. (2001). Mental health telemedicine programmes in Australia. *Journal of Telemedicine and Telecare*, 7, 317-323.
- Li, X., Hess, T.J. & Valacich, J.S. (2008). Why do we trust new technology? A study of initial trust formation with organizational information systems. *Journal of Strategic Informatics Systems*, 17, 39-71.
- Lingely-Pottie, P., & McGrath, P. J. (2006). A therapeutic alliance can exist without face-to-face contact. *Journal of telemedicine and telecare*, 12(8), 396-399.
- Lisney, B., and C. Allen (1993). Taking a snapshot of cultural change. *Personnel Management*, 25(2), 38-41.
- Lowitt, M. H., Kessler, I. I., Kauffman, C. L., Hooper, F. J., Siegel, E., & Burnett, J. W. (1998). Tele dermatology and in-person examinations: a comparison of patient and physician perceptions and diagnostic agreement. *Archives of Dermatology*, 134(4), 471-476.
- Luu, T. T., & Venkatesh, S. (2010). Organizational culture and technological innovation adoption in private hospitals. *International Business Research*, 3(3), 144.
- Made, C., Carle, L., Soderberg, O., & Hellstrom, S. (1999). Tele-otolaryngology consultations between two rural primary-care centres in southern Lapland and the University Hospital of Umea. *Journal of telemedicine and telecare*, 5(Suppl 1), 93-94.

- Magnusson, L., Hanson, E. & Borg, M. (2004). A literature review study of information and communication technology as a support for frail older people living at home and their family cares. *Technology and Disability, 16*(4), 223-235.
- Mair, F., Finch, T., May, C., Hiscock, J., Beaton, S., Goldstein, P. & McQuillan, S. (2007). Perceptions of risk as a barrier to the use of telemedicine. *Journal of Telemedicine and Telecare, 13*(Suppl 1), 38-39.
- Mair, F.S., Goldstein, P., May, C. et al. (2005). Patient and provider perspectives on home telecare: Preliminary results from a randomized controlled trial. *Journal of Telemedicine & Telecare, 11*, S95-S97.
- Mair, F.S., Hiscock, J. & Beaton, S.C. (2008). Understanding factors that inhibit or promote the utilization of telecare in chronic lung disease. *Chronic Illness, 4*(2), 110-117.
- Mair, F.S. & Whitten, P. (2000). Systematic review of studies of patient satisfaction with Telemedicine. *BMJ, 320*, 1517-1520.
- Mancini, J., Noguès, C., Adenis, C., Berthet, P., Bonadona, V., Chompret, A. & Julian-Reynier, C. (2006). Patients' characteristics and rate of Internet use to obtain cancer information. *Journal of public health, 28*(3), 235-237.
- Maric, B., Kaan, A., Araki, Y., Ignaszewski, A. & Lear, S.A. (2010). The use of the internet to remotely monitor patients with heart failure. *Telemedicine Journal and e-health, 16*, 26-33.
- Martin, D. J., Garske, J. P., & Davis, M. K. (2000). Relation of the therapeutic alliance with outcome and other variables: a meta-analytic review. *Journal of consulting and clinical psychology, 68*(3), 438.

- Martins, E.C. (2000). Die invloed van organisasiekultuur op kreatiwiteit en innovasie in 'n universiteitbiblioteek/ The influence of organizational culture on creativity and innovation in a university library (MInf dissertation), Pretoria: University of South Africa.
- Martins, N. (1987). Organisasiekultuur in 'n finansiële instelling/Organizational culture in a financial institution (DPhil thesis). Pretoria: University of Pretoria.
- May, C., Gask, L., Atkinson, T. et al. (2001). Resisting and promoting new technologies in clinical practice: The case of telepsychiatry. *Social Science and Medicine*, 52, 1889-1901.
- McLaren, P. (2003). Telemedicine and telecare: What can it offer mental health services? *Advances in Psychiatric Treatment*, 9, 54-61.
- McLean, S., Chandler, D., Nurmatov, U., Liu, J., Pagliari, C., Car, J., & Sheikh, A. (2010). Telehealthcare for asthma, *Cochrane Database System Rev*, 10.
- McShane, R., Gedling, K., Kenward, B., Kenward, R., Hope, T. & Jacoby, R. (1998). The feasibility of electronic tracking devices in dementia: A telephone survey and case series, *International Journal of Geriatric Psychiatry*, 13(8), 556-563.
- Mielonen, M., Ohinmaa, A., Moring, J & Isohanni, M. (1998). The use of video conferencing for telepsychiatry in Finland, *Journal of Telemedicine and Telecare*, 4, 125-131.
- Miller, E. A. (2003). The technical and interpersonal aspects of telemedicine: effects on doctor–patient communication. *Journal of telemedicine and telecare*, 9(1), 1-7.
- Minore, B., Boone, M., Hill, M.E. et al. (2005). Toward using family health teams to care for chronic mental health clients in Northern Ontario: Barriers, opportunities and

training needs, Report submitted to Ontario Ministry of Health & Long-Term Care Ontario Mental Health Foundation, Thunder Bay, ON: Centre for Rural and Northern Health Research, Lakehead University.

- Mitchell, J.E., Myers, T., Swan-Kremeier, L. & Wonderlich, S. (2003). Psychotherapy for bulimia nervosa delivered via telemedicine. *European Eating Disorders Review, 11*, 222-230.
- Miyauchi, K., Yonezawa, Y., Maki, H., Ogawa, H., Hahn, A.W. & Caldwell, W.M. (2003). A new microcomputer-based safety and life support system for solitary-living elderly people. *Biomedical Science Instrumentation, 39*, 179-182.
- Mohr, D. C., Hart, S. L., Julian, L., Catledge, C., Honos-Webb, L., Vella, L., & Tasch, E. T. (2005). Telephone-administered psychotherapy for depression. *Archives of General Psychiatry, 62*(9), 1007.
- Molyneaux, H., Gibson, K., Simms, D., O'Donnell, S., Oakley, P., Kondratova, I. & Hagerman, V. (2009). Information and Communication Technologies for Assessing and Treating Operational Stress Injury (OSI). *National Research Council, ERB-1159. NRC 50740.*
- Monnier, J., Knapp, R.G. & Frueh, C. (2003). Recent advances in telepsychiatry: An updated Review. *Psychiatric Services, 54*(12), 1604-1609.
- Monthuy-Blanc, J., Bouchard, S., Maïano, C., & Séguin, M. (2013). Factors influencing mental health providers' intention to use telepsychotherapy in First Nations communities. *Transcultural psychiatry, 50*(2), 323-343.
- Morguet, A. J., Kühnelt, P., Kallel, A., Jaster, M., & Schultheiss, H. P. (2008). Impact of

telemedical care and monitoring on morbidity in mild to moderate chronic heart failure. *Cardiology*, 111(2), 134-139.

Morris, M.G. and Dillon, A. (1997), "How user perceptions influence software use", *IEEE Software*, 14(4), 58-65.

Myers, S., Grant, R.W., Lugn, N.E., Holbert, B. & Kvedar, J.C. (2006). Impact of home-based monitoring on the care of patients with congestive heart failure. *Home Health Care Management Practice*, 18, 444-451.

Myers, K., Turvey, C.L. (2013). Research in telemental health: Review and synthesis in Myers, K., & Turvey, C.L. edition, *Telemental health: Clinical, technical, and administrative foundations for evidence-based practice*. Waltham, MA: Elsevier, 397-419.

Nahm, E.S., Blum, K., Scharf, B. et al. (2008). Exploration of patients' readiness for an eHealth management program for chronic heart failure: A preliminary study. *Journal of Cardiovascular Nursing*, 23, 463-471.

National Institute of Mental Health (2011). Depression and Parkinson's disease. Retrieved from: <http://www.nimh.nih.gov/health/publications/depression-and-parkinsons-disease/index.shtml>

Nesbitt, T.S., Hilty, D.M., Kuenneth, C.A. & Siefkin, A. (2000). Development of a telemedicine program: A review of 1,000 video conferencing consultations. *Western Journal of Medicine*, 173(3), 169-174.

Noel, H. C., Vogel, D. C., Erdos, J. J., Cornwall, D., & Levin, F. (2004). Home telehealth reduces healthcare costs. *Telemedicine Journal & e-Health*, 10(2), 170-183.

Nossiter, V. & Biberman, G. (1990). Protective drawings and metaphor: An analysis of

- organizational culture. *Journal of Managerial Psychology*, 5(3), 13-16.
- Nunnally, J.C. (1978). *Psychometric Theory*. 2nd Edition, New York, NY: McGraw-Hill Book Company.
- Onor, M.L., Trevisiol, M., Urciuoli, O., Misan, S., Bertossi, F., Tiron, G. et al. (2008). Effectiveness of telecare in elderly populations-A comparison of three settings. *Telemedicine Journal and e-Health*, 14, 164-169.
- O'Reilly, R., Bishop, J., Maddox, K., Hutchinson, L., Fisman, M., & Takhar, J. (2007). Is telepsychiatry equivalent to face-to-face psychiatry? Results from a randomized controlled equivalence trial. *Psychiatric Services*, 58(6), 836-843.
- Oshlyansky, L., Cairns, P., & Thimbleby, H. (2007, September). Validating the Unified Theory of Acceptance and Use of Technology (UTAUT) tool cross-culturally. *British Computer Society*, 2, 83-86.
- Oudshoorn, N. (2009). Physical and digital proximity: Emerging ways of healthcare in face-to-face and telemonitoring of heart failure patients. *Sociology of Health & Illness*, 31(3), 390-405.
- Öztürk, A., Şimşek, T. T., Yümin, E. T., Sertel, M., & Yümin, M. (2011). The relationship between physical, functional capacity and quality of life (QoL) among elderly people with a chronic disease. *Archives of gerontology and geriatrics*, 53(3), 278-283.
- Pagán, J. A., Chen, H. F., & Kalish, M. C. (2011). An integrated, clinician-focused telehealth monitoring system to reduce hospitalization rates for home health care patients with diabetes. *Journal of primary care & community health*, 2(3), 153-156.

- Palmas, W., Teresi, J., Weinstock, R.S. & Shea S. (2008). Acceptability to primary care providers of telemedicine in diabetes case management. *Journal of Telemedicine and Telecare*, 14, 306-308.
- Parasuraman, S. & Igarria, M. (1990). An examination of gender differences in the determinants of computer anxiety and attitudes toward microcomputers among managers. *Internal Journal of Man-Machine Studies*, 32(3), 327-340.
- Parker-Oliver, D., & Demiris, G. (2006). Social work informatics: A new specialty. *Social Work*, 51(2), 127–134.
- Perednia, D.A. & Allen, A. (1995). Telemedicine technology and clinical applications. *JAMA*, 273(6), 483-488.
- Pfeffer, J. (1982) *Organizations, and Organization Theory*. Boston, MA: Pitman.
- Pickett, Y. R., Raue, P. J., & Bruce, M. L. (2012). Late-life depression in home healthcare. *Aging Health*, 8(3), 273-284.
- Pinna, G.D., Maestri, R., Andrews, D. et al. (2007). Home telemonitoring of vital signs and cardiorespiratory signals in heart failure patients: System architecture and feasibility of the HHH model. *International Journal of Cardiology*, 120, 371-379.
- Pruitt, L.D., Luxton, D.D. & Shore, P. (2013). Additional clinical benefits of home-based telemental health. *Professional Psychology: Research & Practice*.
- Qian, J., Simoni-Wastila, L., Rattinger, G. B., Zuckerman, I. H., Lehmann, S., Wei, Y. J. J., & Stuart, B. (2014). Association between depression and maintenance medication adherence among Medicare beneficiaries with chronic obstructive pulmonary disease. *International journal of geriatric psychiatry*, 29(1), 49-57.

- Quinn, C. C., Clough, S. S., Minor, J. M., Lender, D., Okafor, M. C., & Gruber-Baldini, A. (2008). WellDoc™ mobile diabetes management randomized controlled trial: change in clinical and behavioral outcomes and patient and physician satisfaction. *Diabetes technology & therapeutics, 10*(3), 160-168.
- Rabinowitz, T., Brennan D.M., Chumnler, N.R., Kobb, R. & Yellowlees, P. (2008). New directions for telemental health research. *Telemedicine and E-health, 14*, 972-976.
- Radner, R. and Rothschild, M (1975). On the Allocation of Effort. *Journal of Economic Theory, 10*, 358-376.
- Rahimpour, M., Lovell, N.H., Celler, B.G. & McCormick, J. (2008). Patients' perceptions of a home telecare system. *International Journal of Medical Informatics, 77*, 486- 498.
- Rees, C.S. & Stone, S. (2005). Therapeutic alliance in face-to-face versus videoconferenced Psychotherapy. *Professional Psychology: Research and Practice, 36*(6), 649-653.
- Rialle, V., Noury, N. & Herve, T. (2001). An experimental health smart home and its distributed internet-based information and communication system: First steps of a research project. *Medinfo, 10*(2), 1479-1483.
- Ricci, F.L. (2002). The Italian national telemedicine programme. *Journal of Telemedicine & Telecare, 8*, 72-80.
- Richards, H., King, G., Reid, M., Selvaraj, S., McNicol, I., Brebner, E., & Godden, D. (2005). Remote working: survey of attitudes to eHealth of doctors and nurses in rural general practices in the United Kingdom. *Family practice, 22*(1), 2-7.

- Richardson, L.K., Frueh, B.C., Grubaugh, A.L., Egede, L. & Elhai, J.D. (2009). Current directions in videoconferencing tele-mental health research. *Clinical Psychology, 16*, 323-338.
- Robinson, P.H. & Serfaty, M.A. (2001). The use of e-mail in the identification of bulimia nervosa and its treatment. *European Eating Disorders Review, 9*, 182-193.
- Rogers, E. M., and J. I. Kim. (1985). Diffusion of Innovations in Public Organizations. In *Innovation in the Public Sector*, ed. Richard L. Merritt and Anna J. Merritt, 85-108. Beverley Hills: Sage
- Rogove, H.J., McArthur, D., Demaerschik, B.M. & Vespa, P.M. (2013), Barriers to telemedicine: Survey of current users in acute care units. *Telemedicine Journal of E-Health, 18*, 48-53.
- Roine, R., Ohinmaa, A. & Hailey, D. (2001). Assessing telemedicine: A systematic review of the literature, *Canadian Medical Association Journal, 165*(5), 765-771.
- Rojas, S.V. & Gagnon, M.P. (2008). A systematic review of the key indicators for assessing telehomecare cost-effectiveness. *Telemedicine and e-Health, 14*(9), 896-904.
- Royal College of Nursing (2012). RCN eHealth survey 2012 report: Positioning nursing in a digital world. London, UK: RCN.
- Rudolf, J.N. (2011). Effectiveness of telepsychiatry: An integrative literature review. Bozeman, MT: *Montana State University*.
- Ruskin, P. E., Silver-Aylaiian, M., Kling, M. A., Reed, S. A., Bradham, D. D. (2004). Treatment outcomes in depression: comparison of remote treatment through

- telepsychiatry to in-person treatment. *American Journal of Psychiatry*, 161(8), 1471-1476.
- Salzman, C., Wong, E., & Wright, B. (2002). Drug and ECT treatment of depression in the elderly, 1996–2001: A literature review. *Biological Psychiatry*, 52(3), 265-284.
- Sandberg, Jonathan, et al. (2009). A qualitative study of the experiences and satisfaction of direct telemedicine providers in diabetes case management. *Telemedicine and e-Health*, 15(8), 42-750.
- Schein, E. (1985). *Organizational Culture and Leadership*, “How Culture Forms, Develops and Changes”, In *Gaining Control of the Corporate Culture*, 17-43, San Francisco, Ca: Jossey-Bass.
- Schein, E. (1999). *The Corporate Culture Survival Guides*. San Francisco, CA: Jossey-Bass.
- Schmidt, S., Sheikzadeh, S., Beil, B., Patten, M. & Stettin, J. (2008). Acceptance of telemonitoring to enhance medication compliance in patients with chronic heart failure. *Telemedicine and e-health*, 14, 426-433.
- Scott, W.R. (1990). Innovation in medical care organizations: A synthetic review. *Medical Care Research and Review*, 47, 165-192.
- Seibert, P.S., Whitmore, T.A., Patterson, C. et al. (2008). Telemedicine facilitates CHF home health care for those with systolic dysfunction. *International Journal of Telemedicine and Applications*, 3.
- Shany, T., Hession, M., Pryce, D., Galang, R., Roberts, M., Lovell, N. & Basilakis, J. (2010). Home telecare study for patients with chronic lung disease in the Sydney

- West Area Health Service. *Studies in Health Technology and Informatics*, 161, 139-148.
- Sharma, U., Barnett, J. & Clarke, M (2010). Clinical users' perspective on telemonitoring of patients with long-term conditions: Understood through concepts of Giddens's structuration theory & consequence of modernity. *Studies in Health Technology and Informatics*, 160(1), 545-549.
- Shattow, M. (1996). Out of the blue. *Electric Perspectives*, 21(3), 44-54.
- Shaw, B.R., DuBenske, L.L, Han, J.Y., Cofte-Woerpel, L., Bush, N., Gustafson, D.H. & McTavish, F. (2008). Antecedent characteristics of online cancer information seeking among rural breast cancer patients: An application of the Cognitive-Social Health Information Processing Model. *Journal of Health Informatics*, 13(4), 389-408.
- Shea, S. (2007). The informatics for diabetes and education telemedicine (IDEATel) project. *Transactions of the American clinical and climatological association*, 118, 289.
- Shea, S., Starren, J., Weinstock, R.S. et al. (2002). Columbia University's informatics for diabetes education and telemedicine (IDEATel) project: Rationale and design. *Journal of American Medical Informatics Association*, 9, 49-62.
- Shea, S., Weinstock, R. S., Teresi, J. A., Palmas, W., Starren, J., Cimino, J. J., & Eimicke, J. P. (2009). A randomized trial comparing telemedicine case management with usual care in older, ethnically diverse, medically underserved patients with diabetes mellitus: 5-year results of the IDEATel study. *Journal of the American Medical Informatics Association*, 16(4), 446-456.

- Shegog, R., Bartholomew, L. K., Parcel, G. S., Sockrider, M. M., Mâsse, L., & Abramson, S. L. (2001). Impact of a computer-assisted education program on factors related to asthma self-management behavior. *Journal of the American Medical Informatics Association*, 8(1), 49-61.
- Shepherd, L., Goldstein, D., Whitford, H., Thewes, B., Brummell, V. & Hicks, M. (2006). The utility of videoconferencing to provide innovative delivery of psychological treatment for rural cancer patients: Results of a pilot study. *Journal of Pain Symptom Management*, 32(5), 453-461.
- Shing, D.H. (2008). The development of community telecommunication infrastructure: An evaluation of rural telecommunication project. *International Journal of Information Management*, 28(4), 322-335.
- Simms, D.C., Gibson, K & O'Donnell, S. (2011). To use or not use: Clinicians' perceptions of telemental health, *Canadian Psychology*. 52(1), 41-51.
- Simms, D.C., O'Donnell, S. & Molyneaux, H. (2008). The use of Virtual Reality in the treatment of Posttraumatic Stress Disorder (PTSD). *Lecture Notes in Computer Science*, 5622, 615-624.
- Simon, G.E., Chisholm, D., Treglia, M et al. (2002). The LIDO Group, Course of depression, health service costs, and work productivity in an international primary care study. *General Hospital Psychiatry*, 24, 328-335.
- Simon, G.E. & Katzelnick, D.J. (1997). Depression, use of medical services and cost-offset Effects. *Journal of Psychosomatic Research*, 42, 333-344.
- Simon, G.E., Khandker, R.K., Ichikawa, L. et al. (2006). Recovery from depression predicts lower health service costs. *Journal of Clinical Psychiatry*, 67, 1226-1231.

- Simon, G.E., Revicki, D., Heiligenstein, J. et al. (2000). Recovery from depression, work productivity, and health care costs among primary care patients. *General Hospital Psychiatry, 22*, 153-162.
- Simon, G.E., VonKorff, M. & Barlow, W. (1995). Health care costs of primary care patients with recognized depression. *Archives of General Psychiatry, 52*, 850-856.
- Simpson, J., Doze, S., Urness, D., Hailey, D. & Jacobs, P. (2001). Evaluation of a routine telepsychiatry service. *Journal of Telemedicine & Telecare, 7*, 90-98.
- Simpson, J., Doze, S., Urness, D., Hailey, D. & Jacobs, P. (2001). Telepsychiatry as a routine service: the perspective of the patient. *Journal of Telemedicine & Telecare, 7*(3), 155-160.
- Smith, H.A. & Allison, R.A. (1998). Telemental health: Delivering mental health care at a distance: A summary report, U.S. Department of Health and Human Services: Substance Abuse and Mental Health Services Administration. Rockville, MD: Center for Mental Health Services.
- Solomon, D.K., Portner, T.S., Bass, G.E. et al. (1998). Clinical and economic outcomes in the hypertension and COPD arms of a multicenter outcomes study. *Journal of American Pharmaceutical Association, 38*, 574-585.
- Soran, O. Z., Piña, I. L., Lamas, G. A., Kelsey, S. F., Selzer, F., Pilotte, J. & Feldman, A. M. (2008). A randomized clinical trial of the clinical effects of enhanced heart failure monitoring using a computer-based telephonic monitoring system in older minorities and women. *Journal of cardiac failure, 14*(9), 711-717.

- Sorensen, J.F.L. (2008). Attitudes toward telehealth use among rural residents: A Danish study. *Journal of Rural Health, 24*(3), 330-335.
- Stensland, J., Speedie, S.M., Ideker, M., House, J. & Thompson, T. (1999). The relative cost of outpatient telemedicine services. *Telemedicine Journal, 5*, 245-256.
- Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences, 110*(15), 5797-5801.
- Steventon, A., Bardsley, M., Billings, J., Dixon, J., Doll, H., Hirani, S., Cartwright, M., Rixon, L., Knapp, M., Henderson, C., Rogers, A., Fitzpatrick, R., Hendy, J. & Newman, S. (2012). Effect of telehealth on use of secondary care and mortality: Findings from the Whole System Demonstrator cluster randomized trial. *British Medical Journal, 344*(213), e3874.
- Streets, R and Boundary, C. (2004). Managing Innovation. Australian Institute of Management - Version 1.0.
- Suh, B. and Han, I. (2002), Effect of trust on customer acceptance of internet banking. *Electronic Commerce and Applications, 1*(3), 247-63.
- Sundaravej, T. (2010). Empirical validation of unified theory of acceptance and use of technology model. *Journal of Global Information Technology Management, 13*(1), 5-27.
- Sunmer, C.R. (2001). Telepsychiatry: Challenges in rural aging. *Journal of Rural Health, 17*(4), 370-373.
- Tanriverdi, H. & Iacono, C.S. (1998). Knowledge barriers to diffusion of telemedicine, In

- proceedings of the International Conference of the Association for Information Systems, Helsinki, Finland, 39-50.
- Teo, T.S.H., Lim, V.K.G. and Lai, R.Y.C. (1999), Intrinsic and extrinsic motivation in internet usage. *Omega: International Journal of Management Science*, 27(1), 25-37.
- Tesluk, P.E., Faar, J.L. & Klein, S.R. (1997). Influences of organizational culture and climate on individual creativity. *The Journal of Creative Behavior*, 31(1), 21-41.
- Trappenburg, J. C., Niesink, A., de Weert-van Oene, G. H., van der Zeijden, H., van Snippenburg, R., Peters, A. & Schrijvers, A. J. (2008). Effects of telemonitoring in patients with chronic obstructive pulmonary disease. *Telemedicine and e-Health*, 14(2), 138-146.
- Trief, P. M., Izquierdo, R., Eimicke, J. P., Teresi, J. A., Goland, R., Palmas, W. & Weinstock, R. S. (2013). Adherence to diabetes self-care for white, African-American and Hispanic American telemedicine participants: 5-year results from the IDEATel project. *Ethnicity & health*, 18(1), 83-96.
- Trief, P.M., Sandberg, J., Izquierdo, R. et al. (2008). Diabetes management assisted by telemedicine: Patient perspectives. *Telemedicine and e-Health*, 14, 647-655.
- Trief, P. M., Teresi, J. A., Eimicke, J. P., Shea, S., & Weinstock, R. S. (2009). Improvement in diabetes self-efficacy and glycemic control using telemedicine in a sample of older, ethnically diverse individuals who have diabetes: the IDEATel project. *Age and aging*, 38(2), 219-225.

- Tucker, R., McCoy, M., Chorba, C. & Kumiega, A. (1990). Can questionnaires objectively assess organizational culture? *Journal of Managerial Psychology*, 5(4), 4-11.
- Tudiver, F., Wolff, T., Morin P.C. et al. (2007). Primary care providers' perceptions of home diabetes telemedicine care in the IDEATel project. *Journal of Rural Health*, 23, 55-61.
- Tushman, M.L. & O'Reilly, C.A. III (1997). *Winning through innovation: A practical guide to leading organizational change and renewal*, Boston, MA: Harvard Business School Press.
- Umemuro, H. (2004). Computer attitude, cognitive abilities, and technology use among older Japanese adults. *Gerontechnology*, 3, 64-76.
- Ure, J., Pinnock, H., Hanley, J. et al. (2012). Piloting tele-monitoring in COPD: A mixed methods exploration of issues in design and implementation. *Primary Care Respiratory Journal*, 21(2), 57-64.
- Urness, D., Weisser, L., Campbell, R. & Hilty, D. (2003). Telepsychiatry in Canada and the United States, In Wootton, R., Yellowlees, P. & McLaren, P. Eds, *Telepsychiatry and E-Mental Health*. London, UK: Royal Society of Medicine Press.
- U.S. Department of Veterans Affairs (2011). VHA Office of Telehealth Services, Retrieved from: <http://www.telehealth.va.gov/>
- Valero, M. A., Arredondo, M. T., Del Nogal, F., Rodriguez, J. M., & Frias, E. (2000). Patient satisfaction with a home televisiting service based on interactive

- television over a cable network. *Journal of Telemedicine and Telecare*, 6 (Suppl 1), 99-101.
- Van den Berg, N., Schumann, M., Kraft, K., & Hoffmann, W. (2012). Telemedicine and telecare for older patients—a systematic review. *Maturitas*, 73(2), 94-114.
- Venkatesh, V., Morris, M.G. & Ackerman, P.L. (2000). A longitudinal field investigation of gender differences in individual technology adoption decision-making processes. *Organization Behavior and Human Decision Making Processes*, 83(1), 33-60.
- Venkatesh, V. & Morris, M.G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, 24(1), 115-139.
- Venkatesh, V., Morris, M.G., & Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27, 425-478.
- Venter, A., Burns, R., Hefford, M. & Ehrenberg, N. (2012). Results of a telehealth-enabled chronic care management service to support people with long-term conditions at home. *Journal of Telemedicine & Telecare*, 18, 172-175.
- Vincent, G.K. & Velkoff, V.A. (2010). The next four decades: The older population in the United States: 2010 to 2050. *Current population reports*, 25-1138.
- Wagnild, G., Leenknecht, C. & Zauher, J. (2006). Psychiatrist's satisfaction with telepsychiatry. *Telemedicine Journal of E-health*, 12, 546-551.
- Wan, A. C. T., & Darzi, A. (1999). Real-time remote consultation in the outpatient clinic—experience at a teaching hospital. *Journal of Telemedicine and Telecare*, 5(Suppl 1), 70-71.

- Wang, Y. S., Wu, M. C., & Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, 40(1), 92-118.
- Watanabe, S. M., Fairchild, A., Pituskin, E., Borgersen, P., Hanson, J., & Fassbender, K. (2013). Improving access to specialist multidisciplinary palliative care consultation for rural cancer patients by video conferencing: report of a pilot project. *Supportive Care in Cancer*, 21(4), 1201-1207.
- Weinberger, M. I., Bruce, M. L., Roth, A. J., Breitbart, W., & Nelson, C. J. (2011). Depression and barriers to mental health care in older cancer patients. *International journal of geriatric psychiatry*, 26(1), 21-26.
- Weinstock, R. S., Brooks, G., Palmas, W., Morin, P. C., Teresi, J. A., Eimicke, J. P., ... & Shea, S. (2010). Lessened decline in physical activity and impairment of older adults with diabetes with telemedicine and pedometer use: results from the IDEATel study. *Age and ageing*, afq147.
- West, M.A. & Farr, J.L. (1990). Innovation at work, In West, M.A. and Farr, J.L. Eds, *Innovation and Creativity at Work: Psychological and Organizational Strategies*, 3-13, Wiley, Chichester.
- Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ... & Vos, T. (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet*, 382(9904), 1575-1586.
- Whitten, P., Cook, D., & Cornacchione, J. (2011). Reviewing the Past, Looking Toward the Future. *The Routledge Handbook of Health Communication*, 84.

- Whitten, P., & Love, B. (2005). Patient and provider satisfaction with the use of telemedicine: overview and rationale for cautious enthusiasm. *Journal of postgraduate medicine*, 51(4), 294.
- Whitten, P.S. Mackert, M.S. (2005). Addressing telehealth's foremost barrier: Provider as initial Gatekeeper. *International Journal of Technology Assessment and Health Care*, 21(4), 38-43.
- Whitten, P. S. & Mickus, M. (2007). Home telecare for COPD/CHF patients: Outcomes and perceptions, *Journal of Telecare*, 13, 69-73.
- Wiener, J.M. (2013). After CLASS: The long-term care commission's search for a solution. *Health Affairs*, 32(5), 831-834.
- Williams, G.C., Freedman, Z.R. & Deci, E.L. (1998). Supporting autonomy to motivate patients with diabetes for glucose control. *Diabetes Care*, 21, 1644-1651.
- Williams, T. L., May, C. R., & Esmail, A. (2001). Limitations of patient satisfaction studies in telehealthcare: a systematic review of the literature. *Telemedicine Journal and e-Health*, 7(4), 293-316.
- Wilson, K., Mottram, P. & Hussain, M. (2007). Survival in the community of the very old depressed, discharged from medical inpatient care. *International Journal of Geriatric Psychiatry*, 22(10), 974-979.
- Woo, C., Seton, J. M., Washington, M., Tomlinson, S. C., Phrasavath, D., Farrell, K. R., Goldstein, B. (2014). Increasing specialty care access through use of an innovative home telehealth-based spinal cord injury disease management protocol (SCI DMP). *The journal of spinal cord medicine*.
- Woods, L. W., & Snow, S. W. (2013). The impact of telehealth monitoring on acute care

hospitalization rates and emergency department visit rates for patients using home health skilled nursing care. *Home health care nurse*, 31(1), 39-45.

World Health Organization (2008). The Global Burden of Disease 2004 Update, Retrieved from: http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf

World Health Organization (2010). The Global Burden of Disease, Retrieved from: <http://www.thelancet.com/themed/global-burden-of-disease>

Yarbrough, A. K., & Smith, T. B. (2007). Technology acceptance among physicians: a new take on TAM. *Medical Care Research and Review*.

Yellowlees, P.M. (1997). Successful development of telemedicine systems-Seven core principles. *Journal of Telemedicine and Telecare*, 3, 215-222.

Yi, M.Y., Jackson, J.D., Park, J.S. & Probst, J.C. (2006). Understanding information technology acceptance by individual professionals: Toward an integrative view. *Informatics Management*, 43(3), 350- 363.

Zamaria, C. & Fletcher, F. (2008). *Canada Online! The internet, media and emerging technologies: Uses, attitudes, trends and international comparisons 2007*, Canadian Internet Project: Toronto.

Zanaboni, P., & Wootton, R. (2012). Adoption of telemedicine: from pilot stage to routine delivery. *BMC medical informatics and decision making*, 12(1), 1.

Zullig, L. L., Melnyk, S. D., Goldstein, K., Shaw, R. J., & Bosworth, H. B. (2013). The Role of Home Blood Pressure Telemonitoring in Managing Hypertensive Populations. *Current hypertension reports*, 15(4), 346-355.