THE CATHOLIC UNIVERSITY OF AMERICA

Evaluation of nurses' intention to use after-hour skilled nursing facility telemedicine-enabled physician coverage service

AN EVIDENCE-BASED PRACTICE PROJECT

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Evaluation of Nurses' Intention to Use After-hour Skilled Nursing Facility
Telemedicine-enabled Physician Coverage Service:
An Evidence-based Practice Project

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There is a significant number of unnecessary rehospitalizations of post-acute patients from skilled nursing facilities (SNF). Many of these transfers occur after hours when onsite practitioners are not available. Care is often delegated to telephonic medical coverage which may be ineffective. The acuity level of patients being admitted to SNFs is increasing. An increased presence of medical practitioners is needed to provide safe, effective care at all hours for higher acuity level SNF patients. An after-hours telemedicine-enabled physician coverage service meets the need for additional practitioner presence. In some instances, nurse utilization of the service is limited. The purpose of this project is to ultimately improve utilization of a telemedicine-enabled after-hours coverage service of SNF patients and reduce unnecessary hospitalizations. The PICOT questions for this project were: 1) What barriers affect a nurse's intention to use an after-hours telemedicine-enabled physician coverage service intended to reduce rehospitalizations in SNFs over a three-month period? 2) Is there a correlation between intention to use the service and service utilization? Project design was an evidence-based project that utilized quantitative data. The project method involved introducing nurses to the service through a telemedicine-enabled training session. Demographic data were collected and an anonymous modified UTAUT questionnaire was completed at the initial session and approximately four weeks later. Utilization data were obtained from the service's electronic records. Analysis of the data revealed that there was a statistically significant decline in the intention to use the system scores between the first and second sessions with the level of

intention changing from "probably" to "neutral"; however, there was increased utilization between the same time periods in two of the three facilities. In the months following the project, utilization increased significantly and often exceeded average service-wide utilization. It is concluded that the UTAUT questionnaire did not appear to provide accurate evaluation of the intention to use the service in this setting. In spite of this finding, information gathered from the project can be used to improve the nurse training program.

This evidence-based project by Diane Rose Croll fulfills the requirement for the doctoral degree in Doctor of Nursing Practice approved by Janice Agazio, PhD, CRNP FAANP, FAAN, as Director, and by Marye Kellermann, Ph.D., RN, FAANP and Debbie Simmons, DNP, ANP-BCS-BC, CPON as Readers.

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Dedication

I have been profoundly affected by the thousands of patients who have engaged with me and trusted me to participate in their lives. They have taught me more than can be imagined and I dedicate this project to them.

I also dedicate this project to all nursing students and nurses. I commend you for your work and your service! We have chosen a challenging profession with no guarantee of reward yet, there's nothing else I'd rather do. Helping people meet their goals, sharing in victories large and small, offering empowering information and saving lives… there's nothing like nursing.

I am very blessed. My parents, June and Calvin Croll, made sure my sisters and brothers and I had a solid educational foundation and made significant sacrifices to assure we attended Catholic elementary school. I have no doubt that the learning that took place and the skills I developed decades ago have allowed me to complete this programs. I dedicate this project to my parents for making this possible and to my teachers for getting me started.

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Chapter 1. Nature and Scope of the Problem

Introduction and Scope of the Problem

As each segment of the healthcare industry applies relevant aspects of the Patient

Protection and Affordable Care Act of 2010, the nursing home industry is undergoing significant

changes as it endeavors to survive. Hospitals have experienced negative financial impacts by

progressively increasing payment reductions based on rehospitalization rates (Rau, 2013) and

nursing homes will be similarly impacted in 2018 (American Health Care Association, 2014a;

CMS, 2015). To reduce the likelihood of readmissions, hospitals are reducing the pool of

nursing homes to which they discharge patients as they review facilities' return to hospital

(RTH) rates and select facilities with the most favorable data. Factors that affect the RTH rate

include patient acuity, patient comorbidities, facility preparedness to treat acutely ill patients,

nursing home staff turnover rates, and availability of health care practitioners to care for acutely-

ill patients "in-house". Engelhardt (2012) offers categories for these factors that include,

"inadequate primary care, poor nursing facility quality of care, poor communication among

providers, and family preferences" (slide 39). To provide safe and adequate care for post-acute

patients within the skilled nursing facilities (SNF), many facilities have undertaken major

changes in their plant infrastructure transforming selected areas into specialized post-acute units.

To support transformation of their medical infrastructure, some facilities have introduced various

interventions to increase the staff's ability to provide onsite care.

These changes place additional expectations on those administering care, especially the

bedside nurses who are usually Licensed Practical Nurses (LPNs) and Certified Nursing

Assistants. The long-term care industry struggles with high staff turnover rates and research

reveals that the 2010 turnover rate for LPNs was 34.6% while the retention rate was 56%

(American Health Care Association, 2014b). Evidence-based interventions developed to reduce rehospitalization and involve bedside staff, include Interventions to Reduce Acute Care Transfers (INTERACT) (Butcher, 2012; Ouslander et al., 2011) and the State Action on Avoidable Rehospitalizations initiative (STARR) (Boutwell et al., 2011). INTERACT, a web-based program offered free of charge, offers an assessment tool that is structured to assist the nurse in identifying the level of need for transfers to the hospital (Butcher, 2012; Ouslander et al., 2011). The STAAR initiative involves the states of Massachusetts, Michigan, Ohio, and Washington. STARR involves action by those in state-level positions to improve care transitions and thereby reduce rehospitalizations (Boutwell et al., 2011). Since these and other evidence-based interventions are being implemented throughout the United States, the national average RTH rate has come down to 18%, but unnecessary rehospitalizations occur and there remains work to be done (Rau, 2013).

Telemedicine has been utilized in many settings over the last several decades but there is limited evidence of its being applied to the care of SNF post-acute patients. In a study by Grabowski and O'Malley (2014), telemedicine was shown to be a promising intervention for SNF patients, however, the results were not statistically significant Embedding an after-hours coverage service enabled by telemedicine to complement the daytime primary care practitioner presence in the SNF reduces rehospitalizations, and increases staff performance, when utilized by the nursing staff (personal communication with D. Chess, September 26, 2014).

Avoidable SNF hospitalizations and rehospitalizations often result in negative clinical and financial outcomes. SNF residents and patients who present to the emergency department (ED) with non-emergent symptoms may spend a considerable amount of time waiting to be seen. They may be alone and unable to communicate immediate needs with the ED healthcare team

due to physical limitations or lack of knowledge of how to use the ED communication system.

Whether a prolonged ED stay occurs or the individual is admitted to the hospital, they may

develop infectious illnesses (e.g., MRSA, c-difficile, etc.) and experience a decline in function.

Delirium, pressure injuries, loss of sensory aids (e.g., eyeglasses, hearing aids, dentures) or

assistive devices (e.g., walkers, prosthetics) may occur. Transitions in care can result in

medication errors. From a financial perspective, Medicare costs associated with patients

admitted to nursing homes from hospitals for short-stay treatment or rehabilitation who were

directly readmitted to the hospital within 30 days in 2006 were $4.34 billion, of which an

estimated $3.39 billion was associated with potentially avoidable rehospitalizations (Mor,

Intrator, Feng, & Grabowski, 2010). Preventing avoidable hospital stays has the potential to

prevent negative clinical and financial outcomes. As the telemedicine-enabled after-hours

service has an 80% treat-in-place rate over five years of business, it provides an opportunity for

all stakeholders to realize positive outcomes in many situations. (personal communication, David

Chess, May 11, 2016).

Several of the terms found in this paper require clarification and definition.

"Telemedicine" is defined by the American Telemedicine Association as "the use of medical

information exchanged from one site to another via electronic communications to improve

patients' health status" (American Telemedicine Association, 2016). The service utilized in this

project involves live video streaming technology. "Skilled Nursing Facility" is a structure

utilized to provide nursing care for individuals who are assessed and are found to require the care

of a nursing professional. These facilities care for those with acute needs expected to be

discharged to the community within about thirty days who are referred to as "short-term

patients" as well as those with chronic care needs, referred to as "long-term residents". When a

short-term patient is transferred to the hospital ED and subsequently admitted to the hospital, the event is known as a "readmission". When long-term residents are transferred to the hospital ED and subsequently admitted to the hospital, the event is known as an "admission". "Return to hospital rate" refers to the percentage of short-term patients who return to the hospital within a given period of time. Multiple approaches of data evaluation and rate calculation are used in the healthcare industry. One example would be to tally the total number of patients in the SNF on the first of the month, add the number of patients admitted to the SNF throughout the month to determine the total number of short-term patients who had a potential for being transferred to the ED. That number is divided by the number of patients who were transferred to determine the RTH rate. Although it is recognized that nurse practitioners and physician assistants are capable of providing care to acutely ill SNF patients and residents, the service described in this project currently engages solely with physicians. As a result, the term "physician" is used throughout the paper to refer to the clinicians involved in the service.

Evidence-based Framework

The PARiHS framework (Promoting Action on Research Implementation in Health Services) provides a framework for evidence-based intervention implementation projects (Kitson et al., 2008). As originally designed by Kitson, Harvey, and McCormack in 1998, the PARiHS framework consists of three elements, evidence (E), context (C), and facilitation (F) that have a "dynamic, simultaneous relationship" (Rycroft-Malone, 2004). Each element is evaluated and rated on a low to high continuum and each element has sub-elements. The more elements that are rated on the high end of the continuum indicate the increased likelihood that the evidence-based project will result in successful implementation (SI) so that SI = function of E, C, F. A conclusion reached during the development of the framework suggests that the framework may

be applied as a two-stage process with the evidence and context evaluations revealing areas in need of change prior to full implementation and facilitation occurring as a subsequent stage, once the prescribed changes are made (Kitson et al., 2008). Stetler, Damschroder, Helfrich, and, Hagedorn (2011) suggested changes to the PARiHS framework that included adding SI as a fourth element with its own sub-elements as a means to develop the evaluation process. Consideration of each element and its sub-elements as it relates to the proposed evidence-based project will be an important aspect of the project.

Evidence (E) sub-elements include research evidence, clinical experience, patient experience, and preferences, as well as local data and information. Research involving the use of telemedicine in SNFs has mainly focused on care provided by allied health providers and medical specialists such as dermatologists and psychiatrists (Edirippulige, Martin-Khan, Beattie, Smith, & Gray, 2013). One study that focused on medical care provided after-hours revealed that in the participating SNFs that demonstrated highest usage of the service, rehospitalization rates were reduced, but not to a statistically-significant level (Grabowski, & O'Malley, 2014). In the SNFs with low usage, the rehospitalization rates were not impacted. Grabowski and O'Malley mentioned having provided telemedicine training to the nurses, but lamented the lack of usage in 4 of the 6 SNFs that received access to the telemedicine coverage service. The authors recommended additional study in this area and stated a need for improved direct-care provider buy-in. Research examining nurse use of telemedicine is limited and broadly considers nurse satisfaction level, but does not specifically comment on the use of the telemedicine devices (Chan, & Hjelm, 2001; Corcoran, Hui, & Woo, 2003; Lee et al., 2000). Studies examining SNF nurse use of new treatment interventions or new technology such as electronic health records are limited but suggest that buy-in can be associated with nurse perception that the intervention will

improve patient care, increase their ability to do their jobs, and have ease of use (Yu, Li, & Gagnon, 2009). Clinical experience with after-hours telemedicine-enabled coverage is available from a New York-based company that has worked with hundreds of nurses to provide over 10,000 episodes of care to over 50 SNFs in six states since 2011. The clinicians involved with the program have identified SNF nurse participation as one of the more vital components of the service. Pre-launch as well as supplemental nurse training sessions have occasionally revealed nurse hesitance and reluctance to participate in the hands-on portion of the training (personal communication with D. Chess, September 8, 2014). Utilization review and subsequent discussions with staff nurses have revealed a concern regarding the use of the telemedicine equipment and a conflicting comfort level with the well-known action of telephoning the attending physician (personal communication with D. Chess, September 4, 2014). To date, none of these observations have been quantified or formally evaluated.

Studies that have evaluated geriatric patient satisfaction with telemedicine are limited in strength, but reveal positive findings (Corcoran, Hui, & Woo, 2003; Lee et al., 2000). Satisfaction reports received from patients and families regarding the care received through the New York-based company have been positive and there have been only two reports of patients declining to be examined through telemedicine since the program's inception (personal communication with D. Chess, October 28, 2015).

Based on the PARiHS model, the level of the strength of the research evidence for the use of telemedicine in SNFs would be considered weak to moderate since the research provides minimal information regarding nurse use of telemedicine in SNFs. On the other hand, consideration of the other two sub-elements of evidence described in the PARiHS model, reveals that clinical experience is strong and patient experience is positive. An assessment of the

combined value of the three sub-elements reveals that the overall evaluation of the element of evidence is on the high end of the high-low continuum and is expected to be supportive of a positive implementation outcome.

The sub-elements of context are culture, leadership, and evaluation. A culture that values individual staff and clients, that promotes learning, provides necessary resources for Evidence-based practice (EBP) implementation, and that is aligned with the goals of the EBP is rated as 'high' and supportive of implementation success. Similarly, leadership that is transformational, democratic, and empowering rates 'high' in support of implementation success. An evaluation process that provides individual, team, and system feedback, and utilizes multiple sources of performance appraisal also is consistent with implementation success. This project involved three SNFs in Ohio that were part of a healthcare division of a family-owned, for-profit organization. All three facilities have received Ohio State Healthcare Association awards of excellence and have received 5 stars in the Medicare 5 Star Quality Rating System. The healthcare division management team has worked to integrate processes to produce low RTH rates. The addition of an after-hours coverage service enabled by telemedicine was seen as an important step to support low RTH rates. The Vice President of Operations (VPO) expressed support of the service and was actively involved throughout the planning and implementation stages of this project. The organization has been recognized each year since 2004 as one of the top 99 places to work in Northeast Ohio (Employer Resource Council, 2016). The employees were not affiliated with any unions. Employee benefits included a retirement plan, a time-share plan, paid time off, and an employee support program to assist those experiencing difficulties. Facilities were managed independently and supported by members of the upper management team. Throughout the project, it was clear that the management team was involved and invested

in each facility as well as in the implementation process. Upper management was in regular

contact with the facility administrative team and the two-way communication was effective. The

assessment of context based on the observations associated with the sub elements of culture,

leadership, and evaluation was that the organization scores highly for context.

The facilitator role is one that, "supports practitioners to change their practice" (Rycroft-

Malone, 2004, pg. 300). In this project, several individuals were in place to assume the role of

facilitator. The service company's educator provided pre-implementation information, support,

and training. and conducted the direct-care nurse training. The project locations' VPO provided

administrative support and acted as liaison between the service and the facilities. Each facility

had a Director of Nursing (DON) who acted as the on-site facilitator. All those in facilitator

roles pledged support to the implementation of the intervention. As there were supportive

facilitators in place, the element of facilitation was therefore rated as high.

The PARiHS framework provides support for the project and offers flexibility to address

concerns related to context thereby improving the success of facilitation and successful

implementation. Since the intervention had already been integrated into multiple facilities in

various states with varying characteristics (for-profit and not-for-profit, urban and rural, over 200

beds and under 50 beds, independent and chain-associated, etc.), the project focus was on nurse

utilization of technology with a goal of broadening the understanding of why utilization varies

between locations. PARiHS elements were relevant and identifiable in all SNFs.

Organizational Assessment

The after-hours telemedicine service covered in this project was designed to allow for

national implementation. An important aspect of the service is an organizational assessment of

partnering entities, be they companies managing multiple facilities, a facility chain, or

independently owned and operated facilities. Smith and Donze (2010) recommend assessing

environmental readiness for EBP by evaluating the organizational culture, infrastructure, and

resources. This project took place in three SNFs as the facilities launched the after-hours

telemedicine service and it assessed nurse intention to utilize the service to allow for

identification of barriers to utilization so that the barriers can be addressed.

Past integration of the service has provided information on factors that contribute to

successful integration of the service. Smith and Donze's (2010) approach will be the basis of

this assessment of these factors.

Internal factors.

Organizational culture.

Facilities with a culture that supports change and innovation experience wider acceptance

and smoother integration of new services (Smith, & Donze, 2010). Although the cultures that

exist in many SNFs resists change, the organization involved in this project promotes change and

embraces innovation and provides facility-level infrastructure and resource support for new

interventions (see Figure 1). The organization's desire to provide patient-focused care was a

significant strength and was consistent with the goals of the service. Another identified strength

is that the facilities had programs that involved families and significant others in the care of the

patients, which validated the organization's desire to provide comprehensive care. Experience

has shown that SNF nurses have varying levels of comfort and experience concerning the

administration of medications frequently prescribed by the physicians associated with the after-

hours service. At launch, many nurses are uncomfortable administering some of the medications

but, as their skill level increases, the increased comfort results in less hesitation and more

confidence. As this factor was not measured prior to launch, the service's knowledge, based on

prior experience, will be accessed to determine that this factor will be considered to be a

weakness.

Organizational infrastructure.

There are many organizational infrastructure factors to consider as shown on Figure 1.

Figure 1. Organizational assessment: Assessing internal factors that affect nurse intention to utilize after-hours telemedicine service				
Internal Factors				
	Strengths			Weaknesses
C	Desire to provide great care	C	Level of family/Significant Other involvement	
C	Detail oriented	C	Medication administration comfort level	
C	Willingness to change	I	Advance Directives program	
I	Attending practitioners level of acceptance	I	Catheter policies (Coude, Gastric Tube, supra-pubic, Foley, etc.)	
I	Direct-care - Admin staff rapport	I	Attending practitioners' responsiveness	
I	Staffing levels	I	Staff turnover rate	
I	Clinical strength of direct care staff	R	Educator onsite	
I	Clinical strength of supervisory staff	R	Information Technology support onsite	
I	Communication staff, patients, admin	R	Formal new nurse orientation	
I	Marketing	R	Reliance on agency staff nurses	
I	Technology acumen	R	Specialty programs (cardiac, ventilator, dialysis, Hospice, etc.)	
R	Family-owned organization			
R	Ability to expand post-acute unit			
R	Acute-care readiness (Intravenous, labs, radiology, EKG, meds)			
R	Administrator support			
R	Availability of supplies			
R	Data collection system			
R	Director of Nursing level of awareness of Return to Hospital rate			
R	DON support			
R	Ease of access to telemed unit			
R	Fax capabilities			
R	Financial condition			
R	All nurses as Identified telemed users			
R	Support from org-level representatives			

R	Information Technology capability, system upgraded as needed		
R	For-profit status		
R	Electronic health record, fully implemented		
R	Phone system		
R	Registered nurse 24/7		
R	Training space		
R	Structural environment		
R	Nurse demographics (age, English fluency)		
R	Size of facility Long-term care and Post-acute census		
R	Narcotic delivery system		
R	Medical Director support		

C=Culture; I=Information; R=Resources; Smith, J. R., & Donze, A. (2010). Assessing environmental readiness: First steps in developing an evidence-based practice implementation culture. The Journal of Perinatal & Neonatal Nursing, 24(1), 61-71. doi:10.1097/JPN.0b013e3181ce1357

Those that have the most significant impact on service utilization will be discussed. Previous service experience with other organizations has demonstrated that when SNF nurses report the level of attending practitioners' responsiveness to be high, the nurses are more likely to call the attending practitioners after-hours bypassing the after-hours telemedicine service. When the attending practitioners' responsiveness level is low, the nurses are more likely to utilize the service. When attending practitioners are supportive of the service and redirect nurses who call them after hours to instead call the service, this factor is a strength. Conversely, when nurses are instructed by attending practitioners to call the attending instead of the service, this factor is a weakness and can significantly negatively impact service utilization. The managers of the organization associated with this project notified the nurses that the expectation was that the after-hours telemedicine-enabled service was to be utilized for any patient experiencing a change in condition during the service's on call hours. As this support is invaluable in successful

implementation and high-volume utilization of the service, it is seen as a strength. Other strengths identified within the organization include the clinical strength of the supervisory staff as demonstrated by the high level of care provided. As the facilities utilized an electronic health record (EHR), there was a presumed level of at least basic technology familiarity among the direct-care nurses which is certainly a strength.

Staffing levels can affect the workload nurses experience and influence their perception that they don't have time to spend accessing the service. Experience has shown that the service can save nurses' time and this concern was addressed during the nurse training session. One of the facilities in the project occasionally utilized agency nurses to staff the units and the other two facilities had no involvement with staffing agencies. The facility with agency nurses had the lowest utilization rate. Facilities that have high nurse turnover rates or are dependent on agency nurses tend to have low service utilization rates since, in these situations, nurses caring for patients are less likely to have received training in the application and use of the service. Since agency nurse involvement has resulted in decreased utilization of the service in the past, this was seen as a weakness. Results from the demographic survey that showed that the mean number of years of affiliation with the facility was 4.03 years for direct care LPNs and 1.8 year for direct-care Registered Nurses (RNs). Eight of 20 direct care LPNs and 5 of 10 direct care RNs had worked at the facility for one year of less. These data suggest that direct care staff have relatively frequent turnover which is consistent with national data. The national average annual turnover rate for nursing home LPNs is 36.4% and 50% for RNs (American Health Care Association, 2014b). Thus, high direct-care staff turnover is a weakness. Staffing levels and clinical strength of direct-care and supervisory staff are rated at or above state and national averages and are therefore strengths (Centers for Medicare and Medicaid Services, 2016a).

Organizational resources.

Of the thirty organizational resources listed on Figure 1, the resources having the greatest influence on the components of an evidence-based project include human resources, physical resources, information resources, and financial resources (Smith, & Donze, 2010). Human resources that can impact nurse utilization include the level of support from the facility leaders including the Medical Director, administrator, DON, and nurse supervisors. Each of these stakeholders can impact nurse utilization positively (strength) or negatively (weakness) by their attitude and actions. During the project, the DON position at one facility was stable, at another the DON was out of the facility and unavailable for several weeks and the third facility an interim DON replaced the DON for several weeks until the new DON was placed. Communication with the VPO provided consistent support from the upper management level, but the lack of presence of the same individual functioning in the DON role appears to have been a probably weaknesses at perhaps at least one of the facilities. Although a lack of a dedicated onsite educator at all of the facilities is another weakness, there were onsite liaisons who assisted with the planning, organizing, and executing of the training sessions and completion and submission of both sets of questionnaires.

Physical resources that can be strengths or weaknesses in the assessment of the organization include availability of supplies, ease of access to the telemedicine unit, size of the facility, and level of subacute care readiness on the unit to which the nurse is assigned. Each facility had adequate supplies and assured the telemedicine unit was readily available. The facilities were of small to moderate size having between 71 and 148 patient beds with one staff member facilitating training at each location. The facilities have been involved in subacute care

for an average of 12 years and have demonstrated readiness to provide care (Centers for Medicare and Medicaid Services, 2016a). At all three facilities, these resources were strengths.

Information resources such as a fully-engaged electronic health record with a read-only access option for after-hours telemedicine service physicians, fax capability, user-friendly phone system, onsite information technology support, data collection system, Wi-Fi network that supports video streaming, and access to hospital records were available at each of the three facilities and were seen as strengths to support nurse utilization of the service. The lack of onsite information technology support at the three facilities is regarded as a weakness.

Outside entities, as listed below, acknowledge additional resource strengths associated with the organization behind the 3 facilities. The organization behind the facilities is a for-profit family-owned company that has been in business for over forty years. The twenty facilities owned and managed by the organization have five star ratings in the Centers for Medicare and Medicaid Services' Five Star rating program and the organization has been recognized as one of the top 99 places to work in north east Ohio for 12 consecutive years (Employers' Resource Council, 2016). The organization is regarded highly by its competitors (personal communication, David Chess, August 10, 2016). These factors can significantly impact a nurse's confidence in their job security which can influence their willingness to learn new skills and participate in new programs.

External factors.

External factors by definition, are not under the control of the organization but they can have a significant impact on the events within the organization (David & David, 2015). External factors to be assessed when considering nurse utilization of an after-hours telemedicine service include market factors such as level of competition from surrounding SNFs, local hospital

census, local hospital financial status, local emergency department tendency to admit SNF

patients, market share, quality, and level of local nursing schools, state nursing scope of practice,

state-required SNF staffing levels and the facility's reputation within the community are

presented on Figure 2.

Figure 2. Organizational assessment: Assessing external factors that affect nurse intention to utilize after-hours telemedicine service				
External Factors				
	Opportunities			Threats
R	Five-star rating		R	ACO BPCI participation
R	Legal issues		R	Competitors (geographic distance, quality distance)
R	Preferred provider		R	Emergency Department tendency to admit
R	Relationship with local hospital(s)		R	PointRight
R	Reputation in the community		R	Local economy
R	Access to specialists (onsite?)		R	Local infrastructure
R	Ambulance partners		R	Managed Medicare
R	Homecare partners		R	Market share
R	Hospital census		R	Nurse scope of practice
R	Hospitals' financial status		R	Nursing schools
R	Local demographics			

C=Culture; I=Information; R=Resources; Smith, J. R., & Donze, A. (2010). Assessing environmental readiness: First steps in developing an evidence-based practice implementation culture. The Journal of Perinatal & Neonatal Nursing, 24(1), 61-71. doi:10.1097/JPN.0b013e3181ce1357

The three facilities report over 90% census and, due to their varied geographic locations,

they draw from different hospitals. Maintaining a sufficient census is vital to success and

continued operation and the facilities have been able to meet their census goals. Criteria for

admitting SNF patients to the hospital who are sent to the emergency department for evaluation

can vary depending on the clinician involved, the hospital census, the emergency department bed

availability, and other factors. The hospitals associated with the three facilities have readmission

rates at or just above the national average of 15.9% (Centers for Medicare and Medicaid

Services, 2016b). Since the readmission rates are higher than the national average, it's possible that SNF patients transferred to the ED from the 3 facilities associated with the project have a higher than average risk of being admitted to the hospital rather than being returned to the SNFs. These higher than average readmission rates may be translated to lower census in the SNF resulting in lower service utilization. As a result, the hospitals' suboptimal readmission rates are seen as possible threats to the service utilization.

Summary

This overall review of this SWOT analysis reveals that the facilities identified for inclusion in the project were appropriate and offered a high likelihood of successful implementation.

The PICOT questions for this project were: 1) What barriers affect a nurse's intention to use an after-hours telemedicine-enabled physician coverage service intended to reduce rehospitalizations in skilled nursing facilities over a three-month period and 2) is there a correlation between intention to use the service and service utilization?

Chapter 2. Synthesis and Analysis of Supporting and Related Literature

Methodology of Literature Review

Literature searches dating back to 2001 conducted in September 2015 explored the guidelines and practice recommendations relative to utilization of telemedicine in SNFs and the application of the UTAUT questionnaire to assess nurse utilization of technology. Search words and phrases used included telemedicine, telehealth, telecare, nursing home, SNFs, utilization of technology assessment tools, and UTAUT. The Cochrane Library search listed 2 articles that involved telemedicine, but were not relevant to SNFs and 1 non-relevant article involving technology utilization. CINAHL Plus yielded 34 articles regarding telemedicine in SNFs, of which 4 were relevant, and 2 articles involving technology assessment which were relevant. Medline yielded 23 articles regarding telemedicine in SNFs, 7 of which were previously identified. Of the remaining 16 articles, 11 were relevant. A Medline search yielded 1 article regarding UTAUT which was not previously identified and which was relevant.

PubMed yielded 56 articles, of which 6 were duplicates, and none of the remaining 50 were relevant to telemedicine in SNFs. The PubMed search for technology utilization yielded 5 articles, all of which were new, and 3 of which were relevant. The project leader reviewed the 17 articles, and read those that were relevant. In addition, the project leader reviewed and read relevant articles found in conference speakers' reference lists and from webinars. Periodic literature reviews occurred during the project period and relevant articles evaluated and included as indicated.

Review of Literature Findings

      Telemedicine in skilled nursing facilities.

Continuous access to medical practitioners (MD, NP, and PA) has been recommended to provide safe medical care onsite in SNFs (American Medical Directors Association, 2010). One method to assure such access is telemedicine. A meta-analysis by Edirippulige, Martin-Khan, Beattie, Smith, and Gray, (2013) reported that there is evidence for the feasibility of telemedicine in SNFs in a number of clinical specialties. Although the authors state that many of the telemedicine studies involved small populations, the studies suggest that effective, safe, onsite care has been provided to SNF patients in the fields such as neurology, dermatology, palliative care, and psychiatry.

In the field of neurology, a randomized control trial by Dorsey et al. (2010) found a significant improvement in quality of life and motor performance in a group of patients with movement disorders (n = 6) treated through telemedicine compared to a similar group who received traditional care (n = 4). The researchers used the Parkinson's Disease Questionnaire to assess quality of life improvement (3.4-point improvement versus 10.3-point worsening), and the Unified Parkinson's Disease Rating Scale to assess motor performance (0.3-point improvement versus 6.5-point worsening). Biglan et al. (2009) reported in a case study that improvements in cognitive and motor symptoms associated with care provided through telemedicine suggested that this model of care may be a useful means of care delivery.

Zelickson and Homan (1997) described the use of "store and forward" video telemedicine (telemedicine involving the forwarding of stored videotaped patient interviews to clinicians at other locations) to effectively meet the dermatology needs of SNF residents. Laflamme et al. (2005) compared face-to-face video encounters with in-person encounters between SNF

residents and practitioners and found the video encounters were valuable in at least 75% of the cases. Although intended as a general medicine study, 67% of the encounters involved the care of wounds. In a randomized controlled pilot study involving a small number of patients (control group n=9, intervention group n=13), Vowden and Vowden (2013) found that a telemedicine system utilizing smartphones had a potential to enhance the care of wounds for nursing home patients.

O'Mahony, et al. (2009) examined telemedicine as a means to improve access to palliative care for SNF patients. The pilot study found that staff members' knowledge of palliative care increased following educational sessions provided through telemedicine and patients and staff had favorable ratings of palliative care provided through telemedicine.

Lee et al. (2000) reported that telepsychiatry approval was rated highly by staff and residents. Consistency in the staff and resident approval ratings between video and onsite psychiatric assessment was between 76 and 89%. A prospective cohort study by Shores et al. (2004) found that the telemedicine diagnosis of dementia was as accurate as the in-person diagnosis.

Recent studies have examined the use of telemedicine for general medicine. Grabowski and O'Malley (2014) conducted a quasi-experimental study involving eleven SNFs and reported that, in facilities that utilized the telemedicine after-hours coverage service, rehospitalization rates were lowered although the results were not statistically significant. Wade, Whitaker, and Hamlin (2015) assessed the use of telemedicine in a long-term care facility in Australia. The results revealed a small impact on rehospitalization as 4 of the 60 encounters resulted in avoided hospitalizations. The authors determined the telemedicine was useful to the general practitioners and cited technical issues, a short project period, recurrent need for facility staff training, and

relationships between the general practitioners and the facilities as barriers to increased utilization and rehospitalization prevention.

Conclusion

For decades telemedicine has been successfully integrated in SNFs with a focus on specialty care. Recently investigators have been examining the application of telemedicine to primary care and acute care needs of SNF patients and residents and have found it to be a promising means of increasing access to practitioners and preventing unnecessary rehospitalizations.

Chapter 3. Project Methods

Clinical Practice Problem Description

The integration of new interventions in any practice setting can be challenging and when the intervention involves a SNF culture change and technology, the intervention integration can be daunting. SNF direct-care nurses are asked to care for patients with higher acuity levels and are not always comfortable caring for acutely ill patients, especially after-hours when medical practitioners are not onsite. The telemedicine service associated with this project was specifically designed to be user-friendly with the least number of barriers to use. The service company contracts with a facility to provide after-hours medical coverage. A Wi-Fi site evaluation is done and upgrades performed as needed. The specially-designed telemedicine unit transmits HIPPA compliant videos and does not store any information. Transmitting, but not storing information, assures compliance with state and federal regulations regarding treatment of confidential health information. The attending physicians affiliated with the facility are provided with information about the service. Facility representatives provide the covering service with the attending physicians' contact information. The nursing administration meets with service clinicians to discuss necessary clinical infrastructure improvements. Facilities are required to have an enhanced emergency medication supply, four-hour turnaround time for specific labs and x-rays, onsite ECG capability, and intravenous insertion capability.

During the day of the service launch, nurses from all shifts are assembled and provided with a training overview form to refer to during a training session. A service company representative accesses the telemedicine unit and presents the program to the assembled nurses through the telemedicine unit. An onsite training liaison assists the trainer as needed. The remote trainer answers the nurses' questions and the program launches at 6 P.M.. When a nurse

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notices a change in status, the nurse calls a toll-free number that connects the caller directly with a physician. After giving a verbal report the nurse hangs up the phone and wheels the telemedicine unit to the patient's bedside. The physician 'calls' in from their laptop and the bedside visit begins with the physician controlling the volume of all devices and all camera functions. After the physician-directed physical examination is completed, the nurse returns the unit to the storage location and plugs it in to charge the battery. The unit is cleaned according to the facility infection prevention policy. The nurse phones the physician, receives telephone orders, and proceeds to implement the orders. The physician creates a progress note and order sheet in a proprietary electronic health record software system and electronically faxes the notes and orders to the facility. Follow up ensues as clinically indicated.

Service company data from March 2015 through September 2015 showed that 81% of the calls received resulted in onsite treatment and approximately 50% of those calls would normally have resulted in emergency department transfers (personal communication with D. Chess, October 5, 2015). In most locations, service utilization is low the first several weeks of engagement and increases thereafter. Occasionally, utilization starts low and does not increase. When this occurs, assessments begin with administrators and nursing supervisors looking to identify and address barriers to utilization. Direct-care staff are pivotal stakeholders in this process. By understanding the potential barriers to nurse usage of the service and addressing the barriers as soon as possible, utilization levels may be improved starting at the launch of the service. When efforts to reduce rehospitalizations and provide care onsite are successful, the result is a higher SNF patient census and improved clinical and financial outcomes for all involved (personal communication with D. Tuckerman, February 24, 2015).

To assess nurse intention to utilize the telemedicine technology, the Unified Theory of Acceptance and Use of Technology (UTAUT) questionnaire was applied.

Design

This evidence-based project utilized a quantitative comparative design of pre- and post-implementation actions to consider nurses' intent to use the system. This project involved surveying nurses at three facilities twice over a two-month period to determine their intention to use a technology-based after-hours coverage system and comparing the differences between the questionnaire responses and the actual system utilization. The goal of the project was to identify barriers to utilization of the system so that the barriers could be addressed and utilization optimized going forward.

A remote educator, with the aid of an onsite training liaison using the video-conferencing capability of the telemedicine unit embedded in the SNF, provided training to nurses in the selected SNFs that launched the service. The nurses were presented with information regarding appropriate patient selection, preparing for the physician encounter, accessing the service, initiating use of the telemedicine unit, facilitating a technology-enabled physical exam, and post-visit actions. All nurses who participated in the training session completed a demographic questionnaire and a modified UTAUT questionnaire that included Likert-scale questions concerning their intention to use the service (see Appendix A for demographic and UTAUT questions) (Venkatesh, Morris, Davis, & Davis, 2003). The UTAUT questionnaire assesses the intentions of individuals from various settings (e.g. education, healthcare, business, etc.) to utilize a variety of technological systems and devices such as phone systems, electronic health records and intranet networks. UTAUT includes 4 determinants including Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, and 4 key modifiers

including Gender, Age, Voluntariness, and Experience (Venkatesh, Morris, Davis, & Davis, 2003). The UTAUT questionnaire has demonstrated validity and reliability (Sundaravej, 2010; Venkatesh et al., 2003). UTAUT has been shown to be helpful in identifying factors that are prone to influence the adoption of new technology and can be used to provide information regarding the potential for success of new technology initiation (Williams, Rana, Dwivedi, & Lal, 2011).

A 2010 study by Sundaravej assessing 292 business students' intention to use Blackboard, an online learning platform, concluded that the UTAUT questionnaire was shown to be valid and reliable (Cronbach's Alpha for all constructs are greater than .82). Words or phrases were changed in 9 items and two items that were not adaptable were omitted to adapt the questionnaire to the project setting. For instance, "Using the system enables me to accomplish tasks more quickly" was replaced with "Using the system will enable me to care for ill patients more quickly" and "Using the systems increases my productivity" was replaced with "Using the system will allow me to care for more patients." The phrase "complete a visit" was inserted to increase relevance in 4 items. The question, "The system is not compatible with other systems I use" was eliminated as the system does not interact with any other technological systems in the facilities. Likewise, "It scares me to think I could lose a lot of information in the system by hitting the wrong key" was removed as information storage is not part of the system and there are no keys on the telemedicine unit for the nurses to hit. Time constraints associated with the project and limited availability of test locations precluded testing the revised questionnaire for assured validity.

Additional training sessions were offered to provide those not able to attend the initial training session with questionnaires administered accordingly. One follow-up session was

provided at one of the facilities. Historically, facilities request no more than one additional

training session. Three facilities were included in the project to obtain a minimum of 30 project

participants and a total of 54 questionnaires were received. The anonymous questionnaires were

assigned sequential numbers in the order in which they were received during data processing.

Identities were not known and information regarding an individual's questionnaire results was

kept confidential. The facility administrative staff and associated corporate representatives had

access to the EHR so nurse utilization rates were available to the nurses' supervisors.

Approximately four weeks after the initial questionnaire, the facility nurses completed the same

questionnaire a second time. The second group contained some nurses who participated in the

first session and who had therefore completed a questionnaire previously. Approximately eight

weeks from the initial training and questionnaire, data from the covering service's EHR were

collected and reviewed to determine the level of utilization of the service. Analysis of the

demographic questionnaire information, modified UTAUT questionnaire results and utilization

data allowed for evaluation of factors that may contribute to the level of utilization of the

service.

The project design had several strengths and weaknesses. Strengths included a high

questionnaire completion rate and minimal nurse time to complete the questionnaire. Since the

questionnaires were distributed, completed, and submitted at the time of the training, the

completion rates were high. The questionnaire requested gender, age, nursing degree, years of

nursing experience, years at the facility, current position at the facility, years at current position,

experience with formal computer training, and current overall job satisfaction level. The revised

UTAUT questionnaire consisted of 29 items that were answered by circling answers on Likert

scale. The two tools took less than 5 minutes to complete and therefore required minimal

nursing time. The readability of the modified UTAUT questionnaire used in this project is at a

3.66 grade level on the Flesch Kincaid Grade level test and was expected to be easily read and

understood (Online-Utility.org, 2016). The training session lasted approximately 45 minutes

which is within the one hour time limit for effective in-service training as suggested by

Bourbonniere and Strumpf, (2008).

       The design weaknesses included the absence of a control group, the unknown size of the

available participant pool, potential absence at the training sessions of those who were expected

to use the service, and unlimited variations of demographics of participants. In addition, a lack

of validation testing of the adapted UTAUT means that the tool's validity in this project cannot

be guaranteed to match that of previous validation studies. The design weakness of the lack of a

control group is inherent in this type of project. The identification of service users can vary

between SNFs. Although some facilities direct only supervisors to utilize the service, the three

facilities involved with this project chose to have all nurses utilize the service and participate in

the training. Nurse presence at training sessions was determined by the facilities. Attendance

during off shift hours was highly recommended but not required. The percentage of nurses

employed by the facility who attended the training sessions varied between facilities and was

dependent on the facility expectations and attendance requirements. Since all training session

attendees participated in the project, there was a potential for the pool to have a wide range of

age, education, and experience and consisting of both males and females. Although this

prohibits applying the findings to specific groups, the inclusive nature of the project may allow

the findings to be relevant for locations with nursing staff that reflect the varied demographic

composition of the project group.

According to Graham, Tetroe, and the KT Theories Research Group (2007), an important component of an evidence-based project is the continuation of effective projects after the implementation is completed. For this project, the continuation of the intervention rests ultimately with the organization and is dependent on continuation of the business contract between the owner and the medical coverage group. The technology-enabled after-hours coverage service appears to be cost-effective and appears to support reduction of facility RTH rates (personal communication with John Whitman, July 11, 2016). Much of the effectiveness of the program depends on the level of nurse utilization and therefore identification of factors that act as barriers to nurse utilization is important. Experience has shown that if the level of nurse utilization is sufficient, the program's return on investment is high, making it a valuable and desired intervention.

Methodology

This evidence-based project involved assessing nurse intention to utilize an after-hours telemedicine-enabled medical coverage service for SNF residents and patients. Facilities required the nurses to attend a training session and then use the service. In addition, at locations that participated in the project, nurses completed a demographics questionnaire, and a program-related questionnaire. The population for this project was nurses employed by the participating facilities. This group of nurses included LPNs who graduated from training programs of various duration as well as RNs with various educational backgrounds (i.e., graduates of diploma programs, associate or baccalaureate degree). SNF nurses have a wide variety of years of nursing experience and SNF experience. Within the facility, RNs and LPNs may be in direct-care roles or supervisory roles. In some situations, supervisors assume direct-care roles. Although the after-hours telemedicine service was designed to be user-friendly to address the

varying levels of education and experience found among SNF nurses, there are instances when utilization rates are lower than anticipated. By assessing intention to utilize the service, barriers to utilization may be identified and addressed. It is hoped that the identified barriers can be removed resulting in increased utilization of the service is anticipated.

The SNFs included in the project launched the service in March 2016. The SNFs' populations included sub-acute patients recently discharged from hospitals as well as long-term residents. All individuals who experienced a change in condition should have triggered the nurse to activate the service. The ultimate goal was to provide safe, appropriate care of the patient or resident treating them in-place whenever possible. The SNFs upgraded their level of services to assure that they were able to provide care for acute illnesses prior to service launch.

Following approval of this project by Catholic University of America's Internal Review Board (IRB), the SNF organization's VPO was approached regarding participation in the project. The VPO was given detailed information about the project and enthusiastically agreed to have the three contracting facilities participate. It was hoped that enrolling all three facilities would increase the likelihood that at least forty nurses would participate. The facility DONs were contacted and detailed information about the project was provided. Site assessments were completed using information from the business contracts as well as information from the VPO, the DONs and company research. At the Clinical Launch Meetings that occurred prior to each launch, the DONs and the service clinician discussed areas of concern that could have affected implementation or integration of the service and developed. corrective plans to address the concerns. In addition, at the Clinical Launch Meetings, the training liaisons were identified and, subsequently, the service clinician shared information about the project, including the demographics questionnaire and the UTAUT questionnaire. Following the Clinical Launch

Meeting, several emails and phone calls took place to assure that the training liaisons understood their roles in the project.

In anticipation of the training session, 30 copies of the questionnaires were sent to the training liaison with the request that additional copies be made as needed. Two postage-paid, pre-addressed envelopes were sent to the training liaison at each facility to allow for return of the forms from the initial session and follow up session. After facility personnel completed all corrective actions, the DONs and service clinician collaboratively identified the launch dates and scheduled the training sessions for the afternoon of the launch date. The lead investigator acted as a distance trainer and remotely provided the training session using a training script outline. The nurses gathered in a meeting space at the facility, the training liaison accessed the telemedicine unit and the distance trainer presented the program information through the telemedicine unit. The remote trainer and the trainer liaison encouraged the nurses to practice use of the digital stethoscope. The remote trainer demonstrated the camera capabilities. The remote trainer presented information regarding when to activate the service, preparation for the call to the physician, how to participate in a video-streamed physical exam and post-visit actions. The trainer encouraged and answered questions, and reminded the nurses that the service was available for use beginning at 6 PM on the launch date.

Following completion of the training, the distance trainer introduced the evidence-based project and the demographics and UTAUT questionnaires. The nurses were invited to participate, were assured of anonymity, and were given completion instructions. Directions are also printed on the questionnaires. The onsite training liaison provided the questionnaires and pens or pencils. The distance trainer remained available through the telemedicine unit and observed completion of the forms and provided support as needed. The nurses placed the forms

in the provided envelope. The last nurse sealed the envelope and gave it to the training liaison who sent it to the lead researcher by United Parcel Service (UPS) which allowed tracking of the parcel. The distance trainer supplemented the training liaison's directions and provided other verbal support during the completion of the forms. Although a second training session was offered, none of the facilities chose to schedule a second session.

Following receipt of the forms, the lead investigator wrote identifying sequential numbers on each questionnaire and entered the numbers and corresponding data on an Excel spreadsheet maintained in a password-protected computer. Since the forms were anonymous, it was not possible to clarify answers or address missing or incomplete data. The lead investigator stored the forms in a locked file cabinet and will shred the forms at completion of the project.

Approximately four weeks after the initial training session, the lead investigator contacted the training liaisons and efforts to schedule a follow-up session to complete the second questionnaire ensued. Second sessions scheduling delays occurred for different reasons. One facility experienced a change of DONs (Facility 1) and another DON (Facility 2) was involved in a motor vehicle accident which resulted in time out of work. The third DON (Facility 3) became overwhelmed with facility events and was not able to respond to email inquiries. The VPO was updated and interceded. Within several weeks, arrangements were made with each facility to complete a second questionnaire. In Facility 1, once oriented to the role, the new DON was very responsive and quickly managed to gather nurses and have the questionnaires completed and submitted following the project protocol. In Facility 2, following resumption of the DON responsibilities, the individual scheduled two separate sessions to have the questionnaires completed. Following the first of the two sessions, the nurses placed the completed questionnaires in a sealed white envelope. The nurse who placed the last questionnaire in the

envelope during the first follow up session signed the back flap of the envelope, and placed it in the shipping envelope. Following the second follow-up session, nurses placed the completed questionnaires in the mailing envelope along with the sealed white envelope and the liaison sent the shipping envelope to the lead investigator in accordance with the project protocol. Completion of the second set of questionnaires by the nurses in Facility 3 involved support by the facility's Human Resources Manager (HRM). The HRM coordinated several questionnaire completion sessions that followed the project protocol except that after each session, the nurses placed the completed questionnaires in a white envelope, sealed and signed the envelope prior to placing the while envelope in the shipping envelope, which was kept securely in the HRM's office. Once the questionnaires were completed, the HRM submitted the questionnaires to the lead investigator.

Once received, the lead investigator transferred the information to the existing Excel spreadsheet and stored the questionnaires with those previously received. The second set of forms will also be shredded at completion of the project.

The lead investigator reviewed the service utilization records of the facilities approximately four weeks and eight weeks after the initial training session to determine utilization by facility. The lead investigator added these data to the Excel spreadsheet and initiated analysis. Analysis reviewed the frequency of service use by facility and whether there were any demographic factors or UTAUT questionnaire items associated with different levels of utilization. By comparing the results from the sequential questionnaires, change over time may be identified.

Evaluation

    Outcomes.

    The tool used to assess the nurses' intention to use the service is based on the UTAUT questionnaire (Venkatesh, Morris, Davis, & Davis, 2003). The author, Viswanath Venkatesh, gave permission for its use (personal communication, November 3, 2015). According to Sundaravej (2010), the UTAUT questionnaire has been shown to be valid and reliable (Cronbach's Alpha for all constructs are greater than .82). Minor changes to the original questionnaire were made to adapt the tool to this project and remove items not relevant to the current project. The revised questions are found in Appendix A. Each question was followed by a 7-response Likert scale requiring a number to be circled to record each answer. Several of the lead investigator's nurse associates participated in a completion time trial and completed the questionnaire in under four minutes.

    Following the nurse training session, the onsite training liaison provided the nurse participants with a form to complete. As they completed the questionnaires, the nurses slipped them into a self-addressed postage-paid envelope that the last nurse sealed. The onsite liaison returned the envelope to the lead investigator via UPS to allow tracking of the parcel. Nurses at each of the three facilities repeated the questionnaire completion process approximately four weeks after the initial questionnaire completion as described above.

    Approximately four weeks after the initial training session and again eight weeks from the initial training session, the lead investigator reviewed the number of encounters per facility from the covering service's EHR to determine the level of utilization of the service. Intention to use the service, as measured by the UTAUT questionnaires, was compared with actual utilization rates.

Using the Statistical Package for the Social Sciences (SPSS) Version 24 software, the lead investigator entered and stored all demographic data and UTAUT questionnaire answers for each respondent and utilization data for each facility in a password-protected computer. The demographic data included age, gender, nursing degree, years of nursing experience, primary role at the facility, years at current facility, years in current role, formal computer training, current overall job satisfaction level and overall belief that the service would improve patient care. Analysis including grouping of select demographic variables. The UTAUT questionnaire included 29 items utilizing a 6 choice Likert scale (Appendix A). Analysis included evaluation of each of the UTAUT question results compared with each demographic variable. Analysis also include review of individual UTAUT variable scores prior to the individual scores being combined to determine a score for each of the 8 UTAUT constructs. Further analysis considered the 8 UTAUT construct scores and each of the demographic variable. ANOVA and Independent samples t-test determined any significance between the means of the demographic data and the UTAUT variables.

Utilization data analysis included data retrieved from the service's data files. Low, moderate or high use categories applied to each facility's number of encounters allowed for utilization analysis. Analysis of the demographic questionnaire information, the modified UTAUT questionnaire results, and utilization data, allowed for evaluation of factors that may contribute to the level of utilization of the service.

Chapter 4. Data Analysis and Results

This evidence-based project considered the intentions of nurses from 3 Ohio SNFs to utilize an after-hour medical coverage service that is enabled by telemedicine to provide care onsite and avoid unnecessary hospitalizations. Nurses were surveyed following the service launch training session and again four to six weeks later. The nurse survey data were evaluated along with utilization data and a statistical analysis was performed.

Analysis

The lead investigator received a total of 54 responses, including one excluded due to a lock of responses to the UTAUT questionnaire. The remaining 53 responses, included 24 (45%) from the initial session. The responses were evenly distributed among the 3 facilities (Facility 1 n=17, 32%, Facility 2 n=18, 34%, Facility 3 n=18 34%). Gender responses identified forty-eight females, 4 males and 1 non-response. Mean age was 37.8 years (29 and under n=11, 30-39 n=15, 40-49 n=14, 50-59 n=4, 60 and over n=9). LPNs made up 47% (n=25) of the responders while RNs (Associate Degree n=23, 43% and Bachelor Degree or higher n=5, 9%) comprised the remainder of the group. While the mean years of nursing experience was 11.1 years, the majority of the nurses (n=33, 62%) reported having 2.1 to 10 years of nursing experience while 9% (n=5) had 2 year of less and 28% (n=15) had more than 10 years of nursing experience. The number of years working at the facility was considerably different: 2 years or less n=32 (60%), 2.1 to 10 years n=17 (32%), and over 10 years n=4 (7.5%). Direct care nurses made up 59% (n=31) of the respondents, supervisors made up 17% (n=9) while administrative nurses (ADON/DON n=7, 13% and other nurse roles n=6, 11%) made up 24% of the respondent pool. Facility 1 had 16 respondents, 8 (50%) of whom were direct-care nurses and supervisors. Facility 2 had 19 respondents, all of whom were direct-care nurses or supervisors. Facility 3 had

19 respondents, 13 (72.3%) were direct-care nurses or supervisors. Mean length of time at current job was 4.7 years (2 years or less n=27, 51%; 2.1 through 10 years n=17, 32%; over 10 years n=9, 17%). Fifty nurses responded to the question regarding experience with Formal Computer Education. Of those responding positively, n=22 (44%), n=14 (63%) were direct-care nurses, n=6 (27%) were supervisors and the remaining nurses who responded positively to Formal Computer Education (n-2, 9%) were administrative nurses.

Results

Frequency of Use (FOU), (the number of times the service was utilized during the two sessions comprising the three months of the project, March 1, 2016 to April 15, 2016 or April 16,2016 to May 31, 2016) and each of the UTAUT constructs (Performance Expectancy=PE, Effort Expectancy=EE, Attitude=AT, Social Influence=SI, Facilitating Conditions=FC, Self-Efficacy=SE, Anxiety=AN, and Behavioral Intention=BI) was evaluated with each of the demographic variables (Gender, Age, Nursing Degree, Years of Nursing Experience, Years at Current Facility, Type of Current Job, Years at Current Job, Facility Affiliation, and experience with formal computer training) as well as level of Job Satisfaction (7-item Likert scale), and Belief That the System Could Improve Patient Care (7-item Likert scale). The variable type of Current Job, divided by direct-care nurses (including supervisors) and administrative nurses (including DONs and Assistant DONs), was found to be significant in this analysis. Data were evaluated from three time intervals: first training session score, second training session score, and combined scores from both sessions. Means, frequencies, one-way between-subjects analysis of variance (ANOVA) tests, Tukey's post-hoc tests, and t-tests of independent variables tests were performed in this analysis. Significance level throughout the analysis is 0.05.

Frequency of Use.

Frequency of Use (FOU) was noted to be unevenly distributed among the facilities.

Facility 1 (F1) and Facility 3 (F3) had considerably higher utilization in both time periods than

did Facility 2 (F2). During the 3-month project period, F1 utilized the service 21 times, F2

utilized the service 5 times and F3 utilized the service 24 times as shown in Table 1.

Table 1

Frequency of Use by Facility and Project: Sessions 1 and 2

Facility	Episodes		
	Mar 1 - Apr 15	Apr 16 - May 31	Total
Facility 1	8	13	21
Facility 2	3	2	5
Facility 3	9	15	24
Total	20	30	50

Although ANOVA analysis revealed a statistically significant of Nursing Degree on

FOU, $F(3, 49) = 3.940$, $p = .013$, Tukey post hoc data review revealed that there was not a

significant statistical difference between the means of the various levels of nursing education and

FOU.

Performance Expectancy.

ANOVA analysis of Performance Expectancy (PE) and Facility revealed that Facility had

a statistically significant effect on PE when the first set of data was considered, $F(2, 21) = 3.667$,

$p = .038$, as well as when the combined first and second data sets were examined $F(2, 50) =$

4.857, $p = .035$ as shown in Table 2.

Table 2

Performance Expectancy Significant ANOVA Results

Variable		S^2	df	M^2	F	Sig.
Facility	Between Groups	7.333	2	3.667	3.850	0.038
Session 1	Within Groups	20.000	21	0.952		
	Total	27.333	23			
Facility	Between Groups	9.714	2	4.857	3.572	0.035
Sessions 1 + 2	Within Groups	67.984	50	1.360		
	Total	77.698	52			
Age	Between Groups	15.974	4	3.984	3.106	0.024
Sessions 1 + 2	Within Groups	61.722	48	1.286		
	Total	77.698	52			
Job Satisfaction	Between Groups	11.822	4	2.955	3.536	0.027
Session 1	Within Groups	15.048	18	0.836		
	Total	26.870	22			
Believe Will						
Improve Care	Between Groups	25.568	4	6.392	10.601	0.000
Session 2	Within Groups	10.250	17	0.603		
DCN + Supv.	Total	35.818	21			

S^2 = Sum of squares; M^2 = Mean square; DCN = Direct-Care Nurses; Supv. = Supervisors

In both instances, Tukey post hoc tests identified statistically significant differences between F1 and F3, with F3 having a lower mean PE score: the first session, F3 (n = 9, 3.67) than F1 (n = 7, 5.00) as shown in Table 3, and combined sessions, F3 (n = 18, 3.56) than F1 (n = 16, 4.63) as shown in Table 4.

Table 3

Performance Expectancy and Facility: Session 1

			subset for alpha = 0.05	
Session 1	Facility	N	1	2
Tukey HSD* **	3	9	3.667	
	2	8	4.500	4.500
	1	7		5.000
	Sig.		0.229	0.573

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 7.916

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

Table 4

Performance Expectancy and Facility: Session 1 and 2

			subset for alpha = 0.05	
Session 1 + 2	Facility	N	1	2
Tukey HSD* **	3	18	3.556	
	2	19	4.105	4.105
	1	16		4.625
	Sig.		0.350	0.390

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 17.576

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

In the combined data from both collection periods as shown in Table 2 Age, grouped in 5 groups $\leq$ 29, 30-39, 40-49, 50-59, and $\geq$ 60 was found by an ANOVA to have statistically significant effect on PE, $F_{(4, 48)}$, = 3.106, p = .024. Tukey post hoc test demonstrated a significant statistical difference between the means for those $\leq$ 29, n = 11 (4.91) and those aged 50 – 59 n = 4 (3.00) who had the lower of the two mean scores Table 5.

Table 5

Performance Expectancy and Age by Group: Sessions 1 and 2

			subset for alpha = 0.05	
Session 1 + 2	Age Group	N	1	2
Tukey HSD* **	50-59	4	3.000	
	≥ 60	9	3.556	3.556
	30-39	15	3.867	3.867
	40-49	14	4.286	4.286
	≤ 29	11		4.909
	Sig.		0.152	0.118

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 8.473

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

The variable Job Satisfaction in the initial group of respondents demonstrated a statistically significant effect on PE through an ANOVA $F_{(4, 18)} = 3.535$, $p = .027$ as shown in Table 2. One response category had only one case so a post hoc test was not performed. Review of the means revealed that the respondents who chose "Neutral" for their level of job satisfaction ($n = 2$) had the lowest PE mean score of 2.500, SD .707, while those who responded, "Very satisfied" for their level of job satisfaction ($n = 7$) had a mean PE score of 5.000, SD .817 as shown in Table 6.

Table 6

Performance Expectancy and Job Satisfaction: Session 1

				95% CI	
Session 1	N	M (SD)	SE	LL	UL
Very dissatisfied	1	4.00 (0.000)			
Dissatisfied	0				
Somewhat dissatisfied	0				
Neutral	2	2.50 (0.707)	0.500	-3.853	8.853
Mostly satisfied	6	3.83 (0.983)	0.401	2.802	4.865
Satisfied	7	4.57 (0.976)	0.369	3.669	5.474
Very satisfied	7	5.00 (0.817)	0.309	4.245	5.755
Total	23	4.30 (1.105)	0.230	3.323	4.782

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The data from responses from the second group of direct-care nurses and supervisors to the question regarding the Belief that the System Will Improve Care demonstrated a statistically significant on PE. The ANOVA results for these two variables were $F(4, 17) = 10.601$, $p = .000$ (Table 2: PE). As the "Not at all" group had only 1 case, post hoc test results are not available. A review of the means revealed that those who responded, "Not at all" to the Belief that the System Will Improve Care question ($n = 1$) had the lowest mean score of 0, "Neutral" ($n = 4$) had the next lowest mean score of 2.750, SD .500 while the group who responded, "Probably" ($n = 6$) had the highest mean score 4.667, SD 1.033 as shown in Table 7.

Table 7

Performance Expectancy and Believe Service Will Improve Care: Session 2

Session 2	N	M (SD)	SE	95% CI	
				LL	UL
Not at all	1	0.00 (0.000)			
Not likely	0				
Possibly	0				
Neutral	4	2.75 (0.500)	0.250	1.954	3.546
Probably	6	4.67 (1.033)	0.422	3.583	5.751
Very probably	8	4.25 (0.707)	0.250	3.659	4.841
Definitely	3	4.33 (0.577)	0.333	2.899	5.768
Total	22	3.91 (1.306)	0.278	3.330	4.488

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The final variable that had a statistically significant effect on PE was Formal Computer Education. The nurses who responded, "Yes" to having had Formal Computer Education ($n = 22$) had a mean score of 4.591 (SD = .908) while those who responded, "No" ($n = 28$) had a mean score of 3.571 (SD = 1.29). The independent samples t-test revealed $t(48) = 3.144$, $p = .003$ as shown in Table 8.

Table 8

Performance Expectancy and Formal Computer Education

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	t	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Formal IT Ed	Equal variances assumed	1.456	0.233	3.144	48.000	0.003	1.019	0.324	0.368	1.671
	Equal variances not assumed			3.276	47.511	0.002	1.019	0.311	0.394	1.645

M Dif.= Mean difference; SE Dif.= Standard error difference;

Review of these data indicate that nurses at Facility 1 were more likely to expect the after-hours coverage service to improve their job performance than were nurses at Facility 3. Nurses in the ≤ 29 age group were more likely to expect the after-hour coverage service to improve their job performance than were those in the 50 – 59 age group. Nurses with a higher level of job satisfaction were more likely to expect that the service would improve their job performance than those with lower levels of job satisfaction. Nurses with a higher level of belief that the service will improve care were more likely to expect that the service would improve their job performance than those with lower levels of belief that the service will improve care. Nurses who responded "Yes" to having formal Computer Education were more likely to expect the after-hours coverage service to improve their job performance than were those who responded "No" to having formal Computer Education.

Effort Expectancy.

Data from the ANOVA applied to the second group of direct-care nurses and supervisors responding to the item regarding Believe that the System Will Improve Care demonstrated a statistically significant on Effort Expectancy (EE), $F (4, 17) = 11.171$, $p = .000$ as shown in Table 9.

Table 9

Effort Expectancy Significant ANOVA Results

Variable		S^2	df	M^2	F
Believe Will Improve Care Session 2	Between Groups	29.898	4	7.474	11.171
	Within Groups	11.375	17	0.669	
DCN + Supv.	Total	41.273	21		

S^2 = Sum of squares; M^2 = Mean square; DCN = Direct Care Nurses; Supv. = Supervisors

As the "Not at all" group had only 1 case, post hoc test results are not available. A review of the means revealed that those who responded, "Not at all" (n = 1) to the "Believe that the System Will Improve Care" question had the lowest mean score of 0, those responding "Neutral" (n = 4) had the next lowest mean score of 3.00, SD 0, while the group who responded, "Definitely" (n = 3) had the highest mean score 5.33, SD 1.155 as shown in Table 10.

Table 10

Effort Expectancy and Believe Service Will Improve Care: Session 2

Session 2	N	M (SD)	SE	95% CI	
				LL	UL
Not at all	1	0.00 (0.000)			
Not likely	0				
Possibly	0				
Neutral	4	3.00 (0.000)	0.000	3.000	3.000
Probably	6	4.83 (0.983)	0.401	3.802	5.865
Very probably	8	4.38 (0.744)	0.263	3.753	4.997
Definitely	3	5.33 (1.155)	0.667	2.465	8.202
Total	22	4.18 (1.402)	0.299	3.560	4.803

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

There was a significant difference between the means for EE when the variable Gender was considered; female n = 48 (M = 4.27, SD 1.216) and male n = 4 (M = 5.75, SD .500). T-test for independent variable for EE and Gender was t (50) -2.398, p = .020 as shown in Table 11.

Table 11

Effort Expectancy and Gender

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	t	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Gender	Equal variances assumed	2.850	0.098	-2.398	50.000	0.020	-1.479	0.617	-2.718	-0.240
	Equal variances not assumed			-4.843	6.583	0.002	-1.492	0.305	-2.211	-0.748

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

These data indicate that direct care nurses and supervisors who participated in the second education session and who believed that the service would improve care were more likely to expect the after-hours service to require less effort to learn and integrate into their delivery of care than were those in the same group who did not believe the service would improve care. Male respondents were more likely to expect the after-hours coverage service to require less effort to learn and integrate into their delivery of care than were female nurses.

Attitude.

ANOVA analysis of the variables Attitude (AT) and Facility revealed that Facility had a statistically significant effect on AT, when the second session's data were considered, $F (2, 26) = 4.684$, $p = .018$ and when the data were combined $F (2, 50) = 6.242$, $p = .004$ as shown in Table 12.

Table 12

Attitude Toward Using Technology Significant ANOVA Results

Variable		S²	df	M²	F	Sig.
Facility Session 2	Between Groups	14.340	2	7.170	4.684	0.018
	Within Groups	39.798	26	1.531		
	Total	54.138	28			
Facility Sessions 1 + 2	Between Groups	18.071	2	9.035	6.242	0.004
	Within Groups	72.382	50	1.448		
	Total	90.453	52			
Job Satisfaction Session 1	Between Groups	15.502	4	3.876	3.881	0.019
	Within Groups	17.976	18	0.999		
	Total	33.478	22			
Job Satisfaction Session 1 + 2	Between Groups	19.377	5	3.875	2.482	0.046
	Within Groups	70.270	45	1.562		
	Total	89.647	50			
Believe Will Improve Care Session 2 DCN + Supv.	Between Groups	31.625	4	7.906	6.323	0.003
	Within Groups	12.375	17	0.728		
	Total	44.000	21			

S^2 = Sum of squares; M^2 = Mean square; DCN = Direct Care Nurses; Supv. = Supervisors

Tukey post hoc tests identified statistically significant differences between Facility 1 (F1) and Facility 3 (F3) AT scores, with F3 having a lower mean AT score (n = 9, 3.33) than F1 (n = 9, 5.11) when second session scores were evaluated and when the combined scores were evaluated where F3 was (n = 18, 3.67) and F1 (n = 16, 5.13) as shown in Tables 13 and 14.

Table 13

Attitude Toward Using Technology and Facility: Session 2

			subset for alpha = 0.05	
Session 2	Facility	N	1	2
Tukey HSD* **	3	9	3.333	
	2	11	4.091	4.091
	1	9		5.111
	Sig.		0.386	0.188

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 9.581.

* The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

Table 14

Attitude Toward Using Technology and Facility: Sessions 1 and 2

			subset for alpha = 0.05	
Session 1 + 2	Facility	N	1	2
Tukey HSD* **	3	18	3.667	
	2	19	4.421	4.421
	1	16		5.125
	Sig.		0.161	0.203

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 17.576

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

In the initial session, the "Job Satisfaction" variable demonstrated a statistically

significant on AT through ANOVA, $F_{(4, 18)} = 3.881$, $p = .019$ as shown in Table 12. One

response category had only one case so a post hoc test was not run. Review of the means

revealed that, in the initial groups data set, the respondents who chose "Possibly" (n = 1) or

"Neutral" (n =2) for their level of Job Satisfaction had the lowest AT mean score of 3.000 (SD 0

and 1.414 respectively) while those who responded, "Definitely" for their level of Job

Satisfaction (n = 7) had a mean AT score of 5.571 (SD .787) as shown in Table 15.

Table 15

Attitude Toward Using Technology and Job Satisfaction: Session 1

Session 1	N	M (SD)	SE	95% CI	
				LL	UL
Very dissatisfied	0				
Dissatisfied	0				
Somewhat dissatisfied	1	3.00 (0.000)			
Neutral	2	3.00 (1.414)	1.000	-9.706	15.706
Mostly satisfied	6	4.17 (0.983)	0.401	3.135	5.199
Satisfied	7	4.71 (1.113)	0.421	3.685	5.743
Very satisfied	7	5.57 (0.787)	0.297	4.843	6.299
Total	23	4.61 (1.234)	0.257	4.075	5.142

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The variable Job Satisfaction in the combined data set demonstrated a statistically

significant on AT through an ANOVA F (5, 45) = 3.875, p = .046 as shown in Table 12. One

response category had only one case so a post hoc test was not run. Review of the means

revealed that, in the combined groups data set, the respondents who chose "Probably Not" for

their level of Job Satisfaction (n = 1) had the lowest AT mean score of 2.000 (SD 0), those who

responded," Neutral" (n = 6) had the next lowest AT mean score of 3.833 (SD .983) while those

who responded "Definitely" for their level of Job Satisfaction (n = 12) had an AT mean score of

5.250 (SD 1.055) as shown in Table 16.

Table 16

Attitude Toward Using Technology and Job Satisfaction: Sessions 1 and 2

Session 1 + 2	N	M (SD)	SE	95% CI LL	UL
Very dissatisfied	0				
Dissatisfied	1	2.00 (0.000)			
Somewhat dissatisfied	3	4.00 (1.732)	1.000	-0.303	8.303
Neutral	6	3.83 (0.983)	0.401	2.802	4.865
Mostly satisfied	11	3.91 (1.136)	0.343	3.146	4.672
Satisfied	18	4.39 (1.420)	0.335	3.683	5.095
Very satisfied	12	1.06 (0.305)	0.305	4.580	5.921
Total	51	4.35 (1.340)	0.188	3.976	4.730

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Results of the ANOVA applied to data from the second group of direct-care nurses and supervisors responding to the item regarding "Believe that the System Will Improve Care" demonstrated a statistically significant on AT: $F_{(4,17)} = 10.86$, $p = .000$ as shown in Table 12. As the "Not at all" group had only 1 case, post hoc test results are not available. A review of the means revealed that the nurse who responded, "Not at all" ($n = 1$) to the "Believe that the System Will Improve Care" question had the lowest mean score of 0 while those responding "Neutral" ($n = 4$) had the next lowest mean score of 2.50 (SD .577) and the group who responded, "Probably" had the highest mean score ($n = 6$) 4.83 (SD .983) as shown in Table 17.

Table 17

Attitude Toward Using Technology and Believe Service Will Improve Care: Session 2

Session 2	N	M (SD)	SE	95% CI	
				LL	UL
Not at all	1	0.00 (0.000)			
Not likely	0				
Possibly	0				
Neutral	4	2.50 (0.577)	0.289	1.581	3.419
Probably	6	4.83 (0.983)	0.401	3.802	5.865
Very probably	8	4.37 (0.744)	0.263	3.753	4.997
Definitely	3	4.66 (1.155)	0.667	1.798	7.535
Total	22	4.00 (1.447)	0.309	3.580	4.642

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The variable "Years of Nursing Experience" was shown to have a statistically significant on AT through ANOVA analysis, $F (2, 50) = 5.89$, $p = .031$ with the ≤ 2 years of experience (n = 5) having the lowest mean score of 3.40 and the 2.1 to 10 years of experience group (n = 33) having the highest mean score of 4.73, but Tukey's post hoc test did not find the difference significant.

T-test for independent variable for AT and Formal Computer Education demonstrated a statistical significance between the mean AT scores, "Yes" n = 22 (M = 4.77, SD 1.020) and "No" n = 28 (M = 4.00, SD 1.414) was t (48) 2.157, $p = .036$ as shown in Table 18.

Table 18

Attitude Toward Using Technology and Formal Computer Education

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	t	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Formal IT Ed	Equal variances assumed	0.796	0.377	2.157	48.000	0.036	0.773	0.358	0.368	1.493
	Equal variances not assumed			2.242	47.705	0.030	0.773	0.345	0.394	1.466

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

In summary, data from select groups within the variables Facility, Job Satisfaction, Belief that the System Will Improve Care, Formal Computer Education were found to have significant effects on the variable Attitude. Facility 1 had scores consistent with a more positive attitude than did Facility 3. Nurses with higher levels of job satisfaction tended to have higher AT mean scores than did those with lower levels of job satisfaction. Nurses with the highest level of belief that the system will improve care had the highest AT mean scores while those with lower scores for level of belief that the system will improve care had lower AT mean scores. Nurses with Formal Computer Education had higher AT mean scores than did those without Formal Computer Education.

Social Influence.

ANOVA analysis of perceived Social Influence (SI) and Facility revealed that Facility had a statistically significant effect on SI when session scores were combined F (2, 50) = 7.356, p = .019as shown in Table 19.

Table 19

Social Influence Significant ANOVA Results

Variable		S²	df	M²	F	Sig.
Facility Session 2	Between Groups	13.255	2	6.628	3.633	0.041
	Within Groups	47.434	21	1.824		
	Total	60.690	28			
Facility Sessions 1 + 2	Between Groups	14.711	2	7.356	4.286	0.019
	Within Groups	85.817	50	1.716		
	Total	100.528	52			
Age by Group Session 1	Between Groups	15.700	4	3.925	3.090	0.041
	Within Groups	24.133	19	1.270		
	Total	39.833	23			
Job Satisfaction Session 1	Between Groups	19.337	4	4.834	4.435	0.011
	Within Groups	19.619	18	1.090		
	Total	38.957	22			
Believe Will Improve Care Session 2 DCN + Supv.	Between Groups	28.080	4	7.020	6.323	0.003
	Within Groups	18.875	17	1.110		
	Total	46.955	21			

S² = Sum of squares; M² = Mean square; DCN = Direct Care Nurses; Supv. = Supervisors

Tukey post hoc tests identified statistically significant differences between F1 and F3 SI scores, with F3 having a lower mean SI score (n = 18, 3.61) than F1 (n = 16, 4.88) as shown in Table 20.

Table 20

Social Influence and Facility: Session 1 and 2

| Session 1 + 2 | Facility | N | subset for alpha = 0.05 | |
			1	2
Tukey HSD* **	3	18	3.611	
	2	19	3.895	3.895
	1	16		4.875
	Sig.		0.798	0.078

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 17.576

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

The second session data provided a valid ANOVA F (2, 26) = 3.63, p = .041 however Tukey post hoc test demonstrated the difference between the means of F3 (n = 9, 3.67) and F1 was (n = 9, 5.11) was not statistically significant.

From the data from the first session, Age, grouped in 5 groups, < 29, 30-39, 40-49, 50-59, and > 60, was found by an ANOVA to have a statistically significant effect on SI, F (4, 19), = 3.090, p = .041 as shown in Table 19. One response category had only one case so a post hoc test was not performed. A review of the means revealed that those ≥ 60 (n = 5) had the lowest SI mean score of 3.00 (SD 1.225) while ≤ 29 (n = 6) had the highest mean SI score 5.33 (SD .817) as shown in Table 21.

Table 21

Social Influence and Age by Group: Session 1

| Session 1 | N | M (SD) | SE | 95% CI | |
				LL	UL
≤ 29	6	5.33 (0.817)	0.333	4.477	6.19
30-39	5	3.81 (0.837)	0.374	2.761	4.839
40-49	7	4.00 (1.414)	0.535	2.692	4.308
50-59	1	4.00 (0.000)			
≥ 60	5	3.00 (1.225)	0.548	1.479	4.521
Total	24	4.08 (1.316)	0.269	3.528	4.639

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

In the initial session, the Job Satisfaction variable demonstrated a statistically significant effect on SI through ANOVA, $F (4, 18) = 4.435$, $p = .011$ as shown in Table 19. One response category had only one case so a post hoc test was not run. Review of the means revealed that, in the initial groups data set, the respondents who chose "Neutral" (n =2) for their level of Job Satisfaction had the lowest SI mean score of 2.500 (SD .707) while those who responded, "Definitely" (n = 7) for their level of Job Satisfaction had a mean SI score of 5.143 (SD .900) as shown in Table 22.

Table 22

Social Influence and Job Satisfaction: Session 1

Session 1	N	M (SD)	SE	95% CI	
				LL	UL
Very dissatisfied	0				
Dissatisfied	0				
Somewhat dissatisfied	1	3.00 (0.000)			
Neutral	2	2.50 (0.707)	0.500	-3.853	8.853
Mostly satisfied	6	3.17 (1.169)	0.477	1.940	4.394
Satisfied	7	4.29 (1.113)	0.421	3.257	5.315
Very satisfied	7	5.14 (0.900)	0.340	4.311	5.975
Total	23	4.04 (1.331)	0.277	3.468	4.619

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Results of the ANOVA applied to data from the second group of direct-care nurses and supervisors responding to the item regarding "Believe that the System Will Improve Care" demonstrated a statistically significant on SI: $F (4, 17) = 6.32$, $p = .003$ as shown in Table 19. As the "Not at all" group had only 1 case, post hoc test results are not available. A review of the means revealed that those who responded, "Not at all" to the "Believe that the System Will Improve Care" question (n = 1) had the lowest mean score of 0 while those responding "Neutral"

(n = 4) had the next lowest mean score of 3.00 (SD .817) and the group who responded,

"Definitely" (n = 3) had the highest mean score 5.33 (SD 1.155) as shown in Table 23.

Table 23

Social Influence and Believe Service Will Improve Care: Session 2

Session 2	N	M (SD)	SE	95% CI LL	95% CI UL
Not at all	1	0.00 (0.000)			
Not likely	0				
Possibly	0				
Neutral	4	3.00 (0.817)	0.408	1.701	4.299
Probably	6	4.67 (1.033)	0.422	3.583	5.751
Very probably	8	3.88 (1.126)	0.398	2.934	4.816
Definitely	3	5.33 (1.155)	0.667	2.465	8.202
Total	22	3.95 (1.495)	0.319	3.292	4.618

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

T-test for independent variable for SI and Formal Computer Education demonstrated a

statistical significance between the mean SI scores, "Yes" n = 22 (M = 4.45, SD 1.143) and "No"

n = 28 (M = 3.68, SD 1.492) was t (48) 2.017, p = .049 as shown in Table 24.

Table 24

Social Influence and Formal Computer Education

		Levene's Test for Equality of Variance F	Sig.	t-test for Equality of Means t	df	Sig (2-tailed)	M Dif.	SE Dif.	95% CI LL	95% CI UL
Formal IT Ed	Equal variances assumed	1.296	0.261	2.017	48.000	0.049	0.776	0.385	0.002	1.550
	Equal variances not assumed			2.082	47.981	0.043	0.776	0.373	0.270	1.525

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

In summary, select groups from the following variables were found to have an impact on SI: Facility, Age by 5 groups, Job Satisfaction, Belief the System Will Improve Care and Formal Computer Education. Facility 1 had higher SI mean scores than did Facility 3. Nurses in the >60 age group had the lowest SI mean scores while nurses in the $\leq$ 29 had the highest SI mean scores. Nurses with high levels of Job Satisfaction had the highest SI mean scores while those with lower levels of Job Satisfaction had lower SI scores. Higher levels of belief that the system will improve care were associated with higher SI scores than were lower levels of belief that the system will improve care. Nurses with formal Computer Education had higher mean SI scores than nurses who reported not having formal Computer Education.

Facilitating Conditions.

For the construct of Facilitating Conditions (FC), in the combined data from both collection periods, Age, grouped in 5 groups < 29, 30-39, 40-49, 50-59, and > 60, was found by an ANOVA to have a statistically significant on FC, $F_{(4, 48)}$, = 2.642, p = .045 as shown in Table 25.

Table 25

Facilitating Conditions Significant ANOVA Results

Variable		S²	df	M²	F	Sig.
Age by Group Sessions 1 + 2	Between Groups	16.824	4	4.206	2.642	0.045
	Within Groups	76.421	48	1.592		
	Total	93.245	52			
Job Satisfaction Session 1+ 2	Between Groups	23.202	5	4.640	3.003	0.020
	Within Groups	69.543	45	1.545		
	Total	92.745	50			
Believe Will Improve Care Session 1 DCN + Supv.	Between Groups	11.306	2	5.653	6.891	0.008
	Within Groups	12.306	15	0.820		
	Total	23.611	17			
Believe Will Improve Care Session 2 DCN + Supv.	Between Groups	39.064	4	9.766	13.599	0.000
	Within Groups	12.208	17	0.718		
	Total	51.273	21			

S² = Sum of squares; M² = Mean square; DCN = Direct Care Nurses; Supv. = Supervisors

Tukey post hoc test demonstrated a significant statistical difference between the means

for those ≤ 29, (n = 11, 5.091) and those aged ≥ 60 (n = 9, 3.333) who had the lower of the two

mean FC scores as shown in Table 26.

Table 26

Facilitating Conditions and Age by Group: Sessions 1 and 2

			subset for alpha = 0.05	
Session 1 + 2	Age Group	N	1	2
Tukey HSD* **	≥ 60	9	3.333	
	40-49	14	4.571	4.571
	30-39	15	4.667	4.667
	50-59	4	4.750	4.750
	≤ 29	11		5.091
	Sig.		0.159	0.914

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 8.473

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

The variable Job Satisfaction in the combined data set demonstrated a statistically significant on FC through an ANOVA, $F (5, 45) = 4.640$, $p = .020$ as shown in Table 25. One response category had only one case so a post hoc test was not run. Review of the means revealed that, in the combined groups data set, the respondent who chose "Probably Not" for their level of Job Satisfaction ($n = 1$) had the lowest FC mean score of 1.000 (SD not reported) while those who responded, "Neutral" ($n = 6$) had the next lowest FC mean score of 3.833 (SD .98) while those who responded "Definitely" ($n = 12$) for their level of Job Satisfaction had a mean FC score of 5.250 (SD .97) as shown in Table 27.

Table 27

Facilitating Conditions and Job Satisfaction: Sessions 1 and 2

				95% CI	
Session 1 + 2	N	M (SD)	SE	LL	UL
Very dissatisfied	0				
Dissatisfied	1	1.00 (0.000)			
Somewhat dissatisfied	3	4.00 (1.732)	1.000	-0.303	8.303
Neutral	6	3.83 (0.983)	0.401	2.802	4.865
Mostly satisfied	11	4.27 (1.104)	0.333	3.531	5.014
Satisfied	18	4.61 (1.461)	0.344	3.885	5.338
Very satisfied	12	5.25 (0.965)	0.279	4.637	5.863
Total	51	4.49 (1.362)	0.191	4.107	4.873

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Results of the ANOVA applied to data from the initial group of direct-care nurses and supervisors responding to the item regarding Believe That the System Will Improve Care demonstrated a statistically significant on FC, $F (2, 15) = 6.891$, $p = .008$ as shown in Table 25. Tukey post hoc test demonstrated that the difference between the FC mean scores of those who responded "Very Probably" ($n = 5$, 5.00) and those who responded "Definitely" ($n = 9$, 5.22)

compared with those who responded "Probably" (n = 4, 3.25) was statistically significant as shown in Table 28.

Table 28

Facilitating Conditions and Believe Will Improve Care: Direct-care Nurses and Supervisors: Session 1

			subset for alpha = 0.05	
Session 1 DCN + Supv	Believe	N	1	2
Tukey HSD* **	Probably	4	3.250	
	Very probably	5		5.000
	Definitely	9		5.222
	Sig.		1.000	0.916

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 5.347

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

Results of the ANOVA applied to data from the second group of direct-care nurses and supervisors responding to the item regarding belief that the system will improve care demonstrated a statistically significant on FC: $F_{(4,17)} = 13.599$, p = .000 as shown in Table 25. As the "Not at all" group had only 1 case, post hoc test results are not available. A review of the means revealed that those who responded, "Not at all" to the "believe the system will improve care" question (n = 1) had the lowest mean score of 0 while those responding "Neutral" had the next lowest mean score of (n = 4) 2.50 and the group who responded, "Probably" had the highest mean score (n = 6) 5.33 as shown in Table 29.

Table 29

Facilitating Conditions and Believe Service Will Improve Care: Session 2

				95% CI	
Session 2	N	M (SD)	SE	LL	UL
Not at all	1	1.00 (0.000)			
Not likely	0				
Possibly	0				
Neutral	4	2.50 (1.000)	0.500	0.909	4.091
Probably	6	5.33 (0.817)	0.333	4.477	6.190
Very probably	8	4.38 (0.744)	0.263	3.753	4.997
Definitely	3	5.00 (1.000)	0.577	2.516	7.484
Total	22	4.18 (1.563)	0.333	3.489	4.875

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

For FC, there was a significant difference between the means for the variable Gender, Female n = 48 (M = 4.38, SD 1.33) and Male n = 4 (M = 5.75, SD .50). T-test for independent variable demonstrated a statistical significance between the FC score means and Gender t (50) -2.038, p = .047 as shown in Table 30.

Table 30

Facilitating Conditions and Gender

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	t	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Formal IT Ed	Equal variances assumed	2.793	0.101	-2.038	50.000	0.047	-1.375	0.675	-2.730	-0.020
	Equal variances not assumed			-4.361	7.423	0.003	-1.375	0.315	-2.112	-0.638

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

ANOVA analysis revealed that the variable Years of Nursing Experience was shown to have a statistically significant on FC, $F_{(2, 50)} = 3.30$, $p = .045$ with the < 2 years of experience ($n = 5$) having the lowest mean FC score of 3.60 (SD 2.07), and the 2.1 to 10 years of experience group ($n = 33$) having the highest mean FC score of 4.85 (SD 1/.18) but Tukey post hoc test did not find the difference significant.

In summary, the following variables were found to have a statistically significant effect on the construct of FC: Age, Job Satisfaction, and Belief that the System Will Improve Care and Gender. The nurses in the ≤ 29 age group had higher FC mean scores than did the nurses in the ≥ 60 age group. Nurses with higher levels of Job Satisfaction had higher FC mean scores than did those with lower levels of Job Satisfaction. Nurses with higher levels of Belief that the System Will Improve Care had higher FC mean scores than did those with lower levels of Belief that the System Will Improve Care. The FC mean scores for male nurses were higher than the FC mean scores for female nurses.

Self-Efficacy.

The second session data provided a valid ANOVA for SE and Facility, $F_{(2, 26)} = 3.70$, $p = .039$ as shown in Table 31.

Table 31

Self-Efficacy Significant ANOVA Results

Variable		S²	df	M²	F	Sig.
Facility	Between Groups	10.355	2	5.177	3.698	0.039
Session 2	Within Groups	36.404	26	1.400		
	Total	46.759	28			
	Between					
Facility	Groups	11.249	2	5.625	3.992	0.025
Sessions 1 + 2	Within Groups	70.444	50	1.409		
	Total	81.698	52			
Believe Will	Between					
Improve Care	Groups	21.299	4	5.325	4.574	0.011
Session 2	Within Groups	19.792	17	1.164		
DCN + Supv.	Total	41.091	21			

S² = Sum of squares; M² = Mean square; DCN = Direct Care Nurses; Supv. = Supervisors

Tukey post hoc test demonstrated a significant statistical difference between the SE mean scores of F2 (n = 11, 3.27) and F1 (n = 9, 4.67) with F2 having the lower of the two SE mean scores as shown in Table 32.

Table 32

Self-Efficacy and Facility: Session 2

			subset for alpha = 0.05	
Session 2	Facility	N	1	2
Tukey HSD* **	2	11	3.273	
	3	9	3.556	3.556
	1	9		4.667
	Sig.		0.861	0.119

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 9.581

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

ANOVA analysis of Self-Efficacy (SE) and Facility revealed that Facility had a statistically significant effect on SE, when session scores were combined $F_{(2, 50)} = 3.992$, $p = .025$ as shown in Table 31. Tukey post hoc tests identified statistically significant differences between F1 compared to F2 and F3 SE mean scores, with F1 having the highest SE mean score (n = 16, 4.63) as shown in Table 33, while the difference between the SE means of F2 (n = 19, 3.63) and F3 (n = 18, 3.61) were not significant.

Table 33

Self-Efficacy and Facility: Sessions 1 and 2

			subset for alpha = 0.05	
Session 1 + 2	Facility	N	1	2
Tukey HSD* **	3	18	3.611	
	2	19	3.632	
	1	16		4.625
	Sig.		0.999	1.000

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size =17.576

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

Results of the ANOVA applied to data from the second group of direct-care nurses and supervisors responding to the item regarding Believe That the System Will Improve Care demonstrated a statistically significant on SE, $F_{(4, 17)} = 4.574$, $p = .011$ as shown in Table 31. As the "Not at all" group had only 1 case, post hoc test results are not available. A review of the means revealed that those who responded, "Not at all" to the Believe the System Will Improve Care question (n = 1) had the lowest mean score of 0 while those responding "Neutral" (n = 4) had the next lowest mean score of 2.75 (SD .50) and the group who responded, "Probably" (n = 6) had the highest mean score 4.50 (SD 1.05) as shown in Table 34.

Table 34

Self-Efficacy and Believe Service Will Improve Care: Session 2

Session 2	N	M (SD)	SE	95% CI	
				LL	UL
Not at all	1	0.00 (0.000)			
Not likely	0				
Possibly	0				
Neutral	4	2.75 (0.500)	0.250	1.954	3.546
Probably	6	4.50 (1.049)	0.428	3.399	5.601
Very probably	8	3.88 (1.126)	0.398	2.934	4.816
Definitely	3	3.67 (1.528)	0.882	-0.128	7.461
Total	22	3.64 (1.399)	0.298	3.016	4.257

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The variable "Years of Nursing Experience" was shown to have a statistically significant on SE $F_{(2, 50)} = 5.45$, $p = .007$ with the < 2 years of experience (n = 5) having the lowest SE mean score of 3.20 (SD 1.92) and the 2.1 to 10 years of experience group (n = 33) having the highest SE mean score of 4.33 (SD 1.08). Tukey post hoc test did not find the difference between the SE mean scores to be significant.

In summary, the two variables that had a statistically significant effect of the construct SE in select areas were Facility and Belief that the System Will Improve Care. Facility 1 had higher SE mean scores that Facility 2 or Facility 3. Higher levels of Belief That the System Will Improve Care were associated with higher SE mean scores.

Anxiety.

ANOVA analysis of Anxiety (AN) and Facility revealed that Facility had a statistically

significant effect on AN, when sessions scores were combined F (2, 50) = 3.739, p = .031 as

shown in Table 35.

Table 35

Anxiety Significant ANOVA Results

Variable		S²	df	M²	F	Sig.
Facility	Between Groups	17.993	2	8.997	3.739	0.031
Sessions 1 + 2	Within Groups	120.309	50	2.406		
	Total	138.302	52			

S² = Sum of squares; M² = Mean square;

Tukey post hoc tests identified statistically significant differences between F1 and F3,

with F3 (n = 18, 1.72) having a lower AN mean score, than F1 (n = 16, 3.13) as shown in Table

36.

Table 36

Anxiety and Facility: Sessions 1 and 2

			subset for alpha = 0.05	
Session 1 + 2	Facility	N	1	2
Tukey HSD* **	3	18	1.722	
	2	19	2.053	2.053
	1	16		3.125
	Sig.		0.804	0.111

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 17.576

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

The second session data provided a valid ANOVA for Age, grouped in 5 groups, < 29,

30-39, 40-49, 50-59, and > 60, F (4, 24) = 3.06, p = .036; however, Tukey post hoc test

demonstrated the difference between the AN mean score of the 40 – 49 age group (n = 7, 1.43) and the ≤ 29 age group (n = 5, 3.80) was not statistically significant.

In summary, nurses at Facility 3 chose responses consistent with feeling less anxious about using the after-hours service than did nurses at Facility 1. There were no other significant findings regarding Anxiety and the after-hours telemedicine coverage service.

Behavioral Intention.

Of the UTAUT constructs, the construct of Behavioral Intention (BI) is the most relevant to this project and requires in-depth evaluation and discussion. To meet this need, information and charts describing negative associations are presented more frequently than has occurred in prior sections.

ANOVA analysis determined that Facility did not have a statistically significant on BI, $F (2, 52) = 1.217$, $p = .305$ as shown in Table 37.

Analysis of an ANOVA for Age and BI, grouped in 5 groups < 29, 30-39, 40-49, 50-59, and > 60, revealed that Age had a statistically significant effect on BI when session scores were combined, $F (4, 48) = 3.775$, $p = .010$ as shown in Table 37.

Table 37

Behavioral Intent Significant ANOVA Results

Variable		S²	df	M²	F	Sig.
Facility Sessions 1 + 2	Between Groups	8.787	2	4.394	1.217	0.305
	Within Groups	180.496	50	3.610		
	Total	189.283	52			
Age Sessions 1 + 2	Between Groups	45.295	4	11.324	3.775	0.010
	Within Groups	143.988	48	3.000		
	Total	189.283	52			
Years of Nursing Exp. Sessions 1 + 2	Between Groups	20.289	2	10.145	3.001	0.059
	Within Groups	168.994	50	3.380		
	Total	189.283	52			
Nursing Degree Session 1 + 2	Between Groups	22.862	3	7.621	2.244	0.095
	Within Groups	166.421	49	3.396		
	Total	189.283	52			
Current Job Session 1	Between Groups	6.125	1	6.125	2.428	0.133
	Within Groups	55.500	22	2.523		
	Total	61.625	23			
Current Job Session 2	Between Groups	6.624	1	6.624	1.701	0.203
	Within Groups	105.169	27	3.895		
	Total	111.793	28			
Current Job Session 1 + 2	Between Groups	12.460	1	12.460	3.594	0.064
	Within Groups	176.823	51	3.467		
	Total	189.283	52			
Years at Current Jobs Session 1	Between Groups	30.911	4	7.728	4.780	0.008
	Within Groups	30.714	9	1.617		
	Total	61.625	23			

		S^2	df	M^2	F	Sig.
Job Satisfaction Session 1	Between Groups	37.432	4	9.358	7.082	0.001
	Within Groups	23.786	18	1.321		
	Total	61.217	22			
Job Satisfaction Session 1 + 2	Between Groups	38.603	5	7.721	2.338	0.057
	Within Groups	148.573	45	3.302		
	Total	187.176	50			
Believe Will Improve Care Session 1	Between Groups	25.568	4	6.392	10.601	0.000
	Within Groups	10.250	17	0.603		
DCN + Supv.	Total	35.818	21			
Believe Will Improve Care Session 1	Between Groups	4.450	2	2.225	1.707	0.215
	Within Groups	19.550	15	1.303		
DCN + Supv.	Total	24.000	17			
Believe Will Improve Care Session 2	Between Groups	26.955	4	6.739	2.695	0.066
	Within Groups	42.500	17	2.500		
DCN + Supv.	Total	69.455	21			
Believe Will Improve Care Session 1 + 2	Between Groups	40.191	4	10.048	4.352	0.002
	Within Groups	65.709	35	1.877		
DCN + Supv.	Total	105.900	39			

S^2 = Sum of squares; M^2 = Mean square; DCN = Direct Care Nurses; Supv. = Supervisors

Tukey post hoc test demonstrated the difference between the means of the 50 – 59 age group (n = 4, 2.0) and the ≤ 29 age group (n = 11, 5.09) was statistically significant as shown in Table 38.

Table 38

Behavioral Intent and Age by Group: Sessions 1 and 2

			subset for alpha = 0.05	
Session 1 + 2	Age Group	N	1	2
Tukey HSD* **	50-59	4	2.000	
	≥ 60	9	2.889	2.889
	30-39	15	3.333	3.333
	40-49	14	4.286	4.286
	≤ 29	11		5.091
	Sig.		0.066	0.083

Means for groups in homogenous subsets are displayed.

* Uses Harmonic Mean Sample Size = 8.473

** The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

ANOVA analysis determined that Nursing degree was not found to have a statistically significant on BI F (3, 49) = 2.244, p = .095 as shown in Table 37. However, a review of the combined BI mean scores revealed that LPNs (n = 22) had the highest BI mean score M = 4.05, SD 1.70 while BSNs (n = 5) had the lowest BI mean score M = 1.80, SD 2.49 as shown in Table 39.

Table 39

Behavioral Intent and Nursing Degree: Sessions 1 and 2

				95% CI	
Session 1 + 2	N	M (SD)	SE	LL	UL
LPN	22	4.05 (1.704)	0.363	3.290	4.801
Diploma	3	3.33 (1.528)	0.882	-0.461	7.128
ADN	23	4.00 (1.859)	0.388	3.196	4.804
BSN	5	1.80 (2.490)	1.114	-1.292	4.892
Total	53	3.77 (1.908)	0.262	3.248	4.300

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Although ANOVA analysis determined that Years of Nursing experience was not found to have

a statistically significant on BI F (2, 50) = 3.001, p = .059 as shown in Table 37, a review of the

BI mean scores revealed that nurses with >10 years of experience (n = 15) had the lowest BI

mean scores 2.87, SD 1.77 while 2.1 to 10 years of experience (n = 33) had the highest BI mean

score, 4.24, SD 1.84 as shown in Table 40.

Table 40

Behavioral Intent and Years of Nursing: Sessions 1 and 2

				95% CI	
Session 1 + 2	N	M (SD)	SE	LL	UL
≤ 2 years	5	3.40 (2.074)	0.927	0.825	5.975
2.1 - 10 years	33	4.24 (1.838)	0.320	3.591	4.894
> 10 years	15	2.87 (1.767)	0.456	1.888	3.845
Total	53	3.77 (1.908)	0.262	3.248	4.300

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

ANOVA analysis demonstrated that BI mean scores were not affected by the variable

Current Nurse Job at the initial session, F = (1, 22) 2.428, p = .133, the follow-up session, F = (1,

27) 1.701, p = .203, or when both sessions were combined F = (1, 51) 3.594, p = .064 as shown

in Table 37. However, examination of the difference in the Current Nurse Job means reveals

that, according to data from the initial session, the follow-up session, and both sessions

combined, direct-care nurses and supervisors had higher BI mean scores compared to

Administrative nurses, the largest difference recorded in the combined mean scores, direct-care

nurses (n = 40) M = 4.05, SD 1.65 and Administrative nurses (n = 13) M = 2.92, SD 2.43 as

shown in Table 41, 42 and 43. Review of the direct-care nurse BI means from Session 1 (n = 18)

M = 4.67, SD 1.19 compared to those from Session 2 (n = 22) M = 3.55, SD 1.82 demonstrates a

1.22-point decline in the BI mean scores as shown in Table 41 and 42.

Table 41

Behavioral Intent and Current Job: Session 1

Session 1	N	M (SD)	SE	95% CI	
				LL	UL
DCN + SUPV	18	4.67 (1.188)	0.280	4.076	5.258
ADMIN. Nurses	6	3.50 (2.510)	1.025	0.866	6.134
Total	24	4.38 (1.637)	0.334	3.684	5.066

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Table 42

Behavioral Intent and Current Job: Session 2

Session 2	N	M (SD)	SE	95% CI	
				LL	UL
DCN + SUPV	22	3.55 (1.819)	0.388	2.739	4.352
ADMIN. Nurses	7	2.43 (2.440)	0.922	0.172	4.685
Total	29	3.28 (1.998)	0.371	2.516	4.036

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Table 43

Behavioral Intent and Current Job: Sessions 1 and 2

Session 1 + 2	N	M (SD)	SE	95% CI	
				LL	UL
DCN + SUPV	40	4.05 (1.648)	0.261	3.523	4.577
ADMIN. Nurses	13	2.92 (2.431)	0.674	1.454	4.392
Total	53	3.77 (1.908)	0.262	3.248	4.300

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Analysis of ANOVA for Years at Current Job and BI, grouped in 5 groups ≤ 2, 2.1-5, 5.1-10, 10.1-20 and > 20, revealed that Years at Current Job had a statistically significant effect on BI when an ANOVA was performed on the initial session data, $F(4, 19) = 4.780$, $p = .008$ as shown in Table 37. Tukey post hoc test was not performed as the $\geq$ over 20 group had only one case. Review of the means reveals that the BI mean score was lowest for those with 10.1-20 years at the current job (n = 2) M = 1.50, SD 2.12 and highest for those with 2.1 – 6 years at current job (n = 4) M = 5.50, SD .58 as shown in Table 44.

Table 44

Behavioral Intent and Years at Current Job: Session 1

Session 1	N	M (SD)	SE	95% CI LL	UL
≤ 2	14	4.64 (1.336)	0.357	3.871	5.414
2.1 - 5	4	5.50 (0.577)	0.289	4.581	6.419
5.1 - 10	3	3.00 (1.000)	0.577	0.516	5.484
10.1 - 20	2	1.50 (2.121)	1.500	-17.56	20.559
> 20	1	6.00			
Total	24	4.38 (1.637)	0.334	3.684	5.066

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The variable Job Satisfaction in the initial data set demonstrated a statistically significant on BI through an ANOVA $F (4, 18) = 7.082$ $p = .001$ as seen in Table 37. One response category had only one case so a post hoc test was not run. Review of the means revealed that, in the initial session data set, the respondents who chose "Neutral" for their level of job satisfaction ($n = 2$) had the lowest BI mean score of 1.00 (SD 1.41), those who responded, "Probably" ($n = 6$) had the next lowest BI mean score of 3.50 (SD 1.22) while those who responded "Definitely" for their level of job satisfaction ($n = 7$) had a mean BI score of 5.29 (SD .95) as shown in Table 45.

Table 45

Behavioral Intent and Job Satisfaction: Session 1

Session 1	N	M (SD)	SE	95% CI LL	UL
Very dissatisfied	0				
Dissatisfied	0				
Somewhat dissatisfied	1	4.00			
Neutral	2	1.00 (1.414)	1.000	-11.71	13.706
Mostly satisfied	6	3.50 (1.225)	0.500	2.215	4.785
Satisfied	7	5.14 (1.215)	0.459	4.019	6.267
Very satisfied	7	5.29 (0.951)	0.360	4.406	6.165
Total	23	4.35 (1.668)	0.348	3.627	5.069

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The difference between the BI mean scores and Job Satisfaction in the follow-up session data set was not statistically significant. The variable Job Satisfaction in the combined data set demonstrated a statistically significant on BI through an ANOVA $F (5, 45) = 2.338$, $p = .057$ as shown on Table 37. One response category had only one case so a post hoc test was not run. Review of the means revealed that, in the combined groups data set, the respondents who chose "Probably Not" ($n = 1$) for their level of Job Satisfaction had the lowest AT mean score of 1.00 while those who responded, "Neutral" ($n = 6$) had the next lowest AT mean score of 2.33 (SD 1.97) while those who responded "Definitely" for their level of job satisfaction ($n = 12$) had a mean AT score of 4.92 (SD 1.78) as shown on Table 46.

Table 46

Behavioral Intent and Job Satisfaction: Session 1 and 2

				95% CI	
Session 1 + 2	N	M (SD)	SE	LL	UL
Very dissatisfied	0				
Dissatisfied	1	1			
Somewhat dissatisfied	3	4.33 (1.528)	0.882	0.539	8.128
Neutral	6	2.33 (1.966)	0.803	0.27	4.397
Mostly satisfied	11	3.36 (1.120)	0.338	2.611	4.116
Satisfied	18	3.78 (2.130)	0.502	2.719	4.837
Very satisfied	12	4.92 (1.782)	0.514	3.785	6.049
Total	51	3.76 (1.935)	0.271	3.221	4.309

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The ANOVA analysis for the variable Believe Service Will Improve Care showed no statistically significant effect on BI for the direct-care nurses and supervisors at the initial session, $F = (2, 15) 1.707$, $p = .215$, the follow-up session, $F = (4, 17) 2.695$, $p = .066$, or when both sessions were combined $F = (4, 35) 5.352$, $p = .002$ as shown in Table 37. However, as shown on Tables 47 and 48 a review of the mean scores for the variable Believe the Service will Improve Care for the direct-care nurses and supervisors, showed a decrease in the BI score

means from Session 1 (n = 18) M = 4.67, SD 1.19 compared to those from Session 2 (n = 22) M = 3.55, SD 1.82.

Table 47

Behavioral Intent and Believe Service Will Improve Care: Session 1

Session 1	N	M (SD)	SE	95% CI LL	95% CI UL
Not at all	0				
Not likely	0				
Possibly	0				
Neutral	0				
Probably	4	3.75 (0.957)	0.479	2.227	5.274
Very probably	5	4.80 (1.304)	0.583	3.181	6.419
Definitely	9	5.00 (1.118	0.373	4.141	5.859
Total	18	4.67 (1.188)	0.280	4.076	5.258

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

Table 48

Behavioral Intent and Believe Service Will Improve Care: Session 2

Session 2	N	M (SD)	SE	95% CI LL	95% CI UL
Not at all	1	0.00			
Not likely	0				
Possibly	0				
Neutral	4	2.50 (1.000)	0.500	0.909	4.091
Probably	6	3.67 (2.422)	0.989	1.125	6.209
Very probably	8	3.75 (1.035)	0.366	2.885	4.615
Definitely	3	5.33 (1.155)	0.667	2.465	8.202
Total	22	3.55 (1.819)	0.388	2.739	4.352

Note: CI = confidence interval; LL = lower limit; UL= upper limit;

The t-test for independent variable demonstrated no statistical significance between the BI score means and Gender, female n = 48, M = 3.67, SD 1.81; male n = 4, M = .450, SD 3.00; t (50) -.840, p = .405 as shown in Table 49.

Table 49

Behavioral Intent and Gender

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	t	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Gender	Equal variances assumed	1.950	0.169	-0.840	50.000	0.405	0.833	0.992	-2.826	1.159
	Equal variances not assumed			-0.547	3.185	0.620	-0.833	1.523	-5.524	3.857

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

The t-test for independent variable demonstrated a statistical significance between the BI

score means and Computer Education, Yes (n = 22, M = 4.50, SD 1.37), No (n = 28, M = 3.07,

SD 2.09), t (48) .112, p = .008 as shown in Table 50.

Table 50

Behavioral Intent and Formal Computer Education

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	T	Df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Formal IT Ed	Equal variances assumed	2.62	0.112	2.769	48.000	0.008	1.43	0.516	-0.045	1.357
	Equal variances not assumed			2.908	46.683	0.006	1.43	0.491	0.391	2.466

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

T-test for independent variable demonstrated a statistical significance between the

Behavioral Intention (BI) score means and Sequence, (that is the initial session scores, n = 24, M

= 4.38, SD 1.64, compared to the follow-up session scores, n = 29, M = 3.28, SD 1.20), for the

scores of all the respondents, t (51) 2.160, p = .035 as shown on Table 51.

Table 51

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
All Nurses		F	Sig.	t	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Sequence	Equal variances assumed	0.756	0.389	2.160	51.000	0.035	1.099	0.509	0.078	2.121
	Equal variances not assumed			2.201	50.998	0.032	1.099	0.499	0.097	2.102

Behavioral Intent and Sequence: All Nurses

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

When the BI score means of just the direct-care nurses and supervisors (initial session n = 18, M

= 4.67, SD 1.19; follow-up session n = 22, M = 3.55, SD 1.82) were evaluated, the t-test for

independent variable demonstrated a statistical reliability between the BI score means and

Sequence, t (38) 2.250, p = .030 as shown in Table 52.

Table 52

Behavioral Intent and Sequence: Direct-care Nurses and Supervisors

DCN + Supv		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	T	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Sequence	Equal variances assumed	2.38	0.131	2.250	38.000	0.030	1.121	0.498	0.112	2.130
	Equal variances not assumed			2.344	36.392	0.025	1.121	0.478	0.152	2.091

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

The t-test for independent variable demonstrated no statistical significance between the

BI score means and Sequence for administrative nurses, initial session n = 6, M = 3.50, SD 2.51;

follow-up session n = 7, M = 2.43, SD 2.44; t (11) .779, p = .452 as shown in Table 53.

Table 53

Behavioral Intent and Sequence: Administrative Nurses

Admin		Levene's Test for Equality of Variance		t-test for Equality of Means					95% CI	
		F	Sig.	t	df	Sig (2-tailed)	M Dif.	SE Dif.	LL	UL
Sequence	Equal variances assumed	0.029	0.867	0.779	11.000	0.452	1.071	1.375	-1.955	4.098
	Equal variances not assumed			0.777	10.590	0.454	1.071	1.379	-1.978	4.120

M Dif.= Mean difference; SE Dif.= Standard error difference; LL = lower limit; UL= upper limit;

In summary, in some instances, the scores of the construct Behavioral Intention were found to be effected by the variables Age, Years at Current Job, Job Satisfaction, Formal Computer Education, and Sequence. Nurses in the 50 – 59 age group had the lowest BI mean scores while those in the ≤ 29 age group had the highest BI mean scores. Nurses with the more years at their current job had lower BI mean scores than did nurses with fewer years at their current job. Higher levels of Job Satisfaction were associated with higher levels of BI. Nurses with formal Computer Education had higher BI mean scores that did nurses without formal Computer Education. BI mean scores from the first session were higher than BI mean scores from the second session.

Chapter 5

Discussion, Limitations, and Conclusion

Discussion

The utilization of the after-hours telemedicine coverage service is dependent on nurses to identify a need to activate the service and then proceed with engaging with the on-call physician. Doing so results in more patients being treated in the SNF and fewer patients being transferred to the hospital. Demographic characteristics considered in this project that had a statistically significant association with the UTAUT constructs used to evaluate nurses' intention to use the service included the facility in which the nurse worked, gender, age, the number of years the nurse has worked at their current job, experience with formal computer training, level of job satisfaction, and the degree to which the nurse believed the service would improve care. Nursing degree, years of nursing experience, years at current facility, and current role did not appear to impact the intention to use the service.

The variable that was identified most often as having a statistically significant on utilization was the facility at which the nurse worked. According to the Nursing Home Compare website, the facilities have all been associated with the same family-run for-profit organization for more than eight years (Centers for Medicare and Medicaid Services, 2016a). Facility 1 and Facility 3 had higher utilization than Facility 2 although Facility 2 had a high number of patient beds as shown in Table 54.

Table 54 *Comparison of Number of Patient Beds and Number of Calls by Facility*

Facility	Facility Established	# of beds	Mar 1 2016 to May 31 2016 # of calls	Mar 1 2016 to Nov 1 2016 # of calls
1	2007	72	21	80
2	2003	141	5	29
3	2003	71	24	89

The number of subacute beds, a subset of the total number of beds, per facility is not known. The after-hours coverage service is in place to cover calls pertaining to the subacute patients as they are at a higher risk of hospitalizations and present a more significant financial risk to all stakeholders. The facilities identified as having a DON in place most often throughout the project had the highest utilization. The one facility that experienced a change in DON during the project is the one identified as having significantly lower utilization than the other two facilities. Other variables such as competitors' status, feeder hospital factors, physician issues or physical plant issues could impact utilization but none of these issues were identified as barriers to utilization during the SWOT analysis. The variable Facility was found to have a significant effect on the following UTAUT constructs: Performance Expectancy, Attitude, Social Influence, Self-Efficacy, and Anxiety. Mean scores from F1 were higher for Performance Expectancy, Attitude, and Social Influence than mean scores from F3. F1 mean scores were higher for Self-Efficacy than F2 and F3. This would be consistent with nurses at F1 feeling that the system will support their care efforts, having a more positive attitude toward the system and feeling they have more support from the organization than nurses at F3. Higher Self-Efficacy scores associated with F1 versus F2 and F3 are consistent with nurses at F1 having stronger feelings of belief that using the system will be feasible with current resources. Although F1 had higher scores in the above-mentioned constructs, mean score for Anxiety was higher for F1 than F3. As F1 and F3 had similar rates of utilization, variations in UTAUT construct mean scores would be expected when comparing F1 and F3 (high utilization sites) to F2 (low utilization site) and it is not clear why this is not the case.

To facilitate analysis of the variable Age, the respondents were categorized into 5 groups, ≤ 29, 30-39, 40-49, 50-59, and ≥ 60. Nurses in the ≤ 29 age group had higher mean scores for

Performance Expectancy, Facilitating Conditions, and Behavioral Intention than did nurses aged 50 to 59. Nurses in the < 29 age group had higher mean scores for Social Influence than nursing in the ≥ 60 age group. These results would indicate younger nurses were more likely to anticipate that the system would have a positive impact on their performance, that they were more likely to believe they were equipped to learn about and utilize the system, they were more aware of feeling those in supervisory positions expected them to use the system and they had a stronger intention to use the service than did older nurses.

Although the variable Years on the Job was determined to have a statistically significant of Behavioral Intention through ANOVA when the initial group of surveys was considered, Tukey's post-hoc was not performed as one category had only one respondent. Review of the means revealed that nurses in the group of 2.1-6 years on the job had higher Behavioral Intention mean scores than nurses with 10.1-20 years on the job. Both groups had a limited number of respondents (4 and 2 respectively) and caution must be applied when drawing any conclusions.

Nurses with formal Computer Education had higher mean scores for Performance Expectancy, Attitude, Social Influence, and Behavior Intention than those without Computer Education. These results would suggest that having formal Computer Education may result in nurses feeling that the service will improve their job performance, having more positive attitudes toward the system, having an increased perception of supervisors' utilization expectation, and having a heightened intention to use the service.

Nurses who described high levels of job satisfaction had higher mean scores for Performance Expectancy, Attitude, Social Influence, Facilitating Conditions, and Behavioral Intention than those with lower levels of job satisfaction. Nurses who are satisfied with their jobs may be more likely to perceive the system as supportive of their job performance, may have

more positive attitudes toward the system, feel that their supervisors support utilization of the system, believe they have the necessary resources to successfully utilize the system, and have an enhanced intention to use the system.

Nurses who described high levels of belief that the system will improve patient care had higher mean scores for Effort Expectancy, Attitude, Social Influence, Facilitating Conditions, and Self-Efficacy than nurses with lower levels of belief that the system will improve patient care. Higher levels of believing that the system would improve patient care were associated with a perception that the system would support the nurses' efforts to provide care, learning the system will be easy, a positive attitude toward the system, acknowledgement of general support from the organization, identification that necessary resources are available to ensure successful service utilization, and confidence that the nurse will be able to use the system with current resources.

The mean scores of the Behavioral Intention to use the service of all respondents declined between the initial survey and the follow up surveys from 4.38 (Probably) to 3.28 (Neutral). The mean scores of the direct-care nurses and supervisors declined from 4.67 (Probably) to 3.55 (Neutral). Conversely, although the Behavioral Intention scores declined, the utilization, as recorded by the number of encounters per facility, increased in 2 of the 3 facilities over the duration of the project and increased in all 3 facilities over the three months following completion of the project as shown in Table 55. The disparity between the Behavioral Intention and the known utilization may be an indication that the UTAUT questionnaire was not a reliable assessment tool in this situation.

Table 55

Service Utilization by Facility March 1, 2016 to October 31, 2016

Facility	3/1-4/15	Mo. Avg.	4/16 -5/31	Mo. Avg.	Sub-total	Mo. Avg.	6/1-8/31	Mo. Avg.	9/1-10/31	Mo. Avg.	Total	Mo. Avg.
1	8	5.3	13	8.7	21	7.0	35	11.7	24	12.0	80	10.0
2	3	2.0	2	1.3	5	1.7	11	3.7	13	6.5	29	3.6
3	9	6.0	15	10.0	24	8.0	39	13.0	26	13.0	89	11.1
Total	20	13.3	30	20.0	50	16.7	85	28.3	63	31.5	174	21.8

The service's outcome data show that 159 (79.3%) of the 198 patients cared for were treated on site. Of those treated on site, there were 81 (51.6%) avoided hospitalizations as shown in Table 56.

Table 56

Service Outcomes by Facility March 1, 2016 to October 31, 2016

Facility	Total # of Episodes	Treated in Place	% of Episodes	Avoided Transfer	% of Treated in Place	ED Transfer
1	80	62	78%	36	45%	18
2	29	25	86%	15	52%	4
3	89	70	79%	30	34%	19
	198	157	79%	81	41%	41

Limitations

Limitations associated with the project include the limited number of homogenous facilities that were involved. This limits the application of the findings to for-profit facilities in the state of Ohio. The respondents were mostly females (49 of 53) and the results may not be applicable in settings with a larger proportion of male nurses. Race was not examined in this

project so it is unknown if race would have an impact on the survey analysis. The use of repeated ANOVAs on the data set increases the risk of Type I errors. The total number of respondents was limited at 53 and this small sample size increases the risk of Type II errors. A result of having a small pool of respondents is that some of the sub-groups involved in the analysis were single digits (e.g. initial session administrative nurses, male nurses in all categories) so the results are not robust. Due to IRB requirements, pairing of responses was not possible; therefore, it is unknown how many of the respondents may have participated in both surveys. The project was conducted over the initial 3 months of the service which is a relatively short period and has historically been a period of limited utilization for the company. A longer project period may have offered an opportunity for a third survey which would have increased the size of the respondent pool and provided additional time for the intervention to take hold in the facilities.

Limitations associated with the UTAUT questionnaire revolve around the elimination of 2 items that were not relevant to the project. The eliminated items were from two different constructs. As the project period was three months and additional respondents were not available, time constraints and the lack of respondents precluded validation of the amended questionnaire.

Efforts to obtain information from the organization after the project was launched were less productive than they had been prior to and during the launch. This made understanding some of the findings less clear than had been anticipated.

Conclusion

Implications for clinical practice, education, and administration policy.

Clinical practice.

Nurses who provide direct-care to SNF patients have much responsibility as they care for as many as sixty patients and often have limited or no access to medical practitioners. Many SNF nurses find themselves with sick patients, limited assessment skills, and minimal clinical support. It is conditions such as these that can lead to unnecessary rehospitalizations of post-acute patients. Telemedicine offers readily accessible clinical support and an opportunity to initiate safe, onsite care. Among the project's three facilities, utilization of the service demonstrated 81 avoided hospitalizations in the eight-month period March 2016 through October 2016. Utilization varied for the three months of the project and was below the company's average for the some of the facilities in select months. Over time, without unusual or specially-chosen intervention, utilization increased and has been at or above averaged in two of the three facilities. When barriers to utilization are identified and addressed, the likelihood that nurses will avail themselves to the service would be expected to improve and onsite treatment of acutely ill patients can replace transfers to the hospital emergency department in many cases. Results from this project suggest that the variables Job Satisfaction, Formal Computer Education, and Age can influence one's intention to utilize the service. Future EBP projects could screen for these factors and consider interventions to address any of these factors that are present in a proposed launch location prior to initiation of the service.

Education.

Future training sessions for nurses embarking on using the service will be redesigned based on the results of this project. The training session content will be expanded. When

possible, informal questioning will be employed during the launch training session to determine the level of technological experience and training the nurses possess. Nurses will be reassured that effective use of the service does not require formal Computer Education and the degree to which the technology has been designed to be user-friendly will be highlighted. It's important for nurses to know that no technical expertise is required and that use of the unit is quickly learned as it is being used. Increased efforts will be made to focus on the fact that age does not provide an advantage to effective activation or utilization of the service and nurses of all ages will be asked to submit testimonials of successful experiences. It is hoped that sharing such user reports will encourage other novice users to be more comfortable with the service and using the telemedicine unit. Nurses will be reminded of the health risks for patients associated with avoidable hospitalizations and the time demands associated with admitting patients when they return to the SNF following the hospitalization. By presenting the user-friendly coverage service as a means to reduce both risk to patients and nurse time expenditure related to unnecessary hospitalizations it is hoped that nurse buy-in will be realized.

Validated job satisfaction screening tools may be used in future launches to determine the actual level of job satisfaction present at the initiation of the service and at a pre-determined follow up period. Data from this project revealed a decline in the level of job satisfaction based on a one-question screen which had not been previously tested. More robust information is needed.

The service itself provides educational opportunities for those involved. The physical examination segment of the service provides nurses with an opportunity to increase their physical assessment skills by experiencing one-on-one physical examination tutorials with physicians. As the nurses perform cardiac, respiratory, musculoskeletal, neurological,

gastrointestinal, dermatological, and vascular examinations, they have the option of asking questions and getting immediate feedback as they partner with the physician and evaluate the patient. Interacting with several different physicians offers exposure to different perspectives and possibly different evaluation techniques. This is one of the indirect advantages of utilization and an attractive element for some nurses. There is the possibility that increased knowledge could encourage nurses to pursue additional formal education, but this premise has not been evaluated. Exposure to multiple facilities and the nurses who work there provides opportunities for the physicians to increase their understanding of the skilled nursing industry and increase their awareness of the issues and concerns involved. Increased exposure and opportunities to work together can foster collaborative relationships between nurses and physicians.

Telemedicine research and evidence-based projects have been completed in multiple practice settings. The American Telemedicine Association is actively promoting multiple telemedicine models. As the modality increases in popularity, the increased exposure will be expected to result in improved technology and care, as well as additional research.

Administration policy.

The increased use of telemedicine in the SNF environment has the potential to significantly impact the healthcare system. One barrier to expansion of telemedicine is the current licensing laws that require physicians to be licensed in the states in which the patients reside. The movement to develop a national physician license is getting stronger and multi-state compacts can support the growth of telemedicine. As telemedicine models are tested and implemented, the positive effects to care access, healthcare outcomes, and healthcare costs are likely to support further growth and development.

Relevance to Nursing.

The after-hours telemedicine coverage service provides an opportunity for nurses to improve their assessment skills and provide acute care in a setting that previously had not accommodated this level of care. By widening the breadth of services that SNFs can provide, nurses may have opportunities to work in specialty areas such as orthopedics, cardiology, dermatology, or psychiatry while they continue to work in the SNF. Increasing knowledge, skills, areas of practice, and nurse confidence and expertise has the potential to improve job satisfaction levels and may positively impact the high turnover rate currently associated with this segment of the healthcare system.

Those cared for in the long-term and short-term units in nursing homes are some of the most vulnerable recipients of healthcare. Interventions such as this after-hours telemedicine service that rely on nurse involvement and nurse utilization appear to offer effective solutions for hospitalization avoidance. This is especially important as physicians and nurse practitioners are not routinely available in person at the bedside after hours. Addressing barriers to utilization is vital to successful implementation of the service which has the potential to positively impact patients, their families, nurses, physicians, facilities, hospitals, and payors.

Demographic and UTAUT Questionnaire

As part of the training for TripleCare, please complete this brief questionnaire to the best of your ability. Your answers to these questions will be reviewed only by Diane Croll of TripleCare to understand your intention to use the telemedicine service. Your answers will remain confidential and will not be shared with anyone associated with Altercare. I'm happy to answer any questions. Thank you!

Please fill in or circle the correct answer:

Sex: Female   Male   Other_____   **Age:** _____years

Nursing Degree: LPN   LVN   Associate degree RN   Diploma RN   BSN   Other _____

# of years as a nurse _____   # of years in this facility _____

Current job in this facility: _____ # of years in current job: _____

Have you had any formal computer education? Yes _____ No_____   If yes, please describe:

_____

_____

_____

_____

Please read the statements below and circle the number on the 0-6 scale that most closely matches your response	Not at All						Definitely
I am currently satisfied with my job.	0	1	2	3	4	5	6
I believe this system can improve patient care.	0	1	2	3	4	5	6
1. I will find the system useful in my job.							
2. Using the system will enable me to care for ill patients more quickly.	0	1	2	3	4	5	6
3. I hesitate to use the system for fear of making mistakes I cannot correct.	0	1	2	3	4	5	6
4. I intend to use the system in the next month.	0	1	2	3	4	5	6
5. If I use the system, I will increase my chances of getting a good performance review.	0	1	2	3	4	5	6
6. The administration of this business has been helpful in the use of the system.	0	1	2	3	4	5	6
7. My using the system will be clear and understandable.	0	1	2	3	4	5	6
8. Using the system is a good idea.	0	1	2	3	4	5	6
9. Working with the system will be fun.	0	1	2	3	4	5	6
10. It will be easy for me to become skillful at using the system.	0	1	2	3	4	5	6
11. I will like working with the system.	0	1	2	3	4	5	6
12. People who influence my behavior think that I should use the system.	0	1	2	3	4	5	6
13. I could complete a visit using the system if I could call someone for help if I got stuck.	0	1	2	3	4	5	6
14. In general, the organization has supported the use of the system.	0	1	2	3	4	5	6
15. I have the resources necessary to use the system.	0	1	2	3	4	5	6
16. The system makes work more interesting.	0	1	2	3	4	5	6
17. I have the knowledge necessary to use the system.	0	1	2	3	4	5	6
18. I will find the system easy to use.	0	1	2	3	4	5	6
19. A specific person (or group) is available for assistance with system difficulties.	0	1	2	3	4	5	6
20. I predict I would use the system in the next month.	0	1	2	3	4	5	6
21. I could complete a visit using the system if there was no one around to tell me what to do as I go.	0	1	2	3	4	5	6
22. Using the system will allow me to care for more patients.	0	1	2	3	4	5	6
23. I could complete a visit using the system if I had a lot of time to complete the job for which the system is provided.	0	1	2	3	4	5	6
24. People who are important to me think that I should use the system.	0	1	2	3	4	5	6
25. I could complete a visit using the system if I had just the built-in help facility for assistance.	0	1	2	3	4	5	6
26. I feel apprehensive about using the system.	0	1	2	3	4	5	6
27. The system is somewhat intimidating to me.	0	1	2	3	4	5	6
28. Learning to operate the system is easy for me.	0	1	2	3	4	5	6
29. I plan to use the system in the next month.	0	1	2	3	4	5	6

Please place this form in the manila envelope that has been provided. If you are the last person to turn your form in, please submit your form and then seal the envelope. Please give the sealed envelope to the facility staff person who assisted with the training session. Thank you! Diane

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