Assessing Technology Attitudes and Telehealth Readiness among New Jersey Perinatal Nurses

Elizabeth Talmont

Rutgers School of Nursing

DNP Project Chair: Tracy Vitale, DNP, RNC-OB, C-EFM, NE-BC

DNP Team Member: Rita M. Musanti, PhD, ANP-BC, AOCNP

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Abstract

Purpose: The project goal was to assess the readiness to implement telehealth services among New Jersey nurses who provide prenatal and postpartum care.

Methodology: Online survey of New Jersey perinatal nurses. Data collection included: demographic information, telehealth use, the impact of COVID-19 and administration of the Technology Attitude Survey (TAS), and Telehealth Readiness Assessment (TRA) tools.

Results: 52 perinatal nurses responded for a 25% response rate. Twenty-two answered all 90 questions. Partial answers were accepted. Synchronous "live" telehealth expanded 66% in the wake of COVID-19. 37% (n=15) used telehealth at work, and 27% (n=11) used it in getting care for themselves or a family member (M = 2.0, SD=0.86, one-tailed t-test, $p = 0.25$). In comparing nervousness in using technology with age, scores for the under 45-year-old age group (Mdn=3) and those over 45 years old (Mdn =2), showed no statistically significant difference (U($N_{under\ 45}$=15, N_{over45}=17) = 11. z=-0.02, $p < 0.83$). 46% (n=26) felt telehealth could be *extremely helpful* or *very helpful* in reducing health care disparities and improving quality. Overall, telehealth readiness was ranked "almost ready."

Implications for Practice: Telehealth optimization requires operational, staff, and patient satisfaction, and financial sustainability. Policies must support parity between in-person and virtual visits and video or telephone. Telehealth can improve quality, access, convenience, and equity. The nursing education curriculum should incorporate telehealth clinical hours, communication, leadership, and change management components. Economic considerations are crucial to telehealth sustainability.

Keywords: telehealth, perinatal care, technology attitude, telehealth readiness

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Nurses

The United States spends more money on health care than any other developed country, and yet our health outcomes are poor. Maternal health is a glaring example of this discrepancy (Bradley, Sipsma, & Taylor, 2017). Maternal mortality and morbidity rates are a standard hallmark of public health. Despite the financial and clinical resources and expertise, rates are rising, and New Jersey is, unfortunately, following that trend.

The United States' maternal morbidity and mortality rates are high, and health care disparities are widening (Somer, Sinkey, & Bryant, 2017). Creanga et al. (2015) report that rates have risen from 10 deaths per 100,000 in the early 1990s to 16 deaths per 100,000. From 2006-2010 non-Hispanic Black women have a 3.4 times higher risk of dying after birth than non-Hispanic white women. New Jersey ranks 35th in the nation for maternal mortality, and African American women have four to five times the risk of dying from pregnancy-related complications than white women (Amnesty International, 2010).

With the use of telehealth technology, we can improve perinatal health and address patients' need for education and cost-effective, patient-centered care, which helps them gain access to providers and specialists in a convenient, efficient, and equitable way (Schwamm, 2014). Telehealth investment is growing and is part of the solution. A 2017 survey reported that 71% of health care providers were using some form of telehealth (Beaton, 2017). Unfortunately, New Jersey has one of the lowest levels of telehealth use and ranks among the bottom five states in the country (FAIR Health, 2019).

With such a serious public health problem with rising maternal morbidity and mortality and telehealth holds such promise to improve patient outcomes, reduce risk and decrease costs, why is it not being used? Like the introduction of electronic medical records, telehealth touches all levels of a health care system. To implement telehealth requires a whole system approach, from payors, providers, policymakers, patients, and educators. The barriers and opportunities weigh heavily, and the knowledge to practice gap is significant (Westerlund, Nilsen, & Sundberg, 2019).

This project assessed New Jersey's perinatal nurses' use of telehealth, the impact of COVID-19, their attitudes towards technology, and how ready they were to use telehealth. This assessment provides valuable insight and direct recommendations on the perceived barriers and facilitators, and recommendations are made on how to improve telehealth integration. This understanding will bring us one step closer to closing the knowledge-to-practice. The ultimate goal of integrating any new technology is to improve the quality of health care and equity for women in New Jersey.

Background and Significance

The maternal health crisis, coupled with the rapid innovation and expansion of telehealth in the wake of COVID-19, is worth study. Telehealth use in this context is a hopeful mechanism to improve quality and reduce harm and racial discrepancies. Since 2010, the rates of maternal morbidity and mortality have been increasing in the United States, with over 60% of all deaths and serious outcomes preventable and most incidents occurring outside the hospital setting (Creanga et al., 2015; Creanga, Seed, & Callaghan, 2017). An estimated 700 women die after childbirth every year in the United States, and the rate of maternal morbidity rose from 15.6

per 100,000 live births in 2005 to 21-22 per 100,000 live births, with most deaths occurring in

non-Hispanic black women (Moaddab et al., 2018). Sadly, there has been little sign of

improvement. In fact, there is evidence suggesting in the wake of COVID-19, things have gotten

worse, where women do not have access to providers, signs of complications were missed, and

women and babies are dying (Bobrow, 2020). The most current year data is available, 2018, the

maternal mortality rate was 17.4 per 100,000 live births. While rates increased with age,

disparities remain wide with rates for non-Hispanic black women at 37.1, which is 2.5 to 3.1

times more than white women, which was 14.7 and Hispanic women, which were 11.8 (Hoyert

& Miniño, 2020).

While death after childbirth is rare, it is estimated that for every one death, 100 or more

women experience a severe adverse outcome (Geller et al., 2018). The top four causes of

maternal mortality between the years 2011 and 2013 were cardiovascular disease, non-

cardiovascular disease, infection/sepsis, and hemorrhage (Petersen et al., 2019). Creanga et al.

(2015) report that since 2013, the cause of maternal morbidity and mortality has shifted from

hemorrhage and hypertension to cardiovascular conditions attributed to advanced maternal age,

increased body mass index, and comorbidities. In addition to the clinical causes of morbidity

and mortality, pregnant women are more likely to die and twice as likely to experience trauma

than non-pregnant women (Deshpande, Kucirka, Smith, & Oxford, 2017).

The significance of the increase in maternal morbidity and mortality and inequities in

care cannot be overstated. It has a significant impact on society and erodes the social contract

health care providers have with people. When a woman dies or suffers as a result of pregnancy

or childbirth, it is a tragedy for the family, and as it is preventable, are human rights violations

(Miller & Belizán, 2015). Until very recently, maternal health care disparities were believed to be due to social determinants such as poverty, immigration, rural status, as well as clinical issues of hypertensive disease, diabetes, tobacco, and obesity. However, these factors did not significantly correlate to mortality (Ozimek & Kilpatrick, 2018). Instead, the differences in maternal mortality and morbidity are driven by social factors such as unintended pregnancy, unmarried status, and being African American (Moaddab et al., 2018). The authors found that 26% of the difference in statewide mortality was due to ethnic background and postulate that genetic factors might be involved. However, the role of implicit bias cannot be overlooked (Moaddab et al. 2018). These statistics and trends in maternal morbidity and mortality have apparent impacts on the physical and mental health of the women and families impacted.

On the national level policy and practice level, to focus attention on causes of complications, the Council for Patient Safety in Women's Health Care promotes several safety bundles. These bundles include the reduction of peripartum racial/ethnic disparities and severe hypertension in pregnancy (Council on Patient Safety in Women's Healthcare, 2019). Despite more and more hospitals adopting the safety bundles, the bundles are vague and mostly undefined (Morton, VanOtterloo, Seacrist, & Main, 2019). Moreover, safety bundles primarily involve care in hospitals and do not reach patients at home. Home is where many of the postpartum complications occur, which limits the safety bundles' scope and impact but provides a perfect avenue for telehealth that is convenient, accessible, and timely for the patient and the provider. Providing care when it is needed can avoid more costly interventions later, saving money and resources for individuals, insurance provider, and society overall (Rodriguez et al., 2020).

From a financial aspect, insurance coverage was expected to improve access to preventive services and improve outcomes. Since the Affordable Care Act (ACA) in 2010, 3 million women are reported to have an increase in private insurance and prenatal care, but only a modest reduction in adverse events such as premature birth. Further, there was no change in low birth weight babies or neonatal intensive care (NICU) admission or cesarean section rates (Daw & Sommers, 2018). The cost of insurance alone does not improve the quality of care. In 2018, 39% of all births in New Jersey were paid for by Medicaid (Kaiser Family Foundation, 2019). However, Medicaid only covers women for up to 60 days post-delivery. More than a third of all women die after discharge from the hospital (21.4% 7-42 days postpartum and 11.7%, 43-365 days postpartum), Medicaid coverage falls short, leaving women and their children vulnerable (Petersen et al., 2019). To address this gap in coverage, the New Jersey Assembly voted to extend Medicaid coverage for eligible women for one year after delivery (A-4934, 2019). The number of people covered by Medicaid and an amendment to expand coverage dovetails with the New Jersey telemedicine laws. Expanding Medicaid coverage through the first year postpartum would benefit new mothers. New Jersey has very favorable laws for using telehealth, and if Medicaid expansion can cover one year postpartum, we have a real opportunity to improve maternal health in New Jersey (Ciesla, Christian, & Baxi, 2019). There is political and public health momentum in New Jersey exemplified by the Assembly passage of A-4934 last year.

Regarding patient safety and equity in New Jersey, as stated earlier, over 60% of the mortality and morbidity associated with pregnancy is preventable, and due to the management or lack of chronic conditions like cardiomyopathy (Petersen et al., 2019). Therefore, an intervention aimed at prevention and screening for risk of social or health conditions is an

opportunity through remote patient monitoring, online screening tools, or mHealth telehealth

tools. In 2012, when the most recent data is available, the maternal mortality rate in New Jersey

is 32.8 deaths per 100,000 women (New Jersey Maternal Mortality Review Team, n.d.). New

Jersey has a maternal mortality review board (NJMMR) for decades. This board adheres to the

Center for Disease Control (CDC) recommended four-step practice of identification of maternal

deaths, standard data collection, multidisciplinary case review, and action steps (New Jersey

Maternal Mortality Review Team, n.d.). However, New Jersey's mortality rates are not only

higher than the national rate of 16.0 deaths per 100,000. Health care disparity rates are also

wider. African American women in New Jersey die at four to five times the rate of white women

(Goldenberg & McClure, 2011). The authors state the leading causes of the 225 deaths in New

Jersey from 2009-2013, were cardiac, pregnancy-related cardiomyopathy, embolism, septic

shock/sepsis, and cerebral hemorrhage with more than 60% of the deaths occurring 43 days or

more after delivery (Goldenberg and McClure, 2011). The New Jersey Maternal review board

recommended several interventions that apply to telehealth policy. Namely, screening for

postpartum depression and intimate partner violence, treatment for drug use, reproductive life

planning, and treatment for women with chronic disease (New Jersey Maternal Mortality Review

Team, n.d.). Many of these recommendations can be addressed with telehealth innovation aimed

at screening, detection, and management of health or social conditions that place women at risk.

        The health care and educational needs of women in the perinatal period are well suited to

telehealth innovation (DiVenere, 2017). Women make most of the health care decisions in their

families, spend more money on healthcare, and they have the have access to smartphones

(Bright, 2019; J.D. Power, 2019). The demand for telehealth is there.

The term telehealth is defined as the use of any electronic information or telecommunications technologies used in providing clinical health care, patient and provider health-related education, public health, and administration (Health Resources & Services Administration [HRSA], 2019). Telehealth uses technology in four main ways. One is synchronous videoconferencing, where providers can talk to each other or directly to patients. Second, is asynchronous or store and forward technology. As an example, x-rays would be uploaded and then reviewed by another provider at another time. Third, there is mHealth, which is understood as way to send educational messages, targeted texts, or notifications. Lastly, telehealth includes remote patient monitoring (RPM). Vital signs, such as blood pressure and weight, can be taken at home for a preeclampsia patient and remotely monitored by the care team. It is not only convenient but saves the patient and provider unnecessary cost, improved efficiency, and patient-centered care.

Telehealth's capacity to improve care delivery has been studied. By way of background, the following provides a general review of the literature to address what is known about the types of telehealth tools available and how they can be used to improve outcomes. The research on telehealth's capacity to screen and help triage patient risk is well-founded. A 2019 Cochrane review of client perception and experiences in using telehealth tools on mobile devices focused on the population of interest in this paper, outlined some of the advantages and potential disadvantages to telehealth (Ames et al., 2019). This review found that while some program findings were mixed, many people liked receiving telehealth messages and sent them to friends and family. They also reported the telehealth programs provided support and connectedness and were useful in addressing stigmatized services. Stigmatized services such as HIV, depression, or

required a high level of confidentiality and need for using neutral language and tailoring the

timing, frequency, and content of messages to when the person desires were vital (Ames et al.,

2019).

Further, consideration must be paid to access to free telehealth services and phone data

usage, and the reality that some patients do not have control over their phone—thereby limiting

privacy to assess the patients' experience with the telehealth program (Ames et al., 2019). Data

on the use of telehealth in the perinatal period is established, and a variety of products are

available. Text4baby is a product that has been tested primarily in military women to combat a

variety of issues, flu vaccine, to healthy pregnancy promotion and other prevention and

screening needs (Bahanshal, Coughlin, & Liu, 2017; Evans et al., 2015; Green et al., 2013).

These studies speak to the social aspect of providing patient-centered care and the environmental

conditions of perinatal patients.

One of the Institute of Medicines' six aims for quality improvement is patient-

centeredness (Wolfe, 2001). Telehealth can be used to meet patients where they are (in their

homes). Health care consumers accept telehealth as a supplement to their care when they find it

useful and tailored to their needs (Petersen et al., 2019). Increasingly health care systems are

showing they can redesign care and improve patient satisfaction and quality of care through

telehealth that provides in-home blood pressure and weight monitoring, educational products,

and improvement in patient and provider engagement (Demosthenes, 2019). Phone and web-

based applications (Apps) can serve to improve patient-centered care by improving access to

care, education, and patient satisfaction (Goldenberg & McClure, 2011).

The benefits of providing telehealth to women during the perinatal period are multifaceted. Mobile health apps from a trusted provider can educate and screen women with material tailored to their situation. Remote monitoring can improve the management of chronic or emergent conditions (ex. Measuring blood pressure and weight for preeclampsia). Remote monitoring and education can both help reduce costs, enhance convenience and efficiency. Telehealth can also improve access to care by creating systems to get in touch with providers through multiple modalities (real-time video chat, text, email, or call 24/7) or by accessing specialists, thereby improving care and outcomes. Telehealth holds the promise of providing perinatal women and their care providers with more tools to improve quality and reduce health care disparities.

There is a demand for telehealth from people who are pregnant. Telehealth in all its modelites from live video to the use of mobile health apps, overlap with the needs of the perinatal patients.. What is not known and the literature review revealed is how to assess telehealth readiness so we can close the knowledge to practice gap. With the promise and diversity of telehealth tools available and a need to improve maternal health outcomes and reduce disparities, why is telehealth not being used? Why is New Jersey lagging so far behind? Does the significant challenge of integrating telehealth daunt practices? What is holding back health care leaders, administrators, advanced practice nurses, nurse managers, and floor nurses? If telehealth is here to stay, we need to know where we are, so we can use the best implementation science to reduce risks and harms and improve quality care, maternal health, and return on investment.

Lastly, given perinatal nurses an integral role in any service delivery change, they are sensitive barometers and are key stakeholders in assessing implementation and improvement efforts

Needs Assessment

Maternal health and the prevention of maternal morbidity and mortality is a standard public health measure by which countries, states, and local institutions are judged. Complications from pregnancy and childbirth are a leading cause of death in developing countries (World Health Organization [WHO], 2019). While maternal mortality is not a leading cause of death for women in New Jersey, the rate of maternal morbidity is higher than one would expect. New Jersey rates are perplexing for a well-resourced, densely populated state with access to health care. Further, the use of telehealth is low. According to medical billing data, New Jersey has one of the lowest rates of billing for telehealth in the country (FAIR Health, 2019).

In doing an environmental scan of maternal health and telehealth in New Jersey, a SWOT (strengths, weaknesses, opportunities, and threats) analysis was conducted. The strength and opportunity of this project is the fact that maternal health has the focus of New Jersey's first lady, Tammy Murphy, who has made maternal health her focus and the Governor has (Catalini, 2019). Maternal health has the attention and focus of policymakers. This energy is coupled with New Jersey state licensing boards beginning to implement regulations, after nearly two years of the state's passing a Telemedicine Law (Ciesla et al., 2019). A strength of this non-traditional project is the appeal to an urgent maternal health crisis and the entre of a new service delivery model. The technology industry is rising to the challenge with a growing list of telehealth products (such as Text4baby) to address patient, and provider needs adding to the strength of this

work (Bushar, Fishman, Garfinkel, & Pirretti, 2018; Van Den Heuvel et al., 2018). In the future, educators and future doctor of nursing practice (DNP) students, will focus future projects on telehealth policy, practice, quality improvement, and economics impact perinatal telehealth use.

Weaknesses of the project are the fact telehealth is so new in New Jersey, and those that implemented telehealth in the wake of COVID-19 may skew the results and flavor perceptions (negatively or positively) about telehealth. Telehealth, in particular, is considered a systems disrupter, as it demands cross-functional, multidisciplinary teams to implement and a new way of viewing a financial return on investment, quality, and patient-centered care (Schwamm, 2014).

This project encourages nurse leadership and, in particular, DNP nurses to implement or optimize telehealth as a new health care delivery innovation. Nurses are well-positioned to lead telehealth initiatives when there are dual public health goals; to reduce the impact of the pandemic and improve perinatal health and equity (Fronczek & Cowen, 2019). Nurses can use telehealth to educate, prevent, screen, and triage care and fits the needs of women in pregnancy and the postpartum period. Telehealth can improve outcomes by reducing costs, increasing patient-centeredness, as well as efficiency and equity. On the state level, telehealth readiness could be a motivator and compeditive edge for health care providers as well as and insurance companies. IBy providing perinatal telehealth options they can improve access to care and patient satisfaction.

Lastly, threats to this work are many. One is that the survey only surveys nurse's perceptions of telehealth readiness. Policymakers may roll back some of the progressive and favorable policies, especially concerning parity between in-person and virtual visits after the pandemic wanes. Telehealth will then be reduced to a temporary band-aide to reduce viral

transmission and not be implemented to its full potential.   These threats may make it challenging for policymakers or providers alike to ensure sustainability.

Problem Statement

The clinical questions guiding this project are, why do health care providers in New Jersey not use telehealth? How has COVID-19 impacted their practice, and what is their level of readiness by nurses in the state? This survey provides a baseline assessment of telehealth readiness among New Jersey perinatal nurses.

Aims and Objectives

This project aimed to establish a baseline of perinatal nurses' attitudes towards technology and their readiness to implement telehealth. This assessment helps inform health care policymakers, practice managers, implementation leaders' as well as educators, quality proponents, community leaders, nurses, and patients direct their energies and establish priorities in adopting telehealth in the perinatal setting. The first objective was to design a 15-20-minute online survey on telehealth readiness among nurses who work in the perinatal setting. The second objective is to analyze the survey results concerning demographics, experience with telehealth, the impact of COVID-19, technology attitudes, and telehealth readiness factors. The third objective was to develop recommendations for stakeholders about New Jersey readiness factors to help promote and implement sustainable programs across the state. See the Logic Model in Appendix A.

Review of Literature

Search Strategy

Two search strategies were employed to identify literature about telehealth implementation and readiness. The first search focused on telehealth implementation science. A search of the CINAHL and PubMed databases used the search terms *telehealth* or *telemedicine* and *implementation strategies*. Studies were limited to those in English and published in academic or peer-reviewed journals from 2014-2019. The databases yielded 102 articles after duplicates were removed, with 40 titles screened and reviewed and 62 eliminated. A total of 18 articles were read and included in the table of evidence.

A second search to find readiness assessment tools was conducted through CINAHL and PubMed using the search terms *readiness, assessment, telehealth*, or *telemedicine*. Articles were limited to human subjects and papers in the last five years. A total of 68 articles were found, and 67 had full text available. Four additional readiness assessment tools were culled from a Google search given the paucity of actual readiness tools used in the literature. Of the 71 articles, 46 were excluded, and 25 were abstracts screened. Twenty-one were further eliminated, leaving four studies that directly dealt with telehealth readiness in a health care setting. This search is illustrated in diagram form in Appendix B.

The literature was reviewed and assessed with the Johns Hopkins Nursing Evidence-Based Practice Appraisal Tool for Research and Non-Research are found in Appendix C (Dang & Dearholt, 2018). Eleven of the references were Level 3 and qualitative, descriptive studies based on the survey, focus group, and interview techniques as the literature search strategy reflects the maturation of the telehealth implementation field. Half of the studies had Level III

evidence of good quality. In equal measure, there were systematic reviews as well as non-research articles. This review did not assess the evidence of the safety, efficacy, or impact of specific telehealth tools or the use of telehealth in perinatal care as this is beyond the scope of this project.

The focus of this project is to identify the barriers and enhancers to telehealth implementation in the perinatal setting from all levels of the health care system – from the patient, provider, industry, systems, and theoretical levels of care. This understanding, coupled with the elements of readiness to implement telehealth, perhaps can help avoid flawed or failed telehealth efforts when improvement could mean so much to improve the health of women in the perinatal period. Several themes emerged from the literature review.

Knowledge to Practice and Readiness Assessment Gap

Westerlund et al. (2019) caution that despite a multitude of research in implementation science, the knowledge-to-practice gap in healthcare is substantial, with low rates of adoption and limited integration of evidence-based practice. Health care providers are not taught implementation science in their curriculum, and rarely continuing education training and a focus on practical issues on how to use this evidence is needed to make systematic change. How this lack of training plays out is evident in the themes the literature revealed.

Unfortunately, one of the themes of this review is that there are no studies that test the reliability and validity of readiness tools. Yusif, Hafeez-Bain, and Soar (2017) state that the weakness of the literature is that it is variable and fragmented, and health information technology needs valid readiness assessments to prevent costly failures and increase systems benefits. The strength of the studies is the details and complexity of most quantitative data. While nuanced, it

does provide fertile ground and perhaps a dizzying array of things to think about before

implementing telehealth, which is more reason we need accurate and reliable readiness

assessments. There is a tremendous need for reliable and valid tools to assess readiness, so pilots

can be brought to scale (Lennon et al., 2017; Rho, Choi, & Lee, 2014).

Patient Acceptance

Patient-centered care is a critical lens to view telehealth services. In looking at various

primary, secondary, and tertiary care studies, patients are open to telehealth. In many ways, they

found it to be an improvement, not just for convenience factors but for the reduction of the

stigma of mental health disorders. In primary care screening, Kingston et al. (2017) also found

that mental health screening was feasible and acceptable to pregnant women. The women in the

study reported that they felt the telehealth screening tool was more private and confidential and

preferred it over in-person screening. Concerning treatment, Denison, Hor, Lee, & Reynolds,

(2016), found through a systematic review that women receiving web-based therapy for

postpartum depression improved their Edinburgh Postnatal Depression Scale (EPDS) scores and

were increasingly using telehealth for care. In cases where remote monitoring of blood pressure

and weight was done to manage hypertension in postpartum patients, monitoring was well

accepted by patients. There was a statistically significant difference between the remote monitor

users and non-users who followed up for care (Rhoads et al., 2017). Patients are interested and

willing to accept telehealth in a variety of ways. What remains unknown is how to make the

systems responsive to their needs as co-creators of telehealth services.

Educational Improvement

One of the themes was how telehealth in the perinatal setting could be used to educate patients and health care providers. Educational text messaging to and from patients and providers was useful in providing educational content relevant to the patients' needs as well to improve engagement with the provider. Harari et al. (2018) sent text messages to and from women about breastfeeding, where 83% of the women stated they always or often read the messages. Moreover, there was a statistically significant relationship between women who received texts and those that met their breastfeeding goals, including breastfeeding exclusively at two weeks postpartum. In a similar vein, Bush, Barlow, Echols, Wilkerson, and Bellevin (2017) found that rural women with Medicaid have active user engagement, as evidenced by the number of times the app was downloaded. They found a statistically significant relationship between app usage and completed prenatal visit (p=0.022), as well as a marginal decrease in low birth weight infants (p=0.055) and maternal age, was not a cofounder. The more telehealth app use, the more patients found it useful, which improved outcomes. This finding leads to another aspect of education for the provider. Related to educational programming for nurses, in a recent study, APN nurses reported that telehealth enhanced care performance, make tasks more manageable, and reduced errors (Hah & Goldin, 2019). Further, Stacey, Carley, Ballantyne, Skrutkowski, and Whynot (2014) found that telehealth promoted consistency and standardization in educating nurses on the protocols, which was a value to both patients and providers.

Nursing Leadership

Telehealth is a significant system disrupter, not unlike the implementation of an electronic health record and demands the input and dedication by the whole health care team (Schwamm, 2014). Given that nurses interact with most, if not all, parts of a health care system, they are in an ideal spot to lead telehealth integration efforts. In particular, nurses respect the need for protocols and feel it enhances the quality of care, and team consistency (Stacey et al., 2014; Varsi, Ekstedt, Gammon, Borosund, & Ruland, 2015). Since nurses are the largest group of front line health care providers, they represent the diversity of people perinatal telehealth aims to reach; this is an opportunity for nurses to lead as advocates for telehealth integration and promote equity (Richardson, Goldberg, Aston, & Campbell-Yeo, 2018; Schwamm, 2014).

Equity

As discussed above, Black women in New Jersey have a 4-5 times greater chance of dying during or after childbirth than white women. Therefore, equity and how to improve equity is of paramount importance (Amnesty International, 2010). When introducing behavior based telehealth tools, an equity lens must be applied using the six recommendations to improve health equity. Any integrated intervention platform needs to appreciate user characteristics such as cultural beliefs, preferences, functional uses of technology, health literacy as well as consideration of the environmental context (Bakken et al., 2019; Richardson et al., 2018). Ensuring equity for the vulnerable and disabled community is critical. The emphasis on the patient and the context in which they live and work is paramount. It is the basics, such as knowing if and how a brain-injured person can physically hold or work with a smartphone or app

(Kettlewell, Phillips, Radford, & dasNair, 2018). Knowing what adaptations are necessary if these tools can promote equity and inclusion.

What is known is that patients generally accept telehealth if it is built with and by diverse groups of staff and members of the target population. Without an equity and inclusion rubric by which to measure success, inequities will be perpetuated. The literature review found 11 studies on perinatal eHealth tools, where most were not inclusive of diverse populations or genders and reinforced heteronormative parenting (Richardson et al., 2018).

Telehealth Integration Barriers and Facilitators

As stated above, the knowledge to practice gap is wide, and telehealth integration can suffer, wither, and be costly both financially and to the workforce without understanding key barriers and facilitators. Ford et al. (2015) found that in scaling up a mobile intervention for people with alcohol use disorders over 14 agencies in Wisconsin that strong leadership, clear guidelines, passionately committed staff, and rapid response to client needs were necessary. On the flip side, they also found that sustainability meant they had to have a long-range business plan, work out issues with reimbursement, communications systems, and ongoing staff and patient technical skill support was needed. These same barriers and facilitators were repeated in other studies. Bardosh, Murray, Khaemba, Smillie, and Lester (2017) found their use of the WelTel telehealth mobile app improved patient-provider connection and improved staff accountability and productivity, which were enablers to integration. Normalization of the process and training staff to competence on the systems was critical to staff, and demand for telehealth to be useful as a critical driver (Bardosh et al., 2017; Ford et al., 2015; MacFarlane et al., 2011). Another critical driver for patient and provider acceptance of telehealth involving

end-users in the design and roll-out, as well as taking in the social environment in which people

work and live (Harst, Lantzsch, & Scheibe, 2019; Ossebaard & Van Gemert-Pijnen, 2016;

Richardson et al., 2018). Therefore, it is especially important when a patient may have physical

or cognitive limitations, as in the case of a brain injury or simply does not have a phone or

control over a phone (Bush et al., 2017; Kettlewell et al., 2018).

Strategies that supported the use of strong leadership and feedback from end-users,

including patients, providers, and front-line support staff, and a team that could see the benefits

to their patients was critical (Bakken et al., 2019; Ford et al., 2015; Varsi et al., 2015;

Westerlund et al., 2019). Telehealth simply had to be useful to the providers, and they needed to

see direct benefits to patients. On the other hand, reimbursement concerns, lack of technical

support for both staff and patients. Regulatory, financial reimbursement, and sustainability

concerns were significant barriers to telehealth integration and sustainability (Lennon et al.,

2017; Rho et al., 2014; Schwamm, 2014).

In summary, many of the findings of the literature review had overlapping themes. There

is evidence that telehealth works at promoting quality care and equity, but there is a gap in

translating telehealth into a sustainable practice. What was learned from this review is that there

is a deficit of validated or reliable telehealth readiness assessment tools to help guide us. We

learned about what steps health care providers can take to avoid painful, costly mistakes and

prioritize having enough facilitators to make integration successful. Perinatal patients want and

need telehealth and find it acceptable, even when it involves stigmatized services such as mood

disorders or depression. The review also demonstrated that there are clear educational

opportunities for both patients and providers. Nurses are well-positioned to lead perinatal teams

to integrate telehealth if the whole system can mobilize for its success.

Theoretical Framework

The framework chosen for this project is the Plan-Do-Study-Act (PDSA) model. It was

selected because it is a simple framework that lends itself to a non-traditional DNP project where

one of the outcomes is to make recommendations for the next steps. PDSA was designed to use

rapid change and improvement by doing small studies (Roehrs, 2018). By using the PDSA

model in this project, provides a model for future telehealth implementation projects. In

integrating perinatal telehealth services to Veterans Health Administration (VA) (Cordasco et al.,

2018), completed three PDSA cycles, over three years, to go from pilot to scale and

sustainability. They piloted before they brought it to scale, and the VA care model is now

standard in that setting and has improved patient outcomes. It is critical to key pilot telehealth

well, involve all stakeholders, including patients, before telehealth can be brought to scale.

The PDSA cycle envisioned for this project includes the planning, which is designing and

operationalizing a survey to assess readiness and gain an understanding of the barriers and

facilitators that nurses anticipate in implementing telehealth. This step involves the mechanics of

sending the survey and issuing a reminder email to maximize enrollment. The study stage

included analyzing and synthesizing the results using various statistical tests to shed insight and

recommendations for future work. The act step involves disseminating the findings and creating

strategic partnerships with interested parties, either those individuals or administrators beginning

to think about telehealth or those that have started and are struggling with implementation. A

visual representation of the theoretical framework and steps can be found in Appendix D.

Methodology

Setting

The survey was available via Survey Monkey, an online survey platform from June 25 to July 9, 2020. An email invitation was emailed to members of the New Jersey State Nursing Association (NJSNA). Email recipients were encouraged to forward the survey to other interested nurses who live in New Jersey and work in perinatal health. Social media announcements were shared on the DNP student's Facebook, LinkedIn, and Instagram accounts.

Study Population

The study population consists of members of the New Jersey State Nursing Association (NJSNA) and who identify themselves as perinatal nurses who work or live in New Jersey. Inclusion criteria are New Jersey nurses who work or live in the state and work in the perinatal setting (meaning prenatal, postpartum care in either the inpatient or outpatient setting), who have a current email. The exclusion criteria were nurses who are retired and no longer have an active nurse's license. There are currently 140,000 nurses in New Jersey, of which 6,000 are members of NJSNA. The NJSNA was unable to identify those nurses who work in perinatal settings. However, there are approximately 550 New Jersey Nurses who are members of the Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN). A list of AWHONN members was not available but served as a proxy for the number of perinatal nurses, who would answer this survey. There is likely a high degree of overlap between NJSNA and AWHONN membership. Therefore, it was anticipated that there were a total of 550 potential subjects. To calculate the sample size, Raosoft, Inc. (2004) sample size calculating software was used. With

a sample of 550, a 5% margin of error, and a 95% confidence level, an attrition rate of 70%,

yielded a sample size of 207. A 30% response rate was considered reasonable by those familiar

with the membership lists and had experience with other similar projects. This is supported by

(Aerny-Perreten, Domínguez-Berjón, Esteban-Vasallo, & García-Riolobos, 2015), who found

primary care clinicians need reminders and obtained improvement in response rate. However, it

did not go over 40%.

Subject Recruitment

The subjects were recruited from the email listserv of NJSNA. Providing access to the

membership is a benefit of membership in the NJSNA, of which the DNP student is a member.

The email invite and reminder email sent one week after the original email was sent out by

NJSNA. The survey was open for two weeks. Due to COVID-19, on-campus posters were not

used, opting instead for a social media message (see Appendix E). Participants were asked to

forward the invite and share the link to other possible participants utilizing the snowballing

technique. Eligible and interested participants clicked a link on the invitation to the survey

consent and questions on SurveyMonkey. See Appendix F for the email invitation; Appendix G

for a one-week email reminder; and Appendix H for consent and survey questions.

Risks/Harms

There were no anticipated harms from taking part in this online survey. No private health

information is collected. As with any online survey, there is a risk that there will be a breach of

confidentiality. There was also a risk that the subject may be uncomfortable answering some of

the questions. Subjects were instructed that they could skip questions or stop the survey at any

time and request their data not be recorded. Participants who gave their name, address, and email were automatically entered for a drawing for one of two $50.00 gift cards. Twenty-one people gave their contact information and were randomized in Excel software. Letters and gift cards were mailed to the two participants on August 6, 2020. Documentation of the gift card winners is kept separately from the survey data. All other subject names and contact information was removed from the data set and discarded.

Subject Costs and Compensation

There were no costs or monetary compensation to subjects. Subjects that provided their name, address, and email, were automatically entered into a drawing to win one of two ($50.00) gift cards to establishments of their choosing.

Study Interventions

The study interventions include survey dissemination, collection, data analysis, and recommendations. The Rutgers Institutional Review Board (IRB) approved the study protocol on June 24, 2020. Email invitations were sent, and the survey opened on June 25 and closed on July 9, 2020. After reading the invitation, interested participants clicked to link to the SurveyMonkey online tool, where consent was obtained, and survey questions were answered. The Rutgers IRB granted a waiver of written consent. Participants who gave their name, mailing address, and email and complete the survey will be entered into a drawing for one of two $50.00 gift cards to either Dunkin Donuts, iTunes, or Amazon. They indicate the gift card they preferred. The names of those who entered their contact information were randomly selected by exporting SurveyMonkey data into Excel format, randomized, and the first two names were the gift card

winners. Gift cards were mailed to participants on August 6, 2020. The gift card compensation log will be kept separate from the study results. All other names and contact information was removed and deleted from the final data set.

The survey consisted of 90 questions that covered demographics, impact of COVID-19, use of telehealth, technology attitude survey, and telehealth readiness assessment. Survey questions included free text, drop-down, and multiple-choice answers. The study collected both quantitative and minimal qualitative data through open text fields.

The demographic data were collected using multiple choice answers and free text to capture name, address, and email address. Age with preselected ranges, nursing organization membership(s), years in practice, practice setting, County in which they work and live as well as employment role was collected. This background provided enough data to draw a general profile of the survey population. The second section asks about their experience with telehealth. These are multiple-choice questions with open text fields. Questions are focused on current work-related exposure to telehealth technology as well as non-work use of telehealth technology. Answers to these questions will provide valuable insight and confirmation of the literature that indicates that readiness to use technology in the workplace or as a patient is "dose-dependent." Meaning, if telehealth is used at home or at work, one will be more likely to believe in its benefits and will be more likely to ready to use it.

Questions will be multiple-choice, open text fields, or 5-point Likert scales. Measures of agreement ranged from 1=strongly agree, 2=agree, 3=undecided, 4=disagree, 5=strongly disagree. Measures of frequency range from 1=always, 2=often, 3=sometimes, 4=rarely, 5=never. And measures of importance range from 1=very important, 2=important, 3=moderately

important, 4=slightly important, 5=unimportant. Likelihood measures range from 1=definitely,

2=probability, 3=possibly, 4=probably not or 5=definitely not.

The third section consists of a sample of questions from the Technology Attitude Survey

(TAS). The TAS was developed by McFarland, Hoffman & Green (1997) for use in surveying

teachers and students in their use of technology in the classroom. TAS questions are on a 6 point

scale ranging from 1=strongly disagree, 2=disagree, 3=neutral, 4=agree to 6=strongly agree.

After an initial pilot of the TAS, a full study was done to attain reliability and validity. 86

subjects were enrolled, and validity was provided by significant correlations between pre and

posttest TAS scored and the pre and posttest computer competency scale on the Teach

Effectiveness Scales. A single dimension accounted for 43% of the variance, and the reliability

was reported as .92. On the posttest, a single factor accounted for 32% of the variance, and the

reliability was reported as .85. More recently, the survey was revised by Maag (2006) to 15

questions that targeted students, removing five questions to teachers and used by Mcinerney &

Druva (2019). For this study, references to students were removed, and ten questions remain.

See Appendix F to review the consent and survey questions. Permission to use the TAS as a

modified tool was obtained from one of the original authors.

The last section administered the Telehealth Readiness Assessment (TRA). The TRA tool

was developed in 2019 by the Maryland Health Care Commission. Approval was obtained to use

the questionnaire on December 19, 2019. To date, no reliable or validated tool to assess

telehealth readiness exists. TRA is one tool that was designed based on research, and answers are

weighted and ranked according to low, moderate, or high readiness (Maryland Health Care

Commission, 2019). The TRA is designed for health care teams preparing for telehealth. While

reliability and validity statistics were not provided, a literature and environmental scan of over 150 references, including guidelines, best practices, and other information, was reviewed.

Further, the tool was field-tested using by key stakeholders' groups, including 20 small physician practices in Maryland with and without experience in implementing telehealth (Maryland Health Care Commission, 2019). The stakeholders' input ensured that the tool was appropriate, helpful, and understandable. Telehealth is relatively new to New Jersey, so it was anticipated that many of the questions might not apply to the nurses. Therefore, participants were allowed to skip questions or answer, *not applicable (N/A)*.

After the survey closed, analysis began. Recommendations for next steps will be reviewed and categorized. Recommendations will be categorized to include clinical practice, policy, quality and safety, nursing education, and economic or fiscal considerations.

Outcomes to be Measured

The survey outcomes were measured in a variety of ways. Descriptive statistics will help characterize demographic and telehealth use, technology attitudes will be measured and described, as well. The Telehealth Readiness Assessment tool answers were collected and were entered into the online scoring tool (Maryland Health Care Commission, 2019). The outcome of the survey analysis helped develop recommendations for key stakeholders for consideration in practice, policy, education, and industry.

Project Timeline

The project timeline is found in Appendix I. the COVID-19 pandemic greatly impacted the original timeline. April and May were consumed with the pandemic. Further, given telehealth

taking off as a result of the stay at home orders, it was essential to wait a period before issuing

the survey to give nurses time to experience telehealth, which provided more context. Study

analysis took place in July and August. The final paper was turned in on August 17, 2020, with

the final presentation scheduled for August 26, 2020.

Resources Needed

The budget for implementing the online Survey Monkey survey included the costs of

necessary supplies, membership with SurveyMonkey, and gift cards, and final poster

presentation. The total budget was $219.50. The co-investigator and DNP student was

responsible for covering the costs of the project. The project budget is in Appendix J.

<div align="center">

Evaluation Plan

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The evaluation plan was an analysis of each section of the survey. The report leads to

recommendations and evaluating the impact on practice, policy, education, safety and quality,

and economic considerations. The study provides a broad base of stakeholders who can leverage

these findings to help promote better integration of telehealth in the perinatal setting.

<div align="center">

Data Analysis, Maintenance & Security

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Descriptive statistics and frequency analyses were completed on categorical variables.

For continuous variables, measures of central tendency (mean, median, mode) were performed.

SurveyMonkey calculated these basic statistics. Excel was used to perform a Mann-Whitney test

on non-parametric measures of groups by age and a one-tail t-test.

Qualitative data from any open text responses were organized and used to flavor the discussion and illustrate points in the study findings.

Technology use and readiness questions on the Likert scale and analyzed for frequency analysis. Aggregate data was entered into the TRA tool, which calculated the weighted averages of each component. The answer with the most responses was used to populate the answers. In the event of a tie, the answer with the lower ranking (least ready) indicator used (Maryland Health Care Commission, 2019).   The findings directed the recommendations and impact on practice, policy, education, quality and safety, and economic considerations.

Maintenance of the study materials, survey data, and gift card records are stored on the DNP student's password-protected computer. The Survey Monkey survey link was disabled after the study closed. The SurveyMonkey survey is accessible through the password-protected DNP student's account.

Upon completion of the project, IRB closeout procedures and DNP requirements followed. The copy of the aggregate data stored at Rutgers University School of Nursing; 11th Floor – Office 1126; 65 Bergen Street, Newark, New Jersey 07107, and a copy of the final project will be housed at the Rutgers School of Nursing for their archives. All data will be destroyed per Rutgers University policies and guidelines.

Results

Demographics

Fifty-two (52) surveys were returned during the enrollment period, June 27th to July 9th, 2020, for a response rate of 25%. The target sample size was 207. Of these 52 surveys, 42%

(n=22) completed all 90 survey questions. Participants were instructed that they could skip answers. Partial surveys were accepted and included in the analysis. The subject completion rate decreased with the number of questions. Subjects spent, on average, 12 minutes answering the survey. Those that completed all answers averaged 18 minutes.

The majority of the perinatal nurses who answered the survey in whole or in part identified as registered nurses (71%, n=32), with master's degrees (56%, n=25), who were middle-aged (M=45-54, SD 1.36, Pearson's Coefficient .97) See Appendix K for details. The majority of nurses worked full time (87%, n=39) in a hospital setting (62%, n=28). 62% (n=27) and reported working with less than 50 people. Of the participants in clinical or leadership roles, 28% (n=13) were Advance Practice Nurses (APNs) or Certified Nurse-Midwives (CNMs), 20% (n=9) were Managers/Supervisors, 13% (n=6) were in Academia and 7% (n=3) indicated other roles as Educators, 4% (n=2) in Research and 2% (n=1) were in Administration. Demographic findings and workplace characteristics are found in Appendix L and Appendix M.

COVID-19 Impact and Equity Questions

Seven questions addressed the impact of COVID-19 on telehealth use as well as the nurse's perceptions of telehealth, improving quality and equity. Of the four telehealth modalities, videoconferencing was the most widely used in the workplace. 66% (n=23) stated that they started or expanded "live" video/telephone, synchronous telehealth visits since the COVID-19 pandemic. Of those that had used video, 37% (n=15) used it at work, and 27% (n=11) used it in getting care for themselves or a family member (M = 2.0, SD=0.86, one-tailed t-test, $p = 0.25$). There was no significance between those that used the video at work or home seeking care for

themselves or family members. Appendix N illustrates the use of video at work and home by age. Additionally, 20% (n=7) reported the use of store and forward (asynchronous) visits, and 11% (n=4) reported using remote digital monitoring (RDM) and 11% (n=4) Mobile health apps. 31% (n=11) indicated that they did had not started using telehealth.

How telehealth impacted the workplace varied. 34% (n=12) responded that telehealth had a *great deal* or *a lot of* impact on their practice, and 37% (n=13) felt it had a *moderate* or *a little* impact. Ten participants or 29% reported that it had *no impact*, and 17 people skipped this question. 46% of participants estimated the percentage of telehealth visits the were conducting was between 10-50% of all visits. See Appendix O.

Regarding quality and equity, 43% (n=15) were *very* or *extremely confident* that telehealth improved care. 94% (n=33) felt there were positives to using telehealth. Themes from the open text response were patient convenience and access to care, reducing risk to COVID-19, improvement in communication, and management of things that do not require an in-person visit. 60% (n=20) did see negatives to telehealth. Themes from the open text field included concern about misdiagnosis, inability to make a full assessment, and medical-legal risk as well as lack of education without telehealth, and relationship building. As one participant stated, *"Telehealth in pregnancy can be tricky. We have to trust the patient to tell us exactly what is going on and trust in their BP cuffs at home. Things can easily be missed in pregnancy with telehealth visits."* When asked if they thought telehealth could help reduce disparities and improve health equity, the majority felt it was *somewhat helpful* (43%, n=15) or *extremely helpful* (14%, n=5) or *very helpful* (31%, n=11). See Appendix P. Open text themes revealed a theme of concern over poor

or less fortunate not having access to smartphones or computers. As one participant wrote,

"*people who are poor may not have access to iPhone or other type of mobile device or computer*" another person said, "*if the less fortunate do not have accessibility to a smartphone or other [phone]. Telehealth would not make a difference for them.*"

Technology Attitudes Survey (TAS)

Technology attitudes were positive. The majority of participants felt knowing how to use technology was a necessary skill (77%, n=23). Questions were answered on a Likert scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). 63% (n=20) responded that they *strongly agree*, and 34% (n=11) *agree* that they like using technology and *strongly agreed* (61%, n=19) or *agreed* (35%, n=11) that they felt confident in using technology. Further, 63% (n=20) *strongly disagreed* or *disagreed* that technology made them feel nervous, and 77% (n=24) *strongly disagreed* or *disagreed* that technology makes them feel stupid.

The question working with technology makes me feel nervous was answered with a Likert scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). When compared by age, those aged 18-34 responded in one of two ways, *strongly disagreed* or *disagreed*. Those over 35 included answers, *neither agree nor disagree, agree,* or *strongly agree*. See Appendix Q. In comparing the question by two age those under and over 45 years old, no statistical significance was found. The scores for those under the 45-year-old age group (*Mdn*=3) and those over 45 years old (*Mdn* =2). A Mann-Whitney test indicated that there was no statistical significance between the age groups (U($N_{under\,45}$=15, N_{over45}=17) = 11. z=-0.02, p < 0.83). See Table 3 in Appendix R.

Telehealth Readiness Assessment (TRA)

The TRA is comprised of 54 questions, and scoring is based on weighted averages of concept scores within each of the five domains. The five domains are core readiness, financial considerations, operations, staff engagement, and patient readiness. Weights are based on the relative importance of telehealth readiness. Scores range from low (*area of improvement*), moderate (*almost ready*) to high (*ready*). Low is $\leq 50\%$ and indicates an area of improvement. A low score means the practice is at the beginning stages and has not considered many of the aspects in the domain or concept. A moderate score is $>50\%$ to $\leq 75\%$ and is almost ready. Some domain or concept elements have been considered, and work needs work. Lastly, a score of $> 75\%$ or high indicates the practice is ready. The practice has dealt with many of the aspects of the domain or concept.

The number of questions answered and skipped was about equal. Of questions that were answered, the mean=26.4, median=25, mode=24, min=24, max=31. The mean of questions skipped was 25.6, median=26, mode 27, Min=21, Max=28. Aggregate survey data was entered into the online TRA scoring tool (Maryland Health Care Commission, 2019). The answer with the highest percentage of answers was entered. In the event of a tie, the lower-ranking answer was inputted. For example, if there was a tie between somewhat or no/unsure, no unsure was entered. The rationale for choosing the lower-ranking score was based on the possibility of sampling, response, or confirmation bias given the nurses who would take a telehealth survey. One question on the survey was inadvertently left out of the survey and not included in the final analysis.

The TRA computes weighted scores for each domain and concept on a scale of *ready*, *almost ready*, or *area for improvement*. For the concept of core readiness (20% weight), participants were considered *ready* for telehealth. They understand the need for telehealth and having organizational leadership buy-in. For three of the five domains: operations, staff engagement, and patient readiness, the score indicates they were *almost ready*. Operational scores were weighted 40% of the total, and the critical components of telehealth roles, scheduling, and workflow, were considered *almost ready*. The other three operational scores included assessment approach, technology, and physical space and ranked the lowest rating as an *area for improvement*.

Staff engagement was weighted 15% of the total. The domain has two concepts that scored almost ready in education and awareness and innovators and champions. Patient readiness carried a domain weight of 10% and scored as *almost ready*. The domain's concept of patient engagement scored as an *area for improvement*. Lastly, the concept of health literacy scored *almost ready*. See Table 4 in Appendix S for an overview of the TRA results.

Discussion

The question that guided this project was, why do health care providers in New Jersey not use telehealth and what are perinatal nurses' current attitudes, use, and level of readiness. This survey established a baseline of perinatal nurses' attitudes towards technology and their use of telehealth, and their readiness for telehealth. With this baseline, recommendations for practice, policy, education, finances, and service delivery are made so telehealth can help improve perinatal care and health equity.   In addition to discussing the sample size, the Telehealth

Readiness Assessment Core concepts of core readiness, financial considerations, operations, staff engagement and patient readiness was used to structure the discussion.

Sample Size

The projected sample size was 207 subjects. 52 total subjects responded, for a 25% return rate. While disappointing, the target sample size was acceptable, given that the projected sample size was likely optimistic. A list of perinatal nurses was not available and the fact that the survey was done during a pandemic, which imposed significant strain on the health care system.   Partial answers were included in the analysis. The rationale for this decision was based on the desire to reduce bias, given how few providers used telehealth New Jersey before COVID-19. The survey did not want to force an answer, when the subject may not know the answer to the question.

Age

Additional analysis was done to understand technology attitudes by age of the nurse. This was done given that the average age of nurses is XXX according to XXX and evidence that technology can be a challenge to retaining nurses in the workforce (Ang et al., 2017; Uthaman, Chua & Ang, 2016). When the question *if technology makes me feel nervous* was analyzed by those under 45 and those over 45, there was no statistical significance. However, there were nuances. Those in the over 45-year-old group included answers *neither agree or disagree, disagree* or *strongly disagree,* while those under 45 did not. This nuance in answers reinforces, as Valencia & Raingruber (2010) suggest, that older, likely experienced nurses revert to being novices when learning a new piece of technology and need the support of adequate training that incorporates diverse learning methods. If nurses are nervous about using technology they need

ongoing support to feel confident, without support telehealth usefulness will suffer (Harst,

Lantzsch, & Scheibe, 2019; Ossebaard & Van Gemert-Pijnen, 2016; Richardson, et al., 2018).

Core Readiness

In the wake of the pandemic, telehealth utilization, particularly video conferencing, has

dramatically expanded (Abelson, 2020). The aggregate score for core readiness according to the

TRA, was ready. This indicates that the need for telehealth was clear and there was leadership

buy in. Nurses understand that message and the survey data show that they are using telehealth

both at work and at home when seeking care for themselves or family member. It is not

unexpected, as nurses are health care consumers and arbiters of health care for family members

as well. As Beaton, 2017 discusses, experience with telehealth increases comfort, familiarity,

and ease of use. Their perception of how telehealth impacted their practice varied. This finding is

supported by others who state telehealth as a disruptor in need of clear leadership, project

champions, goals, connection to the mission as well as internal champions (Bardosh et al, 2017;

Ford et al., 2015; Lennon et al., 2017; MacFarlane et al. 2011.).

Financial Considerations

Financial considerations were identified as an area of improvement and is a hallmark of

the beginning stages of implementation and/or many of the aspects around financing or

sustaining telehealth have not been considered. This is a significant concern as without adequate

resources expanding access to care through telehealth will fail. Schwamm (2014) states that

telehealth needs to be untethered from traditional revenue expectations and telehealth can be

helpful in deconstructing the traditional health care encounter that can help improve the value of

health care in the United States. Ford et al. (2015) found that external reimbursement, lack of a

successful business model to cover costs were identified as major inhibitors to telehealth usage.

The TRA score of *area of improvement* underscores, as the literature suggests adequate financial

reimbursement is necessary to ensure telehealth integration and sustainability (Lennon et al.,

2017; Rho et al., 2014; Schwamm, 2014). Given Govenor Murphy's emergency orders under

COVID-19 that provide equity between in-person vs. telehealth visits supports sustainability

efforts (Grewal & Rodríguez, 2020).

Operations

The concept of operations comprised 40% of the TRA weighted score. The survey data

indicates a score of overall *almost ready* in the domain some of the key components were areas

of improvement. A score of almost ready for telehealth roles, scheduling and workflows was to

be expected given that 66% of respondents started or expanded telehealth in the three months or

so prior to taking the survey. As suggested in the literature and consistent with the survey

findings, leadership, teamwork, protocols, staff and patient expectations and responsibilities are

necessary (Schwamm, 2014; Stacey, et al.; Varsi et al., 2015). Lack or weak operational

readiness impress the importance of teamwork and appropriating the workflow. One participant

said, "*Telehealth (mostly by phone, with video option) - going fine, but much more workload for

the provider (no MAs or RNs/LPNs are involved…."* If the workload is not aligned to maximize

clinician time, it will be inefficient and costly to the practice.

Additional *areas of improvement* in operational assessment, technology, and physical

space are consistent with the findings in the literature. It takes time to normalize telehealth, and

keep staff and patients engaged will improve sustainability and buy-in from the front line. To

illustrate the need for access, usability and patient need, one respondent said, "*Maternal Fetal Medicine uses blood sugar and blood pressure monitoring that is stored and sent to them, but labor and postpartum nurses don't have access to that information.*" Staff need concrete, operational support, teamwork, and identifying a champion for the work are fundamental needs in starting telehealth (Gagnon et al., 2008). Without these readiness components, any new service delivery program will suffer under its weight and fail (Gagnon et al., 2008; MacFarlane et al., 2011; Ossebaard & Van Gemert-Pijnen, 2016).   Further, technology readiness and the usability of the telehealth tools are fundamental (Yusif, Hafeez-Baig, & Soar, 2017). Telehealth platforms need to have interoperability across platforms and work to reduce the switch between telehealth and traditional units of care and fit into workflows (Maryland Health Care Commission, 2019). One participant said, "*Telehealth can make things more complicated when using different software/computers/devices….it is MAJORLY helpful in communication and keeping track of things with patients and has the ability to decrease self-reporting.*"

The operational readiness to implement telehealth is a valuable assessment. Yusif, Hafeez-Baig, & Soar (2017) systematic review on telehealth readiness, they found that 46% of the studies indicated that technology readiness was a core concept and 29% of the studies indicated that use of technology at the individual level was crucial to understanding organizational readiness. This supports the survey's finding that many of the nurses not only used telehealth at work but at home as well as their positive attitude towards technology, and their understanding of its importance to their work. The nursing workforce is open and ready to use telehealth. Attitudes towards technology were favorable, which removes a barrier to telehealth implementation. When questioned about nervousness using technology, there were no

differences by age, but there was nuance. There was more variation in how subjects answered

who were over 45, which reinforces the need to practice staff feedback and engagement practices

and reinforce training and ongoing support to ensure the normalization of operational functions.

Staff Engagement

The score for this domain scored *almost ready*.   Education and awareness of why

telehealth is being implemented and the value it will bring to patient care is born out in the

literature and echoed in the survey. Bagot et al., (2020) reported that perceived usefulness and

ease of use of the technical and clinical tools as well as the setting, education, and confidence

they felt. These perceptions were critical for ensuring successful launch of telehealth and

ongoing commitment. Further, Bagot et al. (2020) emphasize that nurses are influential in

implementing telehealth given that it is a complex undertaking that involves both clinical and

technical aspects, therefore, emphasis needs to be placed on the usefulness and benefits to

patients as well as the initial training and ongoing support needed to be successful. Usefulness to

patients was a key facilitator for nurses implementing telehealth (Bakken et al., 2019; Ford et al.,

2015; Varsi et al., 2015; Westerlund et al., 2019).

Positive virtues of telehealth were seen by most nurses in the survey. They could see the

increase in access to care, access to specialists, improved communication, coordination, and

convenience. Given that maternal and reproductive health care is very preference-sensitive,

telehealth can increase patient-centered care, shared decision making, and patient satisfaction

(Tucker Edmonds, 2014). Telehealth also allows for practices to maintain access to patients.

Several respondents stated how valuable telehealth was in maintaining access and corresponding

revenue while reducing the risk of exposure or transmission to COVID-19.

Patient Readiness

The two elements that make up patient readiness concept in the TRA are patient engagement and health literacy. Nurses responding to the survey did consider the impact telehealth had on patients. While the positive findings with telehealth outweighed the negatives, nurses did express concerns about the limitations of telehealth. They worried that without an in - person exam, something would be missed in communication and relationship building, as well as the potential to miss a clinical finding, which increases medical-legal liability. One participant said, *"because of COVID, it [telehealth] has been very useful. However, it takes away from relationship building with [sic] is an essential component of care."* Concerning equity, respondents felt hopeful that telehealth could reduce inequities, but were concerned about technology being out of reach for those without smartphones or adequate bandwidth.

While the nurses were hopeful that telehealth could improve equity, the nurses voiced concern that some patients may not have access to technology (ex. smartphones, wifi, and broadband). These findings are consistent with Ames et al. (2019) and Jennings, Omoni, Akerele, Ibrahim, & Ekanem, 2015) who discuss the digital divide and the importance address when designing and setting up systems as well as match telehealth policy. This is especially true for patients who have different physical, social, or cultural needs (Harari, et al. 2018, Richardson et al., 2018). Taking telehealth to scale requires new organizational partnerships and ways of learning that can engage in structural barriers that prevent access to care and improved outcomes and equity (Bardosh et al., 2017). Co-creating telehealth with patients improves the odds that the tool will reduce disparities and improve equity (Bakken et al., 2019; Richardson et al., 2018.

Implications and Recommendations

Clinical Practice

Telehealth is new to New Jersey perinatal nurses. Patient visits declined sharply early in the pandemic and are rebounding in part with telehealth. Visit volume is not back to baseline (Mehrotra, Chernew, Linetsky, Hatch, & Cutler, 2020). As the TRA pointed out, financial considerations must be addressed if telehealth is going to be a viable option for perinatal providers. Without the fiscal health of a telehealth program, the hope telehealth will improve care and reduce disparities will wither. Practice leaders can take advantage of local, state, or federal programs to expand telehealth through grants, and smaller practice could benefit from new partnerships with larger systems or academic centers. Ongoing costs such as staff time, equipment, upgrades, or monthly service or licensing requirements and opportunities costs for staff need to be identified.

Further, given the ongoing pandemic and ongoing concern of lost revenue or the possibility of closing the practice, the benefits of telehealth must be clear to staff and patients. Telehealth can provide additional income through increased access to patients and possibly better payments under value-based payment models. It can also be a time-saver, reduce the amount of personal protective equipment used, wear and tear on office equipment, and reduce mileage compensation for staff (Maryland Health Care Commission, 2019). As one participant said, telehealth is "virtual PPE."

Non-monetary benefits include better follow up, communication, and coordination between a patient and a provider (Mataxen & Webb, 2019). Improved follow up can directly impact quality scores as well as patient engagement. There is also greater convenience for patients and providers. Flexibility in schedules can be a benefit to both the provider and the patient. Flexible schedules will be particularly relevant as nurses with school-age children try to meet the demand for new school schedules.

The nurse has a prime opportunity to demonstrate leadership and bridge the gap between the practice and the patient (Fronczek & Cowen, 2019). Nurses function across departments, and all aspects support the patients and staff. Nurses are critical to the integration of technology and part of the pre-implementation design, optimization, and continuous quality improvement process (Association of Women's Health, Obstetric & Neonatal Nursing, 2011). Nurses can help spearhead the growth of live video visits as well as expand to the other modalities. Remote patient monitoring (RPM) can be safely and efficiently used to monitor blood pressures and blood sugars from home, which would be a boon for prenatal patients (Marko et al., 2016; Stacey et al., 2012). Asynchronous "store and forward" options can improve efficiency in reporting, maternal satisfaction, and economic savings (Ming et al., 2016). Clinical practices need to take advantage of the in-house talent and leadership skills of nurses.

Mobile health is another tool that overlays well with perinatal health care. The educational needs for pregnant and postpartum patients are significant (Bushar et al., 2018; Duclos et al., 2017; Evans et al., 2015; Sondaal et al., 2016). Medically accurate, evidence-based, attractive, and usable applications that are endorsed by practice can enhance

communication between the patient and provider and boost the patients' knowledge and skills.

Patients use a variety of apps. There would be a benefit to have apps that have been reviewed

and approved by a professional organization and is evidence-based is an opportunity for future

work.

Education on the change to workflows and processes and will require that the practice

deploy change management strategies to ensure the team works well together and remains

focused on the goals. The core competency of leadership buy-in and a vision set the tone, and

the clinical operations carry the lion's share of the burden to implement well and keep staff

focused (Maryland Health Care Commission, 2019). Practices will also need to focus on

optimizing the usability of the technology, physical space needs, and workflows with continuous

quality improvement and feedback from staff and patients. Staff must understand why they are

involved in telehealth, as a new way to care for patients, see the impact on the practice and

patients, and have the training and support to be successful. A staff champion is necessary to

keep staff engaged with enthusiasm to combat resistance, articulate the process and expectations,

identify implications, and keep implementation and optimization on track (Kruse et al., 2018).

Healthcare Policy

On the state level, Governor Murphy enacted executive orders in response to COVID-19,

which encourages telehealth use to the greatest extent possible. These orders temporarily relax

requirements on who, what, where, and how telehealth is provided (Grewal & Rodríguez, 2020).

The policies that relate to telehealth service delivery, reimbursement, and expanded scope of

practice for nurses need to be made permanent policy. Relaxation of strict HIPAA compliant

security platforms for video is useful. Allowing providers to use readily available and encrypted, person to person video platforms (ex. ZOOM, Skype, FaceTime) that are convenient and familiar to both patient and provider is one less operational hurdle (Grewal & Rodríguez, 2020).

Licensure flexibility, reciprocity, and honoring nurse licenses from other states, increases the option of telehealth reach. The Governors' Orders require Medicaid reimbursement parity between telephone and video visits, where there was not before. Ensuring adequate insurance reimbursement makes telehealth sustainable. Advanced practice nurses need to meet the patient demand, expand their scope, and discontinue restrictive collaborative practice agreements. Removing these barriers to care only enhances the reputation and advances APN leadership. According to the American Association of Nurse Practitioners, New Jersey is ranked as a reduced practice for nurse practitioners as the law requires career-long supervision, delegation, or team management to provide patient care (American Association of Nurse Practitioners, 2019). The more time nurse practitioners' practice with an expanded their scope, the more likely the public and policymakers will see the limits as unnecessary.

Nurses can give patients what they want and need in the perinatal setting. Patient satisfaction is a driving force in health care (Greene, Tuzzio, & Cherkin, 2012). Telehealth is a safe, convenient way to access care and will be increasingly mainstream in New Jersey. It, therefore, requires the same level of reimbursement as other services.

Payment for clinical care needs to reflect the reality of work, on the provider, staff, and the patient. Parity between in-person and telehealth visits, as well as parity between phone and video visits, needs to be enacted with Medicaid and other insurance providers. The audio-only

access is critical if we expect to reach those most in need and bridge the digital divide. Access to care and closing the digital divide would improve care for perinatal patients in rural and underserved areas where patients do not have access to the infrastructure or technology to use telehealth modalities effectively. We can close the digital divide and improve health equity for perinatal patients by supporting state-wide policies that invest in broadband/fiberoptics, so high-speed connections can be made to support telehealth interventions. Further, insurance companies and Medicaid, who benefit from the savings of healthy patients, need to pay for the patient care coordinators to teach patients eHealth skills and literacy (Fiscella et al., 2019). Payers also need to appreciate and pay for remote monitoring as well as store and forward technologies. Health care is a pay to play relationship. As such, if the services provide benefits and quality to the patient, they should be paid. Payment includes the health workers that educate and support patients, including language interpretation services on all of the telehealth modalities. (Taylor-Penn & Ruff, 2020).

Quality & Safety

Nurses expect to use and want to use technology. Nurses see the direct benefits to patients and value the opportunities to expand access, improve communication, and impact patient outcomes. The nurses believe that telehealth can improve health equity and reduce disparities. While their enthusiasm is tempered by concern that those less fortunate may not have a smartphone or limited access to a computer by advocating for policies that allow for telephone use is valuable to reduce that barrier. There is also concern about missing a diagnosis and increased malpractice risk. Overall, telehealth is perceived as a positive enhancement,

particularly during the pandemic for maintaining connections with patients and contributing to

the fiscal bottom line. Families USA recommends states prioritize telehealth implementation

grants to improve quality and the delivery of telehealth to providers and health systems who

serve underserved communities – people who use Medicaid, safety-net hospitals, and those in

rural areas (Taylor-Penn & Ruff, 2020).

Quality of service delivery matters too. Given that video or telephonic communication is

the most used modality, nurses can help establish best practices, normalize practices and

protocols (Stacey et al., 2014; Varsi, Ekstedt, Gammon, Borosund, & Ruland, 2015). The nurses

can manage patient needs, triage care by using keep assessment and communication skills to

determine who does and does not need an in-person visit. By reducing barriers to providers,

patients will more readily reach out for help and guidance, improving patient quality of care, and

reducing risk (Cosgrove et al., 2013).

Staff and patient engagement as critical components of telehealth implementation

(Maryland Health Care Commission, 2019). As one of the participants said, "*We have to trust

the patient to tell us exactly what is going on and trust in their BP cuffs at home.*" The

technology has to work. The staff needs to trust it and feel confident patients understand what is

happening and why. Patients will direct the practice, and as the end-users are a crucial

stakeholder in telehealth. Improved communication and access to digital tools can have a direct

impact on quality metrics and patient engagement scores and can be translated into benefits for

value-based payment programs. Lastly, in support of these activities, New Jersey Medicaid can

apply for an Appendix K stand-alone waiver under Section 1915(c), home, and community-

based service wavier authority during an emergency. Resources can then be used to buy

telehealth hardware and pay for staff to reach to those in need (Taylor-Penn & Ruff, 2020).

Education

It may have taken a pandemic to get telehealth started here in New Jersey, but it is here

and likely to stay. Therefore, nursing education for future and existing nurses, particularly those

earning clinical hours, need education, hands-on training, and support for learning best practices

for telehealth (Rutledge et al., 2017). If, as the survey findings suggest, 25% or more practices

will rely on telehealth to support them, the nursing curriculum needs to expand to include

telehealth. The curriculum will need to address all aspects of care from the legal and policy

implications, the cultural competencies, health literacy, and equity, as well as the fiscal,

operational, and leadership impacts of telehealth. In perinatal education, learners need education

on how to reduce health care disparities that incorporate contemporary learning methodologies

and technology (Jain & Moroz, 2017). The curriculum around telehealth, as a part of health care

delivery, can include informatics but also communications techniques and the use of evidence-

based tools and validated history questions. Communication and engagement are different

online or virtually than in person. The American Academy of Ambulatory Care Nursing

(AAACN) has established competencies for telehealth nursing as well as online training and

education (Mataxen & Webb, 2019). Telehealth nursing is more than just a phone call. Best

practices and evidence on how to use telehealth can be folded into the curriculum from across all

areas, from the hospital, outpatient, home, or community setting. Emphasis on financial

management, return on investment of new technologies, billing, and coding practices can be emphasized among graduate students.

Clinical time providing telehealth as well as attention to implementation science is prescient. Clinical credit can be given for these activities for both undergraduate and graduate school curriculum. Given that telehealth impacts all sections of the health care system, it supports lessons on leadership, interdepartmental collegiality, and management skills. Implementation science based on the latest evidence is relevant to clinical practice, leadership skills that build a nursing workforce ready to bridge the knowledge to the practice gap (Westerlund et al., 2019). Research activities should be encouraged to engage nursing students to think of telehealth as an avenue for patient engagement, education, and feedback that can boost outcomes in a dynamic and interdisciplinary way.

Nurses in leadership roles need education on how to ensure staff and patient engagement, as well as quality metrics and safety. Education and training about effective communication, teamwork, and implementation are paramount if telehealth is going to be successful.

Economic Considerations

The weakest score on the TRA was financial considerations. Telehealth in the wake of COVID-19 appears to be an economic lifeline to some and minor support to others. Given the dramatic expansion of telehealth and the endurance of the pandemic, ensuring telehealth is meeting the needs of the patient, staff, and the practice is essential. Having a sound understanding of the return on investment, billing, and coding and economics is vital to the

future of telehealth use. A participant stated that it was *"our in-person visits dropped significantly & telehealth has allowed us to bring our visit numbers up to 50% of prior visits. We were able to call back additional staff previously laid off."* With Governor Murphy's emergency executive orders, there is parity for in-person and telehealth visits through Medicaid, and private providers will likely follow. Further, after the initial investment in equipment, training, and start-up, the system should be sustainable. There is less cost to facilities and operations, less impact, and expenses for office-based materials and supplies. As one of the participants, telehealth is "virtual PPE." It can also allow staff to work from home or other settings offering flexible schedules which may help retain older nurses (Frackler, 2019; Uthaman, Chua & Ang, 2016).

On the local, state, and federal levels, telehealth needs to be promoted as a safe and viable option, so primary care and preventive visits are not further delayed. At the federal level, Medicare and Medicaid policies need to be amended to reimburse doctors for their work if practices are to be sustained (Abelson, 2020). New Jersey, like, the rest of the country, is promoting telehealth to reduce the risk of COVID-19 and maintain access for patients to seek care. Delayed care increases the risk of more costly and poor outcomes. The impact of using telehealth to shore up our health care system, as least in part in the middle of a pandemic, is economically prudent. For patients, telehealth provides a convenient, low-risk way to keep engaged with their provider and can be sued for the management of a condition and is cost-effective for screening as well (Brown-Connolly, Concha, & English, 2014). For perinatal patients, there are advantages to using mHealth apps to educate themselves in both pre and postpartum care, breastfeeding support as well remote monitoring for blood pressure postpartum

and other conditions (Connor, Wambach, & Baird, 2018; Harari et al., 2018; Hirshberg, Downes, & Srinivas, 2018; Lavender, Richens, Milan, Smyth, & Dowswell, 2013).

The advantages of being connected cannot be understated. COVID-19 further exposed the healthcare disparities, this coupled with the pre-COVID-19 reality of NJ's maternal morbidity and mortality statistics, should be an alarm bell for providers and the families most impacted.   The Telehealth Ecosystem™ model offers a hopeful and holistic framework, tapping the wisdom of patients and community partners. While designed for the rural South, the poor health outcomes of perinatal women in New Jersey, and the impact of COVID-19 on preventive visits, the model suits the situation and worthy of future investigation (Leath, Dunn, Alsobrook, & Darden, 2018).

This survey demonstrates that New Jersey perinatal nurses want and need technology to have used live video telehealth at work and in caring for themselves or loved ones. In the wake of COVID-19, telehealth has been used and has impacted their practice. What they need are policies and practices that optimize reimbursement and streamline access to care. Telehealth is here, and with the balance of stakeholders and supportive policies, we can move the needle and improve maternal morbidity and mortality and health equity in our state. Nursing leadership will create a telehealth ecosystem that can be supported long term.

Limitations

There were several limitations to this study. The limited sample size was a significant limitation. A 25% response rate is acceptable, but increased numbers would have enabled the project to map readiness across the state and target areas in need of support. In calculating the

response rate, it was a limitation not to be able to target the NJSNA listserv to perinatal nurses or

know the number of OB/GYN nurses on the list. This inability may have resulted in

overestimating and inaccurately predicting the sample size. It was also a limitation to not be able

to send the invitations directly to the New Jersey Association of Women's Health, Obstetric, and

Neonatal Nurses group. The limited response rate limits generalizability and ability to identify

trends by region in the state.

The length and time to complete the survey was another limitation. The ability to skip

questions limited the power of the findings, in particular the TRA tool, where only an average of

22 subjects completed all of the questions. The length of time to take the survey may also have

limited the reliability and validity of the TAS tool. Given Moore's law that technology changes

exponentially, the TAS tool, developed in 1997, may no longer accurately assess participants'

attitudes towards technology. The lack of comparable current tools is a limitation for future

work.

Lastly, these findings cannot be generalizable to specific perinatal practices. Each

practice interested in using or expanding telehealth services should undergo a practice readiness

assessment, so they can best understand their unique challenges and opportunities.

Facilitating and Inhibiting Factors

The study was planned well before the pandemic, and data collection was to begin at the

same time that infection rates were skyrocketing in New Jersey. Telehealth usage also exploded

during this time as practices scrambled to new safety guidelines and were desperate to keep

engaged with their patients and maintain their practices. Telehealth was a mechanism to so that.

This context greatly facilitated the awareness of telehealth and likely piqued interest among some perinatal nurses.

On the other hand, the pandemic was an inhibiting factor. Nurses in all areas are stressed. We are in an unprecedented time. There are disruptions on many levels: socially, politically, environmentally, economically, and a significant disruptor to the health care system. It is hard to give time to a survey when there are more pressing matters in a pandemic. If they were implementing a new service delivery model under the urgency of a pandemic can bias the data either positively or negatively. Some perinatal nurses may be early adopters, and some may be resistant to changes. Participants may have looked at telehealth as a lifeline, as it helped them keep their jobs, or it could have been viewed negatively as an additional stressor at a uniquely stressful time. There is also the risk of response bias; the people who responded to the survey may be different from other perinatal nurses. Regardless, the pandemic, at the very least, facilitated the conversation about telehealth and imposed a barrier in getting a greater sample size.

Plans for Dissemination/Professional Reporting

This work will be disseminated in the nursing and telehealth literature, and opportunities will be sought to report out on the findings and seek opportunities to partner with payors, providers, and policymakers on how New Jersey can expand care. Through professional membership organizations, NJSNA, AWHONN. Institute for Perinatal Quality Improvement, Northeast Telehealth Resource center, New Jersey Innovations Institute, and Rutgers, there are multiple opportunities to partner and expand the work. Telehealth is here to stay and can be used

to improve care. If done smartly, the return on investment over time can be improved as can health care quality and equity.

The paper will be submitted for publication in professional journals such as the *American Journal of Nursing*, *American Journal of Public Health*, *Journal of Medical Internet Research, Telemedicine and e-Health*, *Journal of Clinical Nursing*, or *International Journal of Medical Informatics*. Professional presentations to be considered for submission include American Public Health Association, American Women's Health and Neonatal Nurses Association, the New Jersey AWHONN conference in 2021, Northeast Telehealth Resource Center conference in 2021, New Jersey State Nurses Association, Institute for Perinatal Quality Improvement (IPQI) 2021 conference as well as submission to present Action Brief - 1-hour teleconference to IPQI members and NJ Innovations Institute submit to present or exhibit poster at the annual meeting.

Plans for Sustainability

This project is the start of a new avenue of work to improve perinatal care for the people of New Jersey and beyond. Therefore, avenues for publishing and promoting the work will be sought along with engaging patient advocates and finding new partners to spark innovation and best practices in the state to reduce maternal morbidity and mortality and health equity.

Publishing and Promotion

This project establishes a benchmark of telehealth readiness for perinatal nurses. As such, there is a wide range of possible projects. Publishing will help spark interest and understanding about the unique challenges and opportunities for telehealth in general, and the specific value

telehealth can have for perinatal patients and practices. Publishing in academic journals as well as more commonly read nursing magazines will be attempted to get the word out. Communicating the results through social media, blogging, video, or other avenues will be explored. Any publication or promotion of the work in written, verbal, or video format can be sent to heads of practices and organizations in leadership positions, with an invitation to consult and offer assistance to practice considering implementing telehealth or who need to optimize services. This work can also be used to advocate for policy change. Without sustainable telehealth models and reimbursement, the service will die, and the promise of changing perinatal care for the better will evaporate. Insurance companies and payors need to be aware of the benefits of telehealth, and the value nurses bring to the work and the necessity of adequate reimbursement.

On the practice level, sharing this work can help practices appreciate the complexity of implementing telehealth. The goal is to publish the findings. To deliver on the promise of telehealth, nurses and practice leaders must wrestle with the complexities of implementing a new care delivery model and become advocates for policies that support telehealth work. By publishing and promoting the action on social media, webinars, and formal presentations, there would be an opportunity to discuss the findings with perinatal providers and practices. They would be interested in consultation services to ensure successful and sustainable implementation.

Patient Advocates and Partnerships

Patients and perinatal health and equity organizations need to know these findings so they can use it their leverage their request for telehealth as a flexible way to get care. This work can

lead to patient engagement studies that showcase the strengths and weaknesses of telehealth and bring the customer into the conversation. Patient advocates like doulas may be very interested in partnerships with hospital systems, practices, and patients to bridge some of the educational and monitoring gaps in care.

Telehealth companies (ex. Babyscripts) would also be interested in the findings because it gives them a vantage point into understanding the value of nurses as leaders in change management and practice innovation. It also some of the common pitfalls and challenges of any new way of providing care. Introducing telehealth is about change management. Companies and consultants who lead practice innovations need to realize the complexity of telehealth so they can ensure best practices. Small practices may be interested in partnering with larger practices and hospital systems to provide their patients have access to specialists, can benefit from remote patient monitoring, endorsed mobile educational apps, and live video or audio visits. All this needs to be knit together with an eye toward health equity so we can improve perinatal care in New Jersey.

Lastly, policy advocates need to know the level of telehealth readiness in the state and what nurses can bring to the table. These findings will be shared with the policymakers and advocates in Governor Murphy's administration and the First Lady's NurtureNJ program. There are advocates across the state who can help secure long-lasting sustainability for telehealth reimbursement, flexible security regulations, and the ability to see patients in a variety of settings and with telephone or video at the very least.

Plans for Future Scholarship

For professional publication, a letter of interest will be sent to the *American Journal of Nursing*, *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *Journal of Perinatal Nurses*, *Nursing2020*, as well as the *Journal of Medical Internet Research (JMIR) and Journal of Medical Internet Research Nursing*. A summary of the study findings will be published in the *New Jersey Nurse*. Submissions to present at professional conferences in 2021 include The American Public Health Association, American Women's Health, Obstetric, and Neonatal Nurses Association, Northeast Telehealth Resource Center, New Jersey State Nurses Association, Institute for Perinatal Quality Improvement, NJ Innovations Institute and Society of Nurse Scientists, Innovation, Entrepreneurs and Leaders (SONSIEL). Dissemination at Rutgers University will be via paper, poster presentation, and oral presentation, as part of the requirements of the doctor of nursing practice. The paper will be included in the Rutgers University School of Nursing DNP Project Repository.

Summary

One participant said telehealth was "*virtual PPE*." When looking at telehealth implementation through the lens of the pandemics, it is no wonder that telehealth has taken off in NJ. Perinatal nurses see the benefit and promise of telehealth, as well as some of the pitfalls and vulnerabilities. Nurses have positive attitudes about using technology and are confident in their use. They use telehealth and see the value of it as a new model of delivering care and potentially reducing health care disparities and improving perinatal health. They appreciate telehealth as a

potent communication tool with patients and an opportunity to enhance convenience and access

to care.

Policy, practice, education, and economic considerations require policy commitments on

the federal, state, and local levels to ensure telehealth is sustainable. There is room to enhance

the implementation of technology and physical space, but roles and responsibilities and

workflows need to be optimized. Attention must be paid and metrics put in place to ensure a

return on investment with a deep commitment to ensuring both staff and patient engagement.

Telehealth is here to stay. Valuing the disruptive nature of implementing new technology will

take, time dedication and nurses can help lead the way.

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Appendix A

Logic Model

Inputs	Activities	Outputs	Immediate Outcome	Longer term Outcome
Member email lists from NJSNA members Survey Monkey account and survey instrument Excel software	Analysis of survey results Review and sorting of open text comments Drafting of Recommenda-tions	Assessment of anticipated findings Anecdotal finings summary Recommenda-tions for practice, policy and education	Final DNP presentation Dissemina-tion of findings Submit paper for publication Proposal for future DNP projects	2-3 publications 2-3 professional presentations New employment opportunities Future DNP students work on telehealth implementation or quality improvement projects

Appendix B

Evidence Search Diagram

Telehealth Readiness Assessment Tools
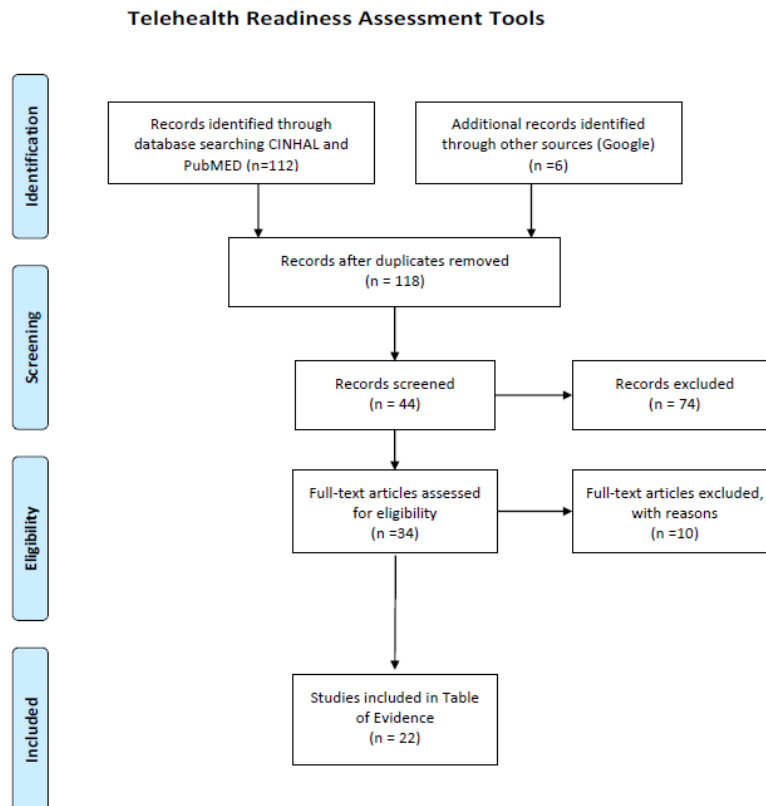
Appendix C

Table of Evidence

EBP Question: This proposed project is to survey perinatal nurses in New Jersey, to find out the

barriers and accelerators and their level of readiness to implement telehealth in their practice

setting.

Article	Author, Date	Evidence Type	Sample, Sample Size, Setting	Study Findings that help answer EBP question	Limitations	Evidence Level & Quality
1. Behavioral interventions using consumer information technology as tools to advance health equity	Bakken et al. (2019)	Consensus Guidelines	No sample or sample size, the setting is the United States	There are six recommendations based on evidence when using computer information technologies (CIT) for behavioral interventions to improve health equity. The authors defined CIT as mHealth, telehealth, and social media. It was advocated that intervention design should integrate focus of intervention, platform, user characteristics (cultural	There was no synthesis of findings in the studies reviewed. Case reports and analysis were provided as the foundation for	IV, A

beliefs, preferences, functional uses of CIT and health literacy as well environmental contexts for its use.

the recommend-ations.

Rigorous reporting standards for studies and adherence to the 20 equity-based extensions to Preferred Reporting Items for Systemic Reviews and Meta-Analysis (PRISMA) guidelines was encouraged.

Utilizing EMR based approaches such as clinical decision support, patient portals and clinical dashboards and advance the use of mHealth and social media interventions is necessary.

It is critical to evaluate all CIT based interventions rigorously throughout development and implementation, so the evaluation design matches the stage of development.

It is essential to address privacy concerns by developing study-specific controls as well as through policy advocacy from the local level to state and national levels.

A goal is to foster inclusion by demonstrating sustained engagement with people who represent populations who experience health disparities.

| 2.

Operational-izing mHealth to improve patient care: a qualitative implementation science evaluation of the WelTel texting intervention in Canada and Kenya | Bardosh, Murray, Khaemba, Smillie, & Lester (2017) | Compara-tive qualitative case study research | Key informants, Stake-holders from Canada & Kenya | The translation of the WelTel mobile app to scale was complicated and context-specific.

WelTel empowered patients and improved patient-provider connection between appointments.

Improvement in staff motivation, performance, teamwork, job satisfaction, work routines, and relations between management and front-line staff was observed when using WelTel.

There was increased clinician accountability (by use of regular reminders, etc.), work productivity, and discipline.

App Use increased emergency access to health care.

Structural barriers identified were illiteracy, stigma, and lack of owning a phone — staff who lacked the technology skills needed support.

The benefits of the app must be shared | The study had a small sample size given the scope of the project spanned two countries | III, B |
|---|---|---|---|---|---|---|

broadly and normalized as part of service and not a "one-off, external" program.

The Consolidated Framework for Implementation Research (CFIR) was used in the study.

| 3. Impact of a mobile health application on user engagement and pregnancy outcomes among Wyoming Medicaid members | Bush et al. (2017) | Quasi-experi-mental Descrip-tive Pilot study research | 85 app users, pregnant women Receiving Wyoming Medicaid benefits | The pilot study showed that women who used the WYHealth Due Date Plus app had a statistically significant association between app use and completing prenatal and follow up visits. Further, there was a borderline significant association between app us and a reduced incidence of low birth weight babies.

While the study had a small sample size (n=85), the pilot is promising — 1,730 downloaded app. Users used the app 6.4 days a month, and 41% continued month to month within a 6-month window.

Chi-square for independence was used for estimations of associations. Statistical significance was reached between app use and completion of a prenatal visit at least six months before delivery (p = 0.022); therefore, a Medicaid member would be 76% more likely (based on odds scale) to have a 6-month prenatal visit. | The study had a small sample size (n=85) and limited demographic data collected by app users.

While there was borderline statistical significance in associations between app use and prenatal visit and low birth weight, this was likely due to small sample size | II, B |

Boaderline significance was found between the use of app and low birth weight (p=0.055)

Since a Yates, correction can create conservative results, a Pearsons Chi-square was used, providing significant results (χ^2=4.45, p=0.035). A Medicaid member, using the app was 25% as likely to have a low birth weight baby (boarderline confidence interval of 05% includes 1.0). This is great promise.

There was no association between App use and rates of C-Section and NICU admission.

Cramer's V was calculated for effect size between 6-month prenatal visit and low birth weight; for association between use and 6-month prental visit (V = 0.033); assosciation between app and low birth weight (V=0.029). With one degree of freedom, a V less than 0.3 = small effect size, so while significant it is weak in both cases and likely due to small sample size. The app had the capacity to evaluate for over 70 health risk factors and identify people who needed additional case management. Additional features included a pregnancy timeline tool, weight tracker, educational content, reminder system and

				support numbers such as a "click to call" nurse support line and other support programs.		
4. Web-based interventions for prevention and treatment of perinatal mood disorders: A systematic review	Denison, F. C., Hor, K., Lee, E. W., & Reynolds, R. M. (2016)	System-atic Review	4 studies, 3 RTCs, 1 feasibility study.	The review was limited to four studies, 3 RTCs, and 1 feasibility study out for a possible 547 articles. The PRISMA and MOOSE guidelines for conducting a systematic review were followed. All participants were in the postpartum period, and all reported an improvement in maternal mood after the intervention. Data suggest that web-based therapies provided in the post-partum period may improve maternal mood, but more studies are needed, especially in therapies delivered antenatally. Edinburgh Postnatal Depression Scale (EPDS) scored showed significant improvement in symptoms. Score reduction of a mean of 8.52 +/- 0.22 and 9.19 +/- 0.63, compared to control groups of 5.16 +/- 0.25 and 6.81 +/- 0.7.	Limitations were the small number of studies (n=4) in the review and the significant attrition rate of the studies, and it is unclear if that was due to the duration of the study or intervention mode.	II, B
5. Successful Organization-al Strategies	Ford et al. (2015)	Qualita-tive research	73 interviews : 24 staff & 20 leadership	Successful strategies included: • Strong leadership support, • Use of client feedback and follow up with non-engaged clients (ex. utilizes clients and peer counselors to train new	The interviewees were part of a self-selected	III, B

to Sustain Use of A-CHESS: A Mobile Intervention for Individuals with Alcohol Use Disorders

across 14 agencies in Wisconsin

users.)

- Passionate staff (champions) and incorporation of A-CHESS in weekly staff meetings. Staff reported 3 key drivers – discussion group, the ability of A-CHESS to address client needs and staff support, rapid response to client concerns.
- Development of A-CHESS guidelines of use,
- Internal workgroups to engaging clients,
- Financial strategies to sustain A-CHESS use.

Inhibitors were identified as:

- External reimbursement and not folding mHealth into the service line, lack of successful business model strategies to cover costs.
- Lack of organizational leadership and commitment
- Lack of communication regarding client feedback or routine reporting of progress (no analysis)
- Lack of agency team approach
- Availability and cost of phones
- Concerns about being tracked
- Technological failure's (no coverage, features not working)
- Client skills /comfort with smartphones

and may not be representative.

The study focused on a specific App, and findings may not transfer to other Apps.

Staff turnover, the timing of interviews ranged widely, could all impact the outcomes. Additionally, clients were not interviewed.

| 6.

Exploring care providers' perceptions and current use of telehealth technology at work, in daily life, and education: Qualitative and quantitative study | Hah & Goldin, (2019) | A qualitative and quantitative study | 109 APN students from Florida University answering an online survey | • Online survey with both Likert scale and open-ended questions of APN nursing students.
• 109 APN students indicated that most thought telehealth technology enhances care performance, makes tasks more manageable, improves the quality of performing care tasks, decreases error in communication, and sharing information.
• Outside of work, most subjects used video-text communication tools and exposed to technology in an education setting.
• They use non-telehealth technology to help them use health info technology to access health information, confirm diagnoses, and bolster patient safety.
• The survey focused on the health care provider's use of technology in work, home (nonwork), and educational settings.
• Supports the need for healthcare policymakers and practitioners need to tailor educational programs around telehealth that match what providers are familiar with in both non-work and workplace settings.
• Researchers validated with experts the questions they used on their survey.
• 70% response rate. | No statistics are supporting the reliability or validity of the questions they asked on the survey. These questions are better vetted than others, given the paucity of validated questions on the subject | III, B |

7.	Harst, Lantzsch & Scheibe, (2019)	Systematic Review	24 studies reviewed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist.	The goal of the review was to identify theoretical predictors of the acceptance of telemedicine users.	Papers on English and German were reviewed, which could result in selection bias based on language.	III, A
Theories Predicting End-User Acceptance of Telemedicine Use: Systematic Review				Theories that explain technology acceptance are better at predicting acceptance than behavior-based theories.		
				Two theories emerged as being the most used and useful, the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM). The TAM theory included in many studies also added on various additional theoretical components.	Publication bias and limitations of search methodology. PRISMA may have limited the number of studies.	
			Articles in English and German	The technology and characteristics of the end-user need to be factored when designing a user-centered telemedicine tool.		
				The key driver for patient acceptance of telemedicine was their social environment, and for health care providers, usefulness in clinical practice was the top driver.	Acceptance could not be evaluated by certain medical conditions.	

| 8. Feasibility and acceptability of a text message intervention used as an adjunct tool by WIC breastfeeding peer counselors: The LATCH pilot | Harari, et al. (2018) | Random-ized control trial | 52 women enrolled, 30 into texting and 22 in the control group | The group of mothers that received texting, they reported they met their breastfeeding goals more often than those in the control group. They also reached out to the provider more often than the control. While it did not reach statistical significance, the texting group had higher levels of exclusive breastfeeding two weeks postpartum than those that did not.

The texting group got educational messages, and 83% stated that they always or very often read the message prenatally, and 80% did so after they delivered. 91% would recommend the program to a friend.

Before the launch of the study, the researchers conducted focus groups with the intended population and gained their feedback and insights. | A pilot study and a limited sample size and was underpowered to detect statistical significance.

The research assistant who conducted interviews was not blinded. | I, B |
| 9. Informing evaluation of a smartphone application for people with acquired brain injury: a | Kettlewell, Phillips, Radford, & dasNair, (2018) | Qualita-tive research | 20 acquired brain injured survivors, 5 caretakers, 25 | Used mixed methods of questionnaires and focus groups. Questionnaires limited responses but allowed for responses to be quantified. Focus groups gave richness and context to issues. Stakeholders were both users, health care providers, and administrative staff. | The iterative approach impacted the ability to plan engagement activities. | III, C |

| stakeholder engagement study | profession-als,

 50 stakeholders & 41 question-naires;

 United Kingdom | Behavior change wheel (BCW) drove the study design. BCW shows the relationship between capability, motivation, opportunity, and behavior.

 Engagement process involved a formal presentation, 3 informal presentations of the Brain in Hand (BiH) tool, and exhibit booth at the conference. Exhibit space discussions (no questionnaires were returned).

 Descriptive statistics were used to report survey findings of stakeholders that may be interested in using the app.

 The app was visually appealing. 65% who saw it wanted to use it. The use of other apps increased confidence in using this Brain in hand App, (BiH).

 Themes considered enablers of the BiH app were: <br> having a Smartphone and being able to physically competent to use it, app personalization, perceived need, or motivation to use it.

 Only 25% felt it was entirely appropriate for Acquired Brain Injured (ABI) patients. Themes that were barriers were |

visual/physical or cognitive impairments to using the app, lack of technical skill, poor literacy, potential cost and reliability of app, and lack of motivation to using the app.

Stakeholders recommended changes: monitoring of fatigue levels, a method for logging tasks, and editing of diaries as improvements to the app.
The cost of the app was a significant barrier.24% were willing to pay for the app, 54% said they would pay, depending on price. Technical barriers (loss of phone, battery, compatibility with another system, risk of lost data) as well as using the app during work time was a concStakeholders agreed on personalization of the app, ability to use a smartphone, motivation to change from existing strategies. Users want it to be personalized, easy to use and inexpensive or free
Interventions driven by theoretical domain frameworks are more effective than behavior change models. Recommendation to use singe person interviews and use TDF domain definitions to design interview questions.

10. Readiness for delivering digital health at scale: Lessons from a longitudinal qualitative evaluation of a national digital health innovation program in the United Kingdom	Lennon et al. (2017)	Longi-tudinal, qualita-tive, multi-stake-holder, implement-tation study	125 interviews 7 focus groups, 12 project responses, 215 program assess-ments Over 3 years	• Barriers to implementation – lack of information technology infrastructure, uncertainty around information governance (ownership), lack of incentives that prioritize interoperability, lack of history of accountability on behalf of the commercial sector, and perception of difficulty in navigating a new and different environment. • Enhancers to implementation: clinical endorsement, project champions, and the professional and public will of the people and institutions involved. • An edict to providers, industry, and policymakers to understand there are significant barriers to update and mainstreaming of digital health on micro, meso, and macro levels. • A call for a complete systems assessment of readiness for digital health is needed.	No single population was	III, A
11. Pregnant women's views on the feasibility and acceptability of web-based	Kingston et al. (2017)	Randomiz ed controlled trial (RTC)	636 women were random-ized. 305 into the interven-tion group	Mental health screening via telehealth is feasible and acceptable to pregnant women. Women randomized to the intervention arm of the study reported that they thought the tool was more private and confidential and less impersonal and time-consuming than in-person screening. They preferred using a tablet over the	The sample was homogeneous and consisted of white, partnered, affluent, and was limited to	I, A

mental health E-screening versus paper-based screening			and 331 in the control group. Outpatient commun-ity and hospital-based antenatal clinics in Canada.	paper. There were no significant differences in the disclosure of emotional health issues between the two groups.	English speakers. Therefore, this limits the generalizability of the study. The scales used are well known, but perhaps others should have been explored.	
12. The e-health implementa-tion toolkit: qualitative evaluation across four European countries	MacFarlane et al. (2011)	Qualita-tive research	Health care managers, clinicians who used e-HIT, Sample size = 22 in Finland, Norway, Scotland, Sweden	Use of an e-HIT tool that was evaluated across four different countries and a variety of e-health tools. Normalization Process Theory (NPT) is a sociological theory that explains why some new technologies are successfully implemented into practice and why some are not. NPT theoretical framework focuses on the relationship between technology and social environment. NPT has been sued to develop other theory-driven implementation tools and frameworks. Key findings were eHIT was recommended by users. The goal of having	No theoretical framework was used to guide the evaluate the e-HIT tool. There were recruitment challenges due to language challenges, which limited the sample size. The interview process may have introduced a	III, B

				an eHIT tool sensitizes the people implementing a technology (health care leaders) to appreciate and think through the challenges. Users wanted inexpensive or free downloadable tool. Likert scales and some free text fields were used. The tool can be modified to include a question about the specific eHealth technology use by staff.	social desirability factor.	

13.
 	
eHealth and quality in health care: implementa-tion time
	Ossebaard & van Gemert-Pijnen, Julia E. W. C, (2016)	Non-research; Descrip-tive review	24 interna-tional studies were discussed for their cost effective-ness and effective-ness	• Discusses the quality of implementation and addresses cultural and behavioral issues (patients, providers, and organizations) that impact the outcomes and quality of the process.
				• Demands implementation improvement and scalability of eHealth to make it useful.
				• ceHRes Roadmap is offered as a viable tool to use for eHealth implementation.
				  ○ Roadmap emphasizes stakeholder participation and co-creating as essential.
				  ○ Development and implementation deeply entwined and on continuous cycles.
				  ○ Validates that eHealth imposes systems and organizational change.
				  ○ The use of telehealth is less about
					The authors are from the Netherlands and work in a health care system that is relatively advanced in terms of using telehealth. There may be bias in their view.
					
					The studies discussed did not detail how they were evaluated for effectiveness
						V, A

technology and more about changing behaviors and contexts of care.

- Of the 31 studies reviewed, 42% (n=12) show promise for cost-effectiveness, while 35% (n=11) showed inconsistent or limited outcomes.
- Indisputable positive effects of health and cost-related measures were reported in 23% (n=7) reviews,
- Patient-centeredness, meaning knowledge of their disease, self-management capacity, and quality of life was significantly supported in 23% (n=7) studies, this may seem small, but those studies represent 150 well-controlled, individual scientific studies. Patient acceptance and adoption are generally high.
- IOM's six components of quality care (matches other studies in review).
- Discusses secondary process supports needed for successful implementation such as information and communication technology (logistics, appointments, finance, case-management, procurement, and personal health records, etc.

or cost-effectiveness. Therefore, critical analysis is lacking.

| 14.

Predictive factors of telemedicine service acceptance and behavioral intention of physicians | Rho, Choi, & Lee, (2014) | Validity testing of Tele-medicine Service theoretical modeling of Accept-ance Model (TAM) | 183 physicians working in hospitals and medical centers in Korea | • A survey of 183 physicians was done to test the validity of the TAM model to predict willingness to integrate telemedicine into practice.

• A purposeful sampling method with snowballing sampling techniques was used to improve (pen and paper) survey results. Survey s were collected over 4 weeks, and a 75.3% response rate was obtained. Questions were answered using a 5-point Likert scale

• Descriptive statistics for internal consistency were assessed with one-way ANOVA on SPSS 18.0 to examine biases and response characteristics. 68% were male, a one -way ANOVA found medical department and type of hospital had statistically significant effects on behavioral intention to use telemedicine. Perceived usefulness impacted intent to use and perceived ease of use impacted perceived usefulness and intent to use. The study also found that the accessibility of both patients and medical records was important, as well as self-efficacy has a positive effect on the perceived usefulness of telemedicine. Lastly, incentives to physicians were also important. TSA could explain the acceptance of telemedicine by | The survey was conducted in a country where telehealth is illegal. Despite the tool being statistically valid, the high response rate may reflect bias. Meaning, participants may have inflated their interest in order to make a point or policy gain.

The focus was only on physicians who were from a city and were young by and large. This limiting as other research stresses the importance of | III, A |

physicians.

- Internal consistency was measured by Cronbach's alpha; all were significant and ranged from 0.749 to 0.924, a limit of 0.70 or higher was set for the study.
- Confirmatory factor analysis using six measures: chi-square/degrees of freedom = 1.377, non-formed fit index = 0.962, comparative fit index = 0.968 and root mean square residual = 0.035 were all in the acceptable range. Two factors did not meet threshold of 0.9; adjusted goodness of fit index = 0.830, and goodness-of-fit index=0.868.
- Convergent validity was done for each construct using the average variance extracted and construct validity. All constructs had AVE scores > 0.5 (min. acceptable score). The instrument, therefore, achieved acceptable validity levels.

a team-based approach; also, the demography of young, male, and urban is limiting no matter where you are.
The study was limited to service between doctor and patient at home, so the scope of service is small.

15. Exploring implementa-tion of m-health monitoring in postpartum women with	Rhoads et al. (2017)	Pilot, quasi-experi-mental, non-random-ized controlled study	48 post-partum women Arkansas	Women who used remote monitoring devices for blood pressure, weight, pulse, and oxygen saturation did not perceive as many barriers to using the technology as the non-users. Of the users, there were no differences between those considered full or partial users in follow up or perception of	The limited sample size and limited research budget. Introducing the study was not ideal timing for	II, B

hypertension

satisfaction or benefits.

Technology measures of facilitating conditions (p=0.0024), higher levels of perceived benefits (p=0.0072), and lower levels of perceived barriers (p=0.0055) between users and non-users.

There was a statistical significance of users and non-users who returned to a medical facility post-discharge (p=0.0046), where 42.9% returned to the facility. This study indicates there is a basis for changing how care is structured for women (meaning more monitoring at home and offering to prenatal patients) who have a serious condition and need monitoring at home.

Pilot study, convenient sample

patient recruitment. A convenient sample of this size may not be generalizable

16.

eHealth versus equity: Using a feminist poststructural framework to explore the influence of perinatal | Richardson, Goldberg, Aston, & Campbell-Yeo, (2018) | Literature Review | 11 Studies from English speaking, high resources settings | This review of literature outlined the necessity and negative impact on not creating telehealth or mHealth tools that are developed by diverse populations and cultures as well as genders (LGBTQ) and non-heteronormative parenting. Of the 11 studies on perinatal eHealth tools, most were not inclusive or diverse.

eHealth modalities can perpetuate and advance health equity if people | The methodology for searching for articles lacked rigor in terms of search terms and critical appraisal. | V, B |

eHealth resources on health equity				representing the target population are not included in the development of eHealth tools. Nurses are well-positioned as those closest to the communities they care for to advocate for inclusivity and representation from the community.	
17.

Telehealth: Seven Strategies to Successfully Implement Disruptive Technology and Transform Health Care | Schwamm, (2014) | Non-research; Expert opinion | n/a | Discusses how telehealth can reduce costs and introduces concepts of space, redesigning care, and improved values. States that telehealth is a "disruptor."

Schwamm states that it is behavioral change on the clinical, organizational, and patient levels that will make telehealth successful.

The author outlines seven strategies which are:
1. Understanding patients' and providers' expectations
2. Untethering telehealth from traditional revenue expectations
3. Deconstructing the traditional health care encounter
4. Being open to discovery
5. Being mindful of the importance of space. Space means the physical and emotional environments where telehealth encounters take place. For example, the patient using telehealth at | The author favors bold and visionary leadership and may be biased as he leads a well-resourced and well-regarded teaching hospital (Mass General, Boston).   V, A |

work or needing to redesign public or residential spaces for health kiosks. Telehealth can also reduce traffic, anxiety, or wasted time. It could reduce costs.

6. Determined a redesign of care to improve value in health care.

18. Perceived factors influencing nurses' use of evidence-informed protocols for remote cancer treatment-related symptom management: A mixed-methods study	Stacey, Carley, Ballantyne, Skrutkowski, & Whynot, (2014)	Mixed methods study	34 nurse focus group/ interviews; 74 nurse surveys; 15 patient/family focus group/interviews Three ambulatory care oncology programs in Canada	Qualitative data from individual and focus group discussions were analyzed with the Ottawa Model of Research Use. They were organized by theme. Likert scales were used. Surveys were analyzed using univariate descriptive statistics. Open-ended questions were analyzed using a thematic analysis. The survey response rate was 46.7%. Survey questions had good internal consistency on all 5 elements (Cronbach's alpha = 0.89, 0.93, 0.81, 0.80 and 0.85). Only 14% of the nurses utilized the remote symptom protocols, and 70% stated they needed more knowledge and skill in knowing how to use the protocol checklists during a conversation with a patient. Barriers to using the protocol ranged from the ease of use, (the protocols were not integrated into EMR), lack of clear	Data saturation levels were not employed for the focus group and interview sections. Member checking of the qualitative data was not done. While 47% of surveys were returned, there could have been a non-response and reporting bias. Nurses may have answered questions as others would want to hear	III, B

mandate or direction to use them (only 54% felt there was clear direction from leadership), the inflexibility of tool (inability to add space or bundle or integrate several symptoms)

Protocol facilitators were the fact that nurses believed that it would standardize care. 83% agreed that the protocols would advance nursing practice and improve system management. 87% agreed that the protocols were useful to the majority of patients. Nurses appreciated the systematic nature of the evidence-based protocols and felt they were well organized and comprehensive. 90% agreed that the protocols help guide a nurse through the symptoms appropriately.

Implementation components must include clear organizational mandates, education of staff and full integration of documentation

and not their real thoughts.

| 19. Middle managers' experiences and role in implementing an interactive, | Varsi, Ekstedt, Gammon, Borosund, & Ruland, (2015) | Qual-itative study, descript-tive design | Norway | A qualitative study with a descriptive design based on interviews with managers who are nurses and physicians. Implementation rests on the middle managers' shoulders. A heavy workload, lack of managerial and implementation skills, and training hampered managers from seeing the Choice telehealth tool | The study took place in a single university hospital in Norway. | III, A |

tailored patient assessment eHealth intervention in clinical practice

successfully integrated into practice.

Four categories of work: action taken by managers, managers role and facilitators and barriers categorized ten subcategories or themes. Those themes are establishing resource group and training and request and remind about use; take responsibility for implementation and make sure that the intervention is used as intended/designed, managers perceive the intervention as having benefits; having a resource group and support from the research center. Lastly, contextual factors, difficulty in learning a new way of communicating with patients, and physician resistance were sub-themes.

Nurses, more than physicians, saw the benefit of using the tool, and when nurses integrated into normal operations, they were successful. Operations consisted of daily discussions and regular reports in addition to encouraging front line nurses to use the tool.

Managers need skills on how to plan and implement new technology as well as techniques for managing barriers and the use of facilitators.

Small sample size, coupled with retrospective assessment, may have contributed to recall bias, despite some of the managers stating they felt they were still in the middle of implementing the tool. There was an inadequate description of the CHOICE tool and how it impacted staff workload.

20.	Wallis et al. (2017)	Non-Research	50 stake-holders from diverse sectors of health care from South Africa and Sweden	The authors describe a process with stakeholders that identified themes and priorities when introducing telehealth for image-based diagnostic support. There were four main themes by which the participants outlined and prioritized strategies.	People from the business and policymakers were under-represented.	V, B
A roadmap for the implementation of mHealth innovations for image-based diagnostic support in clinical and public health settings		Descrip-tive analysis			The dominance of researchers may have influenced strategies and priorities.	
				A seamless interface between the mHealth innovation and existing infrastructures was an overarching theme.		
				Second, front line users wanted not only compatibly but added value. It is clear if providers believed the tool was useful and improved care, would the technology be viable.	Participation was voluntary, and individuals expressed personal rather than organizational opinions.	
				Third, from the organizational point of view, the quality of the implementation with representatives from all sectors was crucial.		
				Lastly, regarding technology, the local context and infrastructure must be considered. This includes the management of security, privacy, data coverage, electricity, scanners, etc.	All six elements of the roadmap were not explored.	
21.	Westerlund, Nilsen, &	Non-Research	n/a	The authors validate that despite the plethora of studies and theories that support implementation, the knowledge-	Expert opinion and does not represent an	V, A

Implementation of implementation science knowledge: The Research-Practice gap paradox	Sundberg, (2019)	Expert editorial		practice gap remains after more than twenty years of research and analysis. Implementation science is not taught to health care providers as part of their educational or continuing education curriculum. To close this gap, programing should be driven to apply implementation science with practical issues or guidance on how to implement new policies or practices. User-friendly tools that will be used by health care providers is needed to bridge the knowledge-practice gap.	organization or an extensive health care system.
22. E-health readiness assessment factors and measuring tools: A systematic review	Yusif, Hafeez-Baig, & Soar, 2017	System-atic Review	63 articles were included in the analysis	The primary conclusion that there is a lack of reliable readiness tools for common constructs such as technology, engagement, and core readiness. Studies were analyzed for themes and were put into two groups, readiness assessment factors and the other being tools used in measuring HIT/eHealth readiness assessment. The articles included were 61 in the final analysis. 44 were empirical and 17 reviewed in 20 years between 1995 and 2015. The inclusion criteria were clear.	Write up of the total number of studies included was confusing and off by one. They said 65 with three rejected, which would leave 62 but a total of 44 and 17 = 61. III, B

The synthesis was done of studies looking for themes. Most studies consisted of surveys, structured interviews, literature review, perspective, qualitative, and mixed methods.

46% of studies had technology readiness as a core concept, followed by 37% were Core/need/motivational readiness, which is related to telehealth's ability to improve quality care, accessibility, reduce costs as well as identifying needs and gaps. 29% of papers considered acceptance and use readiness of technology at the individual level crucial to understanding organizational readiness. 24% had engagement readiness as a theme, which is the goal to create buy-in, engagement, and feedback from stakeholders. End users readiness with IT skills/training, and learning readiness was mentioned in 18% of the papers.

Appendix D

Theoretical Framework

Theoretical Framework
Plan-Do-Study-Act

Disseminate findings to stakeholders and identify centers of readiness

Act
Disseminate findings

Plan

Design online survey to assess telehealth readiness

Analyze findings and synthesize findings and create recommendations

Study

Do

Administer Survey NJ nurses across state
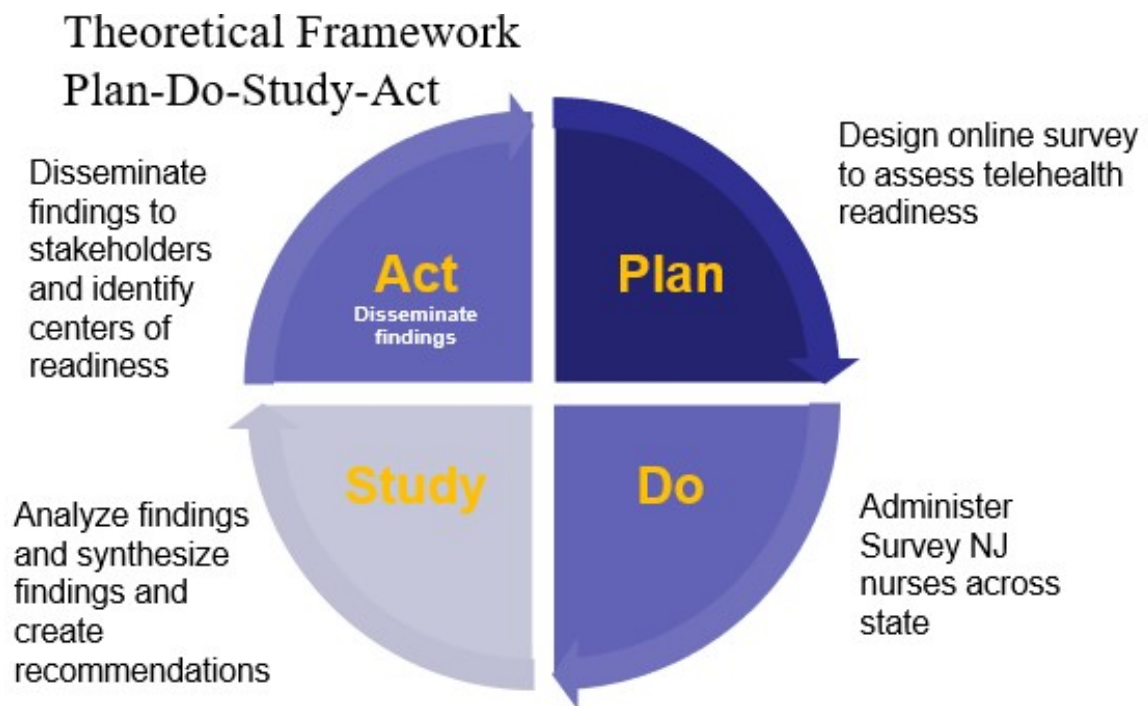
(Adapted from: White, Dudley-Brown, & Terhaar, 2016)

Appendix E

Social Media Post

Take a break from the pandemic to

Talk about the Telehealth Revolution!

NJ Perinatal Nurses

You are invited to participate

in a research survey to understand

nurse's attitudes, use and readiness to use telehealth

The survey will take about 20 minutes or less and

You can enter to win a $50.00 gift card of your choice to

Amazon, Dunkin Donuts or iTunes!

[Click here](#) **to learn more**
and consent to participate

Thank you! Your voice is important and needed!

Appendix F

Email Invitation

Telehealth Revolution! – Perinatal Nurse Survey and chance to win $50.00 gift card!

**Take a break from the COVID-19 pandemic
and
opt to win a
$50.00 gift card to Amazon, Dunkin Donuts, or iTunes!
.
NJ Perinatal Nurses
You are invited to participate
in a research survey to understand
nurse's attitudes, use and readiness to use telehealth**

**The survey will take about 20 min or less and
You can enter to win a $50.00 gift card of your choice to
Amazon, Dunkin Donuts or iTunes!**

**Click here to learn more
and consent to participate
Thank you! Your voice is important and needed!**

Appendix G

Email Reminder

Reminder email:

Don't miss out! Perinatal Telehealth Nurse Survey closing soon and a chance to win $50.00 gift card!

Take a break from the Pandemic

to talk about the Telehealth Revolution!

NJ nurses who take care of prenatal or postpartum people

You are invited to participate

in a research survey to understand

perinatal nurse's attitudes, use and readiness to use telehealth

The survey will take about 20 min or less and

You can enter to win a $50.00 gift card of your choice to

Amazon, Dunkin Donuts or iTunes!

Click here to learn more

and consent to participate

Thank you! Your voice is important and needed!

Appendix H

Consent and Survey Question

Consent to Participate

Thank you for your interest in the Perinatal Nurse Telehealth Assessment Survey. My name is

Elizabeth Talmont, a Doctor of Nursing Practice (DNP) student at the School of Nursing at

Rutgers, and my chair is Tracy Vitale, DNP, RNC-OB, C-EFM, NE-BC. I am conducting a

research survey to understand New Jersey's perinatal nurses' attitudes, use, and readiness to use

telehealth. If you are a perinatal nurse working in New Jersey, we want to know your attitudes,

use, and readiness to use telehealth, …especially in the wake of the COVID-19 pandemic. The

survey will take 20 minutes or less to complete. We hope to enroll 207 subjects. We welcome

you to forward or post the invitation to your social media accounts, so other nurses can make

their voices heard! Your participation is voluntary, and your answers are confidential. The

benefit of participating is contributing to nursing knowledge and stakeholder recommendations.

There are minimal risks to participating. A possible risk is a breach of confidentiality or

discomfort in answering the questions. You can stop the survey at any time or withdraw at any

time by contacting the Principal Investigator. All data will be securely stored on password-

protected computers. Only members of the research team will have access to the data. Contact

information is used to administer the gift cards. Contact information is not needed for any other

study purposes. As a thank you for completing the survey, you can enter, by providing your

name and contact information, to win (1) one of two (2) $50.00 gift cards to your choice of either

Dunkin Donuts, iTunes, or Amazon! Winners will be selected at random. Gift cards will be

mailed within eight weeks of the study close. Name and addresses are used for gift card selection

and will not be used in the survey analysis. By beginning this research, I acknowledge that I am

18 years of age or older and have read and understood the information. I agree to take part in the

research, with the knowledge that I am free to withdraw my participation in the research without

penalty. Click on the link that will take you to the survey. Answer yes below to confirm your

agreement to take part in the research. If you do not agree, answer no, and you will exit the

survey. Thank you! If you have any questions or concerns, please contact: Tracy Vitale, DNP,

RNC-OB, C-EFM, NE-BC, ████████████████████████ and the DNP student is

Elizabeth Talmont, MSN, APN-BC,███████████████████████████ or by

calling ██████████ or you can contact the Institutional Review Board at Rutgers at Newark

HealthSci IRB, 65 Bergen St., SSB 511, Newark, NJ 07107, (973)-972-3608; or the Rutgers

Human Subjects Protection Program at (973) 972-1149, email us at

humansubjects@ored.rutgers.edu or write us at 65 Bergen St., Suite 507, Newark, NJ 07107.

Introduction: Telehealth is emerging to enhance existing patient and provider relationships,

improve access to care, and remove barriers. Telehealth is not used frequently in New Jersey,

but more and more providers are considering adding to their practice. The goal of this survey is

to understand how ready nurses are to implement telehealth.

1. Do you agree to participate? Yes or No

(If yes, subjects were directed to the following questions, if no, they were exited from the

survey).

Welcome to the Perinatal Telehealth Assessment Survey

Telehealth is a new tool to communicate with patients. The goal of this survey is to understand

perinatal nurses, attitudes, experience, and readiness to use telehealth. There are also a few

questions about how telehealth has impacted your practice in view of the COVID-19 pandemic.

What is telehealth? It can be any of the following.

1. **Live video.**
   Patient to Doctor live 2-way communication between a patient and a provider.
   For example, platforms such as PlushMD or RWJBarnabus Health TeleMed.
2. **"Store and forward"** (asynchronous communication). When a provider sends
   information to another provider to review at a different time, for example, sending X-rays
   or scans to a radiologist to review and report back to a primary doctor.
3. **Remote patient monitoring.**
   This is the use of a device that can send a measurement (vital signs) remotely to the
   provider. For example, a special blood pressure cuff that can send the reading
   electronically to the provider.
4. **Mobile Health.**
   This is the use of a phone application for education or tracking. An example is the use of
   mobile communication (apps) for health education or an activity tracker.

Instructions:

The following questions are all multiple-choice, and some have open text fields to add detail and

perspective, in your own words. If you don't know the answer, enter "not applicable." There is no

penalty or harm in answering "not applicable."

Demographics

The following are basic demographic questions to provide characteristics and context for those

who took the survey.

2. What is your age? 18 to 24 25 to 34 35 to 44 45 to 54 55 to 64 65 to 74 75 or older
3. What is the highest level of education you have completed?
   - Associates Degree, Bachelors Degree (BSN) Masters Degree Ph.D. Doctorate of
     Nursing Practice (DNP) Other (please specify)
4. Licensure
   a. Licensed Practical Nurse (LPN), Registered Nurse (RN), Advanced Practice
      Nurse (APN), Certified Nurse Midwife (CNM). Other (please specify)
5. Which of the following categories best describes your employment status?
   a. Employed, working full-time Employed, working part-time Per Diem Volunteer
      Other (please specify)
6. What best describes your professional role(s)? Check all that apply.

a. Staff Registered Nurse (RN) Staff Advance Practice Nurse (APN) Staff Certified Nurse Midwife (CNM) Manager/Supervisor Administration Research Academia Other (please specify)
7. What professional nursing organizations do you belong to?
    a. New Jersey State Nurses Association (NJSNA) Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) Sigma Theta Tau International Honor Society of Nursing Other (please specify)

8. What county do you currently work in? *(pull-down menu of 21 counties in NJ)*

Atlantic
Bergen
Burlington
Camden
Cape May
Cumberland
Essex
Gloucester
Hudson
Hunterdon
Mercer
Middlesex
Monmouth
Morris
Ocean
Passaic
Salem
Somerset
Sussex
Union
Warren

9. What county do you currently live in? *(pull-down menu of 21 counties in NJ)*

Atlantic
Bergen
Burlington
Camden
Cape May
Cumberland
Essex

Gloucester
Hudson
Hunterdon
Mercer
Middlesex
Monmouth
Morris
Ocean
Passaic
Salem
Somerset
Sussex
Union
Warren

10. What is your work setting: Check all that apply:

 a. in-patient hospital,
 b. outpatient facility
 c. Federally Qualified Health Center,
 d. Planned Parenthood or Family Planning Clinic
 e. Private Doctors office
 f. Private APN practice
 g. Private CNM practice
 h. Other:

11. How many people work in your office? Include clinical and non-clinical, administrative, and all other staff. It is okay to estimate the number of staff.
 - 1-10, 10-50, 50-100, 100-199, >200

12. Do you have and use a personal smartphone? Yes/No. If yes
 - Check they type of phone you use ____iphone, ____Android, ____(free text field) Other)

Use of Telehealth

The following questions ask you about your experience using telehealth both at your job and for

your personal/family use. You will not be asked for personal health information. If you do not

feel comfortable answering these questions, enter N/A and move to the next question.

13. Have you used live video? Live video, two-way connection between you and a patient? Check all that apply. For example, use of Plushcare, Cigna Telehealth Connection, or RWJBarnabus Health TeleMed.
    - Yes, I have or currently use live video at work.
    - Yes, I have used live video in getting care for myself or a family member.
    - If yes, describe what you do. (free text field)

14. Have you used "storing and forwarding" (asynchronous communication)? Ex. Xrays sent by a primary care provider for a specialist to review at a different time OR provide information via a patient portal (ex. MyChart). Check all that apply.
    - Yes, I have or currently used "store and forward" communication at work.
    - Yes, I have used "store and forward" communication in caring for myself or a family member.
    - If yes, describe what you do. (free text field)

15. Have you ever used a remote patient monitoring (RPM) device?
    For example, where data from a blood pressure monitor, scale or halter monitor is used, and measurements are sent to the health care provider? (Check off).
    a. I have used it for patients at work
    b. I have used it to care for myself or a family member
        i. If yes, describe what you do. (free text field)
    c. If yes, describe the services used. (free text field)

16. Have you ever used a mobile (mHealth) device for educational or health reasons
    For example, step or workout tracking device, period or pregnancy tracker app. Check all that apply. x.
    a. Yes, I ask patients to use a mobile (mHealth) ap at my office.
    b. Yes, I have personally used a mobile (mHealth) device in caring for myself or a family member.
    c. If yes, describe what you do. (free text field)

17. How helpful do you think telehealth will be in improving perinatal health care?
    1=extremely helpful, 2=very helpful, 3=somewhat helpful, 4=Not so helpful, 5=not helpful at all.
18. If you do not use telehealth in your office, how soon do you expect telehealth (in any form) to be implemented?
    - Within 1 year, 1-3 years, 3-5 years, 5+ years, I don't know

Impact of COVID-19 on telehealth practice

The COVID-19 pandemic has increased the adoption of telehealth. The next group of questions

focuses on your experience and perception of telehealth in the wake of the pandemic.

19. Has your workplace started or expanded telehealth as a result of the COVID-19
     pandemic? Check all that apply.
- "Live" Video/telephone (synchronous) visits. Ex. Patient to Doctor, live 2-way
  communication.
- Store and forward (asynchronous) visits Ex. Provider sends information to another
  provider for review (labs, x-rays)
- Remote digital monitoring Ex. Vital signs being taken at home and transmitting them to
  the provider.
- Mobile health Ex. Use or promotion of mobile communication (apps)

20. Rank the level of impact you believe telehealth has had on your practice.
    - None at all, a little, a moderate among, a lot, a great deal.

21. How confident do you feel telehealth has improved care for patients?
    - Extremely confident, very confident, somewhat confident, not so confident, not at
      all confident.
    - Please share your thoughts (open text).
22. Do you see the positives of telehealth for people who are pregnant or postpartum?
    - Yes, there are positives to telehealth
    - No, I don't see there are any positives to telehealth
    - I don't know
23. Do you see the negatives of telehealth for people who are pregnant or postpartum?
    - Yes, there are positives to telehealth
    - No, I don't see there are any positives to telehealth
    - I don't know
24. What percentage of telehealth visits would you estimate your practice doing now?
    - 10-25%, 25-50%, 50-75%, 75-100%, I don't know, N/A
25. Do you think telehealth can help reduce perinatal health care disparities and improve
    health equity?
    - Extremely helpful, very helpful, somewhat helpful, not so helpful, not at all
      helpful. Other (open text).

Technology Attitude Survey (TAS) These are questions about your experience in using

telehealth at home or in the workplace.

Answers: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree to 6=strongly agree.

26. Knowing how to use technology is a necessary skill for me
27. I like using technology
28. I feel confident with my ability to learn about technology
29. Learning about technology is worthwhile
30. It is important to know about technology in my future career
31. Working with technology makes me feel nervous
32. Technology makes me feel stupid
33. I'm not the type to do well with technology
34. I think using technology will be difficult for me
35. I feel uncomfortable using most technology

Part 5 – Telehealth Readiness Assessment (TAS)

This is the last section of the survey to assess how ready your practice is to using telehealth.

CORE READINESS

Need for Telehealth

Consider your practice's need with respect to telehealth

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

36. Do patients in your practice have difficulty getting the medical care they need because providers are too far away, patients lack transportation, or patients are unable to leave work or home?
37. Has your organization identified specific types of patients or clinical needs that may benefit from using telehealth?
38. Do patients in your practice ask for telehealth services or express interest in aspects of telehealth such as remote visits?
39. Do patients in your practice a need or desire for after-hours (evenings and weekends) medical care?
40. Do providers affiliated with your practice routinely travel over 30 minutes from their primary location to provide services in other locations?
41. Do the potential benefits of telehealth for your practice outweigh the potential challenges associated with telehealth?

Organizational Leadership Buy-In

Consider whether your practice has support and direction from leadership.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

42. Is your practice's leadership committed to telehealth development efforts?
43. Has your practice identified the vision, priorities, and goals for implementing telehealth?
44. Has your practice created a telehealth business plan?
45. Has your practice's leadership had past successes with instituting programs that required complex change processes, such as quality improvement initiatives or electronic health record implementations?

FINANCIAL CONSIDERATIONS

Consider the financial implications of telehealth, including costs and reimbursement, for your

practice.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

46. Has your practice considered how it will fund any capital costs (e.g., equipment, software, licensing) needed to start a telehealth program?
47. Has your practice identified what additional staffing costs, if any, are needed to implement and maintain a telehealth program?
48. Has your practice examined the telehealth services reimbursement policies for major insurers (Medicare/Medicaid, and private insurance)?
49. Has your practice considered whether it would be financially feasible to offer telehealth services that are reimbursed by some but not all insurers?

This question was inadvertently excluded from the online survey. Has your practice gathered

the necessary information to conduct a cost, benefit, and risk analysis of implementing and

using telehealth?

OPERATIONS

Telehealth Roles

Consider the roles and responsibilities needed for telehealth

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

50. Has your practice determined the staff responsibilities required to manage the administrative aspects of telehealth such as appointment scheduling, coordinating information across providers and patient documentation?
51. Has your practice determined the staff responsibilities required to support telehealth patients, such as having a dedicated telehealth contact person to explain telehealth, answer patient questions, and provide assistance during telehealth appointments?
52. Has your practice determined what, if any, additional telehealth staffing support is needed to implement and maintain a telehealth program?
53. Has your practice determined how to protect staff time that needs to be dedicated to their telehealth roles and responsibilities?

Scheduling and Workflow

Consider how your practice will schedule telehealth visits and what the associated workflow will be for the visits.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

54. Has your practice considered how administrative workflows (scheduling, billing, patient documentation, communication between staff) will need to change to incorporate telehealth?
55. Has your practice considered how clinical workflows (e.g., taking vital signs, ordering labs, writing prescriptions) will need to change to incorporate telehealth services?
56. Has your practice considered how care for telehealth patients will be coordinated and communicated across providers?
57. Has your practice determined how to obtain and document the patients' consent prior to receiving telehealth services?
58. Has your practice considered how telehealth services will fit within your practice's workflow with respect to when telehealth services are offered (e.g. follow-up care vs. treatment, referral vs. self-referral, after-hours vs. regular hours)?

Operational Requirements

Consider the operational requirements for telehealth for your practice.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

59. Has your practice determined state licensing requirements necessary for each provider type (e.g., physician, nurse, PA) implementing telehealth services?
60. Has your practice evaluated privacy and confidentiality procedures for telehealth services and how these conform to patient health protection laws (eg., HIPAA, 42 CFR-Part II)?
61. Has your practice determined potential telehealth malpractice insurance coverage and liability costs?
62. Has your practice determined whether any additional credentialing processes are needed to provide telehealth services?

Assessment Approach

Consider how your practice will monitor and assess implementation/outcomes.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

63. Has your practice considered what the "success factors" for telehealth are, such as cost-effectiveness, patient/provider satisfaction, improved patient outcomes?
64. Does your practice have tools or methods in place for soliciting feedback from providers, staff, and patients that could be used or adapted for telehealth?
65. Has your practice considered the need for making improvements to services and administrative procedures based on feedback from providers, staff, and patients?

Technology

Consider the technical infrastructure needed for telehealth in your practice.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

66. Has your practice reviewed or tested different telehealth equipment, software, or services?

67. Has your practice identified what types of telecommunication connections (e.g., bandwidth and internet connectivity quality) are needed to support telehealth at both originating and distant sites?
68. Have staff at your practice been involved in reviewing or selecting technology?
69. Does your practice have existing IT staff or an IT vendor that provides technical expertise, technical support, and troubleshooting?

Physical Space

Consider what facilities are needed for telehealth in your practice.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

70. Has your practice identified a designated space for virtual patient visits with an appropriate layout, privacy, and adequate lighting that will enable a distant provider to do a clinical assessment?
71. Has your practice identified the requirements for physical space and equipment at the providers' sight to ensure quality and privacy? For example, has your practice considered whether a provider will consult from their office or a designated telehealth room?
72. Has your practice considered emergency protocols for telehealth protocols?

STAFF ENGAGEMENT

Education and Awareness

Consider how to increase awareness and engagement among staff.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

73. Are your staff aware of telehealth and the potential benefits and challenges involved in implementing a program?
74. Has your practice considered how to ensure provider engagement in telehealth services once they're implemented?
75. Has your practice considered how to ensure provider engagement in telehealth services once they're implemented?
76. Has your practice considered dhow much time (calendar time and staff time) will be devoted to training staff and providers (particularly those who are less tech-savvy) on telehealth services?

Innovators and Champions

Consider who at your practice will support telehealth.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

77. Has your practice identified one or more provider champions within the practice who are enthusiastic about telehealth and can keep the process moving forward once it has started?
78. Are clinical staff at your practice interested and willing to use telehealth technology for client services?
79. Do any of the staff at your practice have experience with telehealth services?
80. Has your practice solicited interest and input on implementing telehealth from clinical staff and administrative staff within your practice?

PATIENT READINESS

Patient Engagement

Consider how your practice will engage patients in telehealth services.

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

81. Has your practice considered whether telehealth could be used to increase patient engagement in managing their health and making health care decisions?
82. When your practice has implemented technologies aimed at patients (e.g., patient portals, text reminders, online scheduling), have your patients used them? [If you have not implemented any technology aimed at patients, answer Not Applicable.]
83. Does your practice have existing mechanisms in place that can be used or adapted to conduct education and outreach about telehealth to the target population?
84. Has your practice considered what *additional methods* might be needed to conduct education and outreach about telehealth to the target population?
85. Has your practice considered patient demographics and cultural issues that could influence implementing telehealth?

Health Literacy

What is your patient populations' capacity to obtain, process, and understand basic health

information needed to make appropriate health decisions?

Answers: No/Unsure, Somewhat, Definitely, Not applicable.

If you are not involved in these decisions at all, Click here. I am not involved in these decisions.

86. Have you considered your patients' perceived needs and motivations for telehealth to determine how telehealth can best benefit them?
87. Have you considered how well your patients comprehend health information and whether telehealth would help or hinder that?
88. Have you considered surveying patients to learn what types of telehealth services patients need, how important certain telehealth services are, or how best to implement telehealth?

THANK YOU!

Thank you for completing the survey. As a thank you, by providing your name and contact information, you will be automatically entered to win one (1) of two (2) $50.00 gift cards to either Amazon, Dunkin Donuts or iTunes.
Your contact information will only be used for the gift card drawing. Gift cards will be mailed within eight weeks of the study close.
Thank you again for taking part in the survey!
If you have any questions, please contact Tracy Vitale, DNP, RNC-OB, C-EFM, NE-BC, trv22@sn.rutgers.edu or (973) 972-1584 at Rutgers School of Nursing or Elizabeth Talmont, MSN, APN-BC, ejs55@sn.rutgers.edu or by calling 646-265-3839 or by calling 646-265-3839 or you can contact the Institutional Review Board at Rutgers at Newark HealthSci IRB, 65 Bergen St., SSB 511, Newark,NJ 07107, (973)-972-3608; or the Rutgers Human Subjects Protection Program at (973) 972-1149, email us at humansubjects@ored.rutgers.edu or write us at 65 Bergen St., Suite 507, Newark, NJ 07107.

First Name, Last Name
Street Address (apt.)
Town
New Jersey
Zip Code
email address

89. Contact Information (for gift card drawing)

90. Gift Card * Choice (select one)

- Amazon
- Dunkin Donuts
- iTunes

Appendix I

Project Timeline

Fall 2019

Nov-Dec
Committee Chair
Final PICOTS

Dec 26
Submit Draft
Proposal

Winter 2020

February 2
Send revised
proposal to
Committee

Feb 10-28
Revise and get
approval from
Committee

COVID-19 - March

March 4, 1st NJ first
case of COVID-19,

March 9, Gov.
Murphy, state of
emergency. Schools
closed.

March 10, 1st NJ
death

March 16,
statewide curfew.
All gyms, theaters,
restaurants and
bars closed.

March 18, + cases
in 18 of 21
counties.

March 21, >1,000 +
cases, STAY AT
HOME order

COVID-19 - APRIL

April 1, 22,255 +
cases, 355 deaths

April 16, 75,317
total + cases 3,518
deaths

April 30, 118,652 +
cases, 7,228 deaths

Spring 2020

May 1-15, retool
proposal, protocol
and survey

May 15, Project
Committee
Presentation.

May 27
Departmental
Approval
Submitted to IRB

June 9, New Jersey
stay at home order
lifted.

June 23, New Jersey
only state where
cases of COVID-19
dropped in two
consecutive weeks.

June 24 IRB
approval,
June 25 Survey
launched

Summer 2020

July 9th Survey
Closed

July 10-30 Data
Analysis and
consults with
Committee on
findings

July 30 Send draft
paper to
committee

August 17
Final Review of
paper submitted

August 25 Final
Project
Presentation

Fall 2020

September -
October Write for
first publication

Nov-Dec
Preparation of
professional
presentation(s)

Appendix J

Project Budget

Estimated Costs	Cost	Total
Flyers	50 color flyers .15/each	$7.50
Gift cards	2 x $50.00	$100.00
Mailing of gift cards (envelope and stamp)	2 envelopes and 2 x .55 cent stamps	$2.00
Survey Monkey	$5.00 month X 6 months + In-kind use of Dr. Vitale's subscription	35.00
		75.00
Dissemination Posters	Printing of final poster	
Total		**$219.50**

Appendix K

Age Distribution
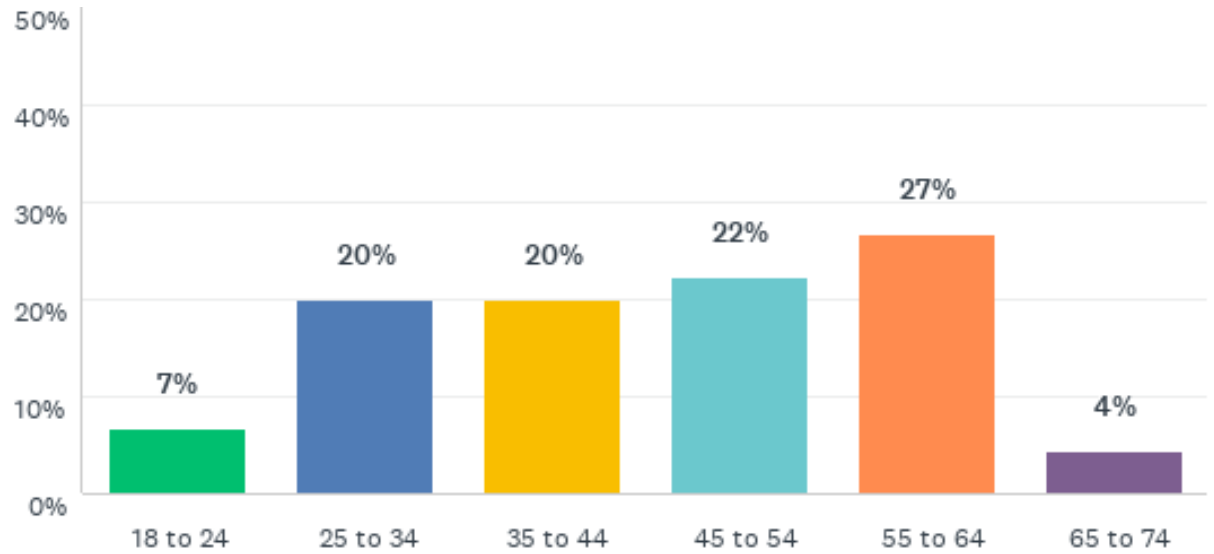
Mean = 3.56, Median = 4.0, Standard Deviation = 1.36, Pearson's Coefficient for Skewness =

0.97

Appendix L

Table 1. *Demographics*
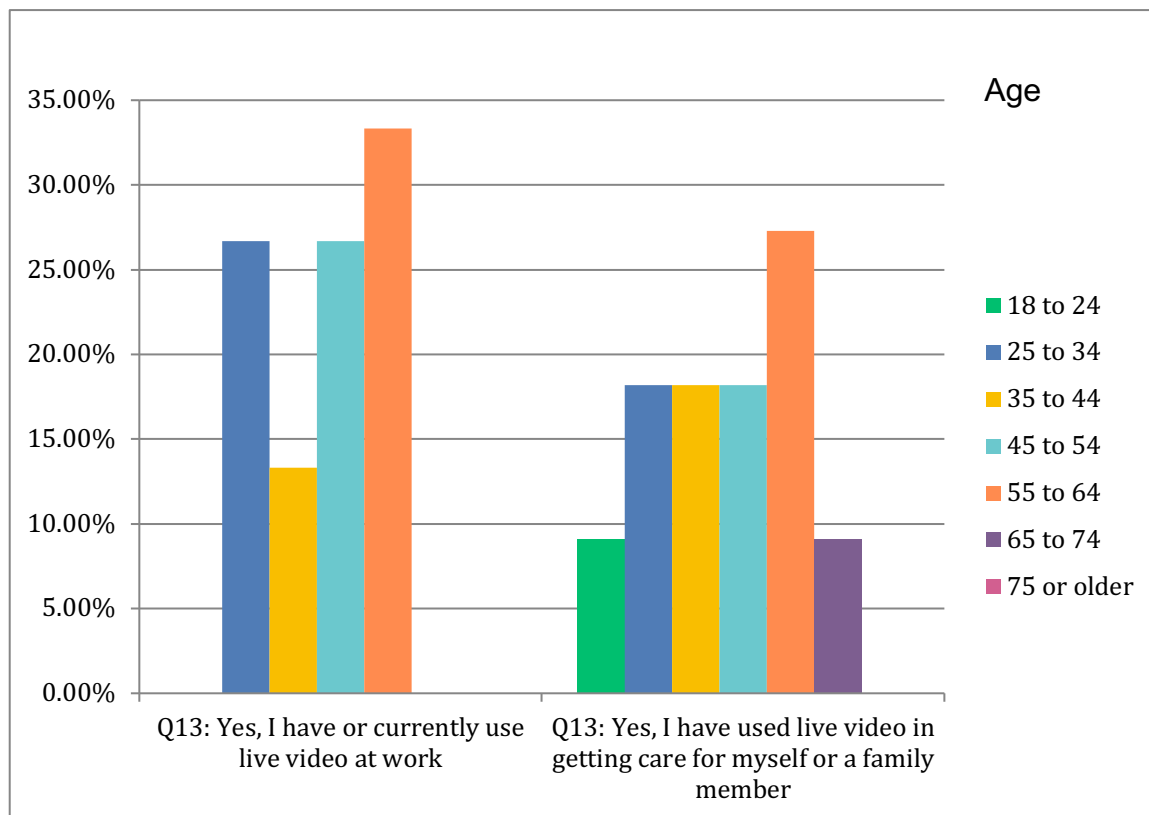
	Percentage	n =
Age		
18 to 24	6.67%	3
25 to 34	20.00%	9
35 to 44	20.00%	9
45 to 54	22.22%	10
55 to 64	26.67%	12
65 to 74	4.44%	2
75 or older	0.00%	0
	Answered	45
	Skipped	7
Highest level of education		
Associates Degree	0.00%	0
Bachelor's Degree (BSN)	35.56%	16
Master's Degree	55.56%	25
Ph.D.	0.00%	0
Doctor of Nursing Practice (DNP)	6.67%	3
Other (please specify)	2.22%	1
	Answered	45
	Skipped	7
Licensure		
Licensed Practical Nurse (LPN)	0.00%	0
Registered Nurse (RN)	71.11%	32
Advanced Practice Nurse (APN)	20.00%	9
Certified Nurse Midwife (CNM)	8.89%	4
Other (please specify)	0.00%	0
	Answered	45
	Skipped	7
Employment status		
Employed, working full-time	86.67%	39
Employed, working part-time	11.11%	5
Per Diem	2.22%	1
Volunteer	0.00%	0
Other (please specify)	0.00%	0
	Answered	45
	Skipped	7

Appendix M

Table 2. Work Environment

|	Percentage	n=
Work setting		
In-Patient Hospital or treatment facility	62.22%	28
Out-patient Facility	15.56%	7
Federally Qualified Health Center (FQHC)	8.89%	4
Planned Parenthood/Family Planning Clinic	4.44%	2
Hospital-based, outpatient facility	11.11%	5
Private Doctors Practice	8.89%	4
Private APN Practice	0.00%	0
Private CNM Practice	4.44%	2
Other (please specify): *Student Wellness Center, School, Corrections, Community Health, Home Hospice*	13.33%	6
	Answered	45
	Skipped	7
Size of office		
1-10 people	28.89%	13
10-50 people	31.11%	14
50-100 people	13.33%	6
100-199 people	8.89%	4
200 + people	17.78%	8
	Answered	45
	Skipped	7
Professional role		
Staff Registered Nurse (RN)	48.89%	22
Staff Advance Practice Nurse (APN)	22.22%	10
Staff Certified Nurse Midwife (CNM)	8.89%	4
Manager/Supervisor	20.00%	9
Administration	2.22%	1
Research	4.44%	2
Academia	13.33%	6
Other (please specify) *Clinical Educator, Perinatal Educator, Educator*	6.67%	3
	Answered	45
	Skipped	7

Appendix N

Age distribution and Use of Live Video at Work vs. Self or Family

One tailed t-test, $p = 0.25$.

Appendix O

Percentage of telehealth visits
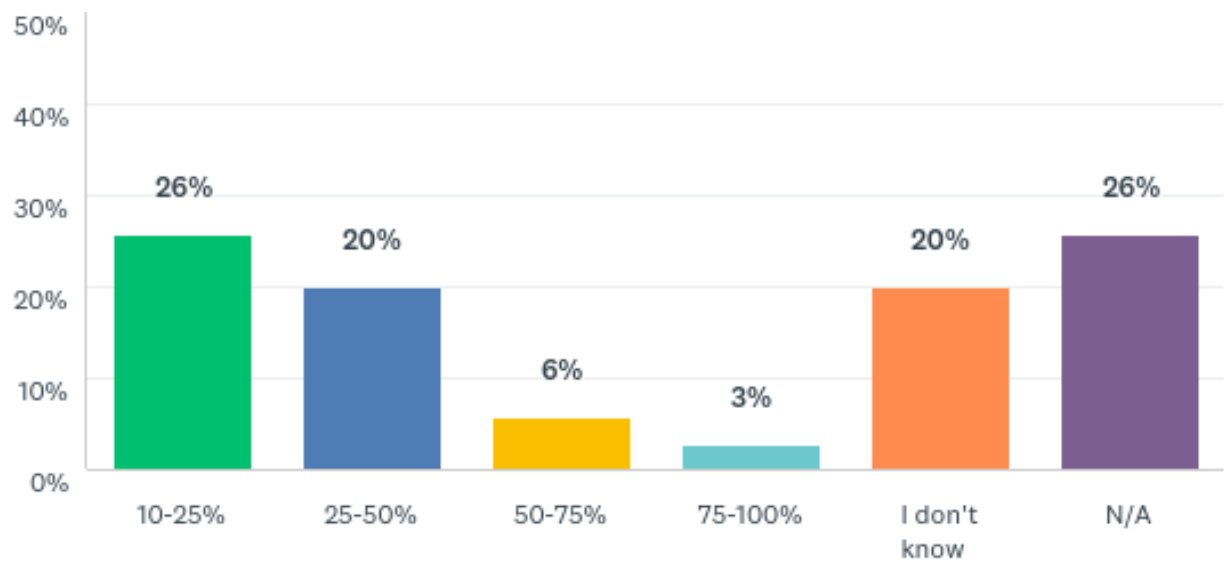
ANSWER CHOICES	RESPONSES	
10-25% (1)	26%	9
25-50% (2)	20%	7
50-75% (3)	6%	2
75-100% (4)	3%	1
I don't know (5)	20%	7
N/A (6)	26%	9
TOTAL		35

BASIC STATISTICS				
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	6.00	3.00	3.49	2.03

Appendix P

Telehealth to help reduce disparities and improve health equity
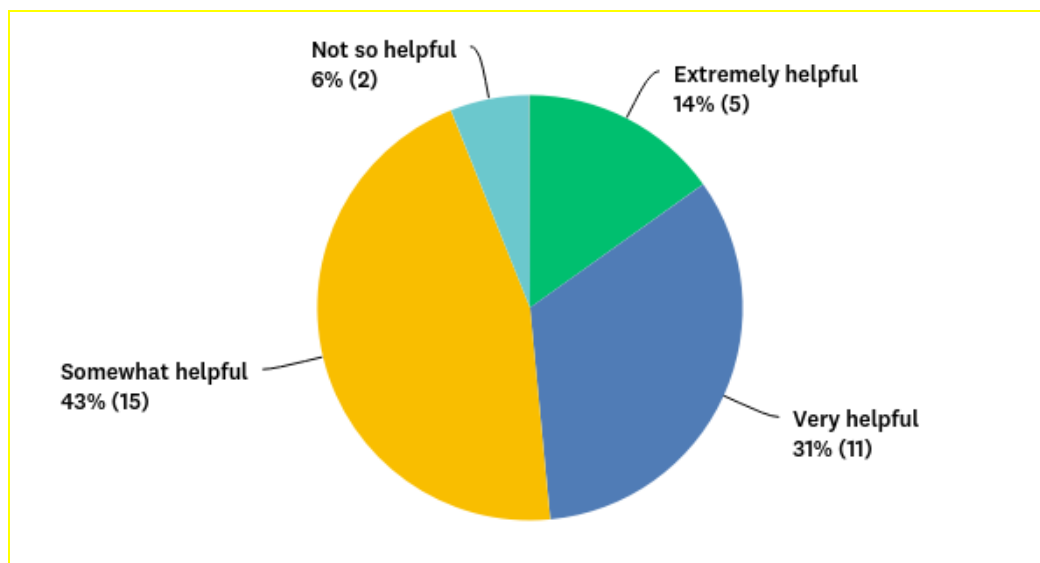
ANSWER CHOICES	RESPONSES	
Extremely helpful (1)	14%	5
Very helpful (2)	31%	11
Somewhat helpful (3)	43%	15
Not so helpful (4)	6%	2
Not at all helpful (5)	0%	0
TOTAL		35

BASIC STATISTICS

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	4.00	3.00	2.42	0.82

Mode = 3.0

Appendix Q

Technology makes me feel nervous by age
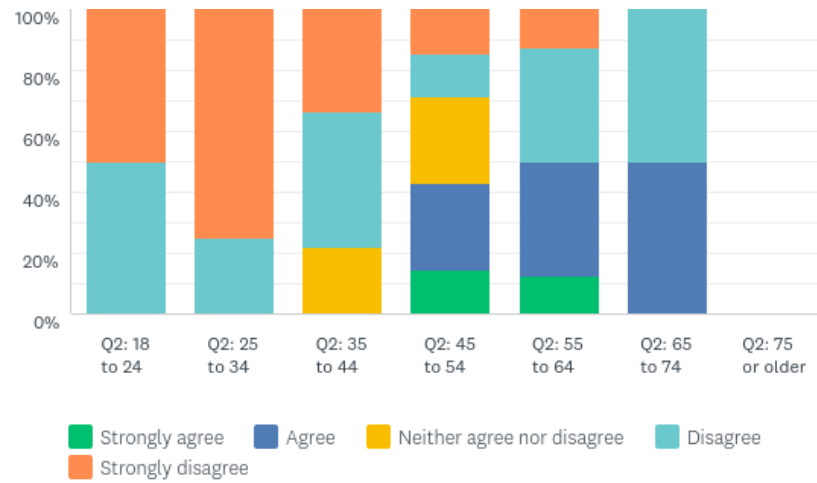
	STRONGLY AGREE (1)	AGREE (2)	NEITHER AGREE NOR DISAGREE (3)	DISAGREE (4)	STRONGLY DISAGREE (5)	TOTAL
Q2: 18 to 24	0.0% 0	0.0% 0	0.0% 0	50.0% 1	50.0% 1	6.3% 2
Q2: 25 to 34	0.0% 0	0.0% 0	0.0% 0	25.0% 1	75.0% 3	12.5% 4
Q2: 35 to 44	0.0% 0	0.0% 0	22.2% 2	44.4% 4	33.3% 3	28.1% 9
Q2: 45 to 54	14.3% 1	28.6% 2	28.6% 2	14.3% 1	14.3% 1	21.9% 7
Q2: 55 to 64	12.5% 1	37.5% 3	0.0% 0	37.5% 3	12.5% 1	25.0% 8
Q2: 65 to 74	0.0% 0	50.0% 1	0.0% 0	50.0% 1	0.0% 0	6.3% 2
Q2: 75 or older	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
Total Respondents	2	6	4	11	9	32

BASIC STATISTICS					
	MINIMUM	MAXIMUM	MEDIAN	MEAN	STANDARD DEVIATION
Q2: 18 to 24	4.00	5.00	4.50	4.50	0.50
Q2: 25 to 34	4.00	5.00	5.00	4.75	0.43
Q2: 35 to 44	3.00	5.00	4.00	4.11	0.74
Q2: 45 to 54	1.00	5.00	3.00	2.86	1.25
Q2: 55 to 64	1.00	5.00	3.00	3.00	1.32
Q2: 65 to 74	2.00	4.00	3.00	3.00	1.00
Q2: 75 or older	0.00	0.00	0.00	0.00	0.00

Appendix R

Table 3 *Technology makes me feel nervous divided by two age groups*

	Under 45	45 and over
Strongly Agree	0	2
Agree	0	6
Neither Agree nor Disagree	2	2
Disagree	6	5
Strongly Disagree	7	2
Mean	3	3.4
Median	2	2
Mode	0	2
Sample Size	15	17
U Value	11	
z-score	-0.02	
p-value	0.83	

Not significant at p <.05

Appendix S

Table 4 *Technology Readiness Assessment Scores*

Domains	Concepts	Concept Weight	Concept Score	Total Domain Weight	Total Domain Score
1. Core Readiness	Need for Telehealth Organizational	10%	Ready	20%	Ready
	Leadership Buy-In	10%	Ready		
2. Financial Considerations			Area for Improvement	15%	Area of Improvement
3. Operations	Telehealth Roles	5%	Almost Ready		
	Scheduling and Workflows	10%	Almost Ready		
	Operational Requirements	5%	Area for Improvement		
	Assessment Approach	5%	Area for Improvement	40%	Almost ready
	Technology	10%	Area for Improvement		
	Physical Space	5%	Area for Improvement		
4. Staff Engagement	Education and Awareness	7.5%	Almost Ready		
	Innovators/Champions	7.5%	Almost Ready	'15 %	Almost ready
5. Patient Readiness	Patient Engagement	5%	Area for Improvement		
	Health Literacy	5%	Almost Ready	10%	Almost Ready