

**AN INTEGRATIVE REVIEW: BEST PRACTICES IN ADVANCED PRACTICE
REGISTERED NURSE (APRN) TELEHEALTH SERVICES TO IMPROVE
OUTCOMES FOR CHILDREN WITH CHRONIC HEALTH CONDITIONS.**

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Tamara Sue Moyer

Liberty University

Lynchburg, VA

1/23/2021

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Scholarly Project Chair Approval:



Dr. Sharon Kopis, Ed. D, MS, RN, NP-C, CNE '91

Chair, DNP Programs, Professor, Nursing

ABSTRACT

Telehealth is a rapidly growing field that affords individuals the opportunity to receive access to specialty providers, reduce expenses and travel, break down geographic barriers, deliver equality of care, and improve patient outcomes. Equality of healthcare for pediatric patients with chronic health conditions in rural areas face geographic barriers to delivery of care, resulting in poor patient outcomes, and increased costs. An integrative review was completed to identify and describe research findings in an attempt to answer the clinical questions proposed and identify areas in research that can lead to improved patient outcomes. The need to receive access to specialty care providers brings challenges that telehealth services, provided by APRNs, can make a difference. The future of healthcare providers, including APRNs, must include training to build competencies and confidence, and bring advocacy for underserved pediatric patient populations by breaking down additional barriers to ease of use with information technology.

Keywords: telehealth, telemedicine, pediatric, child, advanced practice nurse, rural, and outcomes.

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SECTION ONE: FORMULATING THE REVIEW QUESTION

An integrative review was conducted to evaluate the literature for evidence or gaps that support or explore the importance of the clinical questions being asked and looked at how best practices in APRN telehealth services in rural areas can improve pediatric patient outcomes. The goal of this integrative review was to discover what the evidence states which supports the need for further research or implementation of telehealth into APRN practice guidelines focusing on pediatric patients in rural community settings.

Telehealth uses telecommunication and information technology to provide care coordination between patients and providers, providers to other providers, and to improve patient access to care with subspecialists (Utijdian & Abramson, 2016). Families of pediatric patients with complex medical conditions have specific needs, characterized by multiple chronic conditions that care coordination could help when addressed by the APRN using telehealth (Cady et al., 2015). Care coordination delivered by an APRN across services may improve clinical, social, and emotional outcomes, and reduced costs, decreasing the number of unplanned visits (Cady et al., 2015; McKissick, et al., 2016). Future health care providers, including APRNs, will need to be able to advocate for underserved patient populations by developing the needed knowledge and competencies to use telehealth services, as well as to advance their use in rural communities. Previous research shows barriers to clinical telehealth related to a lack of confidence in the use of technology (List et al., 2019)

The Patient Protection and Affordable Care Act of 2010 identified telehealth as an innovated means to provide care coordination to underserved areas, and a tool to provide quality and efficient healthcare services where APRNs are filling the primary care needs for these patients (Utijdian & Abramson, 2016). During the same time as the Affordable Care Act of 2010,

20% of the population in the United States lived in rural areas (Marcin et al., 2015). Pediatric care would benefit by expanding the use of telehealth by improving access to providers in underserved rural areas and expanding the role of telehealth to improve both healthcare quality and safety (List et al., 2019; Utidjian & Abramson, 2016).

The research was critically appraised by a systematic approach analyzing evidence individually and in its entirety. A matrix documenting the strengths and weakness, limitations, methods, and results are listed, and a strength of evidence table provided (Table 1). The full potential of telehealth has yet to be discovered. With gradual growth in acceptance from healthcare professionals and a greater public awareness of the benefits, improved access to care and outcomes are promising (Bradford et al., 2015). A growing body of literature shows that access barriers affect telehealth use, and can allocate pediatric subspecialty expertise into rural communities, as well as other nontraditional pediatric settings, minimizing parental burdens and cost (Marcin et al., 2016).

Healthcare providers need to deliver care for patients that live in underserved or rural communities by applying skills and knowledge to telehealth services (List et al., 2019). More recent research reports that telehealth is being driven by need and supported by evidence and provides opportunities to incorporate telehealth into family nurse practitioner practice (List et al., 2019; Totten et al., 2020).

Defining Concepts and Variables

For this integrative review, telehealth will be defined as "delivery of health care services, where patients and providers are separated by distance...can contribute to achieving universal health coverage by improving access for patients to quality, cost-effective, health services wherever they may be... valuable for those in remote areas, vulnerable groups, and ageing

populations” (World Health Organization, 2016). The term telehealth encompasses telemedicine, which includes diagnosis and management of disease (List et al., 2019). “Telehealth encompasses multiple technologies that have been applied to health services for a wide range of conditions, populations, and settings” (Totten et al., p. 2, 2016). APRNs can assist with care coordination which is defined as a deliberate organization of patient care activities, sharing information among participants involved in the patient’s care to achieve the outcome of safer and more effective care (Agency for Healthcare Research and Quality, 2018).

Rationale for Conducting the Review

First introduced in the 1960s and advancing into the 1990s, telehealth has, through innovation, advanced the healthcare field to provide services to individuals and their communities (Koivunen et al., 2017). Over the last decade, healthcare has been transformed by the implementation of information technology (IT) and improves access to care and reduces expenditures (Bradford et al., 2015).

In the pre-COVID era, research showed how outpatient telehealth provider consultations were mainly used to replace in-person visits with a specialist. However, during the current pandemic, COVID-19, telehealth consultations have provided additional advantages to help support social distancing, while increasing efficiency of healthcare providers as in-person visits are restricted. Benefits include decreased wait times to see a specialist, reduce geographic and travel barriers, and improve access to services (Evans et al., 2020). Providers need training to maximize the potential benefits of telehealth for rural and underserved populations, and pediatric patients with chronic health conditions (List et al., 2019). Healthy People 2020, a federal initiative, focused on identifying strategies to improve health and decrease disparities, making healthcare equal to all. Individuals living in rural communities have an increased risk of poorer

health, poverty, poor housing, reduced transportation, and lack of insurance (Lee et al., 2019). “Improved outcomes for children have been shown in studies of APRN-delivered care coordination within the health care home” (Cady et al., 2015; Looman et al., 2015).

Purpose and/or Review Question(s)

The purpose of this project is to identify and describe the body of literature currently available to answer the clinical questions proposed related to best practices within the use of telehealth services. The goal is to identify areas in research that can lead to improved clinical practice by APRNs when using telehealth services to provide care for children living in rural settings, to change outcomes and access to care. Does the use of APRN telehealth services improve children’s access to care in rural settings? Does the use of APRN telehealth service improve health outcomes for children living in rural settings?

Formulate Inclusion and Exclusion Criteria

The search strategy was conducted by using clinical research questions to define the key interest for this integrative review. National electronic databases: CINAHL Plus with Full Text, ERIC, Healthsource Nursing/Academic edition, and Medline Full Text. The above databases were searched using the following phrases: telehealth, telemedicine, pediatric, child, children, advanced practice nurse, rural, and outcomes. The search was limited to years 2015-2020, English only, full-text and peer reviewed articles, pediatric populations < 19 years of age, and included healthcare providers (nurses, nurse practitioners, and advanced practice nurses) and rural and underserved community healthcare environments. Publications prior to 2015 were excluded, adult populations and urban and inner-city healthcare environments were not considered. The inclusion and exclusion criteria used are shown in (Table 2).

Conceptual Framework

The conceptual framework used for this integrative review is the method designed by Whitemore and Knafl (2005). An integrative review will be used to allow for a combination of diverse methodologies and potentially influence evidence-based practice (EBP) in advanced practice nursing. Steps in the integrative review model included identifying a purpose, searching the literature, evaluating and analyzing data, and providing discussion on the findings. The model directed the use of inclusion and exclusion criteria allowing for a more rigorous study, a broader review of the research, and combining data from various types of literature. Integrative review models provide the opportunity to define concepts, review theories, research evidence and analyze methodologies on a focused topic (Whitemore & Knafl, 2005).

To further understand the impact telehealth can have when supported by the APRN role, an integrative review was conducted to allow for key research findings, and to have a greater position in evidence-based practice (EBP) change (Whitemore & Knafl, 2005). An integrative review is defined as one that includes both empirical and theoretical publications and provides diversity in the sampling as a symbol to this type of review (Hopia et al., 2016). An integrative approach allows for inclusion and exclusion criteria involving a varied collection of methodologies, assists in summarizing what is known about a topic, and communicates findings to specific groups of interest (Toronto & Remington, 2020). Based on the methodological stages by Whitemore and Knafl (2005), the integrative review method can assist in developing a holistic understanding of the phenomena of interest and present the state of nursing science, while emphasizing the only approach that combines various methodologies (Hopia et al., 2016).

The integrative method is comprised of five stages: problem identification, literature search, data evaluation, data analysis, and presentation. Findings to all stages will be presented

and discussed as they relate to this review. Following all stages helped to enhance the rigors of the study and meet standards for a primary research methodology (Whittemore & Knafl, 2005). The problem identification stage provided a clear picture of the problem being addressed; the literature review was critical for conducting a non-biased search and avoiding inaccurate results; data evaluation assisted in extraction of specific studies to evaluate for quality; the data analysis stage required that all data from literature sources are unified and integrated; and presentation of the findings were reported out in a table format with details regarding sources and evidence to support the conclusion statement (Whittemore & Knafl, 2005; Hopia et al., 2016).

SECTION TWO: COMPREHENSIVE AND SYSTEMATIC SEARCH

Integrative reviews are essential to nursing practice, apprising research, and changing policies. The goal of this project and other integrative reviews is to simply present what the research states, support theory development, and be relevant to practice and policy initiatives (Whittemore & Knafl, 2005). This integrative review was conducted to evaluate how Advanced Practice Nurse (APN) telehealth services can provide best practices in pediatric patients and improve outcomes in rural communities. This method was chosen to research and present the current state of evidence along with those still needing further inquiry.

Search Organization and Reporting Strategies

For this integrative review, data collection consisted of a literature search using databases as well as librarian resources and tools to analyze the findings. National electronic databases used included: CINAHL with Plus Full Text, ERIC, Healthsource Nursing/Academic edition, and Medline Full Text. Articles considered were published 2015 to current, peer reviewed, full-text, and in English. Articles not considered were those that looked at adults over the age of 18, were non-research, and prior to 2015. Once articles were located using key words from the

clinical questions, the evidence was grouped and evaluated for validity and relevance to the project. Articles considered for the literature review included those focused on pediatric telehealth, or telemedicine in general. Articles that focused on a specialty care, education, consultation, Mhealth, mobile text, or screening were not considered for this literature review. Melnyk's hierarchy of evidence was used to analyze the data, however, understanding the levels is key to the data collection process, ensuring a variety of levels of studies were considered (Appendix A).

According to the World Health Organization [WHO], telehealth is the “delivery of health care services, where patients and providers are separated by distance...can contribute to achieving universal health coverage by improving access for patients to quality, cost-effective, health services wherever they may be... valuable for those in remote areas, vulnerable groups, and ageing populations” (2016). Telehealth encompasses telemedicine, which includes diagnosing and managing disease (List et al., 2019). “Telehealth encompasses multiple technologies that have been applied to health services for a wide range of conditions, populations, and settings” (Totten et al., p. 2, 2016).

SECTION THREE: MANAGING THE COLLECTED DATA

When conducting a search process, a comprehensive search was performed, and citations were retrieved and labeled during the planning process. A citation manager was used to collect and eliminate duplicates. The Zotero reference manager was utilized to track searches and manage articles. Articles were imported based on search criteria, reviewed for duplicates, then scanned for relevance. Original searches resulted in 300 articles, 119 duplicates removed, and out of the 181 remaining, 49 were reviewed for consideration. Based on the focus of this integrative review, 12 articles were chosen to be included in the evaluation matrix.

SECTION FOUR: QUALITY APPRAISAL

Sources of Bias

Whittemore and Knafl describe the data analysis stage as reviewing the primary sources of data by ordering, coding, categorizing, and summarizing, resulting in a unified conclusion (2005). A matrix of the research was utilized to form common themes and report out the findings using a literature review protocol that supported the specific clinical questions. This review used a content analysis to evaluate the research findings due to not being specific to a research design.

For this review, a literature search was used to evaluate the articles to determine relevance to the clinical questions. The study was conducted looking at specific components using certain inclusion and exclusion criteria to assist in minimizing articles that would not support the project. Categories were studied to collect research, focusing on the keywords related to the clinical questions, and recorded for each source.

Internal Validity

A literature search was conducted using an integrative review methodology to deliver rigor (Whittemore & Knafl, 2005). This method was used to reduce bias that could exist from a narrow-focused literature search. During the integrative review, no biases were identified within the review themes. It is noted that this was pertinent to chronic pediatric patients in rural communities and advanced practice nurse telehealth services.

Appraisal Tools

There is not one best way to appraise an integrative review's quality, however, it is critical that the literature be appraised using a valid and reliable tool (Toronto & Remington, 2020). Information in the studies was evaluated using Melnyk's hierarchy of evidence for legitimacy, bias, interventions, statistical analysis, and discussion to consider the individual

articles' value (Melynyk, & Fineout-Overholt, 2019). Articles were aligned with this tool to ensure the strength of evidence was strong and applicable to the integrative review.

Applicability of Results

The search findings were reported in a matrix during the critical appraisal process. The design, sampling, data collection, ethical considerations, results, discussion, and relevance to the clinical questions were considered. The literature results were noted during the process for credibility and support for the integrative review topic. Data analysis and findings were reported in the strength of evidence and review of evidence charts (Toronto & Remington, 2020).

SECTION FIVE: DATA ANALYSIS AND SYNTHESIS

Content Analysis

The first phase of data analysis refers to the process of selecting, focusing, simplifying, and abstracting data from primary literature (Whittemore & Knaf, 2005; Toronto & Remington, 2020). This phase reduces articles into more focused and detailed smaller groups from broader categories and is crucial to ensure methodological rigor and concise organization of the literature (Toronto & Remington, 2020). Evidence was located using key word searches with Boolean phrases to locate articles that focused on topic specific content. Once articles were organized into the reference manager, abstracts, tags, titles, etc. were reviewed for relevance to the literature focus. Articles that focused on specialty care, mobile health, consultation or screening, or adult care were not considered for this integrative review and placed in an exclusion folder.

Once articles were eliminated based on exclusion criteria or irrelevance, the remaining were evaluated for common themes related to pediatric telehealth in rural settings and the use of advanced practice nurses to provide care leading to improved outcomes. The extracted data was displayed and examined by a matrix supporting patterns and relationships within and across

literature sources. The use of a matrix helped with visualization of relationships and served as a starting point for evidence understanding (Whittemore and Knafl, 2005).

The literature examined the patterns, themes, commonalities, and differences, and used to identify these concepts by clustering and comparing (Whittemore & Knafl, 2005; Toronto & Remington, 2020). Through the constant analysis method, conclusions were drawn based on a rigorous analysis system. Verification involved confirming truthfulness and the identification of themes and relationships related to the clinical questions (Toronto & Remington, 2020).

Descriptive Results

Elements of data analysis for this project included noting patterns and themes, building a logical chain of evidence, and clustering (Whittemore & Knafl, 2005) (Table 3). Identified overarching themes included rural health disparities, perceptions of public and healthcare providers, advanced practice nurse telehealth services, and pediatric patients with health conditions.

Rural Health Disparities

Common themes identified in relation to rural health disparities included travel, time off from work, geographical barriers, patients seen by APRNs in rural areas, telehealth potential to increase access to care, access to specialty care, and improved patient outcomes and reduce healthcare disparities (Bradford et al., 2015; Cady et al., 2015; Koiveunen & Saranto, 2018; List et al., 2019; Marcin et al., 2016; Smith & Satyshur, 2016; Totten et al., 2020; Utidjian & Abramson, 2016).

Participants in a study by Bradford et al., stated that one of the main benefits of telehealth would be reduced need for travel, which overshadowed the concern for limitations or privacy regarding telehealth (2015). Totten et al., reported that patients were generally satisfied with the

outcomes provided by telehealth consultations due to saved time and reduced travel (2020). Substantial support was provided in the evidence that telehealth has the potential to address geographical barriers to disparities of care to children in underserved communities, breaking down barriers to specialists and decreasing travel (Bradford et al., 2015; Marcin et al., 2016; Totten et al., 2016).

Telehealth has the potential to increase access to care that patients may not otherwise have access to in rural and underserved areas (Koivunen & Saranto, 2018; List et al., 2019; Utidjian & Abramson, 2016). Telehealth is revolutionizing access to health care benefiting patients by providing immediate access to specialists (Taylor & Portnoy, 2019). It is necessary to recognize the impact that the APRN can have using telehealth to improve access to care, health care cost, and outcomes in rural areas (Smith & Satyshur, 2016).

Perceptions of Public and Healthcare Providers

Perceptions of public and healthcare providers included the need to understand patient awareness and perceptions, the need to deliver acceptable telehealth services to rural communities, lack of confidence, knowledge or experience with telehealth by APRNs, patient satisfaction with telehealth services, telehealth as perceived as an effective and efficient means to providing patient care, and the need to increase sustainability of telehealth services (Bradford et al., 2015; Koivunen & Saranto, 2018; List et al., 2019; Looman et al., 2015; Cady et al., 2015; Totten et al., 2020; Utidjian & Abramson, 2016).

Looman et al., stated that having an improved relationship with health care systems and providers may ultimately result in a more efficient use of services and improve family confidence in providers (2015). As we move forward and consider telehealth to provide care, we must consider how to incorporate multidisciplinary team care when not in the same physical

location (Evans et al., 2020). It is imperative to understand patient awareness and perceptions to be able to deliver acceptable telehealth services in rural communities, a lack of confidence in telehealth has shown to be a barrier (Bradford et al., 2015; Koivunen & Saranto, 2018). APRN confidence levels in using telehealth was shown to improve interventions (Koivunen & Saranto, 2018). Barriers to telehealth confidence in APRNs existed in tracking and scheduling (List et al., 2019). Telehealth needs to be rethought for sustainability and to increase positive perception, to be effective (Cady et al., 2015).

Advanced Practice Nurse Telehealth

Advanced practice nurse use of telehealth services themes included the need to connect patients and providers, patient need for trust of health outcomes, increased access to specialists, the need for APRNs to become more proficient with the use of telehealth services, increased need for training of the APRN on the use of telehealth in rural areas, improved outcomes when APRNs delivered care with telehealth services, and challenges with keeping up on competencies (Bradford et al., 2015; Koivunen & Saranto, 2018; List et al., 2019; Looman et al., 2015; Mckissick et al., 2016; Cady et al., 2015; Utidjian & Abramson, 2016).

Evidence tells us that APRN telehealth care coordination is effective in increasing caregiver satisfaction and confidence in providing care for their child (Looman et al., 2015). It is important that patients, caregivers, and practitioners trust health outcomes when using telehealth services. Telehealth helps to connect the patient and providers and improve relationships with providers (Bradford et al., 2015; Utidjian & Abramson, 2016). “Partnerships between community healthcare systems and families through telemedicine and APRN leadership will improve pediatric health outcomes and prevent complications in a cost-effective manner” (Smith & Satyshur, 2016).

Pediatric Patient Health Conditions

Pediatric patients with health conditions who used telehealth services showed themes to have burdensome wait times when waiting for primary face-to-face care. These burdensome wait times, along with travel times, can be essentially eliminated with the advances of telehealth use. Improved education for APRNs will likewise improve access of care to rural and underserved populations with chronic health conditions. Disparities in access to healthcare exist and contribute to poorer outcomes among infants and children. Consistent benefits were noted with the use of telehealth, by transforming policy, and delivery of care to pediatric patients, and can lead to better health if access to online services and advances in health IT (Koivunen & Saranto, 2018; McKissick et al., 2017; Marcin et al., 2016; Totten et al., 2016; Utidjian & Abramson, 2016).

Synthesis

Increased access to care, decreased patient/caregiver travel, and improved patient outcomes can be accomplished by breaking down geographical barriers and increasing knowledge in the benefits of telehealth services. Based on the evidence, telehealth services show promise for improving patient outcomes in pediatric populations of rural communities when implemented and utilized by APRNs. However, literature lacks specific practice guidelines for this process to be successful. Awareness of telehealth is present; however, experience is lacking. APRNs must improve personal awareness and knowledge and move from face-to-face practice to telehealth services by accepting change and integrating into practice.

This change could lead to more effective care of pediatric patients. As informatics in healthcare evolves, telehealth and telemedicine have the potential to close the divide between pediatric patients and their specialists, and disparities in access to care in underserved

communities. This integrative review identifies and describes the body of research evidence currently available. Additional research can lead to improved clinical practice by APRNs when using telehealth services to provide care for children living in rural settings to change outcomes and access to care.

Ethical Considerations

The project was submitted for approval by the lead institution Institutional Review Board (IRB). No consent was needed due to the nature of the integrative review focusing on literature evidence and not actual patient information. A copy of the Collaborative Institutional Training Initiative (CITI) certificate completed for this project is provided in (Appendix B). A copy of the IRB approval is provided in (Appendix C).

SECTION SIX: DISCUSSION

Implications for Practice/Future Work

Based on the research, the implication for telehealth services to be implemented into rural settings for pediatric patients shows to have purpose in improving patient outcomes. This can be done by incorporating APRNs into the process; planning and implementing steps to ensure EBP is the focus of literature. Future research is needed for ideas on how telehealth can be used, including school-based telehealth services, community partnerships, expanded access to specialty care in areas where a provider shortage exists, disasters, and for future infectious disease outbreaks. Moving forward, patients and providers are now experiencing more digital technology for health care, school, and social connection, leading to a promising future with telemedicine (Evans et al., 2020) Additional research is needed to look at how to improve reimbursement processes for APRNs when using telehealth services, as this has been tied to

outcomes and patient and family experiences (Looman et al., 2015). Increasing education on best practices and the benefits of telehealth services would also show promise in buy-in for providers.

Dissemination

The integrative review was completed and should be disseminated and presented to the intended audience, reporting findings and thematic patterns. This could be done by a myriad of methods, including but not limited to podium or poster presentations, briefs, or publications to peer-reviewed journals (Toronto & Remington, 2020). Results were distributed using a table or illustrative arrangement, providing the specific details from primary evidence that support the conclusions needed to allow the reader to independently interpret the information. Details included the phenomenon of concern, implications for practice, research, and policy initiatives (Whittemore & Knafl, 2005). The goal was to critically appraise the findings in a way that will inform practice and identify any gaps in the knowledge (Toronto & Remington, 2020).

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Table 1

Strengths of Evidence Table

<p>Article 1 Bradford, N. K., Caffery, L. J., & Smith, A. C. (2015). Awareness, experiences, and perceptions of telehealth in a rural Queensland community. <i>BMC Health Services Research</i>, 15(1), 427. https://doi.org/10.1186/s12913-015-1094-7</p>	<p>To describe the awareness, experiences, and perceptions of telehealth in an Australian rural community.</p>	<p>N= 47 participants</p>	<p>Semi-structured interviews were undertaken in rural towns. Themes extracted for core concepts from the interview</p>	<p>3 healthcare providers with previous telehealth practice, Major themes included: acceptance of the need to travel; paternalism and empowerment ; and trust and misconceptions.</p>	<p>Level VI qualitative</p>	<p>Findings not generalizable beyond the sample recruited. Furthermore, as a convenience sample, views, and experiences; may not be representative views of the whole community.</p>	<p>Yes: it is important to understand perceptions and experiences to improve and eliminate barriers.</p>
<p>Article 2 Cady, R. G., Erickson, M., Lunos, S., Finkelstein, S. M., Looman, W., Celebreeze, M., & Garwick, A. (2015). Meeting the needs of children with medical complexity using a telehealth advanced practice registered nurse care coordination model. <i>Maternal and child health journal</i>, 19(7), 1497–1506. https://doi.org/10.1007/s10995-014-1654-1</p>	<p>To look at FCC outcomes from a 4-year three-arm RCT on the effectiveness of a medical home-based care coordination model for children with</p>	<p>N=800 CMC were enrolled N= 163 used for this report</p>	<p>TeleFamilies is a 4-year three-arm RCT delivered by a clinic based APRN</p>	<p>For all groups, a media FCC score of 18.0-20.0 max of 20.0 across the 30-month study period indicated high levels of parent/guardian satisfaction and reflects</p>	<p>Level II RCT</p>	<p>Generalizability was not present. EMR documentation may not be generalized. One APRN with 30 years' experience provided all care coordination, a less experienced APRN may yield</p>	<p>Yes, important in understanding how APRNs can improve outcome using telehealth for</p>

	medical complex issues delivered by an APRN via telehealth.			the strength of the established home.		different results. Findings could reflect non-response bias of the control group.	care coordination.
Article 3 Koivunen, M., & Saranto, K. (2018). Nursing professionals' experiences of the facilitators and barriers to the use of telehealth applications: A systematic review of qualitative studies. <i>Scandinavian Journal of Caring Sciences</i> , 32(1), 24-44. https://doi.org/10.1111/scs.12445	To synthesize the best available research evidence on nursing professionals' experiences of the facilitators and barriers to the use of online telehealth services in nursing practice.	N= 25 studies	Systematic review of qualitative studies using thematic synthesis of previous studies using International electronic databases	Findings showed nurses' skills and attitudes are preventing factors in the implementation of telehealth. Need to focus on patients' role in telehealth, findings support positive adoption. further development of technological tools used in nursing practice and healthcare services are needed.	Level V Systematic review	Limitations of the review concern the search strategies used in the databases, heterogeneity of the selected studies and synthetization of findings	Yes: a synthesis of nursing experiences and barriers on the use of online telehealth would be beneficial to developing best practices or breaking down barriers.

<p>Article 4 List, B. A., Saxon, R., Lehman, D., Frank, C., & Toole, K. P. (2019). Improving telehealth knowledge in nurse practitioner training for rural and underserved populations. <i>The Journal of Nursing Education</i>, 58(1), 57-60. https://doi.org/10.3928/01484834-20190103-10</p>	<p>Looking at curricula changes to implement telehealth into FNP programs.</p>	<p>N= 24 FNP students</p>	<p>A QI project using PDSA using a self-reported survey</p>	<p>The change in telehealth knowledge was statistically significant ($p < .001$) for all survey items.</p>	<p>Level VI QI</p>	<p>Small size with the survey occurring half-way through the program, lack of exposure to telehealth services</p>	<p>Yes, knowing what students' thoughts are of telehealth early in the career even as a student would provide a heads way to what needs to be understood first, starting at this level will assist in change of perception.</p>
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<p>Article 5 Looman, W. S., Cady, R. G., & Garwick, A., Antolick, M., Lunos, S. A., & Finkelstein, S. M. (2015). Effects of a telehealth care coordination intervention on perceptions of health care by caregivers of children with medical complexity: A randomized controlled trial. <i>Journal of Pediatric Health Care</i>, 29(4), 352-363. http://dx.doi.org/10.1016/j.pedhc.2015.01.007</p>	<p>To evaluate the effect of APRN telehealth care coordination for children with medical complexity (CMC) on family caregiver perceptions of health care.</p>	<p>N=148 ages 2-15 years</p>	<p>Three-armed 30-month RCT to test the effects of adding APRN telehealth care coordination</p>	<p>An association was noted with higher ratings on measures of the child’s provider, communication, health care, and care coordination adequacy, compared with control subjects.</p>	<p>Level II RCT</p>	<p>Subjects were recruited from a single clinic and participation was voluntary, may have been selection bias. Non-English-speaking participants were excluded, number of children with CMC was small, limited. Generalizability limited to this subset of neurological disorders. Findings showed relatively little use of interactive video technology in the intervention group.</p>	<p>Yes, communication could provide information to improving telehealth outcomes.</p>
<p>Article 6 McKissick, H. D., Cady, Rhonda G., Looman, W. S., & Finkelstein, S. M., (2016;2017). The impact of telehealth and care coordination on the number and type of clinical visits</p>	<p>Evaluate the effects of an APRN to deliver telehealth interventions</p>	<p>N=163 started N=148</p>	<p>Secondary analysis of data from an RCT with control</p>	<p>Found that the number of unplanned visits decreased over time with</p>	<p>Level 1: analysis of data from RCT</p>	<p>Response rates differed between groups</p>	<p>Yes: it is key to research the role of the APRN</p>

<p>for children with medical complexity. <i>Journal of Pediatric Health Care</i>, 31(4), 452-458. https://doi.org/10.1016/j.pedhc.2016.11.006</p>	<p>in health care with complex medical issues.</p>	<p>Finished</p>	<p>group and intervention groups</p>	<p>greatest decrease in the video telehealth group.</p>			<p>in innovative health care changes such as telehealth.</p>
<p>Article 7 Marcin, J. P., Shaikh, U., & Steinhorn, R. H. (2016). Addressing health disparities in rural communities using telehealth. <i>Pediatric Research</i>, 79(1-2), 169-176. https://doi.org/10.1038/pr.2015.192</p>	<p>Literature review on telemedicine to improve access and the quality of care for pediatric patients with limited access to subspecialty care and consultations in the settings of ambulatory care, acute and inpatient care, and perinatal and newborn care.</p>	<p>N=3 clinical settings</p>	<p>Literature review</p>	<p>Studies demonstrated that telemedicine to provide direct patient care or support in a variety of settings, are more likely to receive care consistent with evidence-based guidelines and be referred to specialists.</p>	<p>Level 5: systematic reviews of descriptive and qualitative</p>	<p>A broad research agenda is needed to focus on metrics and translational research, community-based participatory research, and public health</p>	<p>Yes: the study focuses on pediatric populations and a variety of settings.</p>
<p>Article 8 Smith, N. & Satyshur, R. D. (2016). Pediatric diabetes telemedicine program improves</p>	<p>Present an overview of the leadership role of</p>	<p>N=14 convenience sample</p>	<p>QI project</p>	<p>The outcomes of the QI project were integral to the</p>	<p>Level VI QI project</p>	<p>Small convenience sample and only a two-month</p>	<p>Yes, help to understand how</p>

<p>access to care for rural families: Role of APRNs. <i>Pediatric Nursing</i>, 42(6), 294-299.</p>	<p>APRNs with the implementation and evaluation of a pediatric diabetes telemedicine program at a rural pediatric outpatient specialty clinic in partnership.</p>	<p>e of caregivers</p>		<p>quality of the telemedicine clinical initiative. Telemedicine and APRN leadership can help implement innovative programs into rural communities to improve access to care, healthcare cost, and outcomes.</p>		<p>period of data collected over implementation of the project</p>	<p>APRN can improve outcome in rural pediatric patients.</p>
<p>Article 9 Taylor, L. & Portnoy, J. W. (2019). Telemedicine for general pediatrics. <i>Pediatric Annals</i>, 48(12), e479-e484. https://doi.org/10.3928/19382359-20191119-01</p>	<p>To review how asynchronous and synchronous technology can be used when delivering health care using telemedicine.</p>	<p>n/a</p>	<p>Expert opinion of a review of types of telemedicine and delivery models</p>	<p>Telemedicine is revolutionizing access to health care either asynchronously or synchronously, ultimately benefiting patients allowing immediate</p>	<p>Level VII expert</p>	<p>Article is not peer review research</p>	<p>Yes, this article could shed light on best ways to deliver telemedicine or telehealth.</p>

				access to providers.			
<p>Article 10 Totten, A. M., McDonagh, M. S., Wagner, J. H. (2020) The evidence base for telehealth: Reassurance in the face of rapid expansion during the COVID-19 pandemic. White Paper Commentary. <i>Agency for Healthcare Research and Quality</i>, 20. https://doi.org/10.23970/AHRQEPCCOVIDTLEHEALTH</p>	<p>Summary of evidence on selected topics from reports that may be relevant in the context of the response to the COVID-19 pandemic.</p>	<p>N=2 reports from AHRQ Effective Health Care Program, N=58 systematic reviews</p>	<p>Review of systematic reviews and evidence mapping</p>	<p>The available evidence cannot promise that telehealth will solve the complex problems the healthcare system faces. However, the evidence can help in learning more about EBP in telehealth.</p>	<p>Level 5: review of systematic reviews</p>	<p>Gaps in literature</p>	<p>Yes: the literature could show where current gaps are identified, and these could either be explored with more literature reviews or prove further gaps.</p>
<p>Article 11 Totten, A. M., Womack, D. M., Eden, K. B., McDonagh, M. S., Griffin, J. C., Grusing, S., Hersh, W. R. (2016). Telehealth: Mapping the evidence for patient outcomes from systematic reviews. Technical Brief No. 26. <i>Agency for Healthcare Research and Quality</i>, 16. www.effectivehealthcare.ahrq.gov/reports/financial.cfm.</p>	<p>The purpose of this brief is to provide an overview of the large and disparate body of evidence about telehealth for</p>	<p>N=1,494 citations about telehealth, from which n= 58</p>	<p>Systematic review</p>	<p>Telehealth interventions produce positive outcomes when used for remote patient monitoring; the most consistent</p>	<p>Level 1: evidence from analysis of systematic reviews</p>	<p>Limitations of the literature are related to both the nature of telehealth and the current state of systematic reviews.</p>	<p>Yes: although the evidence reviewed had gaps, many articles were</p>

	use by decisionmakers	systematic reviews		benefit telehealth is used for communication and counseling or remote monitoring in chronic conditions. In addition, research reported that telehealth interventions have produced positive results when used in the clinical areas of chronic conditions and behavioral health.			reviewed giving a broad sense of what literature is available.
Article 12 Utidjian, L. & Abramson, E. (2016). Pediatric telehealth. <i>Pediatric Clinics of North America</i> , 63(2), 367-378. https://doi.org/10.1016/j.pcl.2015.11.006	To examine the current role of telehealth as a tool for delivery of pt	n/a	Descriptive study	By developing health policy regarding telehealth, the potential can	Level 5: Descriptive study	Limitations found in the descriptive study were that rigorous research needs conducted on the use of	Yes: although this article does give some

	care in pediatrics.			be better fulfilled.		telehealth services to understand its most effective uses including the potential for increasing cost-effective care.	good direction to what needs further reviewed in literature, it is a low level of evidence.
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Table 2

Inclusion and exclusion criteria applied to the literature review

Inclusion criteria	Exclusion criteria
Articles published between 2015-2020	Publications prior to 2015
Pediatric populations < 19 years of age with mild to chronic health conditions	Adult population > 18 years of age.
Peer-reviewed articles	Non-research articles
Full PDF text articles	Abstracts only
Healthcare providers (nurses, nurse practitioners, and advanced practice nurses)	All other providers not listed in the inclusion criteria
Rural and underserved community healthcare environments	Urban and inner-city healthcare environments
English language	Foreign language

Table 3

Review Matrix with abstracted data and column headings aligned with review questions.

Does the use of APRN telehealth services improve children’s access to care in rural settings?

Does the use of APRN telehealth service improve health outcomes for children living in rural settings?

Author (s) and Year	Method	Sample	Level of Evidence	Aspects of Telehealth to Improve Outcomes			
				Rural/Health Disparities	Perceptions of Public/Healthcare Providers	Advanced Practice Nurse Telehealth	Pediatric Patients with Health Conditions
Bradford, N. K., Caffery, L. J., & Smith, A. C. (2015).	Semi-structured interviews were undertaken in rural towns. Themes extracted for core concepts from the interview.	N= 47 participants	Level VI	Decrease travel, convenient, decreased time off work, and more accommodating . Breaks down geographical barriers to specialists.	It is imperative to understand patient awareness and perceptions to be able to deliver more acceptable telehealth services to the community. Important to understand readiness of rural community for implementation of telehealth.	Connects patients and providers. Statements from participant’s: Telehealth is no different and patients and practitioners need to be able to trust health outcomes.	. n/a

<p>Cady, R. G., Erickson, M., Lunos, S., Finkelstein, S. M., Looman, W., Celebreeze, M., & Garwick, A. (2015</p>	<p>3-armed RCT</p>	<p>N=163 Randomized subjects</p>	<p>Level I</p>	<p>Access to primary and specialty care is a challenge.</p>	<p>Telemedicine needs reconceptualized for sustainability. Telemedicine is perceived as an effective and efficient means. Better understanding of telemedicine services for sustainability.</p>	<p>Clinician acceptance identified as a key factor, workforce availability, adequate technology, and relationship between practitioners.</p>	<p>n/a</p>
<p>Koivunen, M., & Saranto, K. (2018).</p>	<p>Systematic review of qualitative studies using thematic synthesis of previous studies using International electronic databases.</p>	<p>N= 25 studies</p>	<p>Level V</p>	<p>Telehealth has the potential to increase access to care otherwise not received in rural areas. Healthcare delivery using telehealth is increasing in rural areas.</p>	<p>APRNs confidence in using telehealth improved with interventions. Lack of confidence in telehealth and associated technology shown as barrier.</p>	<p>APRNs need to be trained to maximize benefits to patients living in rural areas.</p>	<p>Improving telehealth education for APRNs will improve access to care and overall quality of care in rural and underserved populations.</p>
<p>List, B. A., Saxon, R., Lehman, D., Frank, C., &</p>	<p>A QI project using PDSA using a self-reported survey</p>	<p>N= 24 FNP students</p>	<p>Level VI</p>	<p>Potential to increase access to care in rural and underserved areas.</p>	<p>APRN confidence in telehealth knowledge increased following</p>	<p>APRNs need to develop knowledge and competencies in health IT to</p>	<p>N/A</p>

<p>Toole, K. P. (2019).</p>					<p>intervention. Change provided views on integrating telehealth into practicum courses.</p> <p>Barriers to clinical telehealth experiences reported. Barriers in tracking/scheduling. Lack of confidence potential barrier to telehealth use.</p>	<p>advocate for underserved populations.</p>	
<p>Looman, W. S., Cady, R. G., & Garwick, A., Antolick, M., Lunos, S. A., & Finkelstein, S. M. (2015).</p>	<p>Three-armed RCT</p>	<p>N=148 ages 2-15 years</p>	<p>Level III</p>	<p>n/a</p>	<p>Having an improved relationship with health care systems and providers may ultimately result in a more efficient use of services and improve family confidence in providers.</p>	<p>Evidence tells us that APRN telehealth care coordination is effective in increasing caregiver satisfaction and confidence in providing care for their child.</p>	<p>For CMC and other populations who need and use high levels of health care, simply lowering health care use is not sufficient to improve efficiency.</p>

					Health status and satisfaction must also be a primary focus.		
McKissick, H. D., Cady, Rhonda G., Looman, W. S., & Finkelstein, S. M., (2016).	Secondary analysis of data from an RCT with control group and intervention groups.	N=163 started N=148 Finished	Level I	n/a	n/a	Improved outcomes for children have been shown when APRNs delivered care.	APRN delivered telehealth may support a shift from unplanned health care use among pediatric patients with CMC.
Marcin, J. P., Shaikh, U., & Steinhorn, R. H. (2016).	Literature review	N=3 clinical settings	Level V	Differential access to care for pediatric patients, creating barriers to those in rural and underserved communities. The use of telehealth has the potential to address geographical barriers to disparities of care to children	n/a	More consistent care received with EBP practice guidelines.	Disparities in access to healthcare contribute to healthcare outcomes among infants and children. By providing pediatric subspecialty care in more convenient settings patients are more like to receive EBP care increasing outcomes.

				in underserved communities.			
Smith, N. & Satyshur, R. D. (2016).	QI project	N=14 convenience sample of caregivers	Level VII	Telemedicine can reduce access to care barriers, decreased travel, and quality prevention service closer to home.	Caregivers were satisfied with telemedicine visits as an alternative to traditional office visits. One third of caregivers reported they would receive services without telemedicine, they did acknowledge that telemedicine offered them the option and convenience of not having to travel.	Recognize the impact that the APRN can have using telehealth to improve access to care, health care cost, and outcomes in rural areas. Partnerships can improve pediatric health outcomes and prevent complications between community healthcare systems and families through telemedicine and APRN leadership.	Empower patients and their caregivers with self-management skills with effective telemedicine models that use FCC.
Taylor, L. & Portnoy, J. W. (2019).	Expert opinion of a review of types of telemedicine and delivery models.	N/A	Level VII	Telemedicine is changing access to health care providing immediate access to specialists; Rural communities	n/a	TM can be used to deliver care in homes, schools, and virtually anywhere that a patient and provider (have access to telemedicine ?)	n/a

				can have access to specialists that not previously available.			
Totten, A. M., McDonagh, M. S., Wagner, J. H. (2020).	Review of systematic reviews and evidence mapping	N=2 reports from AHRQ Effective Health Care Program, N=58 systematic reviews	Level V	Delivery of care across time and/or distance, increases access to care.	Differences in viewpoints on impact of telehealth, quality of care, variation of implementation, and lack of rigorous and detailed studies.	n/a	Manage patients with chronic conditions
Totten, A. M., Womack, D. M., Eden, K. B., McDonagh, M. S., Griffin, J. C., Grusing, S., Hersh, W. R. (2016).	Systematic review	N=1,494 citations about telehealth, from which n= 58 systematic reviews	Level I	Substantial support in evidence that research needs to study barriers and implementation efforts. Care setting influencing telehealth use and evaluation; urban vs. rural.	Type of telehealth and purpose influenced telehealth use and evaluation.	n/a	More research needed to review management of serious pediatric conditions with telehealth. Patient populations influenced telehealth use and evaluation, clinical focus, care goals, outcomes, etc. Reviews provided consistent findings of the potential

							<p>benefits of telehealth.</p> <p>Healthcare for pediatric patients can be disruptive and affect life, activities, and development. Few studies included clinical outcomes.</p>
<p>Utidjian, L. & Abramson, E. (2016).</p>	<p>Descriptive study</p>	<p>n/a</p>	<p>Level V</p>	<p>Telehealth can help improve access to underserved regions.</p>	<p>Patient satisfaction with telehealth services reported high; of 32 studies examined on patient satisfaction, good levels of satisfaction were reported.</p>	<p>Improve relationships with subspecialists and rural providers; gain new patient management skills</p>	<p>The role of telehealth in pediatric healthcare is expected to increase.</p> <p>Developing health policy can help transform delivery with pediatric patients, improving access.</p> <p>Telehealth has the potential to improve quality of care and patient safety in pediatrics.</p>

Appendix A

Melnyk's Hierarchy of Evidence

Level I: Evidence from a systematic review of all relevant randomized controlled trials (RCT's), or evidence-based clinical practice guidelines based on systematic reviews of RCT's

Level II: Evidence obtained from at least one well-designed Randomized Controlled Trial (RCT)

Level III: Evidence obtained from well-designed controlled trials without randomization, quasi-experimental

Level IV: Evidence from well-designed case-control and cohort studies

Level V: Evidence from systematic reviews of descriptive and qualitative studies

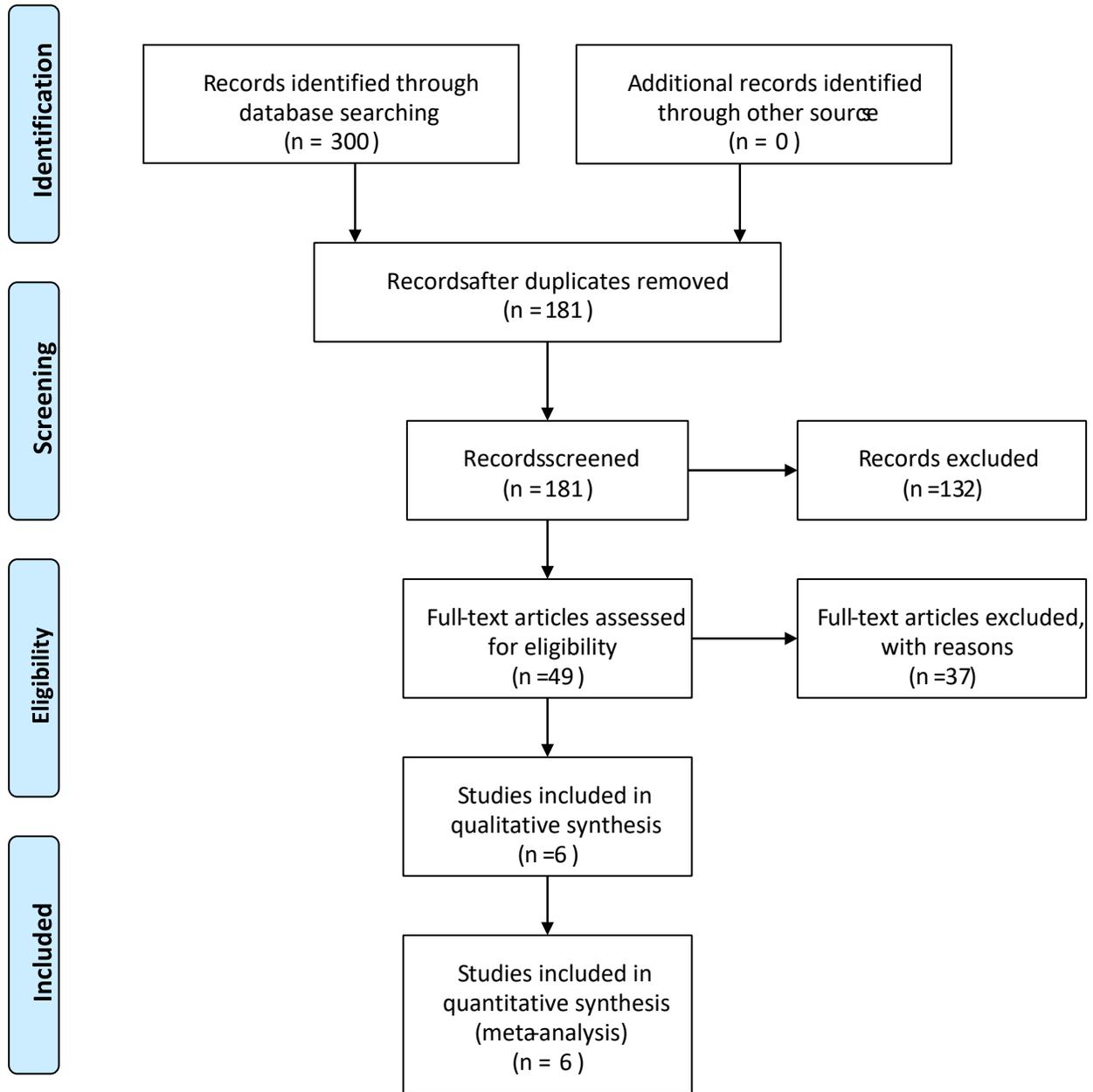
Level VI: Evidence from a single descriptive or qualitative study

Level VII: Evidence from the opinion of authorities and/or reports of expert committees

Melnyk, B. M., & Fineout-Overholt, E. (2019). *Evidence-Based Practice in Nursing & Healthcare*. Wolters Kluwer.

Appendix B

PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097 for more information, visit www.prisma-statement.org.

Appendix C

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

Name: Tammy Moyer (ID: 9214049)
 Institution Affiliation: Liberty University (ID: 2446)
 Institution Email: tmoyerl@liberty.edu
 Institution Unit: nursing
 Phone: 7404386659

Curriculum Group: Biomedical Research -
 Basic/Refresher
 Course Learner Group: Biomedical & Health Science Researchers

Stage: Stage 1 - Basic Course

Description: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in biomedical research with human subjects.

Record ID: 37235878
 Completion Date: 11-Jul-2020
 Expiration Date: 11-Jul-2023
 Minimum Passing: 80
 Reported Score*: 94

	DATE	SCORE
REQUIRED AND ELECTIVE MODULES ONLY	COMPLETED	SCORE
Belmont Report and Its Principles (ID: 1127)	28-Jun-2020	3/3 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	28-Jun-2020	5/5 (100%)
Liberty University (ID: 15111)	28-Jun-2020	No Quiz
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	28-Jun-2020	5/5 (100%)
History and Ethics of Human Subjects Research (ID: 498)	01-Jul-2020	5/5 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	07-Jul-2020	5/5 (100%)
Informed Consent (ID: 3)	08-Jul-2020	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	11-Jul-2020	(100%)
Records-Based Research (ID: 5)	11-Jul-2020	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	11-Jul-2020	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	11-Jul-2020	5/5 (100%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	11-Jul-2020	2/5 (40%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

verify at: www.citiprogram.org/verify/?kce3c5a3b-d48b4555-9939-1280d25719a3-37235878

Appendix D

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

September 16, 2020

Tamara Moyer

Sharon Kopsis

Re: IRB Application - IRB-FY20-21-139 AN INTEGRATIVE REVIEW: BEST PRACTICES
IN ADVANCED PRACTICED REGISTERED NURSE (APRN) TELEHEALTH SERVICES
TO IMPROVE CHILDREN WITH CHRONIC HEALTH CONDITIONS OUTCOMES IN
RURAL COMMUNITIES

Dear Tamara Moyer, Sharon Kopsis:

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study does not classify as human subjects research because:

(1) it will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP

Administrative Chair of Institutional Research

Research Ethics Office