

**Advanced Practice Nurses, Physician Assistants, and Certified Registered Nurse
Anesthetists in Rural Colorado: Why Choose Rural Medicine?**

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Abstract

The problem addressed by this qualitative case study was the shortage of primary care providers in the rural areas of Colorado. Because of the shortage of healthcare providers, rural communities face health disparities at a higher rate than in other areas. The purpose of this qualitative study was to explore the reasons currently practicing Advanced Practice Nurses (APNs) and Physician Assistants (PAs) choose rural medicine in defined Colorado counties. The research questions were as follows: What do APNs and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine? What do APNs and PAs, in Colorado, perceive influence their decision to continue their careers in rural medicine? What do APNs and PAs in Colorado perceive might increase other APNs and PAs to choose a career in rural medicine? The design of this study was a case study. The conceptual framework used for this study was the Pfarrwaller et al. (2017) conceptual framework. The study used qualitative methods as the interviews and questionnaires used open-ended questions so that the participants could express their reasoning openly without being forced to choose from categorical answers. The population of interest included practicing PAs and APNs in designated rural, medically underserved areas of Colorado. Of the 250 potential participants, 12 participated in the study. The data collected from both the interviews and online questionnaires were entered into NVivo qualitative analysis software. Data saturation, validation, and triangulation were achieved by comparing data from the interviews and online questionnaires to clarify obscure concepts. The results of the APNs and PAs study may have several applications in practice, including helping schools identify groups of students or working adults who would be more likely to enter a career in rural medicine, and for rural healthcare facilities to understand the factors that drive APNs and PAs to choose and maintain a rural practice. By understanding those factors, training programs,

rural communities, and lawmakers could develop plans for recruitment and retention of providers in rural areas.

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Thank you to my family and friends for your support and encouragement through this process. I will not name you all, but you know who you are. This journey would not have been possible without each of you. I would also like to thank those who participated in this study, your time and cooperation were greatly appreciated. Finally, I would like to thank the past, present, and future rural health professionals. Your dedication to your patients and their families is integral to keeping rural areas healthy and thriving.

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Pfarrwaller Conceptual Framework**Error! Bookmark not defined.**

Chapter 1: Introduction

Rural communities make up about one-fifth of the population in the United States and are faced with severe shortages of healthcare professionals (Reitz et al., 2018). According to Redford (2019), rural communities have far fewer physicians practicing per capita than urban areas. The lack of general physicians in rural areas is a long-enduring problem, and many studies have shown the causes of the shortages. MacQueen et al. (2017) indicates the requirement of the broad skill set necessary to treat the diversity of illnesses in rural areas without specialized training as a cause of rural physician shortages. Another study by Reitz et al. (2018) discussed physicians' fears of overwork as well as physician reimbursement being lower and delayed in rural areas attributing to the rural physician shortage. Further, according to Diemer et al. (2012), physicians choose urban areas because of higher pay in more affluent areas.

Because of the shortage of healthcare providers, rural communities face health disparities at a higher rate than in other areas. For example, Americans living in rural areas have higher fatality rates due to heart disease, cancer, accidental injuries, chronic lower respiratory disease, and stroke than those living in urban areas (Stone et al., 2021). The Centers for Disease Control (CDC) concluded that improved access to treatment and more targeted prevention efforts in rural areas could help decrease the fatality rates due to chronic conditions (Iglehart, 2018). The CDC also documented a higher likelihood of children in rural communities having mental, developmental, and behavioral disorders than those in urban areas (Iglehart, 2018).

Another effort to address the shortages is increasing the role of physician assistants (PAs) and advanced practice nurses (APNs) in providing primary care (Redford, 2019). Other studies have explored the factors that influenced the choice of rural family practice amongst physicians, medical students, and PA students (Charter et al., 2021; Diemer et al., 2012; Iglehart, 2018;

MacQueen et al., 2017; Redford, 2019; Reitz et al., 2018; Strough-Hunter & Lekies, 2020). However, there is a lack of studies focused on understanding the factors that influenced currently practicing PAs and APNs to choose rural medical practice. According to Stough-Hunter and Lekies (2020), the literature on the lack of rural physicians continues to grow; however, little research exists specifically about PA aspirations. Zwilling et al. (2021) said that the concept of NPs was developed to provide more access to health care in frontier areas of Colorado. Though NPs have helped fill some gaps in rural medicine, the reasons for them to begin and continue practicing rural medicine, in Colorado, have not been examined. The gap in knowledge about factors influencing NPs and PAs choice of rural medicine as a career was the reason this study was necessary. Identifying the factors that influence NPs and PAs to choose rural practice could be used by training programs to recruit students interested in becoming rural practitioners.

Statement of the Problem

The problem addressed by this qualitative case study was the shortage of primary care providers in the rural areas of Colorado. In Colorado, there are 48 counties designated as rural or frontier (Colorado Rural Health Center, 2021). All 48 rural and frontier counties are defined as a State Health Professional Shortage Area, based on the definition outlined in the Board of Health Regulation 6 CCR 1015-6 (CDPHE, 2022). According to Redford (2019), rural America has less than half the physicians, per 10,000 residents, as urban areas of the country. Though many organizations have attempted to increase the number of physicians practicing in rural areas, the shortage remains a problem (Reitz et al., 2018).

Residents of rural and frontier communities acutely feel the healthcare provider shortage's consequences. According to Stone et al. (2021), rural residents have a higher likelihood of dying from leading causes of death such as heart disease, cancer, accidental

injuries, stroke, and chronic lower respiratory disease than those living in rural areas. In a study by Harrington et al. (2020), it was reported that life expectancy gaps between rural and urban areas are increasing, going from 0.4 years higher in urban areas in 1971 to more than 3 years higher in 2014. If the shortage of care providers is not solved, the health disparities for rural communities will continue to grow.

To fix the shortage of healthcare providers in rural areas, an understanding of the reasons healthcare professionals chose to enter rural healthcare is integral. Previous studies have examined why medical students (Charter et al., 2021) and PA students (Diemer et al., 2012) consider practicing rural medicine. However, there were no studies found within Colorado that address the reasons practicing APNs and PAs choose rural medicine.

Purpose of the Study

The purpose of this qualitative case study was to explore the reasons currently practicing APNs and PAs chose rural medicine in defined Colorado counties. The population of interest in this study was all APNs and PAs currently practicing in rural Colorado. The sampling frame used in this study was a list of all practicing APNs and PAs in the 48 Colorado counties to be sampled. The APN and PA study proposed using the Pfarrwaller et al. conceptual framework, developed in 2017. Pfarrwaller et al. (2017) focused on identifying reasons behind medical students' choice to become primary care physicians. As the framework was distinctly designed to categorize the influences on the career choices of medical students, it is logical to adapt the framework for this study. This APN and PA case study was intended to discover and categorize the reasons behind the choice of rural medical practice for APNs and PAs. Lists of APNs and PAs were obtained through the State of Colorado by contacting the representative and entering a Data Use Agreement with the Colorado Department of Public Health and Environment (CDPHE,

2002). Using lists obtained through the Colorado Department of Regulatory Agencies Verify a Colorado Professional or Business License website, a total of 1,096 providers were identified as potential participants. Through the process of random sampling, 250 potential participants were identified and notified via mail communication asking for their participation. A list of willing participants was generated, with a goal of 15–20 for the interviews or questionnaires, based on an average response rate of 35%–44% (Cunningham et al., 2015; Wu et al., 2021). Though 48 counties fit the defined criteria of rural or frontier areas, one provider each from 15–20 counties were desired for participation. The interview and questionnaire protocols were used together to establish study triangulation and saturation. The questions on the interview and questionnaire protocol tool were open-ended. The questions were developed and adapted using studies including Iglehart (2018) and Cuesta-Brand et al. (2020). The goal of data saturation was achieved through establishing a recurrence of themes from the interviews and online questionnaires. The categories that were identified can be used by APN and PA programs to change and improve recruitment strategies.

Introduction to Conceptual Framework

This study used the Pfarrwaller et al. (2017) framework for practicing APNs and PAs. The model categorized the influences on medical student career choice into four hierarchical systems, microsystem, mesosystem, exosystem, and macrosystem, based on Bronfenbrenner's ecological model of human development as applied to nursing career development framework (Pfarrwaller et al., 2017). The microsystem represents direct effects on the individual, such as physical environment, role models, family, and friends. The mesosystem is representative of the interactions between parts of the microsystem, such as family experiences. The exosystem represents indirect influences on individuals such as the health system, provider shortage issues,

resource allocation, and job opportunities. Finally, the macrosystem consists of the culture and values of society such as traditions, social norms, societal needs, and government (Pfarrwaller et al., 2017). Pfarrwaller et al. (2017) developed this framework because they realized the complexity, beyond the formal curriculum, of influencing factors in career decision-making. The developers realized that though much research had been performed on this subject, few conceptual frameworks were used to organize and filter the information. This model was designed to help curriculum planning, evaluation, and research flexibility.

The Pfarrwaller et al. conceptual framework provided the basis for the decision to conduct the APN and PA case study qualitatively. Pfarrwaller et al. focused on identifying reasons behind medical students' choice to become primary care physicians. As the Pfarrwaller et al. framework was distinctly designed to categorize the influences on the career choices of medical students, it was logical to adapt the framework for this study. Because the basic premise for this study aligned with that of the Pfarrwaller et al. study, it could be easily adapted for use with a different set of participants. The same four categorical systems could be used in this case study because each category broadly describes the sources of influence on career decision making. The influences on career decision making were the unknowns the APN and PA case study identified.

Introduction to Research Methodology and Design

The study used the qualitative method because the interviews were conducted using open-ended questions so that the participants were able to express their reasoning openly without being forced to choose from categorical answers. By conducting the study qualitatively, the results were based on real-life experiences rather than confined patient data. According to Sale and Thielke (2018), qualitative research could be described as both inductive and deductive

because the data are analyzed without making prior assumptions, inductively, then as patterns emerge theories develop through the process of deduction.

The design of this study was a case study. The case study design focuses on creating a narrative through an in-depth analysis of real-life experiences. According to Carey (2020), the case study can be used to explore professional attitudes and enable analytical reasoning. The premise of the study was to explore the reasons behind APNs' and PAs' choice of rural medicine as a career. Past studies have focused on why physicians chose rural medicine careers (Charter et al., 2021; Cuesta-Briand et al., 2020; Danish et al., 2020; MacQueen et al., 2017; Reitz et al., 2018). However, no studies within Colorado had explicitly focused on currently practicing APNs and PAs.

In an article by Alpi and Evans (2019), case studies were used to analyze information to research the impact of policy and practice in real time. Medical schools have used previous studies to develop a more diverse experience for medical students to help decrease the shortage of rural care physicians (Iglehart, 2018). The APN and PA study aimed to have the results be used to improve recruitment and training strategies for APN and PA programs so that the shortage of rural healthcare providers could be lessened, as was the goal of previous studies focused solely on physicians.

The population of interest included practicing PAs and APNs in designated rural, medically underserved areas of Colorado. The rural areas of interest were medically underserved, considered health professional shortage areas by the Health Resources and Service Administration (HRSA; 2021), and were more than 1 hour from urban healthcare services. The number of counties in Colorado fitting the criteria was 48 (CDPHE, 2015, 2021). The sampling frame used in this study was a list of all practicing APNs and PAs in the 48 counties that were

sampled. The lists were obtained through the State of Colorado by contacting the representative and getting access to names through the CDPHE (2002).

Using the list of practicing APNs and PAs in the chosen Colorado counties, structured interviews were conducted via Zoom. The questions on the interview protocol tool were open-ended. The questions were developed and adapted using previous studies such as Iglehart (2018) and Cuesta-Brand et al. (2020). The answers to the questions were analyzed and coded into categories of influencing factors using the NVivo program. Data saturation, validation, and triangulation were achieved by collating the answers provided in interviews with those submitted by questionnaire and using member checking to clarify any obscure concepts.

Medical schools have used previous studies to help develop a more diverse experience for medical students that will help decrease the shortage of rural care providers (Iglehart, 2018). However, the provider shortage problem persists. To help reduce the provider shortage, APNs and PAs can provide primary care in these rural areas. By examining practicing APN and PA reasoning for choosing rural medicine, training programs for APNs and PAs can be changed to encourage students to choose rural medicine as a career (MacQueen et al., 2017).

Research Questions

Interviews with APNs and PAs in qualifying counties of Colorado were conducted for the study. The research questions were as follows:

RQ1

What do APNs' and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine?

RQ2

What do APNs and PAs, in Colorado, perceive influences their decision to continue their careers in rural medicine?

RQ3

What do APNs and PAs, in Colorado, perceive might increase other APNs and PAs to choose a career in rural medicine?

Significance of the Study

Medical schools have used previous studies to help develop a more diverse experience for medical students that would help decrease the shortage of rural care providers (Iglehart, 2018). However, the provider shortage problem persists. To help reduce the provider shortage, APNs and PAs could provide primary care in these rural areas. By examining practicing APN and PA reasoning for choosing rural medicine, training programs for APNs and PAs could be changed to encourage students to choose rural medicine as a career.

The shortage of rural health care providers is a problem that persists despite various attempts to address the issue (Redford, 2019). This case study was a new approach to potentially help increase the number of future rural health care providers. The study was focused on identifying the reasons APNs and PAs chose and continue to choose their careers in rural Colorado. Gaining insight into these influences can be used by training programs to define rural recruiting strategies more clearly. Though this study does not provide the complete solution to the rural care provider shortage, it was a step that could be taken to improve the understanding of the issue. By understanding the reasons for APN and PA career choices, one facet of the shortage problem could potentially be addressed (Stough-Hunter & Lekies, 2020).

Definitions of Key Terms

Advanced Practice Nurses

Advanced practice nurses are registered nurses who have completed a master's or post master's education in a specific role. These nurses are educated and certified to assess, diagnose, order tests, and prescribe medication. Specializations include certified nurse practitioner, clinical nurse specialist, certified registered nurse anesthetist, and certified nurse-midwife (NCSBN, 2022).

Frontier County

A frontier county is a county with six or less people per square mile (Colorado Rural Health Center, 2016).

Physician Assistant

A physician assistant is a mid-level medical practitioner working under the supervision of a doctor or physician of osteopathy (Stoppler, 2021).

Rural County

A rural county is a county that is not considered a part of a metropolitan area (Colorado Rural Health Center, 2016).

Summary

A shortage of healthcare providers is a significant problem in the rural areas of Colorado. Studies have been done to understand the reasons for the shortage in primary care physicians in rural areas of the United States. Other studies have focused on PAs and the reasons they may choose rural medicine as a career. However, the primary care shortage continues in rural areas. This study aimed to discover the reasons both APNs and PAs that are currently practicing rural medicine chose their careers and remain in rural practice. As APNs and PAs can help bridge the

gap in the shortage of primary care practitioners in rural areas, understanding the reasons for the choice of rural medicine as a career is imperative to helping develop future providers. This chapter stated the problem and purpose of the study; introduced the conceptual framework, research method, and design of the study; outlined the research questions; and defined the key terms related to the study. The results of this study could provide valuable insight that may help training programs develop more robust recruitment programs for students desiring a career in rural medicine. Chapter 2 details the conceptual framework used for the study. Through the review of existing literature, it also addresses the healthcare insufficiencies in rural areas, physician specific shortages, and the role of NPs, PAs, and CRNAs in shortage areas.

Chapter 2: Literature Review

The problem addressed by this qualitative case study is the shortage of primary care providers in the rural areas of Colorado. This qualitative study aimed to explore why currently practicing APNs and PAs choose rural medicine in defined Colorado counties. The literature on healthcare provider shortages in rural areas worldwide is extensive. Most of the literature focuses on physician-specific deficits; however, the role of NPs, PAs, and CRNAs as rural care providers is gaining recognition. This literature review begins with a discussion of the conceptual framework for the study. Next is a discussion of physicians, NPs, PAs, and CRNAs regarding rural healthcare provider shortages. The literature categories to be discussed include an overview of healthcare insufficiencies in rural areas, physician-specific shortage issues, and the role of NPs, PAs, and CRNAs in rural areas.

Using the National University Library, literature searches, ranging from 2001 to 2023, were conducted through Roadrunner Search, EBSCOhost Discovery Services, a unified search engine. The search terms used included *rural medicine*, *rural healthcare*, *rural physicians*, *physicians in rural healthcare*, *PAs in rural healthcare*, *NPs in rural healthcare*, *advanced practice nurses in rural medicine*, *rural healthcare provider shortages*, *healthcare provider shortages*, *healthcare provider shortage quantitative study*, *healthcare provider shortage non-parametric study*, *Pfarrwaller conceptual framework*, *Pfarrwaller*, *full text*, and *scholarly/peer-reviewed journals*.

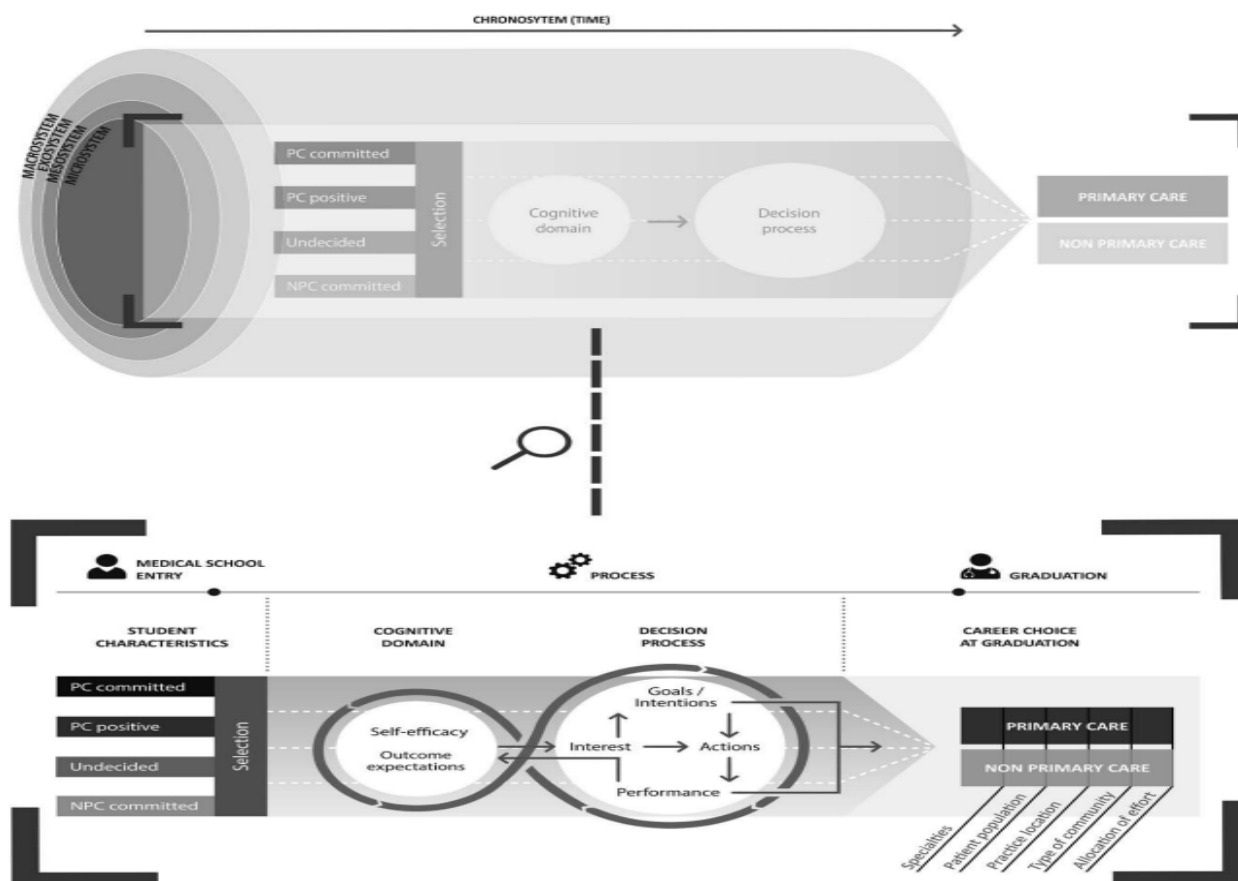
Conceptual Framework

This study used the Pfarrwaller et al. (2017) conceptual framework for practicing APNs and PAs. The model categorizes the influences on medical student career choice into four hierarchical systems, microsystem, mesosystem, exosystem, and macrosystem, based on

Bronfenbrenner's ecological model of human development as applied to nursing career development framework (Pfarrwaller et al., 2017; see Figure 1). The microsystem represents direct effects on the individual, such as physical environment, role models, family, and friends. The mesosystem is representative of the interactions between parts of the microsystem, such as family experiences. The exosystem represents indirect influences on individuals, such as the health system, provider shortage issues, resource allocation, and job opportunities. Finally, the macrosystem consists of the culture and values of society, such as traditions, social norms, societal needs, and government (Pfarrwaller et al., 2017).

Figure 1

Pfarrwaller Conceptual Framework



Pfarrwaller et al. (2017) developed this framework because they realized the complexity, beyond the formal curriculum, of influencing factors in career decision-making. The developers realized that though much research had been performed on this subject, few conceptual frameworks were used to organize and filter the information. This model was designed to help curriculum planning, evaluation, and research flexibility.

The Pfarrwaller et al. (2017) conceptual framework provided the basis for qualitatively conducting the APN and PA case study. Pfarrwaller et al. (2017) focused on identifying reasons behind medical students' choice to become primary care physicians. As this framework was distinctly designed to categorize the influences on medical students' career choices, it is logical to adapt the framework for this study.

Because the fundamental premise for this study aligns with that of the Pfarrwaller et al. (2017) study, it could be easily adapted for use with a different set of participants. The same four categorical systems can be used in this case study because each category broadly describes the sources of influence on career decision-making. The influences on career decision-making are the unknowns the APN and PA case study proposes to identify.

The Pfarrwaller et al. (2017) conceptual framework was further tested by Cuesta-Briand et al. (2020) in the study of the factors influencing the career decision-making of junior doctors in Australia. The researchers conducted semi-structured telephone interviews with 21 recent medical school graduates to identify the factors of influence regarding the junior doctors' choice with respect to specialty areas and rural locations. The authors found that work environment, practice location, peer groups, and family were highly influential to the participants (Cuesta-Briand et al., 2020).

Based on their findings, the authors determined that rural workforce shortages could be mitigated by offering rural-focused post-graduate training paths and improving career information flow (Cuesta-Briand et al., 2020). The study results also indicate that recruitment and retention strategies must address personal and family factors to be effective (Cuesta-Briand et al., 2020). The Cuesta-Briand et al. (2020) study was the model used to create the APN and PA study for this researcher. Both studies aimed to understand the factors of influence for rural healthcare providers, though the population of interest differed between the studies.

Other frameworks considered for the APN and PA study include the Bland et al. (1995) Theoretical model of the variables that determine medical students' specialty choice, Bennett and Phillips's (2010) theoretical model of specialty choice process, and Bronfenbrenner (1977) ecological model of human development, as was applied in Hickey et al. (2013) nursing career development framework. However, this researcher, like Pfarrwaller et al. (2017) and Cuesta-Briand et al. (2020), felt the other frameworks were insufficient representations of the factors influencing medical provider career choices. The Pfarrwaller et al. (2017) conceptual framework integrates portions of all previous frameworks, creating a more comprehensive picture of the factors influencing career choices among medical providers.

Healthcare Insufficiencies in Rural Areas

In both developed and undeveloped countries, rural areas of the world experience healthcare provider shortages and health disparities compared to urban areas. Kumar and Kumar (2018) state that though about half of the global population lives in rural areas, only 38% of the nursing and less than 25% of the physician workforces serve in rural areas. In Nepal, 81% of the population lives in rural areas, leading to a critical shortage of healthcare providers (Gauchan et

al., 2018). The problem is further compounded by most healthcare workers in Nepal being concentrated in the private sector and urban areas (Gauchan et al., 2018).

The public district hospitals and primary health centers provide emergency care and inpatient and outpatient clinical services. Still, they are largely inadequate for addressing the needs of the rural population (Gauchan et al., 2018). As a partial solution, the Nepali government has recognized that general practitioners are vital in improving access to healthcare in rural areas (Gauchan et al., 2018). Gauchen et al. (2018) highlights the problems faced by rural Nepal, and one partial solution is discussed. However, further study is needed to address the lack of accessible healthcare for the rural population.

Darkwa et al. (2015) examined the reasons for providers' reluctance to practice in rural areas of Bangladesh and identified potential methods for overcoming those barriers. The reasons for the lack of desire to practice in rural settings included poor living conditions, heavy workloads, poor safety, inadequate equipment, and little opportunity for career development or skill enhancement (Darkwa et al., 2015). The proposed improvement ideas included increasing allowances and incentives for rural postings, implementing a transparent and fair tract for provider promotion, and national policy changes to increase rural retention (Darkwa et al., 2015).

The authors thoroughly identify why providers are reluctant to practice rural medicine in Bangladesh. Darkwa et al. (2015) also offer ideas for potentially improving rural provider shortages. A longitudinal study would be a logical follow-up to examine the effects of implementing the proposed ideas. The authors could provide further insight and potentially identify the next set of barriers that Bangladesh needs to overcome to continue improving rural healthcare.

According to Weinhold and Gurtner (2014), even developed countries experience severe challenges in delivering comprehensive healthcare to rural areas, especially given the aging population. In the United States alone, 20% of the population lives in rural areas and is served by only 9% of registered physicians (Kumar & Kumar, 2018). These challenges create a distinct disparity between the health of the rural population and their urban counterparts.

Anderson et al. (2015) found that the most significant differences between rural and non-rural counties were in the recorded mortality and clinical care scopes. Anderson et al. (2015, p. 2) used data from the “*2013 County Health Rankings and Roadmaps* published by the University of Wisconsin and the Robert Wood Johnson Foundation.” Their findings showed significantly lower scores in the following categories: health behavior, morbidity factors, clinical care, and the physical environment (Anderson et al., 2015). These results support the claim of a significant difference between the health of those living in rural areas and those living in non-rural areas.

Guilbalt and Vinson (2017) support that the United States currently faces a severe maldistribution of doctors, especially primary care physicians in rural and poorer urban areas. The patients in these areas are representative of a large proportion of the United States population and suffer inordinate adverse health outcomes compared to urban people (Guilbalt & Vinson, 2017). Part of the cause of these unfavorable health outcomes is the lack of easy access to preventative care and maintenance health services (Guilbalt & Vinson, 2017).

A systematic review and meta-analysis of existing literature were conducted indicating the probability of medical students entering rural medical practices after being trained in rural underserved areas (Guilbalt & Vinson, 2017). Guilbalt and Vinson (2017) searched MEDLINE and Cochrane Libraries for previously published literature about rural medical exposure and its effect on students entering rural medicine. After filtering the search results, ten articles were used

for the meta-analysis. Guilbault and Vinson (2017) conducted qualitative and quantitative analyses to identify and quantify the correlation between rural rotations during medical school and the effect on the choice of rural medicine as a career.

The results indicated that medical students who train in rural areas are nearly three times more likely to enter rural medicine than those who do not train in those areas (Guilbalt & Vinson, 2017). Further, medical students who train in underserved areas are four times more likely to become primary care physicians (Guilbalt & Vinson, 2017). Guilbalt and Vinson (2017) indicated the results could help guide administrators and policymakers to expand training programs in rural areas to help relieve some of the access problems faced by rural communities.

The Guilbalt and Vinson (2017) study indicated an essential part of the potential solution to physician shortages in rural areas. However, rural training for medical students is only a piece of a more comprehensive solution. Other medical personnel, such as NPs and PAs, will also be necessary to solve rural communities' medical access problems. Though the results of the Guilbalt and Vinson (2017) study indicate the association between rural training and a career in rural medicine, further study is necessary to understand the other factors that influence the choice of medical professionals to enter rural medicine.

Rural health disparities are a long-running problem, and according to Iglehart (2018), life expectancy from 1969 to 1971 in rural areas was 0.4 years shorter than in urban areas, and from 2005 to 2009, the gap widened to 0.6 years. According to the Centers for Disease Control and Prevention (CDC), in 2014, more rural than urban residents died from the five leading causes of death: heart disease, cancer, unintentional injury, chronic lower respiratory disease, and stroke (Iglehart, 2018). According to Reilly (2021), one explanation for the health disparities is the lack

of preventative healthcare services in rural areas. Preventive services include pap smears, mammograms, colon cancer screening, and flu and pneumonia vaccinations (Reilly, 2021).

Nuako et al. (2022) examined healthcare utilization in rural versus urban areas where a large healthcare system had outpatient clinics. The study found that rural patients had worse health status and lower clinic utilization than their urban counterparts, even after adjusting for demographic data such as age, gender, race, ethnicity, and smoking (Nuako et al., 2022). The study indicated other variables, such as geographical or sociocultural barriers, which may account for the lower clinic utilization in rural areas and iterated that evaluating healthcare utilization is complex (Nuako et al., 2022).

Coombs et al. (2022) examined the social, cultural, and programmatic barriers to healthcare access in rural areas from the perspective of healthcare providers. The study was conducted in Montana and gathered data from advanced practice nurses, physicians, and physician assistants to represent a diversity of experiences. The investigation identified five themes as barriers to rural healthcare access. The themes highlighted include existing friction between rural identities and healthcare systems, the necessity of respect for cultural differences, the fragmentation of communication between healthcare providers, constraints on time and resources in rural health systems, and the prioritization of profits over removing barriers to healthcare access (Coombs et al., 2022).

The authors note that this study was essential in highlighting the perspectives of healthcare providers; however, more research needs to be conducted to capture the patients' perspectives in rural areas (Coombs et al., 2022). Coombs et al. (2022) also acknowledged that the problem of healthcare access in rural communities is a multifaceted problem that requires more study to understand and is not solvable using a solitary approach.

As the lack of adequate access to healthcare in rural areas continues to be an unsolved problem, there is a new concern as healthcare faces the COVID-19 pandemic and its aftermath. According to Stone et al. (2021), the pandemic's impact and the prevalence of comorbidity risk factors increase the vulnerability of rural populations. The article further explains that the pre-existing problems with healthcare access in rural communities are exacerbated by the current Covid-19 pandemic (Stone et al., 2021). The pandemic caused hospital infrastructures to collapse, causing access to ICU beds and ventilators to diminish further (Stone et al., 2021). Rural patients also face less access to disease specialists and larger medical centers than before the pandemic (Stone et al., 2021).

The challenge of the COVID-19 pandemic and its associated issues for rural communities was supported by the Coombs et al. (2022) study of rural care providers' views of the barriers to healthcare access. The researchers asserted that ensuring healthcare access is a multi-dimensional challenge, made more pressing because of the coronavirus pandemic (Coombs et al., 2022). Coombs et al. (2022) interviewed twelve healthcare providers from diverse backgrounds and specialties, finding that having too few providers to meet population needs and fragmented communication between providers impairs the ability of rural health systems to function. The researchers further explain that these issues compound the other barriers to rural access to healthcare (Coombs et al., 2022).

Other developed countries outside the US face the same challenges with provider shortages and healthcare access in rural areas. Weinhold and Gurtner (2018) examined provider shortages from the perspective of patient satisfaction in rural areas of Germany. The authors challenge the accepted use of population density to measure provider shortages adequately.

Weinhold and Gurtner (2018) discussed the need to look at the access problem from more than a geographical barrier. The results of Weinhold and Gurtner's (2018) study supported the idea that patient satisfaction with quality interpersonal relationships with providers and the comprehensiveness of services was more important than geographical barriers. The authors note the limitations of this research included the study being a snapshot of one moment in time and that a longitudinal study may be necessary to determine the genuine relationship between patient satisfaction and continuity of care (Weinhold & Gutner (2018)).

Shortages of healthcare providers in rural areas is a historical and ongoing worldwide problem. Identifying the problem and supporting the knowledge that the problem exists is a good starting point, but the shortage issues can never be solved if the causes are not understood. Coombs et al. (2022), Gauchan et al. (2018), and Darkwa et al. (2015) examined the problems from the provider perspectives only, leaving knowledge gaps in the literature. The provider's perspectives are incredibly valuable, but the problem is so complex, more information is required so that a multi-pronged approach can be taken to solve the issue.

Weinhold and Gutner (2018) examined the access problem from the patient satisfaction perspective. The patient perspective is as important as that of the provider, and taken together, a deeper understanding of provider shortage and healthcare access issues is achieved. However, these perspectives only represent a portion of the problem needing solving. Therefore, further study of the factors influencing provider career choice is another critical step toward finding solutions to the shortages.

Physician Specific Shortages

The shortage of physicians in rural areas of the world is a long-standing problem, and many studies (Anderson et al., 2015; Coombs et al., 2022; Darkwa et al., 2015; Gauchen et al.,

2018; Guilbalt & Vinson, 2017; Iglehart, 2018; Kumar & Kumar, 2018; Nuako et al., 2022; Reilly, 2021; Stone et al., 2021; Weinhold & Gurtner, 2014) have examined different aspects of the problem and the possible methods of solving the issue. Since the 1990s, about 40 medical schools in the U.S. have implemented new rural concentrations, including clinical training, rural-focused lectures, and other incentives to help decrease the shortage problem (Redford, 2019). In 2006, the Association of American Medical Colleges (AAMC) called for a 30% increase in medical school enrollment to be completed by 2015 (MacQueen et al., 2017).

Renner et al. (2010) examined the influence of loan repayment on physician recruitment and retention in rural areas of Colorado. Surveys were sent to rural healthcare providers who participated in one of three loan repayment programs between 1992 and 2007 (Renner et al., 2010). The three programs include the Colorado Health Professional Loan Repayment Program; the Colorado Rural Outreach Program; and the Dental Loan Repayment Program of Colorado (Renner et al., 2010). The objective was to determine the influence of loan repayment on recruitment and retention of rural providers in Colorado and to compare their motivations to those of their urban counterparts (Renner et al., 2010). The results of the study indicated that loan repayment programs had limited influence on recruitment; however, the data suggested that loan repayment has a larger impact on physician retention in rural areas (Renner et al., 2010). Renner et al. (2010) assessed the influence of other factors as well including community location, on call hours, size or type of practice, scope of practice, salary, fit between family and community, educational opportunities, availability of hospital privileges, practice coverage by another practitioner, and if there were friends or family in the area. All factors were shown to influence practitioners at some level, reiterating the idea that the choice of medical practice location is multifaceted and complex (Renner et al., 2010). One limitation of the study was the

sole focus on physicians as rural providers. Further study is necessary to understand influencing factors for other practitioners, NPs, PA, and CRNAs, in rural communities.

Mian and Strasser (2017) examined the effect of The Northern Ontario School of Medicine, a school with a social accountability mandate meant to address rural physician shortages throughout the medically underserved areas of Ontario, Canada. Mian and Strasser (2017) examined eight rural communities that were considered medically underserved, as defined by the provincial ministry of health in Ontario. The eight communities had successfully recruited physicians trained by the Northern Ontario School of Medicine (Mian & Strasser, 2017). The results suggested positive changes in the communities, including five of the communities achieving full physician staffing (Mian & Strasser, 2017). Other improvements included reduced recruitment expenditures, decreased need of replacement physicians, and the shift to long-term planning in recruitment strategies (Mian & Strasser, 2017). The study concluded that the location of medical education sites in the rural communities of Northern Ontario and the engagement of the communities to train physicians showed a positive correlation to the recruitment of physicians in those areas (Mian & Strasser, 2017). Mian and Strasser (2017) examined the importance of rural training on physician recruitment and further supported the idea that rural training can have a positive effect on the choice of rural medicine for physicians. However, the study is limited in that the scope was narrow, and it is unknown if the results could be reproduced in other areas.

Redford (2019) discussed rural initiatives in medical schools in the United States including rural training, financial incentives, increased admission of rural students, and recently, satellite campuses in rural communities. Though too early to know the full impact, satellite medical schools and residency programs have been established in rural areas to combat the

shortages (Redford, 2019). However, early data suggested that only one-third of those students in satellite locations entered rural medicine after graduation (Redford, 2019). Redford (2019) further highlights the importance of NPs and PAs in helping relieve the provider shortages in rural areas. Understanding the importance of other providers to help alleviate the shortages in rural areas is critical, and further study of the factors that influence NPs and PAs to enter rural medicine is vital to recruitment and retention efforts.

Shannon et al. (2005) evaluated the effect of a required statewide rural health education program in West Virginia that was implemented to help combat the shortage of rural physicians. The program required a three-month rural rotation for state-sponsored providers (Shannon et al., 2005). The data “indicate an association between perceived quality of the rural experience and increased interest in rural health, social responsibility and confidence in becoming part of the community” (Shannon et al., 2005, p. 397). The researchers indicated more study is necessary to evaluate the program's effects on recruitment and retention efforts.

Similarly, Schuller et al. (2017) examined the effect of the students/residents Experiences and Rotations in Community Health (SEARCH) program through the University of North Dakota School of Medicine and Health Sciences. The SEARCH program allows health profession students and residents to work in interprofessional teams in rural areas to learn about rural medical practice (Schuller et al., 2017). The study examined journals kept by participants in the SEARCH program, and the researchers extracted themes from the recorded experiences (Schuller et al., 2017).

The three main themes identified included: knowledge of healthcare issues in rural areas, working in interprofessional teams, and general rural awareness regarding medically underserved populations (Schuller et al., 2017). Many SEARCH program students recognized that rural

practitioners take a more holistic approach to care because they get to know their patients more personally (Schuller et al., 2017). The students also understood how vital the interprofessional team is to providing quality care to rural patients in North Dakota (Schuller et al., 2017). Finally, the SEARCH program participants learned that rural medicine is very diverse, and providers wear many different “hats” to provide quality patient care (Schuller et al., 2017).

Though this study by Schuller et al. (2017) indicated that the SEARCH program provides valuable opportunities for students to experience rural medical practice, it did not give any information as to the impact on the desire of those students to enter rural medicine after graduating. Further study could indicate the effect on students’ intention to enter rural medicine and measure the program's impact on improving rural recruitment. Other studies have looked at the effects of medical school, internship, and residency exposures to rural medicine on recruitment and retention in underserved areas, and all have found a positive correlation (Danish et al., 2020; Guilbault & Vinson, 2017; MacQueen et al., 2017; Meade et al., 2022; Topps et al., 2003; Trickett-Shockey et al., 2013).

Trickett-Shockey et al. (2013) surveyed graduating healthcare professional students to determine background and training competency and compared it to the intended practice location after graduation. The participants were from several disciplines of study, including dentistry, dental hygiene, medicine, nursing, and pharmacy (Trickett-Shockey et al., 2013). The study was conducted in West Virginia, a largely rural state with definitive rural health disparities (Trickett-Shockey et al., 2013)

The University where participants were surveyed is a health professional training institution aiming to provide students with the necessary skills to practice effectively in rural environments and improve the health of underserved communities (Trickett-Shockey et al.,

2013). Despite the University's emphasis on and perceived success of its rural health curriculum, the authors found that a small percentage of participants planned to practice in communities with a population below 2,500 (Trickett-Shockey et al., 2013). These findings contradict previous studies that suggested rural upbringing was the strongest predictor of the desire to enter rural practice (Trickett-Shockey et al., 2013). The authors discussed that the discrepancies in their findings versus other studies could be attributed to the definition of rural and the participants being prospective graduates rather than those who've been practicing for years (Trickett-Shockey et al., 2013).

This study is limited in that it included multiple disciplines of health professions. The results could differ in an investigation focused on physician, PA, and APN students due to the scope of practice and community needs. Though rural upbringing has been shown to influence career choice, further understanding of influential factors is needed to guide recruitment and retention processes for rural healthcare.

Landy et al. (2012) examined medical students' attitudes before and after participating in rural health fairs. A pre and post-test questionnaire was used for first-year medical student volunteers. The medical students were enrolled in a school in urban Florida and were volunteering at a health fair in the more rural Florida Keys. The study results indicated that the participating students strongly agreed the fairs were good for the rural practice experience and confirmed beliefs regarding rural medical necessity (Landy et al., 2012). Further, the results indicated that rural health fairs effectively promote early clinical skills for first-year medical students, and the participants strongly believed their participation helped improve patient health (Landy et al., 2012).

Curran and Rourke (2004) explored numerous factors affecting physician recruitment and retention in rural communities. The researchers discussed that rural settings are often isolated and require doctors to employ a broader range of skills to care for their patients (Curran & Rourke, 2004). Because of this responsibility, rural physicians perform vastly more procedures than their urban counterparts (Curran & Rourke, 2004). Rural physicians are placed under higher stress levels, specifically during emergencies, as the resources available are more limited in rural care facilities (Curran & Rourke, 2004).

The authors also discussed that access to continuing education for rural physicians is limited due to the time and distance required to attend educational classes and seminars (Curran & Rourke, 2004). Throughout the paper, Curran and Rourke (2004) focused on the medical schools' role in recruiting and retaining rural physicians. However, the researchers also acknowledged that medical schools cannot solve the issue of rural physician shortages on their own because the problem is multi-faceted and must be addressed on a broader level (Curran & Rourke, 2004).

Terry and Woo (2020) examined physician shortage from the angles of burnout, job satisfaction, and work-family conflict in rural areas. The characteristics of burnout described by Terry and Woo (2020) included emotional exhaustion, depersonalization, and reduced self-efficacy. The number of physicians that experience burnout in their careers is estimated to be over 50% (Terry and Woo, 2020).

The contributing factors to burnout include using electronic medical records, integration problems with work-life balance, and perceived loss of control (Terry & Woo, 2020). The consequences of physician burnout include medical errors, inadequate patient care, provider mental health decline, high turnover, and reduced patient safety (Terry & Woo, 2020). Rural

physicians are susceptible to burnout due to additional demands on their personal time. It is estimated that by 2032 the number of rural physician shortages will increase from 46,900 to 121,900 due partially to burnout (Terry & Woo, 2020). Accessibility for rural citizens is already strained and based on the projections by Terry and Woo (2020), that accessibility will become an even more significant challenge.

Other studies looked at geography, family happiness, living conditions, the scope of practice, lower wages, lack of sufficient medical equipment, and lower insurance reimbursement rates as factors for rural physician shortages (Darkwa et al., 2015; Full, 2001; MacQueen et al., 2017; Reitz et al., 2018; Topps et al., 2003; Wascko et al., 2014). Reitz et al. (2018) highlighted the uniqueness of the rural healthcare infrastructure as a challenge to physicians. The authors referred to lower reimbursement rates, increased patient needs, and the need for full-spectrum care in rural practices (Reitz et al., 2018). Dayaratna et al. (2013) considered the physician shortage problem to be a product of the American medical licensure system producing inadequate licensed professionals. The article further proposed modifications to the current approach to maintain licensing integrity and ensure that more medical school graduates can provide patient care (Dayaratna et al., 2013). The licensure system may need improvement to increase the number of medical school graduates; however, the United States has a limited number of medical schools, each with a set number of spots available per year. Logistically, medical schools cannot produce enough graduates alone to solve the provider shortage problem. Other trained medical professionals such as NPs, PAs, and CRNAs can help fill the gaps in rural areas and help ease the burden on physicians.

Full (2000) outlined the recruitment strategies used to draw physicians to a rural hospital in Indiana. The issues that faced the recruitment of physicians included lifestyle, medical

practice, and competition (Full, 2000). The lifestyle issues focused on the availability of school systems, employment opportunities for spouses, cultural outlets, accessibility to shopping, and available social activities in rural areas (Full, 2000). Issues with medical practice included longer working hours, less vacation or leisure time, reduced accessibility to the latest technology and specialists, and decreased reimbursement provided by Medicare and other payers (Full, 2000). The competitive issue outlined is the heavy demand for primary care physicians in higher-paying areas (Full, 2000).

Similarly, Danish et al. (2020) examined recruitment and retention based on Herzberg's two-factor theory of intrinsic and extrinsic factors for work motivation. The authors discussed the potential positive effects of financial and educational interventions on physician recruitment and retention in rural areas (Danish et al., 2020). Danish et al. (2020) indicated that financial policies such as funded internships, seminars, and support staff hiring, and development could give rural providers and medical students a sense of achievement and recognition for their work and professional and personal growth opportunities.

Another study that examined the financial aspect of rural physician recruitment and retention looked at the influence of loan repayment plans as an incentive (Renner et al., 2010). The authors specifically studied the loan repayment plans targeting rural physicians in Colorado (Renner et al., 2010). The study results indicated that loan repayment programs might have a limited influence on rural recruitment; however, rural communities offering loan repayment incentives may attract more providers than those that do not (Renner et al., 2010).

The authors further indicated that loan repayment programs might be more critical for physician retention in rural areas, as participants in the loan repayment programs tended to remain in their rural communities longer (Renner et al., 2010). Though financial incentives such

as loan repayment programs help with recruitment and retention, Renner et al. (2010) also found that other factors, such as the scope of practice, family satisfaction, and professional satisfaction, were potentially more important in the decision to practice rural medicine.

Reid et al. (2019) examined the effect of a partnership between a place-based foundation and the University of New Mexico's Office for Community Health on the rural provider shortage in Lea County, New Mexico. Lea County represents the extremely rural areas of New Mexico where inadequate access to healthcare is a significant challenge (Reid et al., 2019). Through agreements between the JF Maddox Foundation, the University of New Mexico, New Mexico Junior College, and Lea Regional Medical Center, complete rotations of medical residents were introduced to rural medicine (Reid et al., 2019).

The partnership resulted in significantly expanded primary care capacity, successful healthcare workforce recruitment, increased interest in rural rotations, and dissemination of the model to other rural areas of New Mexico (Reid et al., 2019). One limitation of this study is that though it worked in New Mexico, other sites may not have the platform to launch this model of provider rotations. The other limitation is that physicians were the focus, though other providers were briefly discussed. Because these studies identified various areas of improvement for rural medical recruitment and retention methods, strides have been made; however, the problem still exists. Redford (2019) noted a 2017 national study of physicians in their final year of residency that found 92% of the participants preferred to practice in communities of 50,000 or more, and only 1% interested in rural practice. These statistics reiterated that the rural practitioner shortage will not be solved by physicians alone.

Each of these studies focused on the effect of changes at the academic level to solve the provider shortage problem. Though approaching the rural provider shortage problem at the

training level is integral to improving awareness around rural medicine, it cannot be the only solution to accessibility. Many other barriers exist that affect rural healthcare accessibility, and each barrier must be identified and addressed if the world is to solve the rural provider shortage and healthcare accessibility problems.

A weakness in most of these studies is the primary focus on physicians alone. APNs and PAs are trained to perform many services traditionally afforded to general physicians. Because the problem of rural healthcare provider shortages is ongoing, even after changing strategies for recruitment and retention of physicians, the indication is another approach to the problem is warranted. A more thorough examination of options for closing the rural provider shortage gap requires looking at the roles NPs, PAs, and CRNAs can fill.

The Role of NPs, PAs, and CRNAs in Shortage Areas

Physician Assistants

The concept of a Physician Assistant (PA) was created in the mid-1960s to remedy the shortage of primary care physicians in the United States. Dr. Eugene A. Stead Jr. implemented the first PA program in 1965 at the Duke University Medical Center. The first class of PAs consisted of four ex-Navy corpsmen (American Academy of Physician Associates, 2023). The American Medical Association (AMA) formally endorsed the PA concept, and the accreditation process began in 1972. During the 1990s, accredited PA programs rose from 45 to 114 in the US (Physician Assistant History Society, 2023). The Affordable Care Act, signed into law in 2010, doubled the projected need for PAs, and accredited programs exceed 170, with 50 more awaiting accreditation. Finally, in 2022 CMS changed its repayment policy for Medicare Part B to include PAs for direct reimbursement while working in rural communities (Physician Assistant History Society, 2023).

Physician Assistants (PAs) fill a much-needed role in helping to reduce the shortage of rural medical practitioners. Diemer et al. (2012) stated that PAs are an essential component of rural medical care. Diemer et al. (2012) wanted to understand the factors that influenced PAs to enter rural medicine and found that rural backgrounds and internships were significant deciding factors in the choice of rural medicine. Diemer et al. (2012) further found that the most influential factors for PAs to choose rural medicine were the desire to serve community needs, the type of practice available, and the characteristics of the supervising physician. One limitation of the Diemer et al. (2012) study is it included only PAs that were members of the Texas Academy of Physician Assistants (TAPA), meaning the sample size was relatively small, and results were not generalizable. Further study with a larger, more diverse sample may produce different results.

Similarly, Schuller et al. (2017) examined a program at the University of North Dakota School of Medicine and Health Sciences that allows students to work in interprofessional teams learning about rural medical practices. Those who participated in the program reported having a better understanding of rural healthcare needs and problems, increasing the likelihood they would choose a career in rural health (Schuller et al., 2017). The Schuller et al. (2017) study is limited as it was not extensive enough to indicate how many, if any, of the participants entered rural medicine after their experiences. Exposure to rural practice is an effective measure taken by various medical training schools, and programs have increased in popularity over several years; however, it is only a beginning step. Examining the long-range effects of rural practice exposure during training would be valuable to measure the true success of those programs.

Larson et al. (2003) examined the contributions of NPs and PAs to generalist care in Washington State. The authors found that about 21% of generalist care in Washington State is

provided by nonphysician clinicians (Larson et al., 2003). Further, the authors showed that NPs and PAs provided 24.7% of generalist care in rural areas (Larson et al., 2003). Of the generalist care provided in rural areas, 50.3% of the visits were provided by women practitioners, compared to 36.5% in urban areas (Larson et al., 2003). The Larson et al. (2003) study highlighted the necessity of NPs and PAs in providing generalist care in rural areas; however, the study is limited as it does not explore the reasons for the NP and PA choices of rural medicine as a career.

Stough-Hunter and Lekies (2020) studied the influence of job and community characteristics on PA students' post-graduation plans to enter rural medicine. The study examined the factors influencing PA students' desire to return to their hometowns to begin medical practice (Stough-Hunter & Lekies, 2020). The results identified community attachment as the strongest predictor of willingness to return to participants' hometowns. The authors proposed that recruitment programs for rural students need to foster the connection students feel toward their home communities (Stough-Hunter & Lekies, 2020).

Stough-Hunter and Lekies (2020) provided insight about factors affecting PA students' career plans following graduation; however, it did not examine PAs already in rural practice or discuss the number of PA students who entered rural medicine after graduation. The study only focused on PA students' desire to return to their hometowns to practice, rather than including those who may want to practice rural medicine elsewhere. A broader spectrum study is needed to fully understand the factors influencing the choice of rural medicine for PAs.

Nurse Practitioners

The first NP program was developed in 1965 at the University of Colorado by Drs. Loretta Ford and Henry Silver. By 1973 more than 65 NP programs existed in the United States.

In 1974 the American Nurses Association (ANA) developed the Council of Primary Care Nurse Practitioners, and by 1979 about 15,000 NPs were practicing in the U. S. (American Association of Nurse Practitioners, 2023). The number of NP programs grew to over 200 by 1980, and the number of practicing NPs has steadily increased every decade since 1965. As of 2019, more than 270,000 NPs were practicing in the United States (American Association of Nurse Practitioners, 2023).

Hariharan (2015) discussed potential solutions to the physician shortage problem. One solution involved the government closing the reimbursement gap between primary and specialty care to make primary care more attractive to physicians (Hariharan, 2015). The second option was to develop more post-graduate training slots for primary care so that residents could experience rural healthcare (Hariharan, 2015). The final solution offered by Hariharan (2015) was to use APRNs as part of the healthcare team. Because the first two options require more time for plan implementation, the author indicates that using APRNs to help ease the physician shortage is the most efficient way to address the ongoing shortage problem (Hariharan, 2015). Hariharan (2015) acknowledged the potential barriers to using APRNs from the standpoint of professional liability but reiterated that APRNs are clinically capable of helping ease the physician shortage issues.

Auerbach et al. (2020) projected the number of NPs practicing in the US will grow faster than that of physicians and PAs between 2016 and 2030. The NP growth rate is expected to reach 6.8%, whereas physicians' and PAs' expected growth rates are 1.1% and 4.3%, respectively. Though this growth rate may help with the rural care crisis, it could cause hospital nursing shortages. (Auerbach et al., 2020).

Buerhaus (2018) discussed information published by the American Association of Nurse Practitioners, that there are 248,000 NPs in the US, and they provide a billion patient visits annually. Of those 248,000 NPs, 87% were involved in all major primary care specialties (Buerhaus, 2018). The specialties include family health, adult and geriatric care, pediatrics, and women's health (Buerhaus, 2018). The implication was that NPs in primary care provide the same services as physicians, making them a viable solution to the physician shortage problem (Buerhaus, 2018). Buerhaus's (2018) discussion strongly supported the fact that NPs could be an integral part of solving the provider shortage problems in rural areas. With that knowledge, further study is needed to understand the desire of NPs to practice in rural communities rather than urban settings.

Schramm et al. (2019) studied the role of NPs in underserved areas from a military standpoint, specifically training for primary care in areas of American Samoa. Because primary provider shortages are felt globally in rural areas, military NPs are being prepared to serve in austere, remote locations (Schramm et al., 2021). Michaels-Strasser et al. (2021) examined a program of rural rotation for nursing students in Democratic Republic of the Congo and found that exposing students to rural practice is an essential strategy for increasing interest in rural medicine; retention remains an issue due to poor working conditions and lower salaries. Other studies supported the idea that rural rotations during training are essential for the recruitment of rural care providers such as NPs but also discussed the problems around the retention of providers in those same rural areas (Collett et al., 2020; Dotson et al., 2013; Gibson et al., 2021; Mester, 2018).

Bae (2016) examined the job satisfaction of NPs in rural and nonrural areas. The researchers knew that recruitment and retention are strongly influenced by job satisfaction and

noted: “For NPs, autonomy has consistently been the most significant predictor of job satisfaction. Other extrinsic factors, including collegiality and interaction, professional growth, benefits and rewards, scheduling, recognition for work, and opportunities, are also related to NPs’ job satisfaction (Bae, 2016, p. 472).” The study showed no significant difference between job satisfaction in rural and nonrural NPs (Bae, 2016). However, the author also noted that rural NPs had higher job satisfaction when their skills were used to their fullest extent (Bae, 2016). The full use of NP skills was significantly more critical to rural practitioners than their nonrural counterparts (Bae, 2016).

Bae’s (2016) study provided valuable insight into the characteristics of NPs working in the United States. It aided in the understanding of some factors that influence the recruitment and retention of NPs in rural areas. However, because the study focused solely on job satisfaction, other potential factors influencing the choice of rural medicine as a career were overlooked. Bae (2016) concluded that “the nature of job satisfaction among rural NPs should be examined further.” Further study is necessary to gain insight into those other factors so that a fuller picture of extrinsic and intrinsic influences can be pieced together.

Dotson et al. (2013) used an analytic approach to examine nurse retention in rural areas of the United States. The authors explored the factors that influence a nurse’s choice to remain working in rural areas compared to those who work or commute to work in urban communities (Dotson et al., 2013). According to Dotson et al. (2013), the decision to continue working in a rural community is dependent on the magnanimous nature of the nurse and job, satisfaction with their job, amount of stress, and unity of values personally and professionally.

Three categories of nurses were examined: nursing students, rural nurses, and urban nurses (Dotson et al., 2013). Through focus group sessions and cluster analysis, the authors

identified four categories of nurse satisfaction; nurses undecided about their current job and the profession, those who were unsatisfied but wanted to remain in the profession, nurses unhappy with both their jobs and the profession, and those who were satisfied with both their jobs and the nursing profession (Dotson et al., 2013). This study thoroughly identified the values necessary for nurses to remain in rural practice; however, because it focused on all types of nurses, the results may differ with just the NP and CRNA groups. Further studies with specific nursing professions may show different results in influencing factors for retention in rural practice.

NPs in rural areas face other barriers that could potentially affect recruitment and retention. According to Figueroa (2013), state regulatory policies limit APNs' practice because they do not allow APNs to practice to their full scope. Figuero (2013) discussed evidence that showed care provided by APNs is proportionate to that of physicians in everything, including patient satisfaction, safety, and outcomes. Further, research indicated no differences in outcomes for primary care given by NPs versus physicians (Figuero, 2013). The author cited these findings, making the case that policy changes are necessary to help alleviate the health disparities between rural and urban populations (Figuero, 2013).

The recommended policy changes included increasing government incentives for current and future providers so that the supply of rural healthcare practitioners could increase, improving utilization of APNs by addressing the state regulatory policies limiting APNs' scope of practice, and funding new research to investigate rural practice patterns so that the needs for various practitioners can be determined (Figuero, 2013). Figuero (2013) concluded that the most effective policy change is to remove the state regulatory barriers and allow APNs to practice to their full scope as this change would benefit rural populations the most.

Figuro's conclusion was supported by groups such as the National Council of State Boards of Nursing, the National Academy of Medicine, and the American Association of Nurse Practitioners. According to the American Association of Nurse Practitioners (2023), full practice authority (FPA) allows NPs to evaluate, diagnose, and treat patients without physician collaboration agreements or oversight. The FPA model is recommended by the National Council of State Boards of Nursing and the National Academy of Medicine (American Association of Nurse Practitioners, 2023). Figuro's assertions focused on policy change as the best way to help solve the rural provider shortage issue. However, though policy change is integral to the solution, it is not the only part necessary to mitigate the problem.

Zwilling et al. (2020), found half of US states have FPA for NPs. The remaining states have restricted practice for NPs; however, due to the 2019 coronavirus pandemic, five of the restricting states suspended practice agreement requirements, and fifteen states temporarily waived some practice agreement requirements (Zwilling et al., 2020). Zwilling et al. (2020) discussed that it is unknown whether the temporary suspensions of requirements will result in permanent adoption but emphasized the need to continue the pursuit.

Zwilling et al. (2020) continued by discussing legislative change that resulted in 23 states and Washington D.C. enacting full practice authority for NPs. The goals of passing FPA for NPs include increasing access, decreasing costs, and improving patient experience regarding primary care in rural and urban settings (Zwilling et al., 2020). The authors concluded that using NPs to their full capabilities is vital to providing access to quality care in rural locations (Zwilling et al., 2020).

Zwilling et al. (2020), much like Figuro (2013), approached the provider shortage problem from the standpoint of state legislative policy. Both authors agreed that FPA is integral

to decreasing rural health disparities due to provider shortages. However, both overlooked the need to understand further the influencing factors for NPs to enter and remain in a rural medical practice. Gaining insight into why NPs in rural areas chose their career path and legislative policy changes are both parts of a holistic solution to a growing healthcare crisis.

Certified Registered Nurse Anesthetists

The first nurse to specialize in administering anesthesia was Sister Mary Bernard at St. Vincent's Hospital in Erie, Pennsylvania, in 1877 (AANA, 2023). In 1893, Dr. Charles Mayo hired Alice Magaw as a nurse anesthetist, later naming her the "Mother of Anesthesia" (AANA, 2023). Nurse anesthesia practice was confirmed as legal in 1934 by the California Supreme Court (AANA, 2023). It was not until 1945 that the American Association of Nurse Anesthesiology administered its first certification testing for 90 women across 28 states (AANA, 2023). The term CRNA was adopted in 1956, and in 1986 congress passed legislation for direct reimbursement under Medicare Part B for CRNAs (AANA, 2023).

According to Vitale & Lyons (2021), CRNAs experienced the most restricted scope of practice of advanced practice registered nurses. CRNAs fill a significant gap in providers for rural communities as they are in higher supply in rural communities (Vitale & Lyons, 2021). Through their review, Vitale and Lyons (2021) found that patient mortality rates and risk of complications were no different between CRNA and anesthesiologist care, CRNAs are more available to rural areas and vulnerable populations, and state legislators are influenced by professional group leverage, rather than evidence, to make policy decisions regarding CRNA scope of practice.

The authors discussed reasons for the availability of CRNAs in rural areas by stressing that they are cost-effective resources for providing surgical and emergency care through airway

management and allowing them a full scope of practice helps meet the needs of country's rural people (Vitale & Lyons, 2021). This review highlighted the necessity of CRNAs in rural areas and focused on the fundamental need for full practice authority. As CRNAs are an essential part of a rural healthcare team, understanding what factors influenced the decision to practice in a rural community is as important as allowing them a full scope of practice.

MacKinnon (2021) examined the relationship between population density and the scope of practice for CRNAs. The study was conducted in Arizona and looked specifically at the relationship between population density and scope of practice as well as job satisfaction and scope of practice (MacKinnon, 2021). The study showed no association between population density and scope of practice; however, the scope of practice and job satisfaction were positively correlated (MacKinnon, 2021). The author found that job satisfaction increased significantly as the scope of practice for CRNAs increased (MacKinnon, 2021).

One limitation of this study is that in Arizona CRNAs are allowed a full scope of practice regardless of location, which can account for the lack of correlation between geographic location and job satisfaction. The ability of CRNAs to practice unrestrictedly in Arizona could skew the study's results, meaning it may not be reproducible in a state that restricts the scope of practice for CRNAs. Further study is warranted to fully understand the impact of the scope of practice on job satisfaction and the potential influence on the choice of CRNAs to practice in rural areas.

Like Figueroa's (2013) study involving full-practice authority for NPs, Feyereisen et al. (2021) examined the usage of CRNAs in states that adopted the "opt-out" provision, removing the Medicare billing requirement for physician oversight. Though the study did not find a correlation between being an "opt-out" state and using CRNAs, the authors did recognize a correlation between CRNA usage, rural geographic areas, and teaching hospital designation

(Feyereisen et al., 2021). This study was vital in exploring the relationship between opt-out states and the use of CRNAs in rural hospitals. However, further information could help in understanding the influencing factors behind CRNAs' desire to practice in rural areas.

The healthcare provider shortages in rural areas included surgical and anesthesia providers. According to Cohen et al. (2021), researchers and policymakers progressively worry more about rural community access to surgical services. Rural access to surgical services decreases with the nationwide shortages of surgeons and anesthesia providers (Cohen et al., 2021).

Rural hospitals and the communities supporting them rely on surgical services for financial stability (Cohen et al., 2021). Without the revenue generated by surgical services, rural hospitals are more likely to close due to financial pressures (Cohen et al., 2021). Though hospital closures may not affect the quality of care in rural communities, access to care is detrimentally impacted (Cohen et al., 2021). Because CRNAs provide the bulk of rural anesthesia, understanding why they choose to practice in rural areas, despite the immense challenges, is necessary to help recruitment efforts potentially.

Another approach to understanding the healthcare provider shortage in rural areas related to the closure of rural hospitals (Germack et al., 2021). Germack et al. (2021) provided background for their study by discussing the knowledge that reductions in primary care and specialist physicians are associated with rural hospital closures. Because of this decline, the authors highlight the increased reliance on NPs and CRNAs to provide care in rural communities (Germack et al., 2021).

Germack et al. (2021) studied the relationship between rural hospital closures and the supply of NPs and CRNAs across 1,544 rural counties in the U.S. The authors found no

noteworthy evidence to suggest that NPs and CRNAs responded to rural hospital closures by leaving the underserved area (Germack et al., 2021). However, the authors asserted that policymakers need to remove practice restrictions on CRNAs and NPs in rural areas after hospital closures, allowing rural communities to continue to receive a full scope of care from the available providers (Germack et al., 2021). This study was essential as it indicated that rural hospital closures do not influence NPs and CRNAs to remain in rural medical practice. Knowing factors that do not influence career choices for NPs and CRNAs prompts the need for further study to understand the factors that do impact the decision to remain in rural practice.

Though some of the previously discussed studies examined the factors influencing PA students to choose rural medicine, none researched the factors of influence for practicing PAs, NPs, or CRNAs. One study examined job satisfaction among practicing NPs, but job satisfaction is only one facet of choosing a career in rural medicine. The bulk of the research has involved physicians versus other care providers, and though more studies are beginning to focus on PAs, NPs, and CRNAs, the knowledge gap and provider shortage persist.

Several ideas for recruitment and retention have been theorized and put into practice, but the rural provider shortage problem remains unsolved. It is indisputable that NPs, PAs, and CRNAs are essential in helping solve the rural provider shortage issue, but without understanding the influencing factors for NPs, PAs, and CRNAs to choose to practice and remain in rural medical practice, recruitment, and retention efforts cannot improve. A thorough study of currently practicing NPs, PAs, and CRNAs and the factors influencing their career choice is necessary to add to the literature and continue the efforts to solve the rural healthcare provider shortage issue.

Summary

The shortage of rural healthcare providers in the U.S. and worldwide is an ongoing problem that has yet to be solved. The key points discussed include the discussion of the Pfarrwaller conceptual framework, healthcare insufficiencies in rural areas, physician-specific shortage issues, and the role of NPs, PAs, and CRNAs in rural areas. Prior research has centered on the physician shortage and how more medical students can be encouraged to enter rural medicine. Medical schools have increased acceptance rates, partnered with rural areas to attract students, and increased rural internships and residencies. However, the gap is continuing to widen with dire future projections.

Other research has looked at the role PAs, NPs, and CRNAs can play in helping provide more rural health access. All the literature presented converges on the same conclusion, the shortage of rural care providers is a problem that must be solved; however, the divergence comes in the methods used to try to solve the problem. The strategies used so far include financial incentives, exposure to rural practice during training, fostering community attachment, and considering the issues with work/life balance. Many approaches have been presented, but none have suggested examining the factors that influence currently practicing PAs, NPs, and CRNAs to choose rural medicine and remain in practice.

The lack of this approach to the provider shortage issue creates a knowledge gap that needs to be filled. Knowing the factors influencing the career decisions of practicing PAs, NPs, and CRNAs will add to the literature as another avenue to potentially help solve the rural healthcare provider shortage problem. Chapter 3 discusses the research methods for understanding the factors influencing the career decisions of practicing NPs, PAs, and CRNAs. The research methods discussed include the methodology and design, population of interest and

sample size, the materials and instrumentation used, the operational definitions of the variables, study procedures, and ethical assurances.

Chapter 3: Research Method

The shortage of primary care providers in rural areas is a long-enduring problem throughout the United States. Previous studies have examined the issue from the perspective of physicians and identified some causes of the shortage (Diemer et al., 2012; MacQueen et al., 2017; Redford 2019; Reitz et al., 2018). However, no studies could be located that examined the shortages from the perspectives of APNs and PAs in Colorado. This study is intended to bridge the gap and discover the perceived causes from the points of view of currently practicing APNs and PAs in rural counties of Colorado. The gap in knowledge about factors influencing NPs and PAs choice of rural medicine as a career is the reason this study was necessary. Identifying the factors that influence NPs and PAs to choose rural practice could be used by training programs to recruit students interested in becoming rural practitioners. The problem addressed by this qualitative case study is the shortage of primary care providers in the rural areas of Colorado. The purpose of this qualitative study was to explore the reasons currently practicing APNs and PAs choose rural medicine in defined Colorado counties.

This study included using the Pfarrwaller et al. conceptual framework, developed in 2017. The authors focused on identifying reasons behind medical students' choice to become primary care physicians. As the framework was designed to categorize the influences on the career choices of medical students, it was logical to adapt the framework for this study. The APN and PA case study was intended to discover and categorize the reasons behind the choice of rural medical practice for each group of participants, including NPs, PAs, and CRNAs. This chapter consists of a discussion of research methodologies, target population and sample, and materials and instrumentation. Further discussion includes study procedures, strategies for data analysis,

study assumptions, limitations, and delimitations of the study, and finally the ethical assurances necessary to successfully conduct the study.

Research Methodology and Design

This study was a qualitative case study using interviews and questionnaires with open-ended questions so that the participants could express their experiences in their own words. Using a qualitative approach allowed the researcher to capture the results based on broad, lived experiences rather than confined data. According to Sale and Thielke (2018) qualitative research can be described as both inductive and deductive because the data is analyzed without making prior assumptions. Inductively, as patterns emerge, theories develop through the process of deduction.

The design of this study was a case study. The case study design focuses on creating a narrative through an in-depth analysis of real-life experiences. According to Carey (2020), the case study can be used to explore professional attitudes and enable analytical reasoning. The premise of the study was to explore the reasons behind APNs' and PAs' choice of rural medicine as a career. Past studies have focused on why physicians chose rural medicine careers (Cuesta-Briand et al., 2020; Charter et al., 2021; Danish et al., 2020; MacQueen et al., 2017; Reitz et al., 2018). However, no studies within Colorado have explicitly focused on currently practicing APNs and PAs.

The other study methods that were not used include quantitative and mixed methods. The quantitative method was not used for this study because it is designed to identify factors of influence on a career choice, based on the opinions and experiences of the participants. Goertzen (2017) noted that the quantitative method is designed to collect and analyze data that is represented numerically allowing for statistical analysis. Mixed methods research is a

combination of both qualitative and quantitative designs with integration of the qualitative and quantitative data. According to Schoonenboom & Johnson (2017), the goal of mixed methods research is to expand and strengthen the conclusions of a study. Future research could potentially be performed if the results from this study were to be quantitatively compared to other similar research studies such as those examining physicians or medical students.

Other study designs, such as grounded theory, cross-sectional, phenomenology and descriptive were not used for this study as they were not the best fit for the purposes of the study. For example, grounded theory is designed to develop a new hypothesis as to the cause of a phenomenon (Reitz et al., 2018). This study was not designed to develop a new theory, but rather to identify factors that influenced the choice of rural medicine. The cross-sectional design did not fit because it is designed to explore data at a single point in time. This study is exploring not only the factors that influenced the choice of a rural medical practice, but also the factors influencing the choice to remain in rural medicine. Phenomenology was not used because the chosen approach for this research was from perceptions of events rather than trying to understand a phenomenon experienced by a group (Delmas & Giles, 2023). Finally, a descriptive study did not fit the purpose of this study because its purpose is to identify the factors of influence, not just describe rural medical practitioners as a demographic.

Population and Sample

The population of interest comprised practicing PAs and APNs in designated rural, medically underserved areas of Colorado. The rural areas of interest were medically underserved, considered health professional shortage areas by the Health Resources and Service Administration (HRSA, 2021), and were more than one hour from urban healthcare services. The HRSA's definition of health professional shortage areas are, "geographic areas of populations

that lack enough health care providers to meet the health care needs of that population” (HRSA, 2021, p. 1). According to the HRSA, the definition of rural is, “all non-metro counties, all metro census tracts with RUCA codes 4–10, and large area metro census tracts of at least 400 sq. miles in area with population density of 35 or less per sq. mile with RUCA codes 2–3” (HRSA, 2021, p. 1). The number of counties in Colorado fitting the criteria is 48 (CDPHE, 2015 & 2021). The sampling frame used in this study was a list of all practicing APNs and PAs in the 48 counties to be sampled. The lists were obtained through the State of Colorado by contacting the representative and gaining access to lists of providers registered with the Colorado Department of Public Health & Environment (CDPHE, 2002).

Using the lists of registered practitioners, a total of 1,096 providers were identified as potential participants. Through the process of random sampling, 250 potential participants were identified and notified via mailed letter requesting their participation (Appendix A). A list of willing participants was generated with a goal of 15-20 for interviews or online questionnaires. Though the ideal range of participants was 15-20, based on an average response rate of 35%–44% (Cunningham et al. (2020) and Wu et al. (2021), twelve participants were identified for participation. The interview and questionnaire protocols were used together to establish study triangulation and saturation. The questions on the interview and questionnaire guide were open-ended, allowing for richer responses. The questions were developed and adapted using studies including Iglehart (2018) and Cuesta-Brand et al. (2020). The goal of data saturation was achieved through establishing a recurrence of themes from the interviews and online questionnaires.

The responses were analyzed and coded into categories of influencing factors using NVivo. NVivo is a computer-based program that can be used to upload interview responses for

organization and theme identification. Data saturation, validation, and triangulation were achieved by collating the answers provided in interviews with those submitted by questionnaire and using member checking to clarify any obscure concepts.

Materials and Instrumentation

The data sources used were semi-structured interviews conducted via Zoom, and online questionnaires distributed via email. The questions on the interview protocol and questionnaire were open-ended, developed and adapted using previous studies such as Iglehart (2018) and Cuesta-Brand et al. (2020). Though the questions for the interviews and online questionnaires were developed from previous studies, the researcher attempted to field test the questions by requesting a review from 2–3 practicing NPs and PAs. Due to the lack of response from the reviews, the questions were submitted for IRB approval. The answers to the questions were analyzed and coded into categories of influencing factors using the NVivo program. Data saturation, validation, and triangulation were achieved by compiling all data and using participant reviews to clarify any obscure concepts. The interview and questionnaire protocol focused on the factors that influenced the decision to practice rural medicine, the intention to remain in rural medicine, and factors that may influence other APNs and PAs to enter rural medicine (Appendix B).

Study Procedures

This study was first submitted to the Internal Review Board for approval. Upon receiving the IRB approval letter found in Appendix C, data collection commenced. As this was a qualitative study, the first step in the data collection process was to identify participants using the lists obtained through the Colorado Department of Regulatory Agencies Verify a Colorado Professional or Business License website. Next an invitation was sent to each potential

participant, identifying the proposed study and the reasons for their inclusion as a participant. The recruitment letter/consent form (Appendix A) also provided the necessary contact information for participation, including the researcher's email and phone information. Of those who chose to participate, three chose the online Zoom interview, each lasting 45 minutes, and the other nine chose to complete the online questionnaire. The answers to the questions were combined and categorized for analysis. The answers to the interview questions were recorded and entered in the NVivo program for the purposes of organization and categorization for further analysis. Answers to the questionnaires were entered into NVivo for categorization, allowing for further study triangulation and saturation.

Data Analysis

The data collected from both the interviews and online questionnaires were entered into NVivo qualitative analysis software, used for organization and theme identification. Upon completion of each interview, a transcript was generated using the dictate function of Microsoft Word and the MP3 recording of the interview. Each transcript was sent to the interviewee for review and accuracy check. Once the transcripts were approved by the respective participants, each was assigned a number for anonymity and uploaded directly into NVivo. Qualtrics was used to distribute the questionnaires via email. The answers from the distributed questionnaires were anonymously returned via Qualtrics, numbered, and exported to NVivo. Once all the data was collated, the thematic analysis using code words was completed. This analysis consisted of using pre-determined key words (codes) to identify the consistency of the use of those codes throughout the transcripts and questionnaire answers. The codes that repeated most consistently led to the development of themes. Data saturation, validation, and triangulation were achieved by comparing data from the interviews and online questionnaires to clarify obscure concepts.

The researcher's role was to conduct the interviews, accurately recording the responses to the questions. After the interviews, the researcher uploaded the information in NVivo, allowing the program to analyze the responses. The program also organized the data into categories based on pre-determined key words (codes) as determined by the researcher. The researcher was also responsible for emailing the online questionnaire, using Qualtrics, to the participants and uploading the results in NVivo.

Assumptions

In qualitative research, an assumption is something the researcher accepts as true without proof (Ellis & Levy, 2009). One assumption being made prior to the research was that participants could access online questionnaires via the internet and have a basic understanding of completing and returning the answers. Another assumption was the participants would actively work to complete the questionnaires in the time allotted. An assumption of the interview protocol was that participants were familiar with the use of Zoom for interview participation. Because the timing of the research was post-pandemic, the rationale for each assumption was the participants were not only aware of computer formats for online questionnaires and tele-meeting interfaces but were at least proficient enough to access the necessary programs.

Limitations

Limitations of a qualitative study are identified by the researcher as possible weaknesses with the study (Ellis & Levy, 2009). One limitation of this study was that the numbers of potential participants in each category, NP, PA, and CRNA were not equal. There are less CRNAs than NPs or PAs in rural areas, so obtaining a representative sample from each category could have presented a challenge. However, the randomization protocol for the interviews helped mitigate any potential bias from one group to the other. Another limitation of the study was that

all participation in the study was voluntary, meaning any participant could withdraw at any time, potentially affecting the representation of each population sample. To mitigate this, the invitation email requested that any participant willing to participate agree to finish the study, barring any unforeseen circumstances.

Delimitations

According to Ellis and Levy (2009), delimitations in qualitative research define the boundaries of the study. The delimitations of this study included the parameters set by the definition(s) of rural counties, medically underserved areas, and required distance from an urban area. Given these definitions, the sample population consisted of 1,096 NPs, PAs, and CRNAs out of over 3,000 practitioners in the state of Colorado. The target number of participants was 15–20. Previous studies have focused solely on either physicians, medical students, or PAs, limiting their sample populations, and resulting in between 10 and 21 participants per study (Charter et al., 2021; Cuesta-Briand et al., 2020; & Reitz et al., 2018). Limiting the population sample to include NPs, PAs, and CRNAs currently practicing in defined rural areas fulfilled the intention of the study to help address the shortage of rural care providers and identify the factors that influenced these groups to choose a rural medical practice.

Ethical Assurances

Prior to beginning this study, approval from the Northcentral University's Institutional Review Board (IRB) was obtained (Appendix C). The risk to participants in this study was minimal, as the research was designed to identify patterns among personal views and experiences. The anonymity of this study was achieved through the assignment of a number to each participant so that names could not be attributed to any interview or questionnaire answers. The data was stored on the downloaded NVivo application on a pass-coded PC, owned by the

researcher. Any audio or paper notes were kept in a biometrically locked safe to which only the researcher has access and will be destroyed within one year of study finalization. The researcher outlined in the invitation letter that the study was voluntary, and all participants were protected through the previously discussed security and anonymity protocols.

The researcher in this study is originally from a rural community. The community of origination has always had access to primary medical care, seemingly without any shortage, causing potential bias in the area. However, the researcher understood this phenomenon is not common in all rural areas. The potential bias was mitigated by the researcher using pre-set definitions of health care shortage areas.

Summary

This chapter provided an in-depth discussion of the methods used for conducting the NP and PA research. The identified conceptual framework was based on Pfarrwaller et al. (2017) and adapted for use in this study. The chapter further explained the chosen methods for interview and follow-up questionnaire administration. The sampling methods included random sampling to identify those willing to participate in interviews or online surveys. The interviews were conducted via Zoom, and the questionnaires were administered through email. Analysis of the answers to the interviews and questionnaires was discussed including the use of NVivo for coding and organization. Assumptions, limitations, and delimitations of this research were identified and discussed, including any mitigating steps taken to limit researcher bias. Finally, ethical considerations were addressed, explaining the steps taken prior to beginning the research process. The details of ethical research included field testing of the questions, security of the data received, participant anonymity, and assurance that participation was voluntary. The next chapter

will discuss the trustworthiness of the data collected, the results of the study, and an evaluation of the findings.

Chapter 4: Findings

The shortage of primary care providers in rural areas is a long-enduring problem throughout the United States. Previous studies have examined the issue from the perspective of physicians and identified some causes of the shortage (Diemer et al. 2012; MacQueen et al., 2017; Redford 2019; Reitz et al., 2018). However, no studies could be located that examined the shortages from the perspectives of APNs and PAs in Colorado. This study was intended to bridge the gap and discover the perceived causes from the points of view of currently practicing APNs and PAs in rural counties of Colorado. The problem to be addressed by this qualitative case study is the shortage of primary care providers in the rural areas of Colorado. The purpose of this qualitative study is to explore the reasons currently practicing APNs and PAs choose rural medicine in defined Colorado counties. This chapter is organized into sections that examine the trustworthiness of the data gathered, the results of the study, evaluation of the findings, and a summary of the chapter.

Trustworthiness of the Data

Trustworthiness of the data gathered in qualitative research is achieved by establishing four main pillars. The four pillars of trustworthiness include credibility, transferability, dependability, and confirmability (Ahmed, 2024). Credibility is achieved by spending adequate time in observation to fully understand the perspectives of the study participants and reaching triangulation using multiple data sources to verify findings (Ahmed, 2024). Transferability refers to the ability to apply the findings to other situations outside of the study groups (Ahmed, 2024). Dependability requires an in-depth discussion of the methods used for the study so that it could be replicated, and study decisions can be understood by others (Ahmed, 2024). Confirmability is

achieved by validating interpretations using peer feedback and allowing participants the opportunity to review interpretations for accurate representation (Ahmed, 2024).

The processes used to gather the data ensure the credibility of the responses recorded. The population comprised of practicing PAs and APNs in designated rural, medically underserved areas of Colorado. The invitations were mailed to the work locations for each participant and addressed specifically to those fitting the criteria. The options given to each participant were to sit for an interview session or fill out the online questionnaire. The interview sessions were recorded, and the transcripts produced using the available features on Zoom. The transcripts were then sent back to each participant for review to help achieve triangulation through member checks. The questionnaires were distributed using Qualtrics, and the responses collected as written by each participant. All responses were transferred directly into NVivo for collation and evaluation. Direct transfer of responses, as written by the participants, helped achieve triangulation, like the member checking by the interview participants. Using NVivo, the data was analyzed to generate themes for each research question. Credibility was established through the achievement of triangulation using the themes that were continually repeated for each response analyzed.

The data gathered is highly transferable to other situations, because it relates to previous studies conducted using doctors and medical students as participants. As this was a qualitative study, the first step in the data collection process was to gather the names and contact details of each NP, PA, and CRNA currently practicing in the 48 rural counties. Next was to send an invitation to each potential participant, identifying the proposed study and the reasons for their inclusion as a participant. The letter also outlined the steps necessary to participate and provided the information needed to respond to the invitation.

The dependability of the data can be verified as the study is repeatable using the case study methodology. Triangulation of the data supports the dependability in that the collation of answers provided in both the interviews and questionnaires produced repeating key words. The repeating key words were subjected to a code-recode strategy to ensure consistency and lead to theme development.

The confirmability of the data was ensured by data saturation, validation, and triangulation achieved through collation of the answers provided in interviews with those submitted by questionnaire and using member checking to clarify any obscure concepts (Cuesta-Brand et al., 2020; Iglehart, 2018). The confirmability of the interview responses was achieved by having the participants review the transcripts of their individual sessions, and the questionnaire confirmability was achieved by each participant personally answering the questions and returning the questionnaire anonymously through Qualtrics (Ahmed, 2024). Using the NVivo software to identify the themes from each response removed the possibility of researcher bias. Any potential researcher bias was further negated by removing any participant identification from the responses. Each survey was returned through Qualtrics anonymously and

numbered prior to moving the information to NVivo. The interview transcripts were also numbered and transferred to NVivo to prevent bias based on any identifiable information.

Results

A case study design was employed to complete this study. The study was performed across 48 rural counties of Colorado. Lists of APNs and PAs were obtained through the State of Colorado by contacting the representative and getting access to the lists of practitioners registered. Through the process of random sampling, 250 potential participants were identified and notified via mail communication seeking their participation. A list of willing participants was generated with a goal of 15–20. However, 12 participants were surveyed or interviewed. Three participants chose the Zoom interview and nine completed the questionnaire. The interview and questionnaire protocols, found in Appendix B, were used together to establish study triangulation and saturation. The questions on the interview protocol tool were thematic in nature and open-ended. The responses were analyzed and coded into categories of influencing factors using the principles of Braun and Clark's (2006) phases of thematic analysis and NVivo. Analysis of all responses were based on question numbers and key words rather than individual questionnaires or interviews.

The demographic information collected in this study included the location of upbringing, practitioner designation, and years in rural practice. The majority, 42%, of participants were raised in urban areas. Of the nine participants, seven were PAs, and most participants, 50%, had been in practice for between 7 and 10 years. The full results are shown in Table 1.

Table 1

Participant's Demographics

Demographic	Categories	Frequency	Percentage
Location of Upbringing	Rural	4	33%

	Urban	5	42%
	Both	3	25%
Practitioner Designation	Nurse	4	33%
	Practitioner Physician	7	59%
	Assistant Certified	1	8%
	Registered Nurse		
	Anesthetist		
Years in Rural Practice	0-3	4	33%
	4-6	2	17%
	7-10	6	50%

Table 2*Interviews Conducted*

Pseudonym	Location of interview	Duration	Transcript length (single spaced)
I1	Zoom Interview	45:35	13 pages
I2	Zoom Interview	43:15	12 pages
I3	Zoom Interview	41:58	11 pages

Table 3*Questionnaires Received*

Pseudonym	Questionnaire distribution method	Completion time	Questionnaire length
Q1	Qualtrics Generated Email	30 minutes	3 pages
Q2	Qualtrics Generated Email	30 minutes	3 pages
Q3	Qualtrics Generated Email	30 minutes	3 pages
Q4	Qualtrics Generated Email	30 minutes	3 pages
Q5	Qualtrics Generated Email	30 minutes	3 pages
Q6	Qualtrics Generated Email	30 minutes	3 pages
Q7	Qualtrics Generated Email	30 minutes	3 pages
Q8	Qualtrics Generated Email	30 minutes	3 pages
Q9	Qualtrics Generated Email	30 minutes	3 pages

There were three participants who chose to participate in the Zoom interview option. As shown in Table 2, each interview lasted 45 minutes and each transcript produced an average of twelve pages of content from the transcript generator. After each interview, each participant was provided with a copy of their respective transcript for review. Each participant reviewed the transcripts for accuracy and responded with the assessment of their review. Each participant validated the accuracy of their transcript and once again consented to its use in this study without any changes needed. Those participants who chose to complete the email questionnaire were given two weeks to complete and return it. The emails were generated and distributed using Qualtrics. Each email contained a link to the questionnaire, ensuring anonymity and ease of use for the participants. The responses were exported directly from Qualtrics to NVivo for analysis.

Once the transcripts and the email questionnaire responses were collected, all the data was uploaded to NVivo for inductive thematic analysis. The inductive thematic analysis was conducted using Braun and Clarke's (2006) phases of thematic analysis. The phases included familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report (Braun and Clarke, 2006).

Following the phases of thematic analysis, the steps used for this study were as follows: Each transcript and questionnaire response were assigned a number from one to twelve. Using initial key words such as rural, training, scope of practice, childhood, upbringing, and autonomy, and employing NVivo's key word analysis, each transcript and questionnaire response was analyzed for key word use. Table 4 outlines the key words and frequency of use in both interviews and questionnaires. Following identification, the most frequently used key words were analyzed within each response and correlated with the questions to determine recurring themes to the questions. Table 5 shows the correlation between the most frequently used key words and the resulting recurring themes. The recurring themes were further analyzed within each question to produce the major themes for each research question. Table 6 (Appendix D) shows the complete responses that the themes were developed from, organized by each research question. The results of the inductive thematic analysis produced two to three themes that were categorized under each research question. The themes were aligned with the research questions as outlined in Table 7.

Table 4*Key Word Frequencies*

Key word	Frequency used
Rural	115
Training	96
Practice	75
Childhood	86
Upbringing	69
Autonomy	60
Lifestyle	58
Family	54
Rotation	94
Exposure	73
Community	95
Relationship	78
Care	78
Reimbursement	45
Loan Forgiveness	50
Quality of Life	62
Incentives	30
Small Town	25

Table 5*Highest Frequency Key Words and Resulting Themes*

Key words	Resulting themes
Rural	Rural Exposure/Rural Training/Rural Upbringing
Training	Rural Training/Training Rotations
Practice	Scope of Practice/Autonomy
Community	Sense of Community/Community Based Care/Community Relationships
Childhood	Rural Upbringing/Rural Exposure
Upbringing	Rural Upbringing/Rural Exposure
Relationship	Relationship Based Care/Community Relationships
Care	Scope of Practice/Autonomy/Relationship Based Care
Exposure	Training Rotations/Rural Rotations

Table 7*Themes Associated with Research Questions*

Research Question	Themes
RQ1: What do APNs and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine?	Training – rural rotations Childhood rural experiences Scope of practice – autonomy
RQ2: What do APNs and PAs, in Colorado, perceive influences their decision to continue their careers in rural medicine?	Quality of Life/Family & Friends Scope of practice/Relationship based care
RQ3: What do APNs and PAs, in Colorado, perceive might increase other APNs and PAs to choose a career in rural medicine?	Training/Exposure to rural practice Upbringing -family, friends/Sense of community

Below is a discussion of the responses, organized by research questions and generated themes. The findings below will relate in more detail the themes generated as related to the research questions. Participant responses were used to support the thematic findings of this study.

RQ1

What do APNs' and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine?

Training – Rural Rotations, Childhood Rural Experiences, and Scope of Practice – Autonomy. The results of question one was consistent between participants and the coding used

to filter results included using key words. The key words used for coding included upbringing, training, scope of practice, autonomy, and other. The resulting answers for coding are listed in Table 6 (Appendix D).

In relation to upbringing, participant number three of this study said, "I'm a small-town kid, married to a small-town kid, raising small town kids. Absolutely led me to want to practice in a rural area." Another participant, number six, described their experience as follows: "Seeing the needs and being used to small communities, enjoying smaller groups probably all influenced it, but especially seeing the needs and being familiar with the needs of rural communities influenced it." Yet another participant, number seven, said, "I have worked in urban medicine for many years, but my upbringing has been the sole influence in my current position in rural medicine. This is where I live and it is too far to commute to a larger urban medical center."

Training related responses included participant number ten describing the experience as follows: "My school required a 1 m rural rotation in my 3rd year. This helped me see how much more I would be able to do in a rural setting than in an urban setting." Another participant, number eight said, "My rural rotations and prior experience living in a rural community reinforced my decision to remain in a rural area for practice." A third participant, number four, described their experience, saying:

My school made us do a month-long rural rotation which really helped me understand what it would be like to not have specialist next door and having to run my own labs and draw my own blood. I learned early on in my training that I wanted to do primary care so from there the leap to rural medicine was pretty easy.

Scope of practice, autonomy, and other were related by participants as follows: "This past year, many of the state PA laws increased our scope of practice which will make it easier to

practice in a rural setting.” Another participant, number 12 said, “Full Practice no limits to scope of practice.” According to another individual, Participant 9, “I am lucky to work in a hospital where PAs have pretty much full independence, so I don’t feel the pressure of laws as much.” In relation to other, one participant, number seven said, “I work at a rural health center, and I think it offers better reimbursement than some of the more corporate jobs that I’ve seen.” Another person stated, participant eleven, “Pay or reimbursement rate is probably the biggest factor due to the cost of living being so high in rural areas.” Finally, as stated by another respondent, number one, “Factors include--upbringing, lifestyle, college friends already lived in this town and helped me find a position, and loan forgiveness program was a bonus.”

RQ2

What do APNs and PAs, in Colorado, perceive influences their decision to continue their careers in rural medicine?

Quality of Life/Family & Friends, and Scope of Practice/Relationship Based Care.

The resulting answers for question two consistently fell under the following key words, family, friends, quality of life, scope of practice, and relationship-based care and were used to identify the overall themes. The identified themes include quality of life as relates to family and friends, and the scope of practice including relationship-based care. The answers given by each participant are listed and arranged by code in Table 6.

The theme of quality of life as it relates to family and friends was described by participant two saying, “It was more of a family decision to move to a rural town but it has been a great fit for how I like to practice medicine. Family and friends were the biggest influencers...” Similarly, another participant, number seven said, “My family and I love having land to explore and love having so many recreational opportunities so close to home.” A third participant,

number three said, “For me it was more the lifestyle rural living can give.” Finally, another participant, six, stated, “I grew up visiting the town I currently work in and still have many family members in the area who deserve good health care.”

In relation to scope of practice and relationship-based care, one respondent, participant one stated, “In the workplace, I feel more connected to my patients and colleagues. I have a wider range of practice. I see lots of different pathology that is interesting.” Participant four in this study said, “Getting to see such a wide scope of medicine and not always having the option of a referral (or at least one the patient is willing to go to). “Also, it is a great place to build community and really get to know the families you serve.” From another participant, five, “The ability to work with the patient and help them achieve what they want to achieve.” As expressed by another participant, number one, “It always compels me to because of my patient base. I always feel like it is patient based, and my kind of motto is that it is relationship based, not just medicine based.

RQ3

What do APNs and PAs, in Colorado, perceive might increase other APNs and PAs to choose a career in rural medicine?

Training/Exposure to Rural Practice, and Upbringing -Family, Friends/Sense of Community. The key words used for coding, as related to question three are as follows, training, rural exposure, scope of practice, upbringing, family, friends, and community. The recurring themes that resulted include an amalgamation of training, rural exposure, and scope of practice as well as a combination of upbringing, family, friends, and a sense of community. The list of answers associated with question three are listed in Table 6.

According to participant, eight, “Scope of practice is an incentive. The pay is not much, if any, higher than in urban areas. Family is a huge factor- if one can practice where relatives and friends reside, then this is very important.” Another respondent, participant nine, said: “Scope of practice and community is a big plus. Upbringing, scope of practice and incentives.”

Evaluation of the Findings

The model, used as the basis for this study, categorizes the influences on medical student career choice into four hierarchical systems, microsystem, mesosystem, exosystem, and macrosystem (Pfarwallner et al., 2017). The same hierarchical systems were repeated in this study, as the themes that were developed are representative of the systems named by Pfarwallner et al. (2017).

The microsystems were shown by participants as they discussed the direct effects that their career choices had on themselves, their families, and friends. The participants named the mesosystem as they discussed the experiences their families had in the rural communities, and the effects those experiences have on the continuation of the participant’s rural practice. The exosystem was identified in themes that surrounded the participants’ acknowledgement of the need for practitioners in rural areas, and the challenges created by practicing in rural areas. Finally, participants named the macrosystem by discussing their experiences with the needs of their patients and their ability to work with a scope of practice that is more varied from those who choose to practice in urban areas. The themes identified, using Braun and Clarke’s (2006) inductive thematic analysis in this study align with those found in studies such as Cuesta-Briand et al. (2020); Charter et al. (2021); Danish et al. (2020); MacQueen et al. (2017); Reitz et al. (2018) and are further discussed below.

RQ1

What do APNs' and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine?

The first research question produced three major themes. The first theme, like that of the Guilbalt and Vinson, (2017) study, shows that exposure to rural medicine during training positively affects the desire of NPs, PAs, and CRNAs to enter rural medicine. One participant, ten, described the experience as follows: “My school required a 1 m rural rotation in my 3rd year. This helped me see how much more I would be able to do in a rural setting than in an urban setting.”

The second major theme that continually repeated was rural experiences during childhood. The theme of rural attachments aligns with an earlier study of PAs. Stough-Hunter and Lekies (2020) studied the influence of job and community characteristics on PA students' post-graduation plans to enter rural medicine. The results identified community attachment as the strongest predictor of willingness to return to participants' hometowns. One participant, number three, of this study said, “I'm a small-town kid, married to a small-town kid, raising small town kids. Absolutely led me to want to practice in a rural area.”

The third theme to repeat was the scope of practice and autonomy of rural medical practice. Curran and Rourke (2004) explored numerous factors affecting physician recruitment and retention in rural communities. The researchers discuss that rural settings are often isolated and require doctors to employ a broader range of skills to care for their patients (Curran & Rourke, 2004). One participant, number four in this study said, “Getting to see such a wide scope of medicine and not always having the option of a referral (or at least one the patient is willing to go to)”.

RQ2

What do APNs and PAs, in Colorado, perceive influence their decision to continue their careers in rural medicine?

The second research question produced two major themes. The first theme was quality of life combined with the influence of family and friends. The authors of an earlier study concluded that recruitment and retention strategies, for rural medicine, must address personal and family factors to be effective (Cuesta-Briand et al., 2020). Many respondents for this study echoed the influence of personal and family factors on their choice to remain in rural medicine. One participant, number seven said, “It was more of a family decision to move to a rural town, but it has been a great fit for how I like to practice medicine. Family and friends were the biggest influencers...”.

The second theme that resulted from this study was scope of practice combined with the ability to provide relationship-based care in rural areas. As one respondent, participant one stated, “In the workplace, I feel more connected to my patients and colleagues. I have a wider range of practice. I see lots of different pathology that is interesting.” The findings of this study align with that of Schuller et al., 2017, where many SEARCH program students recognized that rural practitioners take a more holistic approach to care because they get to know their patients more personally (Schuller et al., 2017).

RQ3

What do APNs and PAs, in Colorado, perceive might increase other APNs and PAs to choose a career in rural medicine?

The final research question produced the following major themes, training/exposure to rural practice and upbringing along with a sense of community. According to one participant,

four, “Scope of practice is an incentive. The pay is not much, if any, higher than in urban areas. Family is a huge factor- if one can practice where relatives and friends reside, then this is very important.” Of the twelve participants, ten commented on upbringing, scope of practice, and training or exposure to rural medicine as influences on the choice to practice rural medicine. These themes align with an earlier study by Diemer et al. (2012) that found that rural backgrounds and internships were significant deciding factors in the choice of rural medicine.

Summary

This chapter reviewed the study and discussed the processes and techniques used to perform the study. The four pillars of trustworthiness were revisited to ensure the study can be considered credible, transferable, dependable, and confirmable. The discussion included a reiteration of the Pfarrwaller et al. (2017) conceptual framework and its adaptability to this researcher’s work. Next the overall results of the NP, PA, and CRNA study in rural Colorado areas were outlined. The demographic information collected was presented along with a reiteration of the research questions. The results were further presented by explaining the Braun and Clarke (2006) inductive thematic analysis phases used to generate themes as pertains to each research question. The codes used were presented along with responses that are found in Table 6. The study results were presented by naming the major themes that emerged from the interview and survey answers collected. Finally, each research question was discussed using the associated themes and the alignment with previous studies was presented for each highlighted theme. The next chapter will be a discussion of this study’s implications, recommendations, and conclusions.

Chapter 5: Implications, Recommendations, and Conclusions

The shortage of primary care providers in rural areas is a long-enduring problem throughout the United States. Earlier studies have examined the issue from the perspective of physicians and found some causes of the shortage (Diemer et al. 2012; MacQueen et al., 2017; Redford 2019; Reitz et al., 2018). However, no studies could be found that examined the shortages from the perspectives of APNs and PAs in Colorado. The APN and PA case study was intended to bridge the gap and discover the perceived causes from the points of view of currently practicing APNs and PAs in rural counties of Colorado. The problem addressed by the qualitative case study was the shortage of primary care providers in the rural areas of Colorado. The purpose was to explore the reasons currently practicing Advanced Practice Nurses (APNs) and Physician Assistants (PAs) choose rural medicine in defined Colorado counties.

This qualitative case study explored why APNs, PAs, and CRNAs choose and remain in rural practice in Colorado. Guided by the Pfarrwaller et al. (2017) framework, the study revealed that rural upbringing, exposure during training, autonomy, and strong community ties are key factors influencing recruitment and retention. Through interviews and questionnaires with 12 rural providers, themes emerged around full-scope practice, quality of life, and meaningful relationships with patients.

Limitations of qualitative study were identified by the researcher as possible weaknesses with the study (Ellis & Levy, 2009). One limitation of this study was that the numbers of potential participants in each category, NP, PA, and CRNA were not equal. There are less CRNAs than NPs or PAs in rural areas, so obtaining a representative sample from each category could have presented a challenge. However, the randomization protocol for the interviews and questionnaires helped mitigate any potential bias from one group to the other. Another limitation of the study was that all participation in the study was voluntary, meaning any participant could

withdraw at any time, and slightly affected the representation of each population sample. To mitigate this, the invitation asked that any participant willing to participate agree to finish the study, barring any unforeseen circumstances. Further limitations of this study include only addressing the perspective of currently practicing APNs and PAs. Including current students or retired individuals could have increased sample size and potentially changed the developed themes. The limited number of participants could affect applicability and transferability to other studies as it could be considered too small to be usable. Also, the responses to the questionnaires tended to be much shorter than those given during the interviews. If more participants had chosen the interview over the questionnaire, the responses may have been richer, as interviews are more discussion based. Applicability could be affected by less dense answers to the questions as there could be a loss or misinterpretation of the context of the questions and answers. This chapter will discuss the implications of the study, recommendations for practice, recommendations for further study, and finally discuss the conclusions of the research study.

Implications

The implications of this study include the ability to use the resulting themes to aid in the development of recruitment and retention strategies in both the education and professional sectors. Factors that might have influenced the interpretation of the results for each research question include the key words chosen to aid in thematic development, and the knowledge that the developed themes aligned with those of earlier studies. Discussion of the implications are organized below by research question.

RQ1

What do APNs' and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine?

The key words that repeated regarding the first research question included, upbringing, training, scope of practice, autonomy, and other. The repeating nature of these key words led to the development of the following themes: exposure to rural medicine during training, rural experiences during childhood, and the scope of practice and autonomy of rural medical practice. The results of the study indicate that the choice of a career in rural medicine for the participants was driven by these themes. Participants consistently cited rural upbringing and training exposure as key influences, echoing themes identified in prior literature (e.g., Diemer et al., 2012, Guilbalt & Vinson, 2017, and Schuller et al. 2017).

RQ2

What do APNs and PAs, in Colorado, perceive influence their decision to continue their careers in rural medicine?

The second research question produced two major themes. The first theme was quality of life combined with the influence of family and friends, and the second was scope of practice combined with the ability to provide relationship-based care. Similar to the findings of Cuesta-Briand et al., 2020, many respondents for this study echoed the influence of personal and family factors on their choice to remain in rural medicine. The participants repeatedly citing scope of practice and relationship-based care as driving factors in their decision to remain in rural medicine address the study problem and purpose by adding to existing literature such as Schuller et al. (2017), The alignment of previous study results and these results lend further support to the Pfarwallner et al. (2017) framework.

RQ3

What do APNs and PAs, in Colorado, perceive might increase other APNs and PAs to choose a career in rural medicine?

The final research question produced the following major themes, training/exposure to rural practice and upbringing along with a sense of community. These findings contribute to the existing literature and framework by aligning with the results of previous studies. For example, Diemer et al. (2012) wanted to understand the factors that influenced PAs to enter rural medicine and found that rural backgrounds and internships were significant deciding factors in the choice of rural medicine. Again, alignment of these results with existing literature helps to support the framework and can be used to further enhance efforts to reduce the rural healthcare provider disparity throughout the world.

Recommendations for Practice

The results of this case study have many potential applications for both the education and professional sectors. The first potential application is to be used by NP, PA, and CRNA schools to help identify groups of students or working adults who would be more likely to enter a career in rural medicine. This result is consistent with the study by Guilbalt and Vinson (2017), involving medical students. The results indicate that medical students who train in rural areas are nearly three times more likely to enter rural medicine than those who do not train in those areas (Guilbalt & Vinson, 2017). Further, medical students who train in underserved areas are four times more likely to become primary care physicians (Guilbalt & Vinson, 2017). Guilbalt and Vinson (2017) show the results could help guide administrators and policymakers to expand training programs in rural areas to help relieve some of the access problems faced by rural communities.

Another application of this study is for rural healthcare facilities to understand the factors that drive APNs and PAs to choose and maintain a rural practice. By understanding those factors, perhaps rural communities along with lawmakers could develop plans for recruitment and

retention of providers in rural areas. One of the factors that was repeatedly mentioned in this study was the autonomy and scope of practice that rural providers are afforded. The scope of practice may be a draw for individuals who like the idea of meeting challenges somewhat unaided. However, for some a broad scope of practice may be an undesirable situation to be in for their medical practice. Previous studies have examined recruitment and retention from the perspective of physicians and found that the factors that affect the choice of a rural medical practice are varied, but most discuss the scope of practice as both a draw and a deterrent (Curran & Rourke, 2004; Diemer et al. 2012; MacQueen et al., 2017; Redford 2019; Reitz et al., 2018). If these studies could be used to develop incentives that offset the deterrents, those programs could be another step in helping solve the disparity in rural health care availability.

The study performed by Curran and Rourke (2004) explored numerous factors affecting physician recruitment and retention in rural communities. The researchers discuss that rural settings are often isolated and require doctors to employ a broader range of skills to care for their patients, perform vastly more procedures than their urban counterparts, and are under higher stress levels (Curran & Rourke, 2004).

The authors also discuss that access to continuing education for rural physicians is limited due to the time and distance needed to attend educational classes and seminars (Curran & Rourke, 2004). Throughout the paper, Curran and Rourke (2004) focus on the medical schools' role in recruiting and retaining rural physicians. However, the researchers also acknowledge that medical schools cannot solve the issue of rural physician shortages on their own because the problem is multi-faceted and must be addressed on a broader level (Curran & Rourke, 2004).

Further, other studies considered influences including geography, family happiness, living conditions, the scope of practice, lower wages, lack of sufficient medical equipment, and

lower insurance reimbursement rates as factors for rural physician shortages (Darkwa et al., 2015; Full, 2001; MacQueen et al., 2017; Reitz et al., 2018; Topps et al., 2003; Wascko et al., 2014). Reitz et al. (2018) highlight the uniqueness of the rural healthcare infrastructure as a challenge to physicians. The authors refer to lower reimbursement rates, increased patient needs, and the need for full-spectrum care in rural practices (Reitz et al., 2018). Dayaratna et al. (2013) consider the physician shortage problem to be a product of the American medical licensure system producing inadequate licensed professionals. The article further proposes modifications to the current approach to maintain licensing integrity and ensure that more medical school graduates can provide patient care (Dayaratna et al., 2013). The licensure system may need improvement to increase the number of medical school graduates; however, the US has a limited number of medical schools, each with a set number of spots available per year. Logistically, medical schools cannot produce enough graduates alone to solve the provider shortage problem. Other trained medical professionals such as NPs, PAs, and CRNAs can help fill the gaps in rural areas and help ease the burden on physicians.

The applications of this study are varied and could potentially help shift the rural healthcare disparity problem in a more positive direction. Rural areas need more providers including physicians, NPs, PAs, CRNAs and support staff. Every study that gives insight into understanding the influential factors that affect the decision of providers to enter rural medicine can be part of the solution. However, more study is needed to continue developing new solutions to the same problem, as it is complex and ever changing.

Recommendations for Future Research

Further research is needed to continue finding potential solutions for the disparity in primary health care providers in rural areas. This study focused on the perspectives of NPs, PAs,

and CRNAs to help understand the reasons practitioners originally chose and continue rural medical practices. Based on the Pfarrwaller et al. (2017) framework, the model categorizes the influences on career choice into four hierarchical systems, microsystem, mesosystem, exosystem, and macrosystem, based on Bronfenbrenner's ecological model of human development (Pfarrwaller et al., 2017). The same hierarchical systems were repeated in this study, as the themes that were developed are representative of the systems identified by Pfarrwaller et al. (2017). Future researchers could use this study to design studies in other areas of the world and expand the study population size. By studying on a larger scale, the results could lend support to the findings of this study and could help identify other possible solutions to the rural healthcare provider shortage issue.

Other studies could be conducted to compare the results of previous studies from all points of view. The information gained from the comparison studies could provide insight into changes needed to recruiting and retention efforts at both the educational and clinical levels. Considering the effect of changes in physician oversight laws, allowing APNs and PAs more autonomy is another avenue to pursue. This could be done by comparing the health disparities in states with more strict oversight to those that have implemented changes to physician oversight policies.

Another approach could be a study that takes the results of previous research and includes technological advances such as telehealth networks to understand the impact of these technologies on rural healthcare. Advanced technology, such as telehealth services could allow more access to providers in rural areas, without those providers living in those areas. Further, studying the acceptance of telehealth services, by patients, as a practical choice for care would be important in understanding the impact on rural care disparities. Telehealth technology can only

be a part of the solution if the patients are willing and able to use the services provided. Only through continued study and understanding will rural healthcare provider shortages be solvable.

Conclusions

This qualitative study adds to existing literature by adding the perspective of APNs and PAs who are helping to bridge the gap in rural provider shortages. Previous literature generally addresses the rural healthcare provider shortages from the physician perspective alone. The findings of this study and previous literature highlight the need for better core strategies for recruitment and retention of rural healthcare providers. Structured rural rotations, supportive community engagement, and full-scope practice authority are the basis for the core strategies necessary to address healthcare shortages in rural Colorado and beyond.

Using the Pfarrwaller et al. (2017) framework for practicing APNs and PAs, and the case study design focused on creating a narrative through an in-depth analysis of real-life experiences, this study highlighted themes addressing the three research questions proposed. The themes generated, using the principles of Braun and Clark's (2006) phases of thematic analysis and NVivo included training/rural rotations/exposure to rural practice, childhood rural experiences, scope of practice/autonomy, quality of life/family and friends, scope of practice/relationship-based care, and upbringing/family, friends/sense of community. The results of the NP, PA, CRNA study may have several applications in practice.

The first potential application is to be used by NP, PA, and CRNA schools to help identify groups of students or working adults who would be more likely to enter a career in rural medicine. This result aligns with that of the study by Guilbalt and Vinson (2017), whose results show that medical students who train in rural areas are nearly three times more likely to enter rural medicine and are four times more likely to become primary care physicians. Using this

information, strategic curriculum could be created to encourage more students, interns, and residents to choose a rural medical practice.

Another application of this study would be for rural healthcare facilities to understand the factors that drive APNs and PAs to choose and maintain a rural practice. By understanding those factors, perhaps rural communities along with lawmakers could develop plans for recruitment and retention of providers in rural areas. Previous studies have examined recruitment and retention from the perspective of physicians and found that the factors that affect the choice of a rural medical practice are varied, but most discuss the scope of practice as both a draw and a deterrent (Curran & Rourke, 2004; Diemer et al. 2012; MacQueen et al., 2017; Redford 2019; Reitz et al., 2018). If these studies could be used to develop incentives that offset the deterrents, those programs could be another step in helping solve the disparity in rural health care availability.

The applications of this study are varied and could potentially help shift the rural healthcare disparity problem in a more positive direction. Rural areas need more providers including physicians, NPs, PAs, CRNAs and support staff. Every study that gives insight into understanding the influential factors that affect the decision of providers to enter rural medicine can be part of the solution. Continued study is necessary to solve the problem of rural provider shortages around the world. This study adds to the existing literature and could be used to help with recruitment and retention efforts from the perspective of NPs, PAs, and CRNAs. The findings presented offer insights for healthcare programs and policymakers to strengthen rural workforce pipelines and improve healthcare access in underserved areas. Using current knowledge and future study, the rural healthcare disparity problem could be solved, leading to healthier rural lives.

References

- Ahmed, S. K. (2024). The pillars of trustworthiness in qualitative research. *Journal of Medicine, Surgery, and Public Health*, 2, 1–4. <https://doi.org/10.1016/j.glmedi.2024.100051>
- American Academy of Physician Associates. (2023). *History of AAPA & the PA profession*. www.aapa.org/about/history/
- American Association of Nurse Anesthesiology. (2023). *AANA timeline of events*. www.aana.com/about-us/aana-archives-library/our-history
- American Association of Nurse Practitioners. (2023). *Historical timeline*. www.aanp.org/about/about-the-american-association-of-nurse-practitioners-aanp/historical-timeline
- Anderson, T. J., Saman, D. M., Lipsky, M. S., & Lutfiyya, M. N. (2015). A cross-sectional study of health differences between rural and non-rural U.S. counties using the *County Health Rankings*. *BMC Health Services Research*, 15(441), 1–8. <https://doi.org/10.1186/s12913-015-1053-3>
- Auerbach, D. I., Buerhaus, P. I., & Staiger, D. O. (2020). Implications of the rapid growth of the nurse practitioner workforce in the US. *Health Affairs*, 39(2), 273–279. <https://doi.org/10.1377/hlthaff.2019.00686>
- Bae, S. H. (2016). Nurse practitioners' job satisfaction in rural versus nonrural areas. *Journal of the American Association of Nurse Practitioners*, 28(9), 471–478. <https://doi.org/10.1002/2327-6924.12362>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–10. <http://dx.doi.org/10.1191/1478088706qp063oa>

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise, and Health*, 11(4), 589–597.

<https://doi.org/10.1080/2159676X.2019.1628806>

Buerhaus, P. (2018). Nurse practitioners: A solution to America's primary care crisis. *American Enterprise Institute*, 1–31. <https://www.aei.org/wp-content/uploads/2018/09/Nurse-practitioners.pdf>

Charter, L., Scully, R., & Laidlaw, A. (2021). The word that comes to mind is polymath': Medical students' perceptions of rural postgraduate careers. *Rural and Remote Health*, 21(3), 1–9. <https://doi.org/10.22605/RRH6750>

Cohen, C., Baird, M., Koirola, N., Kandrack, R., & Martsolf, G. (2021). The surgical and anesthesia workforce and provision of surgical services in rural communities: A mixed-methods examination. *The Journal of Rural Health*, 37, 45–54.

<https://doi.org/10.1111/jrh.12417>

Colorado Department of Public Health and Environment. (2015). *Primary care health professional shortage areas (HPSAs) map*. www.cdphe.colorado.gov

Colorado Department of Public Health and Environment. (2021). *Medically underserved areas (MUAs) and populations (MUPs) map*. www.cdphe.colorado.gov

Colorado Department of Public Health and Environment. (2022). www.cdphe.colorado.gov

Colorado Rural Health Center (2020). *Snapshot of rural health in Colorado*.

<https://coruralhealth-wpengine.netdna-ssl.com/wp-content/uploads/2013/10/Snapshot-2020-FINAL-FINAL-FINAL.pdf>

- Collett, M.J, Fraser, C., & Thompson, S.C. (2019). Developing the future rural nursing workforce: Report on a nursing roundtable. *Collegian*, 27, 370-374.
<https://doi.org/10.1016/j.colegn.2019.10.007>
- Coombs, N.C., Campbell, D.G., & Caringi, J. (2022). A qualitative study of rural healthcare providers' views of social, cultural, and programmatic barriers to healthcare access. *BMC Health Services Research*, 22(438), 1-16. <https://doi.org/10.1186/s12913-022-07829-2>
- Cuesta-Briand, B., Coleman, M., Ledingham, R., Moore, S., Wright, H., Oldham, D., & Playford, D. (2020). Understanding the factors influencing junior doctors' career decision-making to address rural workforce issues: Testing a conceptual framework. *International Journal of Environmental Research and Public Health*, 17, 1-12.
<https://doi.org/10.3390/ijerph17020537>
- Cunningham, C.T., Quan, H., Hemmelgarn, B., Noseworthy, T., Beck, C.A., Dixon, E., Samuel, S., Ghali, W.A., Sykes, L.L., & Jette, N. (2015). Exploring physician specialist response rates to web-based surveys. *BMC Medical Research Methodology*, 15(32), 1-8.
<https://doi.org/10.1186/s12874-015-0016-z>
- Curran V. & Rourke, J. (2004). The role of medical education in the recruitment and retention of rural physicians. *Medical Teacher*, 26(3), 265-272.
<https://doi.org/10.1080/0142159042000192055>
- Darkwa, E.K., Newman, M.S., Kawkab, M., & Chowdhury, M.E. (2015). A qualitative study of factors influencing retention of doctors and nurses at rural healthcare facilities in Bangladesh. *Health Services Research*, 15(344), 1-12. <https://doi.org/10.1186/s12913-015-1012-z>

- Dayaratna K, Larkin, P.J., & O'Shea, J. (2019). Reforming American medical licensure. *Harvard Journal of Law & Public Policy*, 42(1), 253-278.
<https://journals.law.harvard.edu/jlpp/wp-content/uploads/sites/90/2019/02/Larkin-Final.pdf>
- Delmas, P.M., & Giles, R.L. (2023). Qualitative research approaches and their application in education. *International Encyclopedia of Education*, 4(12), 24-32.
<https://doi.org/10.1016/B978-0-12-818630-5.11003-6>
- DesRoches, C.M., Gaudet, J., Perloff, J., Donelan, K., Iezzoni, L.I., & Buerhaus, P. (2013). Using Medicare data to assess nurse practitioner-provided care. *Nursing Outlook*, 61, 400-407. <http://dx.doi.org/10.1016/j.outlook.2013.05.005>
- Diemer, D., Leafman, J., Nehrenz, G. M. Sr., & Larsen, H. S. (2012). Factors that influence physician assistant program graduates to choose rural medicine practice. *The Journal of Physician Assistant Education*, 23(1), 28-32.
https://journals.lww.com/jpae/abstract/2012/23010/factors_that_influence_physician_assistant_program.5.aspx
- Dotson, M.J., Dave, D.S., Cazier, J.A., & McLeod, M.D. (2013). Nurse retention in rural United States: A cluster analytic approach. *International Journal of Healthcare Management*, 6(3), 184-191. <https://doi.org/10.1179/2047971913Y.0000000037>
- Dye, Tyler (2023). The primary methods of qualitative data analysis. *Thematic*.
<https://getthematic.com/insights/methods-of-qualitative-data-analysis/>
- Ellis, T.J. & Levy, Y. (2009). Towards a guide for novice researchers on research methodology: Review and proposed methods. *Issues In Informing Science and Information Technology*, 6, 1-15. <https://doi.org/10.28945/1062>

- Feyereisen, S.L., Puro, N., & McConnell, W. (2021). Addressing provider shortages in rural America: The role of state opt-out policy adoptions in promoting hospital anesthesia provision. *The Journal of Rural Health, 37*, 684-691. <https://doi.org/10.1111/jrh.12487>
- Figueroa, S. (2013). Policy barriers for advanced practice nurses in rural health care. *Health Policy and Technology, 2*, 196-202. <http://dx.doi.org/10.1016/j.hlpt.2013.07.001>
- Full, J.M. (2001). Physician recruitment strategies for a rural hospital. *Journal of Healthcare Management, 46*(4), 277-282. <https://doi.org/10.1097/00115514-200107000-00011>
- Gauchan, B., Mehanni, S., Agrawal, P., Pathak, M., & Dhungana, S. (2018). Role of the general practitioner in improving rural access: A case from Nepal. *Human Resources for Health, 16*(23), 1-8. <https://doi.org/10.1186/s12960-018-0287-7>
- Germack, H.D., Kandrack, R., & Martsof, G.R. (2021). Relationship between rural hospital closures and the supply of nurse practitioners and certified registered nurse anesthetists. *Nursing Outlook, 69*, 945-952. <https://doi.org/10.1016/j.outlook.2021.05.005>
- Gibson, N.A., Pravecek, B., Burdette, L., & Lamb, L. (2021). ANEW project to develop and support rural primary practice. *Online Journal of Rural Nursing and Health Care, 21*(1), 85-99. <https://doi.org/10.14574/ojrnhc.v21i1.649>
- Glasser, M., Peters, K., & MacDowell, M. (2006). Rural Illinois hospital chief executive officers' perceptions of provider shortages and issues in rural recruitment and retention. *The Journal of Rural Health, 22*(1), 59-62. <https://doi.org/10.1111/j.1748-0361.2006.00007.x>
- Goertzen, M.J. (2017). Applying quantitative methods to E-book collections. *Library Technology Reports, 53*(4), 12-18. <https://doi.org/10.5860/ltr.53n4>

- Guilbault, R.W.R. & Vinson, J.A. (2017). Clinical medical education in rural and underserved areas and eventual practice outcomes: A systematic review and meta-analysis. *Education for Health, 30*(2), 146-155. https://doi.org/10.4103/efh.EfH_226_16
- Hariharan, S. (2015). Using advance practice registered nurses and physician assistants to ease physician shortage. *Physician Leadership Journal, 2*(3), 46-51.
<https://pubmed.ncbi.nlm.nih.gov/26214952/>
- Harrington, R. A., Califf, R. M., Balamurugan, A., Brown, N., Benjamin, R. M., Braund, W. E., Hipp, J., Konig, M., Sanchez, E., & Joynt Maddox, K. E. (2020). Call to action: Rural health A Presidential advisory from the American Heart Association and American Stroke Association. *Circulation, 141*, 615-644.
<https://doi.org/10.1161/CIR.0000000000000753>
- Health Resources & Services Administration [HRSA] (2021). How we define rural.
<https://hrsa.gov/rural-health/about-us/what-is-rural>
- Iglehart, J. K. (2018). The challenging quest to improve rural health care. *The New England Journal of Medicine, 378*(5), 473-479.
www.nejm.org/doi/pdf/10.1056/NEJMhpr1707176
- Jones, D., Ballard, J., Dyson, R., Macbeth, P., Lyle, D., Sunny, P., Thomas, A., & Sharma, I. (2018). A community engaged in a primary healthcare strategy to address rural school student inequities: A descriptive paper. *Primary Health Care Research & Development, 20*(26), 1-6. <https://doi.org/10.1017/S1463423618000907>
- Kumar, P. & Kumar, R. (2018). Rural health scenario – role of family medicine: Academy of Family Physicians of India position paper. *Journal of Family Medicine and Primary Care, 7*(6), 1157-1162. https://doi.org/10.4103/jfmprc_254_18

- Landy, D.C., Gorin, M.A., Egusquiza, J.D., Weiss, J., & O'Connell, M.T. (2012). Medical student attitudes before and after participation in rural health fairs. *Journal of Research in Medical Sciences*, 17(3), 298-303
https://www.researchgate.net/publication/233984845_Medical_student_attitudes_before_and_after_participation_in_rural_health_fairs
- Larson, E.H., Palazzo, L., Berkowitz, B., Pirani, M.J., & Hart, L.G. (2003). The contribution of nurse practitioners and physician assistants to generalist care in Washington state. *Health Services Research*, 38(4), 1033-1050. <https://doi.org/10.1111/1475-6773.00161>
- MacKinnon, M.A. (2021). Relationship between population density and scope of practice for certified registered nurse anesthetists in Arizona. *AANA Journal*, 89(4), 325-333.
<https://mydigitalpublication.com/article/Relationship+Between+Population+Density+and+Scope+of+Practice+for+Certified+Registered+Nurse+Anesthetists+in+Arizona/4086116/716109/article.html>
- MacQueen, I. T., Maggard-Gibbons, M., Capra, G., Raaen, L., Ulloa, J. G., Shekelle, P. G., Miake-Lye, I., Beroes, J. M., & Hempel, S. (2017). Recruiting rural healthcare providers today: A systematic review of training program success and determinants of geographic choices. *Journal of General Internal Medicine*, 33(2), 191-199.
<https://doi.org/10.1007/s11606-017-4210-z>
- Meade, Z.S., Li, H.W., Allison, H., Bhatia, M.B., Joplin, T.S., Simon, C., Darkwa, L., Keung, C., & McDow, A.D. (2022). Demographics and medical school exposures to rural health influence future practice. *Surgery*, 172, 1665-1672.
<https://doi.org/10.1016/j.surg.2022.08.016>

Mester, J.S. (2018). Rural nurse recruitment. *Nursing Management*, 49(12), 51-53.

<https://doi.org/10.1097/01.NUMA.0000544468.98484.b7>

Mian, O., Hogenbirk, J.C., Warry, W., & Strasser, R.P. (2017). How underserved rural communities approach physician recruitment: Changes following the opening of a socially accountable medical school in northern Ontario. *Canadian Journal of Rural Medicine*, 22(4), 139-147.

<https://eds.p.ebscohost.com/eds/pdfviewer/pdfviewer?vid=7&sid=49585ec2-9e94-4832-bce1-b7d4336d5bf7%40redis>

Michaels-Strasser, S., Thurman, P.W., Kasongo, N.M., Kapenda, D., Ngulefac, J., Lukeni, B., Matumaini, S., Parmley, L., Hughes, R., & Malele, F. (2021). Increasing nursing student interest in rural healthcare: Lessons from a rural rotation program in Democratic Republic of Congo. *Human Resources for Health*, 19(53), 1-13.

<https://doi.org/10.1186/s12960-021-00598-9>

Nuako, A., Liu, J., Pham, G., Smock, N., James, A., Baker, T., Bierut, L., Colditz, G., & Chen, L.S. (2022). Quantifying rural disparity in healthcare utilization in the United States: Analysis of a large midwestern healthcare system. *PLoS ONE*, 17(2), 1-15.

<https://doi.org/10.1371/journal.pone.0263718>

Pfarrwaller, E., Audetat, M.C., Sommer, J., Maisonneuve, H., Bischoff, T., Nendaz, M., Baroffio, A., Perron, N.J., & Haller, D.M. (2017). An expanded conceptual framework of medical students' primary care career choice. *Academic Medicine*, 92(11), 1536-1542.

<https://doi.org/10-1097/ACM.0000000000001676>

Physician Assistant History Society (2023). Timeline. www.pahx.org/timeline/

- Redford, L. J. (2019). Building the rural healthcare workforce: Challenges – and strategies – in the current economy. *Journal of the American Society on Aging, 43*(2), 71-75.
<https://www.jstor.org/stable/26760118>
- Reid, R., Rising, E., Kaufman, A., Bassett, A., McGrew, M.C., Silverblatt, H., & Haederle, M. (2019). The influence of a place-based foundation and a public university in growing a rural health workforce. *Journal of Community Health, 44*, 292-296.
<https://doi.org/10.1007/s10900-018-0585-y>
- Reilly, M. (2021). Health disparities and access to healthcare in rural vs. urban areas. *Theory in Action, 14*(2), 6-27. <https://doi.org/10.3798/tia.1937-0237.2109>
- Reitz, R., Horst, K., Davenport, M., Klemmetsen, S., & Clark, M. (2018). Factors influencing family physician scope of practice: A grounded theory study. *Family Medicine, 50*(4), 269-274. <https://doi.org/10.22454/FamMed.2018.602663>
- Renner, D.M., Westfall, J.M., Wilroy, L.A., & Ginde, A.A. (2010). The influence of loan repayment on rural healthcare provider recruitment and retention in Colorado. *Rural and Remote Health, 10*(1605), 1-14. <https://doi.org/10.22605/RRH1605>
- Schoonenboom, J., Johnson, R.B. (2017). How to Construct a Mixed Methods Research Design. *Köln Z Soziol* **69** (Suppl 2), 107–131. <https://doi.org/10.1007/s11577-017-0454-1>
- Schuller, K.A., Amundson, M., McPherson, M., & Halaas, G.W. (2017). An interprofessional programme to culturally sensitise students to the needs of patients and realities of practice in rural areas. *Journal of Interprofessional Care, 31*(3), 410-412. <http://dx-doi.org/10.1080.13561820.201.1283299>
- Schramm, J.F., Seibert, D.C., Thompson, M.J.M., Binder, M.M., Young, S.K., & Deleon, P.H. (2019). Primary care in American Samoa: How nurse practitioners created a bridge

across an ocean. *Military Medicine*, 184(3/4), 72-77.

<https://doi.org/10.1093/milmed/usy219>

Shannon, C.K., Baker, H., Jackson, J. Roy, A., Heady, H., & Gunel, E. (2005). Evaluation of a required statewide interdisciplinary rural health education program: Student attitudes, career intents and perceived quality. *Education for Health*, 18(3), 395-404.

<https://doi.org/10.1080/13576280500289710>

Stone, L. C., Roary, M. C., Diana, A., & Grady, P.A. (2021). State health disparities research in Rural America: Gaps and future directions in an era of COVID-19. *The Journal of Rural Health*, 37, 460-466. <https://doi.org/10.1111/jrh.12562>

Terry, D.L. & Woo, M.J. (2021). Burnout, job satisfaction, and work-family conflict among rural medical providers. *Psychology, Health & Medicine*, 26(2), 196-203.

<https://doi.org/10.1080/13548506.2020.1750663>

Trickett-Shockey, A.K., Wilson, C.S., Lander, L.R., Barretto, G.A., Szklarz, G.D., VanVoorhis, G.C, & Minardi, J.J. (2013). *International Journal of Medical Education*, 4(18), 18-25.

<https://doi.org/10.5116/ijme.50f1.48cf>

Vitale, C.M. & Lyons, K.S. (2021). The state of nurse anesthetist practice and policy: An integrative review. *AANA Journal*, 89(5), 403-412.

<https://mydigitalpublication.com/article/The+State+of+Nurse+Anesthetist+Practice+and+Policy%3A+An+Integrative+Review/4124346/723084/article.html>

Wascko, K., Jenkins, J., & Meili, R. (2014). Medical practice in rural Saskatchewan: Factors in physician recruitment and retention. *Canadian Journal of Rural Medicine*, 19(3), 93-102.

<https://eds.p.ebscohost.com/eds/pdfviewer/pdfviewer?vid=9&sid=49585ec2-9e94-4832-bce1-b7d4336d5bf7%40redis>

Weinhold, I. & Gurtner, S. (2014). Understanding shortages of sufficient health care in rural areas. *Health Policy*, 118, 201-214. <http://dx.doi.org/10.1016/j.healthpol.2014.07.018>

Wu, M.J., Zhao, K., & Fils-Aime, F. (2022). Response rates of online surveys in published research: A meta-analysis. *Computers in Human Behavior Reports*, 7, 1-11.

<https://doi.org/10.1016/j.chbr.2022.100206>

Zwilling, J., Fiandt, K., & Ahmed, R. (2021). Comparison of rural and urban utilization of nurse practitioners in states with full practice authority. *The Journal for Nurse Practitioners*, 17, 386-393. <https://doi.org/10.1016/j.nurpra.2020.12.033>

Appendix A

Consent Form

My name is Erika Remus, and I am a doctoral student at National University (NU).

I'm asking you to take part in a research study about the factors that influence the choice of practicing rural medicine in Colorado. The name of this research is Advanced Practice Nurses, Physician Assistants, and Certified Registered Nurse Anesthetists in Rural Colorado: Why Choose Rural Medicine?

You may participate in this research if you meet all the following criteria:

1. You are an NP, PA, or Nurse Anesthetist.
2. You are currently practicing in a rural area. Rural area for this research is defined as medically underserved, considered a health professional shortage area by the Health Resources and Service Administration (HRSA, 2021), and is more than one hour from urban healthcare services.

I hope to include 15-20 people in this research.

Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

What you will be asked to do: If you agree to be in this study, you will be asked to do the following activities:

1. Participate in a 1:1 online interview over Zoom for 45-60 minutes or complete an online questionnaire.
2. Review your interview transcript via email for 10-15 minutes.

During these activities, you will be asked questions about:

- Your training, years of experience, factors contributing to your choice of rural medical practice, the location of your upbringing, and your future endeavors as pertain to your career.

Risks: There are minimal foreseeable risks or discomforts associated with this research. You can still skip any question you do not wish to answer, skip any activity, or stop participation at any time.

Benefits: If you participate, there are no direct benefits to you. This research may increase the body of knowledge in the subject area of this research.

Recording: I would like to audio/video record your responses using Zoom during the 1:1 interview. You can disable the video function of the online meeting platform at any time.

Confidentiality: I will keep the records of this study private and take reasonable measures to protect the security of all your personal information. In any report I make public, I will not include any information that will make it possible to identify you. All recordings will be kept on an encrypted drive that is password protected and stored in a fireproof safe. Responses to the online surveys will also be kept on an encrypted drive that is password protected and stored in a fireproof safe. After the research is completed, all data will be permanently erased from the drives.

Taking part is voluntary: Participation in this study is completely voluntary. You may quit at any time.

If you have questions: Please ask any questions you have now. If you have questions later, you may contact me at e.remus2812@o365.ncu.edu or at (303) 478-9465.

If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) via email at irb@nu.edu

Appendix B

Interview Protocol

Thank you for participating in this research. The goal of this study is to understand why practitioners pursue rural medical practices. Before we begin, I want to assure you that your answers will be kept confidential and will only be referenced in this study by participant number.

RQ1: What do APNs and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine?

How would you describe the area of your upbringing? What type of community (prompts – urban, rural, frontier)? (Cuesta-Briand et al., 2020)

In what ways and to what extent do you believe your upbringing influenced your decision to choose a career in rural medicine?

How many years have you been in your medical practice? Have you had a practice outside of a rural area? (MacQueen et al., 2017)

How do you think the duration of your practice influenced your choice in practice location(s)?

How would you describe the locations you've practiced influencing your decision to choose a career in rural medicine?

How would you describe your training and its influence on your choice of rural medicine (prompts – school, program)? (Charter et al., 2021)

In what ways and to what extent do you believe your training influenced your decision to choose a career in rural medicine?

How did you decide you wanted to practice rural medicine (prompts – age, year in training, another experience)? (Diemer et al., 2012 & Cuesta-Briand et al., 2020).

What factor(s) influenced your decision to enter rural medicine (prompts – place of origination, lifestyle, family, friends, experience during school or other training, loan forgiveness program)? (Charter et al., 2021 & Pfarrwaller et al., 2017)

RQ2: What do APNs and Pas, in Colorado, perceive influences their decision to continue their careers in rural medicine?

What factors or influences would compel or dissuade you from continuing to practice rural medicine (prompts- community, family, job satisfaction/dissatisfaction, location)? (MacQueen et al., 2017)

In what ways and to what extent do you believe outside influences affect your decision to continue or leave your rural practice (government, healthcare law, reimbursement rates)?

RQ3: What do APNs and PAs, in Colorado, perceive might increase other APNs and PAs to choose a career in rural medicine?

What factors do you believe would influence those currently practicing in urban areas to pursue rural medicine (scope of practice, family, community, incentives)?

What factors do you believe will influence current (PA, NP, or CRNA) students to pursue a career in rural medicine (upbringing, community, scope of practice, family, incentives)? (Charter et al., 2021, Cuesta-Briand et al., 2020, & Diemer et al., 2012)

Thank you again for your time and participation. Before we end do you have any questions for me?

Appendix C
IRB Approval



9388 Lightwave Ave.

San Diego, CA 92123

irb@nu.edu

Notice of Exemption

October 10, 2023

To:

Erika Remus

Project Title:

Advanced Practice Nurses, Physician Assistants, and Certified Registered Nurse Anesthetists in Rural Colorado: Why Choose Rural Medicine?

NU IRB Number:

IRB-FY23-24-208

Determination:

Exempt from further review 45 CFR 46.101 Category 2.(ii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:

Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or

Status: Active - Research activities may begin as of October 10, 2023

Dear Erika Remus:

The study referenced above has been reviewed by the National University IRB. The IRB has determined

your research is exempt from further review under 45 CFR 46.104, which means you will not need to renew your study and may begin your study effective immediately. However, if you find the need to change your study in any way, you will need to submit a modification to the IRB prior to implementing the changes. This will allow the IRB to determine whether or not the study still meets exemption criteria.

Please review your Post Approval Responsibilities here:

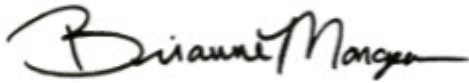
Approved Documents Guidelines

For any questions regarding your protocol, please reach out to the IRB at irb@nu.edu.

Sincerely,



Dr. Joseph Marron, IRB Chair



Dr. Brianne Mongeon, Director, HRPP & IRB



Jenessa Eberhardt, Associate Director, HRPP & IRB

Appendix D

Table 6

Research Question Responses by Theme

RQ1: What do APNs and PAs, in Colorado, perceive influenced their decision to choose a career in rural medicine?

Themes	Responses
Training - Rural Rotations	My undergrad (University of Colorado Anschutz) definitely placed extra focus on rural and lead to quite a few rural rotations which solidified my desire to go into rural family medicine.
	While I felt strong about rural populations after going to undergrad in rural Tennessee and working as a CNA there, my graduate program and getting to do rural rotations as a PA solidified that decision.
	I entered my training knowing I wanted to practice rural. Attended school in Wichita, KS at Newman University. Knew I was not an urban person. I designed my clinical training to spend as much time in a rural or community hospital as I could.
	My school required a 1 m rural rotation in my 3rd year. This helped me see how much more I would be able to do in a rural setting than in an urban setting.
	I think that the rural rotation did influence my decision to go to a rural setting. I realized after working in the urban setting that I did more referrals instead of being able to keep my patients in house for more procedures
	My PA program was 3 years, 2 years didactic and 1 year clinical. I was in the rural track, and over half of my clinical rotations were in rural settings. This reinforced my desire to live and work in a small rural community.
	I was already convinced I wanted to work in a rural area and my training reinforced that. I

	<p>saw the direct impact that healthcare professionals had on their smaller communities.</p>
	<p>My school made us do a month long rural rotation which really helped me understand what it would be like to not have specialist next door and having to run my own labs and draw my own blood</p>
	<p>I learned early on in my training that I wanted to do primary care so from there the leap to rural medicine was pretty easy</p>
	<p>My rural rotations and prior experience living in a rural community reinforced my decision to remain in a rural area for practice.</p>
	<p>I decided to seek my clinical rotations in a rural environment because I moved to a mountain town while I was in graduate school. I greatly enjoyed working in the rural clinics and decided to continue my practice in this rural environment after I became a licensed NP.</p>
	<p>I think my clinical training in a rural environment greatly influenced my decision to practice rural medicine.</p>
Rural Upbringing/Childhood Exposure	<p>Seeing the needs and being used to small communities, enjoying smaller groups probably all influenced it, but especially seeing the needs and and being familiar with the needs of rural communities influenced it. I'm a small town kid, married to a small town kid, raising small town kids. Absolutely led me to want to practice in a rural area.</p>
	<p>Spending my summers with my grandparents showed me what community could really be like.</p>
	<p>It had a strong influence on choosing rural medicine</p>
	<p>in general, I prefer rural areas</p>
	<p>My grandparents were farmers and resided in rural Ohio. I enjoyed spending time on their farms and in general, I prefer rural areas.</p>
	<p>It had a strong influence on choosing rural medicine as I saw what real community was like at my grandparents house</p>

	my upbringing has been the sole influence in my current position in rural medicine
Scope of Practice/Autonomy	This past year, many of the state PA laws increased our scope of practice which will make it easier to practice in a rural setting. I am lucky to work in a hospital where PAs have pretty much full independence, so I don't feel the pressure of laws as much
	Full Practice no limits to scope of practice. Business niche and goal was to practice rural and develop a successful business and practice.
	And definitely some of that autonomy
	My philosophy is very much relationship based care, so that's not necessarily something that happens in, you know, the urban areas.
Other Outside Influences	Family and Friends were the biggest influencers, loan forgiveness program was a bonus
	reimbursement rates would be the biggest outside influence
	I work at a rural health center and I think it offers better reimbursement than some of the more corporate jobs that I've seen
	Factors include--upbringing, lifestyle, college friends already lived in this town and helped me find a position, and loan forgiveness program was a bonus
	Pay or reimbursement rate is probably the biggest factor due to the cost of living being so high in rural areas.
	I wanted the lifestyle of living remote

RQ2: What do APNs and PAs, in Colorado, perceive influences their decision to continue their careers in rural medicine?

Themes	Responses
Quality of Life/Family and Friends	It was more of a family decision to move to a rural town but it has been a great fit for how I like to practice medicine After living in a city, I knew I did not want to live in the city long term so that pushed me to reevaluate

	where I really wanted to practice long term
	I got to work my dream job at the underserved urban setting but I did not like living in the city. When we got a chance to move to a rural setting and practice here, my family was more than willing to make the move.
	Now that I have been in a rural setting, I do not think I could go back to an urban setting. I like the "small town" feel of rural medicine
	I had an opportunity to move back to rural and back towards where I grew up or where I grew up. And so I took that opportunity because I enjoyed it a lot, much better than the city
	Well, the biggest thing for me on on staying rural was really about the fact that I didn't want to drive like I like being in the community that I'm in.
	The longer I practice in a rural area the less time I want to spend in cities.
	I grew up visiting the town I currently work in and still have many family members in the area who deserve good health care
Relationship Based Care	Both of my practices have been in rural areas. Those experiences reinforced my desire to continue living and working in rural areas because you get to be a part of a close knit community. I think this makes me more invested in my job.
	where I currently practice, I get to spend plenty of time with my patients. I think that it builds trust when they see that I really care about their health and wellness
	For me it was more the lifestyle rural living can give. In the workplace, I feel more connected to my patients and colleagues.
	It always compels me to because of my patient base. Always feel like it is patient based and kind of motto is that it is relationship based. Not just medicine based.
	Caring for family and extended family and the community is. In need of care and it's a it's a just a beautiful way to provide it.

RQ3: What do APNs and PAs, in Colorado, perceive might increase other APNs and PAs to

Themes

Responses

choose a career in rural
medicine?

Training/Exposure to rural practice/Scope of Practice	Understanding if they had the opportunity to just really see what the quality of life is for both provider and patient and how that that translates to job satisfaction.
	I think increasing the exposure to rural setting during training and showing scope of practice and incentives available will help.
	Rural community health clinics actively recruiting students for clinical rotations.
	Getting to see such a wide scope of medicine and not always having the option of a referral (or at least one the patient is willing to go to).
	scope of practice.
	scope of practice and incentives
	Scope of practice and community is a big plus.
	Scope of practice is an incentive
	I the one thing I. Think would influence it is the. The skill set that they use in urban will be better used in a rural.
Upbringing - Family, friends / Sense of Community	Being able to be invested in their community
	Also it is a great place to build community and really get to know the families you serve.
	Upbringing and interests in the rural/outdoor activities.
	Family, community & a desire to live in a slower paced life style with less community resources, but the ability to spend time with your patients
	Up bringing and community
	I believe it is more upbringing and desired way of life. It is hard to live in a rural area and takes a certain type of person.
	I think upbringing and the sense of community in rural areas can help influence current students to purse rural medicine.
	Upbringing
	Family is a huge factor- if one can practice where relatives and friends reside, then this is very important.

