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Identifying Predictors of Eventual Rural Practice Among  
Female Osteopathic Medical Students

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Education in Adult and Lifelong Learning

by

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May 2023  
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This dissertation is approved for recommendation to the Graduate Council.

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## **Abstract**

The United States is facing a growing physician shortage that threatens the ability of our healthcare system to provide needed services. This shortage will be more acutely felt in rural and underserved areas. Osteopathic medical education, with its priority of primary care specialties, plays a significant role in meeting the healthcare needs of rural communities in America. The fastest-growing demographic of osteopathic physicians is women under the age of 45 (American Osteopathic Association, 2021). Additionally, for the first time in history, women outnumber men in medical schools, accounting for 51% of current medical students (Boyle, 2019).

Who is admitted to medical school is a fundamental issue in medical education. In an effort to alleviate the healthcare workforce maldistribution, preferences should be given to candidates with a higher likelihood of eventually practicing in rural or underserved communities. Studies have looked at factors that influence practice location, including age, the influence of a rural background, parental education, and gender. The literature describes factors that have a strong relationship with an eventual rural practice, including planning to practice family medicine and growing up rural. Women physicians are more likely to choose primary care than their male counterparts but are less likely to practice in rural areas. This non-rural preference, combined with the increase in the proportion of female medical students, represents a risk to the future supply of rural physicians. No studies have been conducted to understand what factors best predict a female osteopathic medical student's choice to practice in a rural setting.

This study used multiple linear regression to investigate the relationship between female osteopathic medical students' attitudes toward practicing in a rural setting and their characteristics of a rural upbringing, a plan to practice in a primary care specialty, and degree of civic-mindedness. The results of this study illustrate three substantial effects. First, the greater

the degree of civic-mindedness of the student, the more favorable the attitude toward practicing in a rural setting. Second, students who plan to practice family medicine have a more favorable attitude toward practicing in a rural setting. Third, a conditional effect of civic-mindedness was found in which, for students with high civic-mindedness, planning to practice family medicine is associated with a more favorable attitude toward rural practice than students with low civic-mindedness. Of note, although the literature overwhelmingly suggests that a rural background is a predictor of eventual rural practice for medical students in aggregate, the results did not indicate that this was true for female osteopathic medical students in Arkansas. This study has implications for medical school admission practices, and further investigation with a larger sample may provide added insight into what characteristics predict eventual rural practice for women physicians.

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## **Chapter One: Introduction**

The quality and performance of a health care delivery system are dependent on the availability of medical personnel to provide needed services. The United States is facing a growing physician shortage that threatens the health care system. According to a recent study by the Association of American Medical Colleges (AAMC) the United States could see a shortage between 46,900 and 124,000 physicians by 2034 (Association of American Medical Colleges [AAMC], 2019). This shortage will be felt more acutely in rural and underserved areas. Rural communities generally have fewer physicians, specialists, and other healthcare workers. Consequently, the small population size and scale makes the loss or shortage of a single health provider likely to have far-reaching impacts. If rural and underserved populations utilized health care to the extent of those who have fewer access barriers, the shortfall of physicians would be even greater. In fact, the AAMC projections of physician supply and demands noted that an additional 14,100 to 17,600 physicians were needed in nonmetropolitan areas to give underserved populations the same access to care as populations facing fewer barriers (AAMC, 2019).

In this chapter, I describe the unique challenges that rural populations face regarding healthcare and the well-documented need for primary care physicians in rural areas. I explain how osteopathic medicine is well-positioned to help meet the healthcare needs of rural communities. I discuss how a growing number of women pursuing osteopathic medical degrees provides an opportunity for medical schools to recruit and invest in female candidates who would be more likely to practice rural medicine. I then theoretically define concepts related to characteristics that may contribute to a favorable attitude toward practicing rural medicine and describe the questions guiding this study. I relate how understanding characteristics that

positively influence the choice to practice rural medicine is essential to selecting candidates who will contribute to alleviating the dearth of primary care physicians in rural areas and improving access to healthcare in underserved communities.

Because it is crucial to understand relationships between a medical school applicant's characteristics and background and their willingness to practice in a rural area to effectively recruit future generations of physicians interested in working in rural areas, this study aims to determine what factors play a role in the career decision of female osteopathic students in Arkansas. To do so, hierarchical multiple regression will be used to examine factors that best predict a favorable attitude toward practice in a rural setting. Finally, I conclude this chapter with a discussion of the proposed study's scope and limitations.

### **Background of the Study**

Rural Americans, who make up at least 15% of the U. S. population, face numerous health disparities compared with their urban counterparts. In general, residents of rural areas in the United States tend to be poorer, older, and sicker than their urban counterparts (Center for Disease Control and Prevention [CDC], 2017). Frequently cited factors underlying rural health disparities include health-related behaviors, socioeconomic class, chronic conditions, and health care access (Rural Health Information Hub [RHIHub], 2021a). Physician shortages, poverty, and remote locations also contribute to the lack of access to health care in rural areas. Because of physician shortages and remote locations, rural populations are more likely to need to travel long distances to access healthcare services. The time and expense incurred to travel for health care often strains already tight budgets.

There is a well-documented need for primary care physicians across the country, but especially in rural areas (Larson et al., 2020). Healthcare workforce shortages are higher in rural

areas, accounting for 61.5% of primary care health professional shortage areas in the United States (Bureau of Health Workforce Health Resources and Services Administration [HRSA], 2021b). Primary care, along with emergency services, is the most basic and the most vital service needed in rural communities. Primary care serves as the first entry point into the health system, which is particularly important for rural residents who face barriers to accessing healthcare. Rural residents with limited primary care may not receive preventative screenings that can lead to early detection and treatment of disease.

Health disparities are acutely felt in Arkansas. Twenty-six out of 34 health outcome measures, e.g., percentage of adults self-reporting fair or poor health, and health factor measures, e.g., ratio of population to primary care physicians, fall below national estimates (University of Wisconsin Population Health Institute, 2021). As a state, Arkansas is ranked 46<sup>th</sup> out of 50 states for active physicians per 100,000 population (AAMC, 2021b). More specifically, in Arkansas there are only 6.9 primary care physicians per 10,000 individuals in rural areas versus 17.9 per 10,000 people in urban areas (Brock et al., 2021). An overwhelming 78.8% of Arkansas's primary care physicians are practicing in an urban county in 2020, not in rural areas (Brock et al., 2021). This downward trend is worsening. In the past decade, rural counties in parts of Arkansas have lost half of their primary care physicians (Hanson, 2021). Gaps in health outcomes between rural and urban areas will continue to widen if this trend is not reversed.

Physicians in the United States hold either the Doctor of Medicine degree (MD) or the Doctor of Osteopathic Medicine degree (DO). These two types of accredited doctors have the same standards for practicing medicine, and the same licensing board gives licenses to both kinds of doctors but differ in their philosophy of care. DOs practice an osteopathic approach to care, while an MD practices an allopathic approach. DOs often focus on “whole body” care with

an emphasis on preventative care (Murphy, 2020). Over its history, osteopathic medicine has strongly identified itself with the primary care specialties of family medicine, pediatrics, and general internal medicine essential for rural healthcare. A high number of osteopathic physicians, roughly 60%, practice primary care as opposed to specialties (Miller et al., 2006). By comparison, less than 30% of active MDs in the United States practice in primary care specialties (Murphy, 2020). Additionally, osteopathic physicians have a 1.5 times greater probability of practicing in a rural area compared with allopathic physicians (Miller et al, 2006).

According to the Association of American Medical Colleges, 2019 was the first year in history that the majority of U. S. medical school students, in both osteopathic and allopathic medical schools, are women (Boyle, 2019). An analysis of osteopathic medical school survey data found women are 1.75 times more likely to choose primary care than men (Stefani et al., 2020). However, women physicians are less likely than men to practice in rural areas (Ellsbury et al., 2000; RHIHub, 2021b). This non-rural preference, combined with the increase in the proportion of female medical students, represents a risk to the future supply of rural physicians. The so-called “feminization” of primary care, particularly pediatrics and family medicine, threatens the rural workforce without efforts to recruit women into rural practice. It is critical to understand relationships between a medical school applicant's characteristics and background and their willingness to practice in a rural area to effectively recruit future generations of women physicians interested in working in rural areas. Osteopathic medical schools need to recruit female candidates who will be most likely to pursue rural medicine and train them to provide health access for rural populations. The problem is that no studies have been conducted to understand specifically what factors best predict a female osteopathic medical student to choose to practice in a rural setting.

### **Need and Purpose**

Today, osteopathic physicians continue to play a significant role in meeting the healthcare needs of America's rural population. The majority of osteopathic medical schools are located in health professional shortage areas or medically underserved areas (American Association of Colleges of Osteopathic Medicine [AACOM], 2021). Osteopathic medical school enrollment has doubled over the past decade, and doctors of osteopathic medicine (DO's) now comprise 26% of first year medical students in the US (Salsberg & Erikson, 2017). A number of these newer schools are in mid-sized cities in rural areas such as Tulsa, OK, Dothan, AL, and Fort Smith, AR. Additionally, the fastest-growing demographic of osteopathic physicians is women under the age of 45, accounting for 47% of practicing DOs (American Osteopathic Association [AOA], 2021). With their priority of primary care specialties, osteopathic medical schools need to recruit individuals who will be most likely to pursue rural medicine and train them to provide health access for rural America. This is even more imperative in the state of Arkansas, where 41% of the population lives in rural counties, well above the average of 19% for the United States as a whole (Miller & Knapp, 2019). In response to that need, the Arkansas College of Osteopathic Medicine (ARCOM) was opened, with an inaugural class of 150 aspiring physicians, in August of 2017. According to their mission statement, the key focus of ARCOM is to provide service to underserved areas (Arkansas College of Osteopathic Medicine [ARCOM], 2020).

Like ARCOM, many medical schools have a social mission. In general, a social mission can be described as "beyond the general education mission, medical schools are expected to have a social mission to train physicians to care for the population as a whole, taking into account such issues as primary care, underserved areas, and workforce diversity" (Mullan et al., 2010, p.

805). Despite the move to social missions in medical education, there has been a paucity of evidence reflecting the efficacy or impacts of making this connection (Ellaway et al., 2018). In a critical review of the literature on the subject, Ellaway et al. (2018) conclude, “It was discouraging to see that after more than four decades of talking about social responsibility of medical schools, the outcomes of admission to medicine do not seem to have substantially changed in that regard” (p. 225). Who is admitted to medical school is a fundamental issue in medical education. Assuming all factors are equal, preference should be given to candidates with a higher likelihood, at least in the aggregate, to fulfill the social mission of the school. In an effort to clarify which students are more likely to aspire toward fulfilling ARCOM’s mission, this study aims to determine what factors play a role in the career decision of female osteopathic students in Arkansas.

Studies have looked at the demographic factors that influence practice location, including age, the influence of a rural background, parental education, and gender. Factors related to physicians’ backgrounds that have a strong relationship with eventual rural practice include growing up rural and planning family medicine (Rabinowitz et al., 2012; Brooks et al., 2002; Owen et al., 2002). Evidence of a motivation toward civil service or volunteerism is often considered when admitting students to a medical program, but there is no conclusive evidence this could predict a positive attitude regarding eventual practice in a rural setting. One study found that volunteerism prior to medical school was predictive of an interest in working with vulnerable populations, but not rural populations specifically (Rogers, 2020). An older study by Madison (1994) found a high community service orientation prior to medical school strongly predicted the choice of a generalist medical career but did not examine the setting of the general practice. Would understanding an individual’s civic-minded motivation toward the collective

good improve the predictive model of which students intend to practice in a rural or underserved area?

It is crucial to understand relationships between a medical school applicant's characteristics and their willingness to practice in a rural area to effectively recruit and support future generations of physicians interested in working in rural areas. The purpose of this study is to determine if a rural background, a plan to practice family medicine, and motivation toward civic duty affect the attitude toward eventual practice of rural medicine in female osteopathic medical students. This study will contribute to the understanding of factors that positively influence the choice to pursue rural medicine for women in Arkansas. Understanding the predictive value of variables that are available at the time of admission to medical school is a significant step toward understanding which applicants are most likely to eventually practice in underserved rural communities.

### **Definitions of Concepts**

*Allopathic medicine* is the term for what most would call “mainstream medicine”. There are two types of degree programs to become a physician in the U.S., a MD (allopathic) degree and a DO (osteopathic) degree. Historically, the term allopathy emerged in the 19<sup>th</sup> century to differentiate itself from homeopathy, which was widely practiced at the time (Merriam-Webster, n.d.).

*Civic-minded* is defined as having, showing, or actively carrying out one's concern for the condition and affairs of one's community, or public-spirited (Collins, n.d.). The concept of civic-mindedness refers to a person's disposition to be involved in the community and to have a commitment to act upon a sense of responsibility as a member of the community (Bringle & Steinberg, 2010).



*Doctor of Osteopathic Medicine (DO)* is a medical degree offered by medical schools in the United States. Osteopathic medical school curricula are virtually identical to those at schools granting Doctor of Medicine (MD) degrees, with an additional 300-500 hours in the study of hands-on manual medicine, referred to as osteopathic manipulative medicine, to treat musculoskeletal conditions (Shelat, 2020).

*Osteopathic medicine* is a uniquely American branch of medicine that trains physicians to practice the entire scope of modern medicine, emphasizing a patient-centered, holistic, hands-on approach to diagnosing and treating illness and injury. Doctors of Osteopathy in the United States can choose any specialty, prescribe drugs, perform surgeries, and practice medicine anywhere in the U.S. (AACOM, 2021).

*Rural* is defined by both population-based factors and geography-based factors, with methodologies used for identifying rural areas include population size, population density, distance from an urban center, settlement patterns, labor market influences, and postal codes (Pitblado, 2005). The U. S. Census Bureau defines rural as all territory, population, and housing units located outside of urbanized areas and urban clusters. Urbanized areas include populations of at least 50,000, and urban clusters include populations between 2,500 and 50,000. The core areas of both urbanized areas and urban clusters are defined based on population density of 1,000 per square mile and then certain blocks adjacent to them are added that have at least 500 persons per square mile (HRSA, 2021a).

*Rural health* or *rural medicine* is the interdisciplinary study of health and health care delivery in rural environments. Rural medicine addresses the health disparities rural Americans face compared with their urban counterparts including higher rates of mortality from heart disease, cancer, unintentional injury deaths from motor vehicle accidents and opioid overdoses,

chronic lower respiratory disease, and stroke (Center for Disease Control and Prevention [CDC], 2017).

### **Research Questions**

Women have achieved parity with men regarding admission rates of medical schools but differ in their choice of practice specialty and practice location. Although more women choose primary specialties, fewer decide to practice in rural settings. Efforts need to be made to understand which applicants are more likely to practice in rural areas to help reverse diminishing access to primary care for individuals who live in rural areas. This study seeks to better understand the relationship between female osteopathic medical students' attitudes toward practicing in a rural setting (dependent variable) and background characteristics of a rural upbringing (independent variable), degree of civic-mindedness (independent variable), and plans of practicing in primary care specialties (independent variable). Additionally, this study seeks to understand if the degree of civic-mindedness (moderating variable) affects the strength of those relationships.

Three research questions guide this investigation:

1. Among female osteopathic medical students at Arkansas Colleges of Health Education, what factors best predict attitude toward practicing in a rural setting?
2. Does civic-mindedness affect the relationship between a rural upbringing and attitude toward practicing in a rural setting?
3. Does civic-mindedness affect the relationship between planning to practice family medicine and attitude toward practicing in a rural setting?

### **Scope and Limitations**

The scope of this study is female osteopathic medical students in a private, not-for-profit osteopathic medical school in Arkansas. A limitation of this study is that it will take place at only one medical school, which may threaten external validity. Additionally, the college's emphasis on the mission of serving the underserved may influence the participants to answer more strongly in the affirmative to the question regarding their intent to practice in a rural setting due to social desirability. The survey also uses other self-reported data, which may not be accurate. Subjects may make the most socially acceptable answer rather than being truthful. The average online survey response rates are currently around 30%. If the response rate is low, a limitation would be that the data is collected only from participants who respond, or self-selection bias. Additionally, survey questions can lack depth and may not capture the participants' true feelings. There is a lack of prior research on this topic, and the Civic-Minded Professional Scale has not been used with potential or actual medical students in published research. However, it has been used to measure the effectiveness of service-learning coursework in physical therapy, civic-mindedness in librarians and higher education faculty (Palombaro et al., 2017; Barry et al., 2017; Hatcher, 2008). Measuring attitudes toward a behavior may not predict behavior precisely but measuring actual behavior after graduation is beyond the scope of this research study. Arkansas Colleges of Health Education welcomed its first class of osteopathic medical students in 2017, so those students have not completed their training yet. Due to the newness of the college, no data exists on actual practice setting after graduation. Lastly, self-declaration of rural by the participants may not be as accurate as gathering Rural-Urban Commuting Area (RUCA) data.

## **Summary**

This chapter provided the reader with the background of the study, namely rural health disparities and the lack of primary care physicians in rural communities. I discuss the unique position of osteopathic physicians in relation to the delivery of rural health care. I explain how a growing number of women interested in pursuing osteopathic medicine provides medical schools with an opportunity to accept female candidates who are more likely to be interested in rural health. The purpose of the study, research questions, and significance of the problem were examined. This chapter provides the reader with the key concepts and terminology commonly found in the discussion of predicting rural practice choice in medical students. Finally, I discuss the scope and limitations of the study. The following chapter reviews the theoretical and empirical literature on the significance of women in medicine and explores predictors of intent to practice primary care, especially in rural and underserved communities, to support the rationale for the research question and hypotheses guiding this investigation.

## **Chapter Two: Literature Review**

Within the last decade, U.S. medical student interest in and choice of practicing in primary care, practicing in a rural community, or practicing in an underserved area has fallen below the threshold necessary to maintain the physician workforce in underserved settings (Salsberg & Grover, 2006). This shift in future physicians' practice interests threatens to enhance an existing workforce maldistribution in rural healthcare. Recruitment and retention of health professionals in rural and underserved areas is a persistent problem. More specifically, there is a well-documented need for primary care physicians in rural areas (Larson et al., 2020).

Understanding characteristics that positively influence the choice to practice rural medicine is essential to selecting candidates who will contribute to alleviating the dearth of primary care physicians in rural areas and improving access to healthcare in underserved communities. This review examines the current literature regarding characteristics that positively influence a choice of life in rural medicine including a rural background and a desire to practice family medicine, particularly in female osteopathic students. Additionally, I examine the literature regarding the personal character trait of civic-mindedness and its influence on rural practice choice. This chapter will provide conceptual and theoretical frameworks on which this study is grounded. Lastly, this chapter will review the research questions posed in the study and provide hypotheses based on those frameworks. Social Identity Theory will be used as the theoretical framework to guide the study's hypotheses.

Sources for this study were found using Google, Google Scholar, the United States Bureau of Health Workforce Health Resources and Services Administration (HRSA), and the ERIC, Proquest, PubMed, and QuickSearch databases available through the University of Arkansas Library and the Taylor Health Sciences Library at Arkansas Colleges of Health

Education. I also used Connected Papers, an online visual tool that selects papers with the strongest connection to a chosen paper and graphs strongly connected work by a criterion based on overlapping citations and references. A number of articles were located through the reference list of relevant articles. Although I found numerous studies from other countries with a significant rural population, namely Canada and Australia, I chose to focus this literature search on the rural physician workforce in the United States. The reason for this is twofold. First, my population of interest is DOs, a uniquely American branch of medicine (AACOM, 2021). Also, these countries vary widely in healthcare delivery and the research may not be as applicable as research conducted in the US. Search terms included “osteopathic medicine,” “women in medicine,” “medical student,” “admission factors,” “civic-mindedness,” “the Civic-Minded Professional Scale,” “service orientation,” “attitudes to living in rural areas,” “medical specialty choice,” “career choice,” “family medicine,” “primary care,” “rural background,” “rural healthcare,” “rural medicine,” “volunteerism,” “voluntary action” “self-categorization theory” and “social identity theory” .

### **Conceptual Framework**

Before a researcher attempts to understand the relationship between variables, each variable must be thoroughly understood individually. This study seeks to understand relationships between a medical school applicants characteristics and background and their willingness to practice in a rural area. This literature review uses a thematic approach to analyze the variables in this problem. The following section examines the literature surrounding the concepts of a rural background, a choice of practicing rural medicine, women in medicine, osteopathic medicine, civic-mindedness, and voluntary action.

## Rural Background

The term "rural" has multiple definitions. The simple meaning of rural is "in, of, or like the country, not in the city" (Cambridge, n.d.). Even so, "rural" is a multifaceted concept with no universal agreement to the definition. The term suggests low population, pastoral landscapes, and a distinct sociocultural atmosphere (Miller & Luloff, 1981). The definition of rurality frequently relies on stereotypes and personal experience. Rural has been defined historically in two principal ways in the United States. First, the Census Bureau does not define rural per se, but "not urban." Any tract or block outside of two urban categories is often considered rural, with those urban tracts or blocks either containing 50,000 or more residents or 2,500-50,000 residents (Ratcliff et al., 2016). Under this definition, 19.3% of the population of the U.S. was classified as rural in the 2010 Census. (Ratcliff et al., 2016). The Office of Management and Budget (OMB) provides the second principal way of defining rural. OMB designates counties as metropolitan, micropolitan, or neither based on Census Bureau data. A metropolitan area contains a population of 50,000 or more, and a micropolitan area has an urban core of at least 10,000. (U.S. Department of Health and Human Services, 2020). All non-metropolitan counties are considered rural, about 15% of the population after the 2010 Census (HRSA, 2021a). The Census and OMB definitions present challenges, as the Census overcounts the number of people in rural areas while the OMB undercounts them. To overcome this challenge, the U.S. Department of Agriculture's (USDA's) Economic Research Service (ERS) created Rural-Urban Continuum Codes (RUCC) (U.S. Department of Agriculture Economic Research Center [ERS], 2020). These codes distinguish metropolitan counties by the size of their metro area and non-metropolitan counties by the degree of urbanization and adjacency to a metro area. Counties with RUCA code values of 6 (meaning that the county had an urban population of 2,500-19,999 and

was adjacent to a metropolitan area) through 9 (meaning that the county was completely rural or had an urban population of fewer than 2,500 people and was not adjacent to a metropolitan area) are considered "rural" (U.S. Department of Agriculture Economic Research Service [ERS], 2020).

Because of the multiple definitions of rural, establishing focused outreach programs to increase the number of physicians practicing in rural areas is challenging. Little is known about which description of rural background may be effective for these programs to use in identifying applicants whose rural upbringing may lead them to rural practice. To understand this more fully, Owen et al. (2007) used different definitions to determine the relationship between a medical school applicant's rural background and the prospect of rural practice. Rurality was assessed by coding three background addresses: high school attended, college from which the individual received a bachelor's degree, and permanent mailing address at the time of application. The addresses were coded using OMB classification, U.S. Census Bureau classification, RUCC, and Rural-Urban Commuting Area (RUCA) codes. The authors also asked the question, "Did you grow up in a rural area?" Multivariate logistic regression analysis was performed to observe the relationship between the three addresses using each of the four definitions of rural as well as the self-description of growing up rural. The self-description of growing up rural was the only predictor variable that had a significant relationship with eventual rural practice. The authors concluded that answering the simple question of whether a person grew up in a rural area encompassed more than just geography; it also encapsulates the lived experiences and self-identification as someone with meaningful rural connections and was therefore a more meaningful construct (Owen et al., 2007).



A rural background plays an essential role in the recruitment of rural physicians. With roots in rural America, the conditions of rural life are familiar and comfortable. Eventual rural practice may be more likely. In the literature, no consensus has been reached regarding how to define what comprises a rural background, but the literature suggests that this question is best answered from the perspective of the student. If the student feels that they grew up in a rural community, then that perceived rural identity is a crucial connection to eventual rural practice.

### **Choice of Practicing Rural Medicine**

Significant disparities in availability of health care services in rural areas are not new, nor is the research on identifying factors that may predispose a medical student to gravitate toward rural medicine. The literature on the characteristics of medical students who intend to practice in rural settings began with a study by Steinwald and Steinwald (1975). The authors of this study sent questionnaires to the 1965 graduating class of all U.S. medical schools and reported an impressive 76.3% response rate. Although the focus of the study was the influence of rural training programs on eventual practice in rural areas, the authors found the two most significant factors that affect rural practice were being "rural-reared" and choosing primary care specialty (Steinwald & Steinwald, 1975). Pretorius et al. (2008) and Hughes et al. (2005) found that students graduating from rural high schools were more than twice as likely to enter family medicine than students from non-rural high schools in New York and California, respectively. Daniels et al. (2007) found that a rural background, namely intent to return to hometown, was associated with rural practice choice. In a survey of primary care physicians licensed in the state of North Carolina, seventy-two percent of rural physicians reported being raised in a town of less than 11,000 (Duffrin et al., 2014). A review of the literature by Brooks et al. (2002) found six

studies that analyzed pre-medical school factors that related to rural recruitment and found that a rural upbringing was positively associated with physicians' practice in a rural community.

Several studies explored the compounding effects of a rural background and specialized rural training while in medical school. A study by Orzanco et al. (2011) compared two categories of predictors of family practice among undergraduate medical students: individual characteristics, or nature, and a rural component of their training program, or nurture, in predicting practice location. The individual variables (nature) explained 16% of the variability in the model, and when a mandatory rural clerkship was added to the model (nurture), 27% in the variability in practice location was predicted. In the nature plus nurture model, for students who attended high school in a rural area the likelihood of practicing in a non-metropolitan area was increased fourfold. Woloschuk and Tarrant (2002) also found that a rural educational experience increased medical students' likelihood of practicing in a rural community, more so for students from rural backgrounds. It is clear from these studies that a rural background will strengthen the effect of a rural medicine training program during medical school.

The literature search found three systematic reviews on the subject of a rural background and eventual rural practice. One systematic review conducted by Laven and Wilkinson (2003), reviewed national and international literature from 1973 to 2001 and found that medical students with a rural background were two to two and a half times more likely to practice in a rural setting in 10 of the 12 studies reviewed. The authors commented that many of the studies reviewed lacked the rigor of modern peer reviewed publications, and in most of the studies a rural background is not clearly defined. Goodfellow et al. (2015) found a positive association between growing up in a rural area, prior interest in family medicine, and prior interest in rural and underserved practice and practicing in an underserved or rural area. More recently, MacQueen et

al. (2018) found 22 studies that addressed the rural background of medical providers, and overwhelmingly showed a positive association with the choice to practice in a rural area. However, gender differences in the strength of this association were not reported, nor were differences in osteopathic versus allopathic medicine. Study limitations reported by the authors include social desirability effects in interviews determining choice of practice as many of the studies originated from medical schools motivated to highlight program successes. Additionally, these findings may suffer from publication bias, as some studies that found no association or a negative association may not have been published.

Although these two systematic reviews agree that a rural background increased a medical student's likelihood of practicing in a rural area, the number of medical school students with a rural background is small to begin with, and dwindling. A study by Shipman et al. (2019) found a decline of 18% in the number of applicants from a rural background, and a decline of 28% in the number of matriculants from 2002 to 2007. Additionally, the authors found that students from rural backgrounds made up only 4.3% of the total incoming medical student body in both 2016 and 2017 (Shipman et al., 2019). Of note, this study included only MD granting medical schools, not DO granting schools. Osteopathic medical schools attract a higher percentage of applicants and matriculants from small town and rural background, estimated at 20%, but DO's only make up about eleven percent of the physician workforce (AACOM, 2020). Still, the study by Shipman et al. (2019) has made it clear that students from a rural background are increasingly underrepresented group in medical school.

Very few studies have explicitly focused on characteristics that influence an osteopathic physicians' intent on practicing rural medicine. Osteopathic physicians have approximately 1.5 times greater probability of practicing in a rural area compared with other physicians in the U. S.

(American Osteopathic Association, 2021). Two studies were found exclusive to osteopathic medical student participants, and both found that a rural upbringing was strongly statistically significant for interest in rural practice among osteopathic student doctors (Colgrove & Whitacre, 2009; Royston et al., 2012). Both of these studies found no significant difference between male and female students, but the sample sizes were small, and the study by Colgrove and Whitacre had only a 12% response rate.

Evidence that doctors with a rural background are more likely to work in a rural setting is robust. A rural background is an essential factor that can inform policy and practice in medical education that should lead to an increased number of rural physicians, but questions remain. What is it about a rural background that really influences future career choice? Here the literature falls short. Is it the lack of the hustle and bustle of a large city, the small-town life, the close network of friends and family, or the sense of belonging to a community that is the most crucial component of rural background? For example, a rural physician may be called on to be a community leader and represent the interests of the community in public health emergencies. The rural family physician tends to encounter patients more often during the course of the day, e.g., while shopping, and must be comfortable with the degree of community engagement most likely not present in urban practice. Perhaps aspects of rural life such as these play an important role in eventual rural practice. An individual's attitude toward living and working in a rural community is multidimensional and can relate to personal, family, community, social, or professional issues. It is reasonable to hypothesize that measuring a student's attitude toward rural practice would shed light on the likelihood of eventual rural practice.

## **Women in Medicine**

Elizabeth Blackwell was the first female admitted to an American Medical School in 1847, and her acceptance was deemed an administrative practical joke by the all-male student body (Markel, 2014). Despite being ostracized by educators, classmates, and patients, she graduated in 1849, ranked first in her class, and became the first woman to become a medical doctor in the United States (Markel, 2014). Dr. Blackwell spent her life fighting for equality in the medical profession. By the end of the 19th century, 19 women's medical colleges and nine women's hospitals were established, with women comprising 5% of the physician workforce and nearly 7000 physicians (Wynn, 2000). In the 20<sup>th</sup> century, progress for women in medicine halted; in 1949, 100 years after Elizabeth Blackwell began medical school, still only 5% of medical students were women (Rosenthal, 1982). Title IX of the Higher Education Act and the Equal Opportunity Act of 1972 opened the door for women to pursue a medical education. Title IX mandated equal treatment for women and men in education. In fact, Patsy Mink, the co-author of Title IX, became a politician and wrote this legislation after being denied from a dozen medical schools because she was a woman (Stringer, 2018). An increasing number of women attended medical school from 1960, when less than 6% of incoming medical students were female, to 1990, when women represented 1 in 5 physicians. (Wynn, 2000). Just recently women have achieved equal numbers to men attending medical school. 2019 marked the first year in history that the majority of U. S. medical school students, in both osteopathic and allopathic medical schools, are women, according to the AAMC (Boyle, 2019).

Although women have achieved parity with men in medical school admissions, differences still exist in men's and women's choice of specialties after graduation. Women comprise the majority of resident physicians in several specialties, including obstetrics and

gynecology (83.5% are women), allergy and immunology (66.6%), family medicine (53.5%), and pediatrics (69.5%) but are underrepresented in many specialties, including orthopedic surgery (16.1%), neurosurgery (19.3%), and thoracic surgery (22%) (Accreditation Council for Graduate Medical Education, 2020). Kilminster et al. (2007) conducted a literature review to understand the effects of the changing gender composition of the medical profession. The authors found conflicting evidence about whether women practice medicine differently but conceded that gendered expectations shape health care interactions and experiences for both patients and physicians. The cultures and practices of medicine are interrelated within the social context in which health care is delivered, so cause and effect are difficult to establish. Of note, female doctors are categorized as the "other" and male doctors are the normative group in many of these studies. Today, women outnumber men in medical schools, accounting for 50.5% of medical students (Boyle, 2019). Many refer to this phenomenon as the "feminization" of medicine (Ross, 2003).

A physician's practice location, either urban or rural, is often influenced by the type of medicine they practice. This includes the specialty chosen, for example dermatology or pediatrics, and the type of training, either allopathic or osteopathic. A small town may not be able to support a highly specialized thoracic surgeon, for example. The chosen specialty has a powerful effect on physician location, and primary care physicians are the largest source of physicians in rural areas (Rosenblatt & Hart, 2000). Stefani et al. (2020) found that female osteopathic medical students were 1.75 times more likely to choose primary care than men. Additionally, Miller et al. (2006) found that female osteopathic physicians were two and a half times more likely to practice primary care in a rural location than female allopathic physicians. Yet women are only about half as likely to practice in rural communities than men (West et al.,

1996). Ellsberry et al. (2000) also found that there were twice as many male as female rural family physicians and general practitioners. Because of this, the growing proportion of women in medicine has the potential to prolong or exacerbate the national shortage of rural physicians. Doescher et al. (2000) found that fewer than 7,000 female allopathic physicians were practicing in rural America in 1996 and emphasized that serious efforts to increase the placement of rural female physicians are warranted.

In summary, the shortage of rural physicians has been one of the most persistent and critical problems facing health care policymakers. Women now account for the majority of the future physician workforce. The literature suggests that women physicians are less likely than men to practice in rural areas but more likely to practice a specialty desperately needed in rural healthcare. In addition to improving the overall supply of rural physicians, women physicians are needed to serve in rural communities as female role models, meet the needs of women patients, and advocate for women's health issues in rural communities. It is essential to identify ways to increase the proportion of women practicing in rural areas.

### **Osteopathic Medicine**

Osteopathic medicine is a uniquely American branch of medicine that trains physicians to practice the entire scope of modern medicine, emphasizing a patient-centered, holistic, hands-on approach to diagnosing and treating illness and injury. (AACOM, 2021). DOs in the United States can choose any specialty, prescribe drugs, perform surgeries, and practice medicine anywhere in the U.S. (AACOM, 2021). Andrew Taylor Still, MD, founded osteopathy in 1874 (DiGiovanna et al., 1991). Dr. Still was trained at the College of Physicians and Surgeons in Kansas City and attained the rank of major during the civil war (DiGiovanna et al., 1991). He shunned the liberal use of toxic drugs and compounds used by physicians of the day and believed

that the primary role of the physician was to facilitate the body's inherent ability to heal itself (Lesho, 1999). Many of the drugs used by physicians at that time were indeed poison, including mercury, arsenic, and heroin (Kam, 2006). After a tour of medical schools in the U.S. in 1910, Abraham Flexner reported that U.S. medical schools produced "uneducated and ill-trained medical practitioners" (Chen & Mullen, 2009). Shortly after that, allopathic medical schools aligned with large research universities and moved rapidly toward reform (Chen & Mullan, 2009). Osteopathic schools were slower to reform due to more rural roots, a traditional focus on general practice, and a lack of external funding (Chen & Mullan, 2009). Still today, unlike their allopathic counterparts, osteopathic schools generally have modest research portfolios and do not own hospitals. As a result, osteopathy has concentrated on education with a focus on primary care and rural practice (Fordyce et al., 2007). In 2005, 58% of DOs were generalists compared with only 35% of M.D.'s; with 19% of DOs practicing in rural areas compared with 11% of MDs (Fordyce et al., 2007). Today, DOs comprise 11% of practicing physicians in the U.S., with 71% practicing in the general specialties of primary care, emergency medicine, or obstetrics and gynecology (AOA, 2021).

Women were admitted to the first osteopathic medical school in 1892 with equal rights of men students, a starkly different stance than allopathic medical schools, who continued to reject women out of hand (Moehling et al., 2019; Quinn, 2011). In 1908, 35% of DO graduates were women, and by 1923, 50% of DO graduates were women (Quinn, 2011). A drop in female enrollment was seen after World War II due to the passing of the GI Bill (Serviceman's Readjustment Act of 1944) which increased male enrollment in higher education, as well as society's traditional gender role expectations at the time (Quinn, 2011). By the late 1960s and early 1970s, both MD and DO numbers of women physicians began to slowly increase (Lesho,



1999). Today, the fastest-growing demographic of osteopathic physicians is women under 45, accounting for 47% of practicing DOs (AOA, 2021).

Osteopathic medicine continues to have a special focus on providing care in rural and underserved areas. Six out of the top ten U.S. medical schools that produce the most graduates practicing in rural area are osteopathic medical schools, according to U.S. News and World Report's annual ranking of medical schools (U.S. News and World Report, 2022). The literature suggests many reasons for this including faculty composition, institutional mission, student characteristics, admission criteria, and cultural forces such as faculty and peer role models (Campos-Outcalt & Sneyd, 1992, Martini et al., 1994, Colwin, 1992). Interest in rural medicine remains strong among osteopathic medical students, with 67% of residents expressing an intention of practicing rural medicine (Colgrove & Whitacre, 2009). Osteopathic schools have a larger percentage of primary care-centric faculty to serve as role models, compared with allopathic schools (Peters et al., 1999). Osteopathic schools are uniquely positioned to contribute to alleviating a part of the maldistribution of health care in the United States.

### **Civic-Mindedness**

Alex de Tocqueville, in the early decades of the nineteenth century, wrote, "Americans of all ages, all conditions, and all dispositions constantly unite"(p. 896) in his book *Democracy in America* (Toqueville, 2012). He emphasized the uniqueness of average citizens of America initiating change as they saw a need in society, rather than such action being limited to the elite (Toqueville, 2012). But more recently, American medicine has been criticized. Dr. Edward Eckenfels, advocating for a return of humanism to medicine, states, "American medicine has lost its connectedness to society, and in the process has become self-absorbed, devoted more to its own technology and what it is able to do than to what patients and society actually need."

(Eckenfels, 2009). Despite highly favorable physicians' attitudes toward volunteerism, less than half of U.S. physicians volunteer within the community according to Grande & Armstrong (2008). In the article "Is civic engagement the new frontier of physician advocacy?" by Boyd (2020), an emphasis was placed on reaching beyond the clinical roles to engage in the issues that matter to patients and communities, namely combatting the effects of poverty and inequality on health.

Civic-mindedness is defined as having, showing, or actively carrying out one's concern for the conditions and affairs of one's community or being public-spirited (Collins, n.d.). The concept of civic-mindedness refers to a person's inclination or disposition to be knowledgeable of and involved in the community and to have a commitment to act upon a sense of responsibility as a member of that community (Bringle & Steinberg, 2010). Definitions of civic-mindedness tend to be categorized into three distinct areas of emphasis: civic-mindedness as an individual personality trait, civic-mindedness in the workplace, and civic-mindedness as an outcome of service-learning, usually in higher education (van Rooij, 2020). For the purposes of this study, civic-mindedness as an individual personality trait will be emphasized.

A civic-minded professional is "skillfully trained through formal education with the ethical disposition of a social trustee of knowledge and the capacity to work with others to achieve public good" (Hatcher, 2008). Civic-mindedness is a combination of one's personal and professional identities as well as the civic attitudes that influence and drive behaviors related to engagement (Hatcher, 2008). Underlying this idea is the philosophy that educated individuals, especially health professionals, are responsible for using their position for the public good. A review of the literature found that civic-mindedness has been measured using the Civic-Minded Professional (CMP) Scale developed by Hatcher on several occasions. In her doctoral

dissertation on developing and evaluating the CMP, Hatcher found that faculty nominated for national awards scored higher on the CMP scale than non-nominees (Hatcher, 2008). Palombaro et al. (2020), using the CMP Scale, found that civic-mindedness supported empathy throughout a graduate-level Doctor of Physical Therapy program. This is noteworthy because alternative research found a decline in empathy scores throughout osteopathic medical school education (Hojat et al., 2020). A study by Barry et al. (2017) utilized the CMP Scale and found academic librarians who volunteered and participated in community activities were more civic-minded than ones who did not.

Having an interest in serving underserved populations is associated with subsequent practice in an underserved area (Rabinowitz et al., 2000). Madison (1994) found that a high "service index," reflective of a demonstrated orientation toward community service prior to medical school admission, is a strong predictor of a primary care career. Shannon and Jackson (2015) found that students with a rural background, rural practice intent, or greater service orientation are more likely to enter rural practice. Service orientation was measured by projected accessibility of practice, ranging from "my practice will generally direct indigent patients elsewhere" to "my practice will focus on indigent patients." Two studies from Canada found that a history of volunteer work in a developing nation, a societal orientation, and a preference for social versus medical problems were predictive of whether a student named family medicine as their top residency choice (Feldman, 2008; Scott, et al., 2011). In both studies, a societal orientation was measured by the importance of health promotion, long-term relationships with patients, focus on patients in the community, and social commitment. Gruen et al. (2006) conducted a study to determine the importance that physicians assign to public roles such as community participation and collective advocacy. The previously mentioned study by Royston,

et al. found that medical students felt that physicians in rural communities have more impact on their community than their urban counterparts (2012). Community participation and collective advocacy were rated as very important by more than 90% of physician respondents, and rural physicians tended to be significantly more active in community participation than their urban counterparts (Gruen et al., 2006). The authors found that civic-mindedness varied with sociodemographic characteristics, but suggested that civic-mindedness is influenced heavily by physicians' personal characteristics and less by professional or practice attributes.

These few studies have found that an orientation toward community service is a strong predictor of a choice of family medicine, and a choice of family medicine is a predictor for practicing in a rural setting, but no studies have investigated the relationship between civic-mindedness and attitudes toward practicing in a rural setting. In the quest to reduce the inequality of rural versus urban healthcare, it would be beneficial to investigate this relationship. If a positive relationship exists between civic-mindedness and practicing in a rural or underserved area, medical schools must make efforts to recruit civic-minded medical students.

### **Voluntary Action**

Voluntary action, or volunteerism, is defined as the principle of donating time and energy for the benefit of other people in the community as a social responsibility rather than for any financial reward (Collins, n.d.). Volunteerism has been a unique part of American culture and democracy, as noted by previously mentioned Alexis de Toqueville in *Democracy in America* (Toqueville, 2012). In 1736, Benjamin Franklin founded the first volunteer firehouse, and the 1800's saw the rise of social reform movements around issues like poverty, temperance, women's rights, and the abolition of slavery (Dreyfus, 2018). Institutions were formed to connect a volunteer force to social services that improved the lives of others like the YMCA, Salvation

Army, American Red Cross, and the United Way. The determinants of participation in voluntary activities are highly multivariate and included contextual factors (e.g., smaller community), social factors (e.g., higher educational attainment), personality (e.g., higher self-efficacy), attitudinal factors (e.g., more group attractiveness), and situational factors (e.g., being asked to join) (Smith, 1994). Volunteerism in the United States peaked at 28.8% in the years between 2003-2005 (U.S. Bureau of Labor Statistics, 2016) but has steadily declined since that time (Lowe & Fothingill, 2003). The national volunteer rate bottomed out at a fifteen-year low of 24.9% in 2015 and has remained around 25% since that time (Grimm & Dietz, 2018). This decline equates to a loss of millions of volunteers. At the same time, the need for volunteers as a resource for the nonprofit sector has grown by 25% (Minocha, 2017).

Medical school admission committees value community service and require documentation of voluntary activity as part of the application process. According to the American Association of Medical Colleges, successful medical school applicants must be able to demonstrate proficiency across multiple competencies related to voluntary service including cultural competence, ethical responsibility to self and others, service orientation, and social skills (AAMC, 2021a). Medical schools suggest a history of at least ten to fifteen hours a month for a minimum of six months for a given organization. But little is known about how volunteerism prior to medical school admission impacts desire to work with disadvantaged populations. Volunteerism is difficult to operationalize. One reason is that service hours or volunteering experiences are provided via self-report on medical school applications, therefore are somewhat vulnerable to recall bias and social desirability bias. Additionally, the quality of those service hours listed may vary greatly between applicants. One study by Rogers (2020) found that prior to medical school admission, students with an interest in serving the underserved patient

populations had volunteered significantly more than students without an interest in community service. Community service participation prior to medical school has been associated with primary care career choice (Owen et al., 2002). This is noteworthy because, as has been previously mentioned, a primary care career choice is positively correlated with eventual practice in a rural or underserved area. Conversely, Rogers (2020) also found that medical students with no service interest had a higher academic performance and a higher interest in subspecializing, which would be more likely to necessitate eventual practice in an urban setting, not a rural one.

The current shortage of physicians serving in underserved and rural areas is projected to worsen with population growth and aging. Without an understanding of the factors driving career decision-making of future physicians, simply educating and training more physicians will not meet the growing demand. Medical school admission committees must strive to grant entrance to students who will advance the institution toward its social mission. These committees play an important role in selecting which students to invest in but may not be aware of characteristics predictive of interest in serving in rural areas. The presence of high levels of voluntary action may indicate a disposition toward choosing a career in a rural environment, but the paucity of empirical studies, as well difficulty with objectively measuring volunteerism, leaves many questions unanswered.

### **Theoretical Framework**

The theoretical framework that guides this study is the social identity approach, comprising social identity theory (SIT) and self-categorization theory (SCT). This theory explains the cognitive processes that align people's self-conception with the groups they belong to (American Psychological Association, n.d.). Henri Tajfel and John Turner, developers of the SIT, proposed that groups which people belonged to were an important source of pride and self-

esteem; groups give us a sense of social identity. In the 1970s, Tajfel and colleagues published a series of studies in which participants were allocated into groups based on meaningless and arbitrary criteria, then asked to assign points (devoid of value) to their own group and members of the other group (Tajfel & Turner, 1979). Participants gave more points to members of their group than members of the outgroup, even though grouping was meaningless, and points had no value. Tajfel argued that human interaction ranges from being purely interpersonal (which Tajfel felt was rare) to purely intergroup. With a strictly interpersonal interaction, people related as individuals with no awareness of social categories. A purely intergroup interaction is one in which people relate entirely as representatives of their group, and ones' individualizing qualities are overshadowed by the salience of one's group membership (Tajfel & Turner, 1979). Tajfel argued that the mere process of making "them" and "us" distinctions can change the way people see themselves and alter their self-concept. Tajfel and Turner believed that this was due to a desire for a positive and secure self-concept. For example, even a low-status group member can have a favorable social identity by making downward intergroup comparisons, leaving a group, or focusing on dimensions that make the ingroup look relatively good and minimizing dimensions that reflect poorly on the ingroup (Tajfel & Turner, 1979). After Tajfel's death, Turner and colleagues sought to elaborate on intragroup processes also with self-categorization theory (SCT) (Turner et al., 1987). SCT and SIT share most of the same assumptions, so many refer to the "social identity perspective" as a reference to both SIT and SCT (Hornsey, 2008).

Turner and colleagues identified three levels of self-categorization: self as a human being (human identity), self as a member of a social ingroup (social identity), and personal self-categorizations based on interpersonal comparisons (personal identity) (Turner et al., 1987). According to SCT, categorization occurs as a function of accessibility and fit. Accessibility is

dependent upon previous experiences, expectations, and a person's current goals or objectives.

Fit refers to the extent to which the social categories are perceived to reflect real-world differences. In short, fit relates to matching an individual to an accessible category that minimizes in-group differences and maximizes out-group differences.

Professional identity is an example of social identity, and transitioning to a medical student, and eventually, a doctor, involves internalizing the "doctor" identity. Which clinical specialty of the profession becomes accessible to the medical student? And among the accessible specialties, which one seems to fit the professional and social identity of the student the best? Different clinical specialties have commonly invoked stereotypes, which may influence student doctors' perceived fit for a specialty and thus their career choice. Stereotypes may be fueled by the media: i.e., the drug addicted, misanthropic Dr. House or the neurotic New Yorker exiled to remote Alaska in *Northern Exposure*. These stereotypes may be entertaining, but a specialty portrayed in a negative light can deter future physicians from pursuing that specialty and cause recruitment shortages. One article reported that doctors are "quite tribal," and it makes them feel better about themselves and what they do to define who they are (Oxtoby, 2013). New doctors may embody the qualities associated with their specialty, or of a role model. Studies have found that badmouthing among different medical specialties within medical schools influences career choice and that this often occurs in the earlier years of a medical student's career (Hunt, 1996). A previously mentioned study by Colegrove and Whitacre on interest in rural medicine among osteopathic medical students found that as time in medical school increases, the likelihood of choosing rural practice declines, and posits that decline may be influenced by the medical students' belief that rural doctors were less qualified (2009). Anticipated socialization may lead student doctors to adopt stereotypical traits to match the specialty in-groups to which they aspire.



The process of specialty choice and location can be described as “trying on possible selves” or projecting oneself into hypothetical practice career and location with the most accessibility and fit (Burack et al., 1997).

A rural background has been strongly positively correlated with a student doctor's intent to practice in a rural setting. Social identity theory and self-categorization theory would conclude that those from a rural background felt higher levels of accessibility and fit with a rural community, thus intending to practice in a rural community. A desire to practice family medicine has been shown to be predictive of practicing in a rural area, but Campos-Outcalt (2003) found that negative comments from faculty and residents were heard more frequently about family practice than other primary care specialties. SCT posits that a low-status group member can have a favorable social identity by focusing on dimensions that make the ingroup look relatively good. In the case of a medical student receiving negative comments about their choice of specialty, the student can focus on a dimension that makes the ingroup favorable, like a preference for community service and social commitment. For example, Royson et al. (2012) found that 70% of osteopathic students felt that physicians in rural communities have more impact on their community than their urban counterparts. The student then would adopt traits, such as civic-mindedness, to match the specialty group they desire. The reverse could be true as well, using the SCT as a theoretical framework. A medical student with an individual quality of high civic-mindedness would make career choices that placed them in a group with like-minded individuals who seek out opportunities to improve the community, like practicing in an underserved area. This would secure a positive self-concept for themselves.

## **Research Questions and Hypotheses**

The hypotheses for the research questions that follow are based on the social identity approach. Three research questions guide this study. In this section, each question is stated with its associated hypothesis, based on previous findings from the empirical literature discussed in this review.

### **Question 1**

Among female osteopathic medical students at Arkansas Colleges of Health Education, what factors best predict a favorable attitude toward practicing in a rural setting?

H<sub>1</sub>: Female osteopathic medical students at Arkansas Colleges of Health Education with a rural background have a more favorable attitude toward practicing in a rural setting than female osteopathic medical students who do not have a rural background.

The social identity approach would support the hypothesis by concluding that those individuals from a rural background felt higher levels of accessibility and fit with a rural community, thus will have a positive attitude toward practicing in a rural community.

H<sub>2</sub>: In female osteopathic medical students at Arkansas Colleges of Health Education, the greater the degree of civic-mindedness, the more favorable the attitude toward practicing in a rural setting.

If an individual has self-categorized themselves as someone who has the attributes of a civic-minded professional (one who feels they are a social trustee of knowledge and have a responsibility to work toward public good), they will feel commonalities with an “ingroup” of other physicians who want to help alleviate the workforce maldistribution and work in an underserved area. The ingroup would socially compare with the outgroup to increase their positive self-concept, strengthening their resolve to work toward improving society.

H<sub>3</sub>: Students who plan to practice family medicine have a more favorable attitude toward practicing in a rural setting than students who don't plan to practice family medicine.

Family practice is not a “prestige” specialty. An individual who chooses to practice family medicine may do so for altruist reasons. Their “ingroup” is altruistic people who have a heart for service. If the student receives negative comments about their choice of specialty, the student can focus on a dimension that makes the ingroup favorable, like a preference for community service and social commitment. Their justification may be “Well, I may not be in a prestigious specialty but at least I’m thinking about the common good, not just trying to get rich.”

## **Research Question 2**

Does civic-mindedness affect the relationship between a rural upbringing and attitude toward practicing in a rural setting?

H<sub>4</sub>: For students with high civic-mindedness, a rural background is associated with a favorable attitude toward practicing in a rural setting, but students with low civic-mindedness, a rural background is not.

Self-categorization theorists believe that self-categorization is comparative, inherently variable, fluid and context dependent. As a social identity becomes salient, people adopt the norms, beliefs, and behaviors of fellow ingroup members and distance themselves from norms, beliefs, and behaviors of outgroup members. Groups are complicated and are different depending upon the context, some are more salient than others. With this hypothesis the ingroup of “coming from a rural background” may compete with the ingroup of “level of civic-mindedness” or other categories not considered. For example, an individual that came from a rural background but doesn't really feel a conviction to be an active participant in their community may choose to

work in an urban setting (leave the rural group) because they feel that now (as a well-paid physician) a new group is more accessible and fits better (young urban professional, for example).

### **Research Question 3**

Q<sub>3</sub> : Does civic-mindedness affect the relationship between planning to practice family medicine and attitude toward practicing in a rural setting?

H<sub>5</sub>: For students with high civic-mindedness, planning to practice family medicine is associated with a positive attitude toward practice in a rural setting, but for students with low civic-mindedness, planning to practice family medicine is not.

Self-categorization is fluid and context dependent. With this hypothesis, the ingroup of “planning to practice family medicine” may compete with the feelings of fit within a group defined by its level of civic-mindedness. If the student feels like they have more in common with an ingroup with high civic-mindedness, their actions as a group would reflect that by feeling a responsibility to strengthen the community by serving in a rural or underserved area. If the student does not feel that she fits in a group with high civic engagement, practicing family medicine in an urban or suburban area would be a better fit.

### **Summary**

The shortage of physicians in rural area of the U. S. has led medical schools to focus on recruiting and selecting students who will choose to work in non-urban settings. The literature on the characteristics of medical students who will eventually practice in rural settings has been ongoing. Several characteristics emerge as predictive, including having a desire to practice primary care and a rural background. Those two factors have been found to be associated with a 36% likelihood of a graduate practicing in a rural area, compared with 7% for individuals

without those characteristics (Senf et al., 2003). Data from recent years show that medical student interest in both family medicine and rural practice is declining. Additionally, the recent increase in the number of women graduating from US medical schools could further diminish the supply of rural physicians, since women appear to be much less likely to practice rural medicine than men. However, gaps exist in the literature. Studies have not investigated if the predictive value of intent to practice primary care and a rural background holds true for female osteopathic medical students. Additionally, little is known about the predictive value of civic-mindedness in practice intentions. After reviewing the literature, one can hypothesize that indeed a relationship exists between a medical student's degree of civic-mindedness and attitude toward practicing in a rural or underserved community. Combined with a rural background and an intent to practice primary care medicine, the degree of civic-mindedness in a student may moderate the strength of their attitude toward practicing in a rural setting. Chapter 3 discusses the research design and operationalizing, measuring, and analyzing these concepts.

## **Chapter Three: Research Method**

### **Introduction**

The purpose of this chapter is to explain the research methodology used to determine what factors play a role in the career decision of female osteopathic students in Arkansas. More specifically, this chapter describes the methods used in this study to identify what factors best predict favorable attitudes toward practicing medicine in a rural setting. The study also looked at how civic-mindedness interacts within the relationship of a rural background, an intent to practice primary care medicine and attitudes toward practicing rural medicine. The chapter begins with an overview of the methodology, followed by an explanation of the research design, the source of the data and study participants, the data preparation, and the variables to be measured. The chapter concludes with data analysis and an explanation of the study's limitations.

### **Research Questions and Hypotheses**

Throughout this study, the researcher sought to answer the following research questions:

1. Among female osteopathic medical students at Arkansas Colleges of Health Education, what factors best predict a favorable attitude toward practicing in a rural setting?

Hypothesis 1: Female osteopathic medical students at Arkansas Colleges of Health Education with a rural background have a more favorable attitude toward practicing in a rural setting than female osteopathic medical students who do not have a rural background.

Statistical hypothesis:  $H_0: b_1 = 0$ ,  $H_1: b_1 \neq 0$

Hypothesis 2: In female osteopathic medical students at Arkansas Colleges of Health Education, the greater the degree of civic-mindedness, the more favorable the attitude toward practicing in a rural setting.

Statistical hypothesis:  $H_0: b_2 = 0$ ,  $H_1: b_2 \neq 0$

Hypothesis 3: Students who plan to practice family medicine have a more favorable attitude toward practicing in a rural setting than students who don't plan to practice family medicine.

Statistical hypothesis:  $H_0: b_3 = 0$ ,  $H_1: b_3 \neq 0$

2. Does civic-mindedness affect the relationship between a rural upbringing and attitude toward practicing in a rural setting?

Hypothesis 4: For students with high civic-mindedness, a rural background is associated with a favorable attitude toward practicing in a rural setting, but for students with low civic-mindedness, a rural background is not.

Statistical hypothesis:  $H_0: b_4 = 0$ ,  $H_1: b_4 \neq 0$

3. Does civic-mindedness affect the relationship between planning to practice family medicine and attitude toward practicing in a rural setting?

Hypothesis 5: For students with high civic-mindedness, planning to practice family medicine is associated with a positive attitude toward practicing in a rural setting, but for students with low civic-mindedness, planning to practice family medicine is not.

Statistical hypothesis:  $H_0: b_5 = 0$ ,  $H_1: b_5 \neq 0$

## **Methods**

### **Study Design**

This study's design incorporated cross-sectional regression modeling of survey data.

Cross-sectional analysis is a type of observational study that analyzes data from a population at a

specific point in time, when the objective is to get a “snapshot” or picture of a group. The term cross-sectional design is often used interchangeably with the term survey and most frequently refers to data that are collected through interviews or questionnaires that are administered to individuals who represent themselves or households, institutions, or other social entities (Lewis-Beck et al., 2004). The emphasis in the analysis is to examine the frequency distribution of single variables and the associations between two or more variables to determine whether conclusions can be drawn about how certain things influence or result in change (Lewis-Beck et al., 2004).

### **Study Setting**

This study took place at Arkansas Colleges of Health Education (ACHE), a private, not-for-profit institution located in Fort Smith, Arkansas. Fort Smith has an estimated population of 87,000 and lies on the Arkansas and Oklahoma state borders. The vision of ACHE is to improve health care in the area surrounding the college, one of America’s most underserved regions. Graduate programs within ACHE include the Arkansas College of Osteopathic Medicine (ARCOM), a Master of Science in Biomedicine, Doctor of Physical Therapy, and Doctor of Occupational Therapy programs. ACHE was founded in 2014 and graduated its inaugural class of 145 osteopathic medical students in May of 2021.

### **Participants and Placement**

The participants of this study are the female ACHE Doctor of Osteopathic Medicine Students of Year 1, Year 2, Year 3 and Year 4. The current enrollment number of those female students is 305 out of a total of 620 students. The ARCOM study body is comprised of 49% female and 51% male. Ninety percent of the female osteopathic students are ages 22-29. Female student population by race/ethnicity are as follows: nonresident alien 2%, Hispanic 3.8%, American Indian or Alaskan Native less than 1%, Asian 25%, Black or African American 4.7%,



White 53%, two or more races 1.7%, and unknown 8.6%. Thirty-nine percent of the female osteopathic medical students are from Arkansas, 14% are from Missouri, 13.6% are from Oklahoma, and 33% are from Texas (Arkansas Colleges of Health Education, 2021).

The sampling was a convenience sample because I am employed by ACHE and have access to the students' email addresses to send a link to the survey. Sampling was also a voluntary response sample, as the email to the students specified that participation in the study is voluntary. Although it is voluntary, the email to the participants explained the purpose of the study, and that the study is specifically interested in female osteopathic medical students.

An a priori power analysis was conducted using G\*Power version 3.1.9.7 (Faul et al., 2007) to determine the minimum sample size needed to identify anticipated relationships between variables. Results indicated the required sample size to achieve 80% power for detecting a medium effect, at a significance criterion of  $\alpha = .05$ , was  $N = 77$  for multiple linear regression: Fixed model,  $R^2$  deviation from zero. Thus, the obtained sample size of  $N = 77$  is adequate to test the study's hypotheses.

## **Materials**

The first measurement instrument is the Civic-Minded Professional Scale (CMP), a tool designed to measure the domains of self-identity; work, career, and profession; and civic attitudes, civic action, and public purpose to measure the construct of civic-mindedness (Hatcher, 2008) (see Appendix A). It is a 23-item, 7-point Likert-scale survey with reported reliability and validity (Hatcher) and is shortened from the original 44-item version. The scale ranges from strongly disagree to agree, and total scores range from 23 to 161. Hatcher (2008) developed the Civic-Minded Professional (CMP) scale to operationalize the construct of a civic minded professional. The author used the scale in a national study of faculty in higher education ( $n =$

373) to evaluate the reliability and validity of the scale. Reliability of the scale was evaluated using Cronbach's alpha, an index of internal consistency. The standardized alpha was .95, indicating a high degree of internal consistency among the items.

Exploratory factor analysis of the CMP scale provided a base for identifying five factors of the CMP scale: voluntary action, identity and calling, citizenship, social trustee, and consensus building. The subscales consisted of Voluntary Action with six items (item numbers 7, 11, 13, 16, 20, 23), Identity and Calling with five items (item numbers 5, 10, 12, 17, 19), Social Trustee with four items (item numbers 6, 8, 15, 21), Citizenship with four items (item numbers 2, 3, 9, 18) and Consensus Building with four items (item numbers 1, 4, 14, 22). The Voluntary Action subscale consisted of knowledge of volunteer opportunities and nonprofit organizations, willingness to give time pro bono, comfort with recruiting others, and bringing people together to address community issues. This subscale, with a coefficient alpha .93, accounted for 38.3% of the scale variance. The Identity and Calling subscale consisted of items related to a sense of personal satisfaction and identity at work. This subscale, with a coefficient alpha .83, accounted for 6.7% of the scale variance. The Citizenship subscale, with a coefficient alpha .85, accounted for 6.3% of the scale variance and contained items related to attitudes and behaviors associated with civic participation, like knowledge of current events and political activism. The Social Trustee subscale related to attitudes toward responsibilities of professionals due to their level of education and, with a coefficient alpha .86, accounted for 4.8% of the scale variance. The final subscale is Consensus Building and contained items related to working with others from diverse perspectives, and with a coefficient alpha of .74 accounted for 4.3% of the scale variance.

When testing the CMP validity, Hatcher (2008) found that faculty nominated for the *Thomas Erlich Faculty Award for Service-Learning* or the *Ernest A Lynton Award for the*

*Scholarship of Engagement* scored statistically significantly higher on the CMP than faculty not nominated for these national awards. Empirical tests for convergent validity correlated scores from the CMP with three other measures: the Civic Engagement Index  $r = .13$  to  $.60$ ,  $p < .001$ , items from the New England Research Center for Higher Education (NERCHE) Scale  $r = .16$  to  $.54$ ,  $p < .001$ , and The Public Interest Subscale from the Public Service Motivation Scale  $r = .25$  to  $.69$ ,  $p < .001$  (Hatcher, 2008).

The second measurement instrument is the Student Attitudes to Rural Practice and Life Questionnaire, a tool designed to examine health students' attitudes to rural work and life covering the domains of community and social issues, family and personal issues and professional issues (Adams et al., 2005) (see Appendix B). The questionnaire contains 18 items, with five items related to professional, community, and social issues associated with friendliness and support (Items 4, 12, 13, 14, 16), five items relating to the negative aspects of rural life and work including isolation and socialization (Items 5, 10, 11, 17, 18), three items related to enjoyable aspects of rural life (Items 8, 9, 15) and five items relating to professional opportunities (Items 1, 2, 3, 6, 7). The five items relating to the negative aspects of rural life were negatively worded to avoid bias and will be reverse scored. Respondents indicate how strongly they agree or disagree with each statement on a Likert scale of 1 (strongly disagree) to 6 (strongly agree). The scale ranges from strongly disagree to strongly agree, and total scores range from 18 to 108. Content validity was assessed through a discussion and rating process conducted with an academic panel and through student pilots. Exploratory factor analysis was used to provide evidence of construct validity and the four-subscale model explained 60.82% of the total variance. Each item's alpha coefficient ranged between .54 to .86. Cronbach's alpha coefficient was used to assess internal consistency by correlating each item with all other items to show

whether each item is related to the one concept. The Cronbach's alpha coefficient was .68, considered acceptable for newly developed scales.

The Student Attitudes to Rural Practice and Life Questionnaire has been used to measure undergraduate medical students' attitudes to rural health practice by Spencer Gulf Rural Health School in South Australia and the Northern Ontario School of Medicine in Canada (Adams et al., 2005; Hogenbirk et al., 2015). Additionally, items from the questionnaire have been used to assess attitudes toward a rural environment in nurses in rural Kenya and veterinary medicine students in Canada (Mullei et al., 2010; Hashizume et al., 2015).

Research Electronic Data Capture (REDCap) was used for survey management. REDCap is a free secure web platform for building and managing online databases and surveys and is able to export data to Excel and common statistical packages like SPSS. Nonprofit organizations can install and administer REDCap on their local servers to use for work based at their organization. As Arkansas Colleges of Health Education is part of the REDCap consortium, it is available for use in this study.

## Measures

***Dependent variable:*** Attitude toward practice in a rural setting

The dependent variable of interest is attitude toward practice in a rural setting. An attitude is a settled way of thinking or feeling about something, typically one that is reflected in a person's behavior (Merriam-Webster.com, n.d.). Attitudes significantly and substantially predict future behavior (Ajzen & Fishbein, 1977; Fishbein & Ajzen, 1980; Kraus, 1995). Favorable attitudes toward rural practice in medical students could indicate a greater likelihood of eventual practice in a rural setting. The Student Attitudes to Rural Practice and Life Questionnaire (SARPLQ) is an eighteen-item tool that measures health students' attitudes across a broad

spectrum of professional, social, and personal related factors (Adams, et al., 2005). Attitudes toward rural practice and life is operationally measured using the SARPLQ. A single score for this variable was obtained by adding up the responses to a total sum score for each participant and is continuous.

***Independent Variable: Plan to Practice Family Medicine***

A plan is defined as an intention or decision about what one is going to do (Merriam-Webster.com, n.d.). A plan to practice family medicine refers to the individual's intention to practice the medical specialty of family medicine. Family medicine is also called primary care, as family physicians are the only specialist qualified to treat most ailments and provide comprehensive health care for people of all ages from newborns to seniors (Kozakowski et al., 2016; American Academy of Family Physicians, 2021). A five-point Likert scale was used to describe the likelihood of intending to practice family medicine with response choices of: not at all likely/ not very likely/somewhat likely/very likely/extremely likely. Likert, or ordinal variables with five or more categories can often be used as continuous without any harm to the analysis (Pasta, 2009; Sullivan & Artino, 2013).

***Independent Variable: Rural Background***

Self-declaration of rural origin as “primary childhood residence” is commonly included in medical school applications. The word "rural" has multiple definitions, but the simple meaning of rural is “in, of, or like the country, not in the city” (Cambridge, n.d.). The term “grow up” is an intransitive verb, meaning a verb without an object. The definition of “grow up” means to begin to exist or grow toward physical or mental maturity: to progress from childhood to adulthood (Merriam-Webster.com, 2021). The presence of a rural background is operationally defined by the simple dichotomous question: “Did you grow up in a rural area?” Owen and

Wendling demonstrated that self-declaration as rural holds a better predictive value than more formal geographical-based coding schemes, like using a Census or Office of Management and Budget definition or zip code (Owen, et al., 2007, Wendling, et al., 2019).

***Independent Variable: Civic-mindedness***

Civic-mindedness is defined as having, showing, or actively carrying out one's concern for the conditions and affairs of one's community or being public-spirited (Collins, n.d.). The concept of civic-mindedness refers to a person's inclination or disposition to be knowledgeable of and involved in the community and to have a commitment to act upon a sense of responsibility as a member of that community (Bringle & Steinberg, 2010). Civic-mindedness is a combination of one's personal and professional identities as well as the civic attitudes that influence and drive behaviors related to engagement (Hatcher, 2008). Civic-mindedness is operationally measured using the Civic-Minded Professional Scale (CMP-23). A single score for this variable was obtained by adding up the responses to a total sum score for each participant and is continuous.

**Data Collection**

Data was collected after the Institutional Review Board (IRB) of the University of Arkansas's Office of Research and Innovation and the IRB of Arkansas Colleges of Health Education approved the study. Once approvals were received, an electronic survey was used for data collection. Recruitment took place via an advertisement in the Student Daily Update sent through ACHE email and on the electronic monitors in the shared common spaces on campus. September is the American Medical Association's (AMA) Women in Medicine Month, and I sent out the survey at the end of August and the beginning of September in conjunction with ACHE's recognition of Women in Medicine Month. An email to the Office of Student Affairs

requested encouragement for students to participate in the survey (Appendix D). An email was sent to all female students at ARCOM with a link to the online survey (Appendix C). A follow-up message was sent one week later to all participants to ensure a better response rate (Appendix E). The survey had a four-week time limit to return responses. To encourage student participation, an ACHE branded t-shirt was given for participation, and a drawing for a one-hundred-dollar gift card was made at the end of the survey. Students who wished to receive the participation gift voluntarily showed a screenshot of their completed survey's final page to the Office of Student Affairs at ACHE to receive their gift. In that way, no identifying information was gathered in the survey.

I administered the survey using REDCap. All survey participants received a link via email, and a link will be posted in ACHE's Daily Update, the institution's electronic newsletter. A QR code was available to scan on the electronic monitors in the common spaces on campus. Respondents answered 45 questions and were advised that the survey will take 10-15 minutes. Survey items were close-ended with forced-choice response options. Items were primary Likert-type items with response options from strongly agree to strongly disagree. Topics of the survey included demographic items, such as ethnic belongings and age. Thirty-two of the items made up the independent variable of civic-mindedness via the Civic-Minded Professional (CMP) scale, while eighteen of the items made up the dependent variable of attitude toward rural practice via the Student Attitudes to Rural Practice and Life Questionnaire (SARPLQ). Data was collected on REDCap. Data was exported from REDCap to Excel and SPSS for analysis.

### **Data Analysis**

All data was derived from the participants' response to the electronic survey. Multiple regression was used to test each hypothesis. Multiple regression examines the effect of an

independent variable, after controlling for other independent variables, on a dependent variable. The dependent variable is the outcome that the study is attempting to explain or predict, and the independent variable is the factor that predicts or determines the value of the dependent variable (Roberts & Roberts, 2021, p.11). More specifically, hierarchical multiple regression was used in this study. Hierarchical multiple regression allows the investigator to enter the independent variables into the regression equation in an order of choosing. This can allow the investigator to control for the effects of covariates and consider the possible causal effect of independent variables when predicting a dependent variable. Hierarchical multiple regression answers the question of how much extra variation in the dependent variable can be explained by the addition of one or more independent variables. For this study, the variable I attempted to predict is attitude toward practicing in a rural setting, and this variable was treated as a scale variable. The predictors, or independent variables, include the presence of a rural background, the extent of civic-mindedness, and the intent to practice the medical specialty of family medicine. The presence of a rural background is a dichotomous variable, civic-mindedness is a scale variable, and the intent to practice family medicine is a scale variable. Additionally, this study aimed to investigate the moderating effects of civic-mindedness on the independent variables of the presence of a rural background and plan to practice family medicine.

The first model examined the main effects of a rural background, civic-mindedness, and a plan to practice family medicine on a female osteopathic medical student's attitude toward practicing in a rural setting. The second model included the interaction of the presence of a rural background and civic-mindedness, and the third model examined the interaction of a plan to practice family medicine and civic-mindedness. Each model produced an  $R^2$  change with a  $F$ -test to determine statistical significance. Algebraic expressions for these models are below.



Findings were interpreted based on significance values and effect size, and conclusions were drawn about the possible relationship between the dependent variable and the independent variables and quantified how much of the variation in the dependent variable is explained by variation in the independent variables.

$\hat{Y}$  = attitude toward practicing in a rural setting

$X_1$  = rural background

$X_2$  = civic-mindedness

$X_3$  = plan to practice family medicine

$X_4$  = rural background x civic-mindedness

$X_5$  = plan to practice family medicine x civic-mindedness

Model 1:  $\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3$

Model 2:  $\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4 X_1 X_2$

Model 3:  $\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3 + b_5 X_2X_3$

IBM SPSS Statistics Version 28.0.0.0 statistical software was used to analyze the data.

To achieve valid results with hierarchical multiple regression, several assumptions must be met.

The assumption of independence of observations is designed to test for first order

autocorrelation. This was checked using the Durbin-Watson statistic, which should be

approximately 2 to indicate that there is no correlation between residuals. There must be a linear

relationship between the outcome variable and the independent variables collectively, as well as

each of the independent variables separately. Scatterplots and partial regression plots established

whether there is a linear or curvilinear relationship. Next, the assumption of homoscedasticity

needs to be met. Visual inspection of the plot of studentized residuals against the unstandardized

predicted values was checked for heteroscedasticity. Additionally, the data must not show

multicollinearity, and this was evaluated through an inspection of correlation coefficients and Tolerance/VIF values. If Tolerance value is less than 0.1, which is a VIF or greater than 10, a problem with collinearity exists. There should be no significant outliers, higher leverage points or highly influential points. These unusual points can be detected using casewise diagnostics; all cases should have standardized residuals less than  $\pm 3$ . Lastly, the residuals must be approximately normally distributed. I checked for the assumption of normality by inspecting a histogram with a superimposed normal curve, a P-P plot, and a Normal Q-Q Plot of the studentized residuals (Laerd Statistics, n.d.).

### **Internal and External Validity**

Threats to external validity in this study include convenience sampling and volunteer sampling. A criticism of convenience sampling is that the sample is not representative of the entire population. In this case, though, the research problem is specific to female students in an osteopathic medical school. Therefore, the convenience sample is an appropriate population to study. Another criticism about using a convenience sample is the limitation in generalization and making an inference about the entire population (Explorable, 2009). The findings may not be representative of the entire population of female osteopathic medical school students in the United States. According to the American Association of Colleges of Osteopathic Medicine (2022) a total of 5,266 females are enrolled in osteopathic medical schools across the United States. Colleges are located in all regions of the United States as well as in urban, suburban, and rural areas. Findings may differ based on regions of the country or location of the college.

Additionally, voluntary response sampling may be biased because individuals who take the time to respond tend to have stronger opinions compared to the entire population. In this

case, it is my hope that potential participants were more inclined to complete the survey because they are interested in the topic of the survey as it is framed for female medical students.

Confounding variables are threats to internal validity because they provide alternative explanations for changes in outcomes. For example, the participants in this study are from Year 1 through Year 4 of medical school. To address a shortage of physicians in rural areas, many medical schools have initiated programs during Years 2, 3 and 4 that prepare and support students who intend to practice in rural areas. Admittance to this program may influence the participant's intent to practice rural medicine but is not included as a variable in the study. Other confounding variables may include rural clinical exposure during medical school, influence of rural-based faculty members, or financial incentives, e.g., loan repayment programs, to practice in a rural area, to name a few.

### **Summary**

The goal of this chapter is to outline the research method used to answer the research questions. A discussion of the procedure, study participants, data collection, and data analysis outlined the specifics of how the study was conducted and who participated in the study. The aim of this study was to assess factors that influence a female osteopathic medical student's attitude toward practicing in a rural setting and use those factors to generate a predictive model. This approach helps quantify those factors so that schools can recruit and invest in the candidates who will be most likely to pursue rural medicine.

## Chapter Four: Results

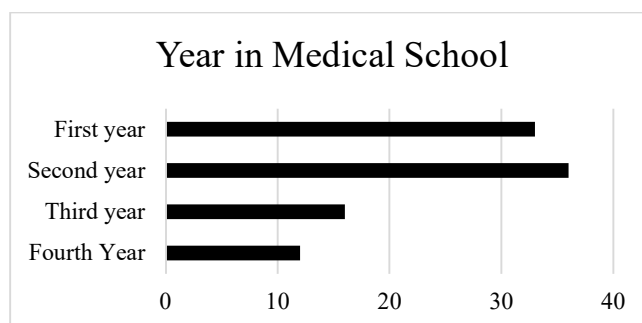
This study aimed to determine what factors play a role in the career decision of female osteopathic medical students in Arkansas. More specifically, this study attempted to determine if a rural background, a plan to practice family medicine, and motivation toward civic duty influenced the attitude toward eventual rural practice for women in Arkansas. This chapter presents the findings of the study. In this chapter, I review the study setting, describe the data collection process, and explain how the data was prepared for analysis. I then describe how assumptions were tested, how data was analyzed, and how the sample was composed. Results for each question are then presented. Concerns regarding reliability and validity are discussed, and key findings are summarized.

### Study Setting and Data Collection

Data from the female students at Arkansas Colleges of Health Education Osteopathic Medical College included 129 survey responses, collected from August 11 to September 6, 2022. Of those responses, 32 surveys were incomplete and were eliminated from the data set, leaving 97 completed survey responses ( $n = 97$ ). For class standing, 33 (34.0%) designated themselves as first-year students, 36 (37.1%) as second-year students, 16 (16.5%) as third-year students, and 12 (12.4%) as fourth-year students. Figure 1 illustrates the sample breakdown by class standing.

**Figure 1**

*Year of Medical School of Survey Respondents*



The racial/ ethnic makeup of respondents was as follows: 0 (0.0%) Native Hawaiian or other Pacific Islander, 1 (1.0%) American Indian or Alaskan Native, 1 Hispanic or Latino (1.0%), 3 (3.1%) Black or African American, 8 (8.2%) Multiracial/ ethnic, 19 (19.6%) Asian, and 65 (67.0%) White. This makeup is similar to the overall female student population reported by the college: less than 1% American Indian or Native Alaskan, 3.8% Hispanic or Latino, 4.7% Black or African American, Multiracial/ ethnic 1.7%, 25% Asian, and 53% White (Arkansas Colleges of Health Education, 2021). Total enrollment in US Osteopathic Medical Colleges for the 2021-2022 academic year for females is as follows: less than 1% Native Hawaiian or other Pacific Islanders, less than 1% American Indian or Alaskan Native, 7.8% Hispanic or Latino, 5.2% Black or African American, 4.4% Multiracial/ ethnic, 25.8% Asian, and 53.2% White (AACOM Report on Student Enrollment, 2022). Percentages of racial/ ethnic demographics for the institution and national data do not equal 100% because each dataset has an unknown category that is not a category in the survey's dataset. Demographics of the final dataset for the study as compared to institutional and national levels are presented in Table 1.

**Table 1**

*Final Dataset Compared to Institution/ Nation by Number and Percentage*

	Survey	Institution	Nation
Total students by number	97	304	5,084
Native Hawaiian or other Pacific Islander	0(0.0%)	1(0.33%)	3(0.06%)
American Indian or Alaskan Native	1(1.03%)	3(1.00%)	8(0.16%)
Hispanic or Latino	1(1.03%)	13(5.26%)	410(8.06%)
Black or African American	3(3.10%)	16(5.26%)	271(5.33%)
Multiracial/ ethnic	8(8.25%)	5(1.65%)	232(4.56%)
Asian	19(19.59%)	86(28.29%)	1,359(26.73%)
White	65(67.01%)	180(59.21%)	2,801(55.09%)

Before analyzing my data, several assumptions needed to be verified to ensure linear regression would provide unbiased parameter estimates. A Durbin-Watson statistic of 2.1 suggested the assumption of independence of observations was met. The assumption of linear relationships between the dependent variable and each independent variable was assessed by reviewing a scatterplot of studentized residual by unstandardized predictive value as well as partial regression plots of each variable combination. Each scatterplot confirmed an approximately linear relationship between the variables. The assumption of homoscedasticity of residuals was met by visual inspection of a plot of studentized residuals versus unstandardized predicted values. The assumption of multicollinearity was assessed by reviewing the correlation coefficients for each variable as well as the Tolerance/ VIF values. No correlations were present larger than 0.7, indicating that the assumption of multicollinearity was not violated. Inspection of Tolerance/ VIF values revealed some values less than 0.1, indicating a problem with collinearity but only because variables have been multiplied together to create interaction terms in which multicollinearity is inevitable. Therefore, the assumption of multicollinearity was not violated. There were no significant outliers, higher leverage points, or highly influential data points. All cases had standardized residuals less than plus or minus 3. The assumption of normally distributed residuals was met by visual inspection of the Q-Q Plot.

## **Results**

For research questions 1-3, all variables were added into the multiple regression model with the Student Attitudes to Rural Practice and Life Questionnaire (SARPLQ) set as the dependent variable. Results for the research questions follow.

## Question 1

Question 1 asked what factors best predict a favorable attitude toward practicing rural medicine. An initial model was constructed to predict attitude to rural practice from the following variables: presence of a rural background, intention to practice family medicine, and civic-mindedness. This model significantly predicted attitude toward rural practice  $F(3, 93) = 12.37, p < .001, R^2 = .285$  (see Table 2).

### *Hypothesis 1*

Hypothesis 1 stated that female osteopathic medical students at Arkansas Colleges of Health Education (ACHE) with a rural background have more favorable attitudes toward practicing in a rural setting than those without a rural background. Findings illustrated, however, that having a rural background had no relationship with a student's attitude toward practicing in a rural setting,  $b = -0.97, SE = 1.96, t = -0.49, p > .05, CI [-4.86, 2.92]$ . Hypothesis 1, therefore, was not supported.

### *Hypothesis 2*

Hypothesis 2 stated that for female osteopathic medical students at ACHE, the greater the degree of civic-mindedness, the more favorable the attitude toward practicing in a rural setting. Findings illustrated that civic-mindedness had a positive relationship with attitude toward practicing in a rural setting,  $b = 0.17, SE = .07, t = 2.44, p = .016, CI [.03, .31]$ , accounting for 4.57% of its variance. Holding other variables constant, a one-point increase in civic-mindedness was associated with a 0.17-point increase in attitudes toward rural practice. Hypothesis 2 was therefore supported.

### ***Hypothesis 3***

Hypothesis 3 stated that students who plan to practice family medicine have a more favorable attitude toward practicing in a rural setting than those who don't plan to practice family medicine. A plan to practice family medicine was positively associated with a student's attitude toward practicing in a rural setting,  $b = 4.38$ ,  $SE = 0.85$ ,  $t = 5.15$ ,  $p < .001$ ,  $CI [2.69, 6.07]$ , accounting for 20.25% of its variance. Holding other variables constant, when students have this plan, their attitudes toward rural practice are on average 4.38 points higher. Hypothesis 3 was therefore supported.

### **Question 2**

Question 2 asked if civic-mindedness moderated the relationship between a rural upbringing and attitude toward practicing in a rural setting. Including an associated interaction term in Model 2, however, did not improve model fit,  $F(1, 92) = 1.02$ ,  $p = 0.32$ ,  $R^2 = 0.293$  (see Table 2).



**Table 2***Model Summary: Predicting Attitude Toward Practice in a Rural Setting*

Variable	Model 1					Model 2			Model 3		
	M	SD	B	SE B	sr <sup>2</sup>	B	SE B	sr <sup>2</sup>	B	SE B	sr <sup>2</sup>
Constant			77.44	2.69		77.95	2.71		77.94	2.65	
Rural background (yes/no)	.41	.5	-.97	1.96	.001	-.88	1.96	.001	-.52	1.94	.00
Civic-mindedness	125.13	13.84	.17*	.07	.04	.23*	.09	.05	-.21	.21	.00
Plan to practice family medicine	2.9	1.15	4.38**	.85	.20	4.29**	.86	.19	4.02**	.85	.17
Rural background*civic-mindedness						-.14	.14	.008			
Plan to practice family medicine*civic-mindedness									.14	.07	.03
R <sup>2</sup>				.29			.29			.31	
Δ R <sup>2</sup>							.01			.03	
F Change				12.37**			1.02			3.91	

*Note: \*p < .05, \*\*p < .001***Hypothesis 4**

Hypothesis 4 stated that for students with high civic-mindedness, a rural background is associated with a favorable attitude toward practicing in a rural setting but for students with low civic-mindedness, a rural background does not. Hypothesis 4 was not supported,  $b = -0.14$ ,  $SE = 0.14$ ,  $t = -1.01$ ,  $p = 0.32$ ,  $CI [-0.43, 0.14]$ .

**Question 3**

Question 3 asked if civic-mindedness moderated the relationship between planning to practice family medicine and attitude toward practicing in a rural setting. When an associated

interaction term was included in Model 3, an additional 3.4 percent of variation in favorable attitudes toward rural practice was accounted for,  $F(1, 91) = 3.91$ ,  $p = 0.05$ ,  $R^2 = 0.31$  (see Table 2).

### ***Hypothesis 5***

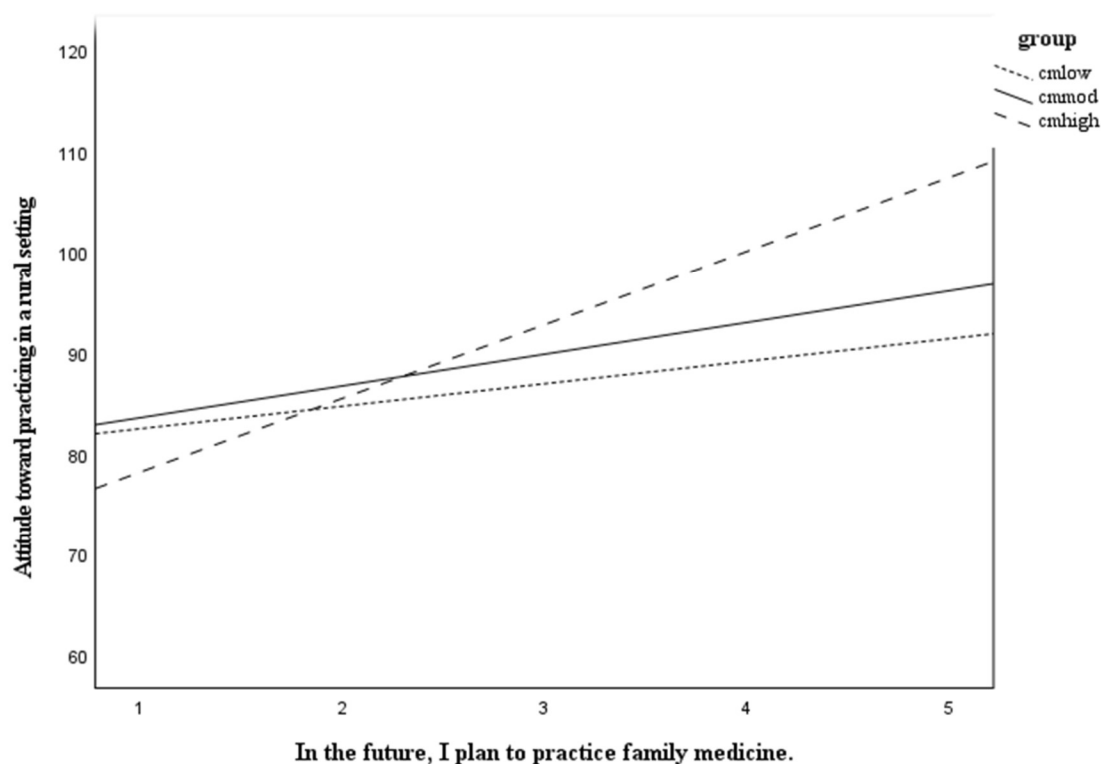
Hypothesis 5 stated that for students with high civic-mindedness, planning to practice family medicine is associated with a positive attitude toward practicing in a rural setting, but for students with low civic-mindedness, planning to practice family medicine is not. This hypothesis was not statistically supported,  $b = 0.14$ ,  $SE = 0.07$ ,  $t = 1.98$ ,  $p = 0.05$ ,  $CI [-.001, .27]$ . Its associated interaction term accounted for 2.89% of the variance in attitudes toward rural practice.

The nature of the relationship between planning to practice family medicine and attitudes toward practicing in a rural setting appeared to vary as a function of a student's civic-mindedness. Although the p-value for this interaction term did not fall below the customary  $p < .05$  criterion—it was exactly .05—its effect size measure and graphical representation revealed a substantive effect. To illustrate this relationship, I first mean-centered the civic-mindedness variable, then I ranked students' civic minded scores and categorized them into 3 similarly sized groups: a) low civic-mindedness ( $n = 33$ ), b) moderate civic-mindedness ( $n = 33$ ), and c) ( $n = 34$ ) high civic mindedness. Figure 2 showed that students with high civic mindedness had a stronger positive relationship between their intentions to practice family medicine and their attitudes toward practicing in a rural setting. For students with high civic mindedness, intentions to practice family medicine accounted for 40% of the variance in their attitudes toward rural practice, whereas for students with moderate civic mindedness and low civic mindedness, this relationship was considerably smaller: 18.3% and 6.7%, respectively. This interaction between a

student's plan to practice family medicine and civic mindedness accounted for 3% of the variation in her attitudes toward practicing in a rural setting ( $sr^2 = .03$ ).

**Figure 2**

***Interaction Plot Civic-Mindedness\*plan to practice family medicine***



### **Validity and Reliability**

Chapter 3 mentioned threats to external validity that include convenience sampling and volunteer sampling. Convenience sampling may limit the ability to generalize and make an inference about the entire population. The majority of survey responses in this study were submitted from first- and second-year students, with only 28.9% of the respondents from female students in their third and fourth year of medical school. Additionally, the survey used voluntary response sampling, with a return of 126 surveys from a population of 304 female students, a 41% response rate. Voluntary response sampling may attract those individuals with stronger opinions

compared to the population as a whole. I used several methods to attract participants to complete the survey including in-person announcements in class, reminders via email and other student communication, and assistance from the Office of Student Affairs with gifts of t-shirts and entrance into a gift card drawing for individuals who completed the survey. It is possible that the results were impacted by nonresponse error, which occurs when non-participants respond differently than participants (Burkell, 2003).

Lastly, the source of information must be considered. All responses were self-reported for this study. Self-reporting data can be affected by a bias caused by social desirability or approval. Social desirability bias is a threat to external validity, as respondents may answer questions in a manner that is viewed favorably by others, and not answer the questions truthfully (Althubaiti, 2016). I attempted to minimize this by using an anonymous survey, but the threat remains.

### **Summary**

The findings outlined above answered the research questions of this study. Three linear regression models were run. The first model answered the research question of what factors best predict a favorable attitude toward eventual practice in a rural setting. The second model answered the second research question regarding whether civic-mindedness affects the relationship between a rural upbringing and attitude toward practicing in a rural setting. Lastly, the third model answered the third research question, whether civic-mindedness affects the relationship between planning a career in family medicine and attitude toward practicing in a rural setting in the future.

Results of the first model supported the hypothesis that a relationship existed between a higher degree of civic-mindedness and a more favorable attitude toward rural practice. Results from this model also supported the hypothesis that a relationship existed between a plan to

practice family medicine and a more favorable attitude toward rural practice. For these two hypotheses, the alternate hypotheses are supported. Surprisingly, results from the first model did not support the hypothesis that a relationship exists between a rural background and a more favorable attitude toward rural practice. This is contradictory to what literature indicated and to what I hypothesized, as well. For the first hypothesis, the null hypothesis is supported.

The second model answered the second research question regarding whether the degree of civic-mindedness and a rural background interact within the relationship tested in the first model. This study failed to find evidence to support the alternative hypothesis for this question, indicating that there is no interaction between a rural background and degree of civic-mindedness and attitude toward eventual rural practice. Lastly, the third model answered the third research question regarding whether the degree of civic-mindedness and a plan to practice family medicine interacted within the relationship. This study found evidence to suggest that such an interaction exists, and therefore the alternative hypothesis for this question is supported. The following chapter will discuss and interpret these findings, along with suggestions for continued research and practice.

## **Chapter Five: Discussion**

### **Overview**

In this chapter I summarize the study's background and purpose, themes from the literature, and methodology. I also discuss the guiding questions, findings, and conclusions drawn from the study. I address limitations that may affect the interpretation and generalizability of the results. Lastly, I make recommendations for practices in medical education and future studies.

### **Summary**

#### **Problem and Purpose**

Many rural Americans have limited access to health care. Living in remote locations, negative health-related behaviors, and socioeconomic factors contribute to health disparities in residents of rural areas. Additionally, compared to urban populations, rural populations experience higher rates of chronic conditions, higher rates of poverty, and are more likely to have inadequate or no health insurance (Fordyce et al., 2007). The recent coronavirus crisis highlighted these long-standing disparities. The gap in access between rural and urban areas has resulted in clear health differences, including rural residents' risk of COVID-19 and severe illness from exposure to the virus. The Centers for Disease Control and Prevention (CDC) identified several characteristics that would contribute to poorer outcomes in individuals exposed to COVID-19. The factors that tend to worsen the impact of COVID-19 infection include the presence of underlying medical conditions, older age, lacking health insurance, and residing farther from a county with an intensive care hospital (McGranahan & Dobis, 2021). Rural residents are more likely to possess each of these pandemic vulnerabilities and, when compared to their urban counterparts, remain almost eight times more likely to live with underlying

medical conditions and thirty-five times more likely to live distant to an intensive care hospital (McGranahan & Dobis, 2021). Additionally, rural residents are four times more likely to be an older adult and twice as likely to be uninsured (McGranahan & Dobis, 2021). The quote “crisis lay bare the fault lines of society” appropriately encapsulates the health disparities recently noted in rural America because of the pandemic (Perry et al., 2021).

The rural physician supply lags far behind the current urban supply of physicians. The National Rural Health Association (NHRA) 2012 policy brief noted that healthcare labor shortages were an ongoing problem and predicted that conditions would not improve significantly in the near future (Weinhold, 2014). A decade later, those predictions have bared out. Nearly 20% of the U.S. population, more than 60 million people, live in rural areas, but only 9% of the nation’s physicians practice in rural communities (RHIHub, 2021a). In addition, the rural physician shortage appears to be worsening. Skinner et al. (2019), in the *New England Journal of Medicine*, predicted that by 2030 nearly a quarter fewer rural physicians will be practicing medicine than today, as more than half of rural doctors were at least 50 years old in 2017 and nearing retirement. The demand for physicians in rural communities will continue to grow faster than the supply.

One of the most compelling issues shaping medical education in the U.S. has been the perceived shortage of physicians in rural areas. Public concern over persistent shortages in rural parts of the country has led to the establishment of a wide variety of programs to address this problem. Increasing the rural physician workforce is critical to addressing the health inequities faced in rural communities. Today, U.S. medical school class sizes are increasing, and new schools are being created. In the last 20 years, enrollment has increased by 30% in allopathic

schools and 162% in osteopathic schools (AAMC, 2019). But simply producing more physicians does not seem to solve the problem.

Medical schools must also consider the changing demographics of medical school matriculants. Thirty years ago, women made up 20% of the physician workforce, but today women in medicine are the majority, comprising 51% of current U.S medical students (Wynn, 2000; Boyle, 2019). Women physicians are needed in rural settings, so medical schools must strategically attract women who are more likely to pursue rural medicine. The literature suggests that women physicians are less likely to practice in rural areas but more likely to practice in primary care medicine, a specialty that tends to attract individuals who intend to practice rural medicine (Doescher et al., 2000; Miller et al, 2006; Rosenblatt & Hart, 2000; Stefani et al., 2020; West et al., 1996). The changing gender composition of the medical profession necessitates investigating the factors that positively influence the choice to pursue rural medicine for women and men separately. Understanding the predictive value of available factors at the time of admission to medical school can inform admission policy and recruiting strategies. This study attempted to provide a better understanding of those students who have not historically been considered, namely women osteopathic medical students, but are in a position to significantly contribute to alleviating the problem of rural healthcare workforce maldistribution.

### **Research Questions**

The following research questions guided the study:

1. Among female osteopathic medical students at Arkansas Colleges of Health Education, what factors best predict a favorable attitude toward practicing in a rural setting?



2. Does civic-mindedness affect the relationship between a rural upbringing and attitude toward practicing in a rural setting?
3. Does civic-mindedness affect the relationship between planning to practice family medicine and attitude toward practicing in a rural setting?

## **Literature Review**

Academic medical centers, through their admission procedures, curricula, and commitment to a social mission have both the capability and responsibility of increasing the supply of physicians to rural and underserved communities. Selecting medical school applicants who are most likely to enter rural practice using a targeted admissions approach is one way of meeting the goal of increasing the rural physician workforce. The literature is unequivocal, a rural upbringing has been shown to be positively associated with physicians' likelihood of practicing in a rural community (Brooks et al, 2002; Laven & Wilkinson, 2003; MacQueen et al., 2018). Having an interest in community service, especially in underserved areas, is a strong predictor of a primary care specialty choice (Feldman, 2008; Goodfellow et al., 2016; Madison, et al. 1994; Rabinowitz et al., 2000; Scott et al., 2011). Physicians who choose the specialty of primary care are the largest single source of physicians in rural areas (Rosenblatt & Hart, 2000). Using the current available evidence, medical schools should seek to admit students who possess the attributes of a rural background, civic-mindedness, and interest in pursuing a primary care specialty. Most medical schools in the U.S. report that they use strategies to admit students who exhibit an interest in alleviating the workforce maldistribution.

How U.S. medical schools use targeted admissions strategies to respond to rural workforce gaps is poorly understood. Schemitz, et al. (2020) surveyed 133 medical schools and found that 69.2% of the respondents reported targeting students likely to practice in rural areas

during the admission process. The authors found that this approach was more common among osteopathic schools and schools rurally located. This study did not specify how the schools' admissions process identified the students more likely to indicate an interest in rural practice, but instead explored the schools' motivations, resources, challenges, and recommendations for success of targeted admissions. The authors concluded that the schools "inconsistently implemented some, but not all available evidence-based practices" (Schmitz, et al., 2020).

A similar study by Evans et al. (2020) also found that 69% of responding schools reported targeting recruitment of students likely to practice in rural areas. The authors surmised that the schools searched for evidence-based characteristics from the centralized application to identify applicants of interest. These characteristics included graduation from a rural high school, growing up in a rural community, volunteering in a rural community and having a partner receptive to rural living. Additional attributes of interest included interest in family medicine or primary care medicine, commitment to practicing in an underserved area, and possessing altruistic beliefs about healthcare. The literature supports these traits listed as factors that may predispose a medical student to choose rural medicine, but questions remain.

For example, Schmitz et al. (2020) interviewed admissions personnel from ten medical schools to further understand targeted admission practices. The researchers identified a theme: admissions personnel stressed the importance of breaking away from usual academic metrics, such as the MCAT, and using a more holistic approach. But utilizing a holistic approach provides its own challenges. Respondents reported difficulties discerning the applicant's actual intent to practice in a rural area during the interview process, considering that potential students would respond in a way that was most advantageous for their chances of admission into the program, not their true feelings. Ascertaining an applicant's genuine commitment to practicing in

a rural area and altruistic beliefs about healthcare may be difficult given just a single question answered in the affirmative on a centralized application or during a short interview.

Another problem with using current practices for targeted admission is that women and men are regarded equally but not equitably. For instance, evidence that medical students with a rural background are more likely to work in a rural setting is robust. However, past studies failed to meaningfully evaluate men and women separately. One must consider that what is true for male medical students may not be true for female students. A rural background may or may not influence the female medical students' eventual choice of practice location. Holistic or broad-based admissions strategies should assess the applicant's unique characteristics, considering the student as a whole rather than solely basing evaluation criteria on traditional measures of academic achievement such as grades and test scores. Each applicant's life experiences and attributes should be considered, especially when those experiences differ based on gender.

The research on the characteristics of medical students who will eventually practice in a rural setting has been ongoing for decades. This study helped fill a gap in the literature by focusing on what factors predict a favorable attitude toward practicing in a rural setting for a specific group of individuals who have not been studied but have become an essential factor in the future healthcare workforce supply, female osteopathic medical students. Secondly, this study investigated the moderating effects of civic-mindedness on the relationship between those factors (i.e., a rural background and planning to practice family medicine) and these students' attitude toward practicing rurally. This data from this study provides salient information to the Arkansas Colleges of Health Education College of Osteopathic Medicine (ARCOM) regarding the school's female matriculants. As ARCOM's mission is to provide service to surrounding rural and underserved areas in Arkansas, Oklahoma, Kansas, and Missouri, this study can inform

targeted admission practices for students with a higher likelihood of providing medical care to rural communities.

## **Methodology**

This study used multiple linear regression to answer its research questions. I collected data via an online survey sent to all female medical students at Arkansas Colleges of Health Education in Fort Smith, Arkansas. The survey was open for three and a half weeks and had 129 responses. Incomplete responses were removed, which left 97 responses to analyze.

## **Findings**

I examined if the predictive value of a rural background and intent to practice primary care holds true for female osteopathic medical students in Arkansas. I also investigated the predictive value of civic-mindedness in practice intentions. I hypothesized that the degree of civic-mindedness would moderate the strength of the relationship between the students' attitude toward practicing in a rural setting and a rural upbringing, and would also moderate the strength of the relationship between the students' attitude toward practicing in a rural setting and plan to practice family medicine. The results of my study illustrate three substantial effects. The first is an unconditional partial effect of civic-mindedness. The greater the degree of civic-mindedness of the student, the more favorable the attitude toward practicing in a rural setting. The second is an unconditional partial effect of a plan to practice family medicine. Students who plan to practice family medicine have a more favorable attitude toward practicing in a rural setting. The third is a conditional effect of civic-mindedness, wherein the effect of civic-mindedness is conditional on a student's plan to practice family medicine. This is best described as follows: For students with high civic-mindedness, planning to practice family medicine is associated with a more favorable attitude toward rural practice than students with low civic-mindedness.

## **Conclusions**

Based on the study's outcomes, I draw three conclusions. I present each conclusion with the related research question and results below.

### **Conclusion 1: Rural background**

My first conclusion from this study was that a rural background was not a predictor of eventual rural practice in women, although the literature overwhelmingly suggests that it is for medical students in aggregate. Based on a review of the literature, my hypothesis was that students with a rural background would have more favorable attitudes toward practicing in a rural setting. The results did not indicate that this was true. In this case, an insignificant finding is noteworthy, and its discussion can meaningfully contribute to the knowledge of predictors of eventual rural practice in osteopathic women. As I contemplated this finding, I returned to the literature to deepen my understanding of the context.

My survey found that women from a rural background did not have a more favorable attitude toward eventual rural practice. Images and, in truth, realities of the lives of rural men as cowboys, farmers, and hunters play a prominent role in depicting what rural life entails. Hunting, fishing, and adventures in the wilderness are central to rural life and strongly identify with masculine traits. Rural women face a different set of challenges than men or women from non-rural communities. Rural women marry earlier and have children earlier than their urban counterparts (Uecker, 2010). Women in rural and isolated areas report the highest prevalence of intimate partner violence at 22% compared to 15% of urban women (Peek-Asa et al., 2011). Furthermore, as previously discussed, the lack of healthcare providers in rural areas limits women's access to family planning, prenatal care, and cancer screenings. For example, rural communities have seen a decline in hospitals offering obstetric care. Between 1982 and 2002,

metropolitan areas saw an increase of 11% in hospitals that offered obstetric services, while the same services in rural areas fell by 52% (Zhao, 2007). Rural women may view their life experiences more negatively than their urban counterparts.

On the other hand, rural men tend to express pride in the differences between themselves and urban men. Participating in hunting and other outdoor activities, gun ownership, self-reliance, and the ability to protect themselves and their families are masculine traits commonly found in the context of rural life. These masculine characteristics may be the threads that bind men with a rural background, but not women, to an eventual return to a rural community. Social identity theory (SIT), which posits that behavior is guided by an individuals' desire to maintain "in-group" social identity and status, can be used to explain why a rural background is predictive of eventual rural practice in male medical students, but not in female medical students (Tajfel & Turner, 1979).

## **Conclusion 2: Civic-Mindedness**

My second conclusion from the study is that the greater the degree of civic-mindedness, the more favorable the attitude toward practicing in a rural setting. Overall, respondents with higher civic-mindedness had a more favorable attitude toward rural practice. In the first regression model I found that the predicted attitude toward rural practice increased by .17 as civic-mindedness increased by one point on the civic-mindedness scale. For context, the sample mean of the civic-mindedness scale is 125.13 with a standard deviation of 13.85, and the sample mean of attitude toward rural practice was 89.81 with a standard deviation of 10.97. For an individual with higher civic-mindedness, i.e., identified as one standard deviation above the mean, the predicted attitude toward rural practice would increase by 23.62 points on the attitude toward rural practice scale. Given the mean and standard deviation of the attitude toward rural

practice scale, an increase of 23.62 points would be practically significant because an increase of that magnitude would be more than two standard deviations on the rural attitude scale. The semi-partial correlation coefficient shows that civic-mindedness accounts for 4% of the variance of the model.

In my third model, I found that the relationship between planning to practice family medicine and one's attitude toward practicing in a rural setting varied as a function of one's civic-mindedness. As civic-mindedness increased, the strength of the relationship between planning to practice family medicine and attitudes toward rural practice increased. With that in mind, is civic-mindedness something that can be developed in students? Several studies suggest that coursework that engages the community and provides service-learning opportunities to students is effective in creating a sense of civic responsibility (Bringer & Steinberg, 2010). Palombaro, et al. (2017) found that civic-mindedness increased in a cohort of physical therapy students as they participated in a pro bono clinic throughout their coursework. Beninger (2019) noted that "medical institutions have the opportunity to inculcate strong civic attitudes and behaviors for the betterment of patients and for the greater public health of the community and the country". Developing civic-minded health professionals may be a crucial step in addressing the country's health care inequalities.

### **Conclusion 3: Family Medicine**

My third conclusion is that the intent to practice family medicine significantly predicts a positive attitude toward rural practice. The predicted attitude toward rural practice increased by 4.38 points as the plan to practice family medicine increased by one point. The sample mean of a plan to practice family medicine is 2.88, with a standard deviation of 1.15. For an individual with a higher likelihood of practicing family medicine, i.e., one standard deviation above the mean,

the predicted attitude toward rural practice would increase by 17.65 points, more than one standard deviation of the attitude toward rural practice scale. The plan to practice family medicine has a five times larger effect size than the civic-mindedness variable, accounting for 20% of the variance in the model. This is consistent with the literature. Family physicians comprise just under 15 percent of the physician workforce in the U.S. but provide 42 percent of the care in rural areas (Cherry et al., 2007). A physician's choice of specialty has a powerful effect on eventual practice location. Physicians who chose the specialty of family medicine tend to distribute themselves in proportion to the population in both rural and urban locations, but all other specialties are much more likely to settle in urban areas (Rosenblatt & Hart, 2000). Family physicians are the largest single source of physicians in rural areas (Rosenblatt & Hart, 2000).

### **Limitations**

The above conclusions should be interpreted in the context of this study's limitations. In chapter one, I identified several limitations of the study. Here, I discuss three limitations of the study that may prevent generalization. First, the survey was sent to female osteopathic medical students from one college, which may limit the ability to generalize the findings to osteopathic female students in other areas of the country or to allopathic female medical students. Second, data were self-reported using an online survey, therefore did not allow students the opportunity to ask clarifying questions before responding. Students may have misinterpreted the meaning of questions, or social desirability bias may have occurred. Students may have answered the questions according to the school's expectations rather than their own beliefs or experiences. Social desirability bias can also be based on self-deception, or not answering true to one's beliefs. To minimize this bias, surveys were self-administered and anonymous. Finally, a third limitation is the response rate by year of medical school. Overall, 42% of the female student



body responded, but 71% of the respondents were first- and second-year students. Third- and fourth-year students were not on campus as frequently as the first- and second-year students, so fewer of the upper classes responded to the recruitment attempts. Therefore, these findings may not be generalized to students later in their training.

### **Discussion**

This study aimed to determine if a rural background, a plan to practice family medicine, and motivation toward civic duty affected the attitude toward eventual rural practice. Attitudes can be valuable predictors of future behavior (Ajzen & Fishbein, 1977; Fishbein & Ajzen, 1980; Kraus, 1995). Moreover, attitudes are to be more useful as predictors when they are more easily recalled and stable over time (Glasman & Albarracin, 2006). Memories made in childhood can be easily recollected and fixed. For these reasons, one's background can be an influential predictor of attitudes toward future plans. Earlier, in Chapter 2, I queried, "What is it about a rural background that really influences career choice?" Although answering this question was beyond the scope of this study, one supposition emerges. Growing up rural is not a homogeneous experience for all who share that experience, and my results indicate as much.

Today, interest in family practice by current U.S. medical students is diminishing. Many speculate that the decline of the general practitioner has been the most influential cause of the shortage of rural physicians. As more and more physicians specialize, the number of general practitioners, including those more likely to serve in rural areas, gradually declines. In 2018, eight family medicine organizations launched the 25 x 2030 Collaborative, a movement to achieve the goal of 25% of medical school graduates entering family medicine residencies each year. Currently, one in eight, or 12.5%, graduates of medical school continue with a family medicine residency (Young & Tinger, 2022). Young and Tinger (2022) report that interest in

family medicine has essentially been flat for the last ten years. Although osteopathic medical students match with family medicine residencies at a higher rate than allopathic, their presence does not alter the results. Factors that discourage students from a family medicine career include the beliefs that family medicine has fewer research opportunities, it is not prestigious or intellectual, and it demonstrates a lower income relative to other specialties. Other influences that dissuade students from a career in family medicine include reports that students or mentors have bad-mouthed the specialty of family medicine, and fewer role models were available for students (Young & Tinger, 2022). It seems that family medicine has an image problem.

The theoretical framework that guided this study is the social identity approach, which explains how people categorize themselves as members of a group. This theory proposes that groups to which people belong are an important source of social identity, pride, and self-esteem (Tajfel & Turner, 1979). One important aspect of social identity is professional identity. Commonly, when two individuals meet for the first time, the second identifying attribute after exchanging names is the question, “What do you do?” What we “do” is intimately connected to who we are. Social identity theory explains why a rural background has been positively correlated with a physician’s intent to practice in a rural setting where they felt higher levels of belonging within that community. Additionally, social identity theory accounts for why a medical student with high civic-mindedness would choose to practice a specialty such as primary care that emphasizes community relationships and practicing in underserved areas. The student’s choice of clinical specialty would categorize their professional identity into a group that feels like a “good fit” with like-minded individuals who seek out opportunities to engage civically. As a member of a particular group, an individual can relate in terms of “we” rather than “I” and see “us” as unique and different from other groups. Social identity theory can assist in explaining, in

part, why family medicine has a negative stereotype. Interest in family medicine tends to decline as time in medical school increases, possibly influenced by the assumption that family medicine doctors are less qualified (Colegrove & Whitacre, 2009). In my study, I found that a plan to practice family medicine is a significant predictor of a positive attitude toward rural practice. Medical schools need to recruit those students who are more likely to practice family medicine and facilitate their continued interest in pursuing the specialty. That may be accomplished by embodying the schools' rural mission, adding rural training with quality role models, or otherwise nurturing the students' interests.

### **Implications for Practice and Research**

#### **Recommendations for Teaching and Practice**

Traditionally, most medical education opportunities have been based in metropolitan areas, thus limiting future physicians' exposure to medical practice in rural settings and contributing to challenges in recruiting future physicians to train and practice in rural communities. One recent study found that 56% of graduates of family medicine residencies practice within 100 miles of where they completed their training (Fagan et al., 2015). With that in mind, many medical schools have opened in rural areas in the last decade, attempting to alleviate the workforce maldistribution by "growing their own" physicians. Arkansas College of Osteopathic Medicine is one such school. ARCOM's mission is to focus on service to the underserved, mainly the rural areas in the surrounding states. Schools like ARCOM should use mission-based admissions criteria to admit students whose professional goals align with the school's mission and goals. Holistic admissions balance each student's academic metrics with other experiences and attributes. Most schools report that they seek students with a rural background when using a targeting admissions approach. This study suggests that for half of the

potential students, the women, this approach may be misguided. Instead, finding and nurturing students with a desire to practice a more public-minded practice, namely family medicine, may be a more advantageous strategy to fulfill the schools' mission.

### **Recommendations for Further Research**

With the limitations of this study, several areas of inquiry are recommended for further research. This study is limited to a small number of students from one medical college. Studies with larger samples and different populations are needed to make more generalizable conclusions. Alternative research design, such as qualitative inquiry, could add a more in-depth understanding of the subject. Additionally, following these participants through their early careers in medicine would be helpful to ascertain if a positive attitude toward rural medicine translated to the behavior of practicing rural medicine.

Healthcare workers other than physicians are needed to ease the burden of health disparities in rural areas. Workforce shortages in rural areas are not solely physicians but other healthcare professionals as well. In recent years, shortages of non-physician providers, including nurses, nurse practitioners, physician assistants, dentists, pharmacists, physical therapists, radiology and laboratory technicians, and mental health professionals have become more apparent. Inquiring about what factors best predict attitude toward rural practice for those professions can inform other aspects of medical education as well.

### **Summary**

In this chapter I provided a summary of the study, asserted findings, discussed conclusions and addressed the limitations of the study. This chapter also discussed how the conclusions relate to the current body of literature and theory. Recommendations for practice and further study were suggested. Overall, the findings suggest that a plan to practice family

medicine and, to a lesser extent, the degree of civic-mindedness is predictive of a positive attitude toward eventual rural practice in female osteopathic medical students. Of note, this study did not find a rural background predictive. The degree of civic-mindedness may moderate the relationship between the student's plan to practice family medicine and attitude toward rural practice, but replication with a larger sample would need to strengthen this argument. This study has implications for medical school admission practices, and further investigation may provide more insight into what characteristics predict eventual rural practice.

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## Appendix A



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**To:** Dana E. Kahl  
**From:** Douglas J Adams, Chair  
IRB Expedited Review  
**Date:** 07/27/2022  
**Action:** Exemption Granted  
**Action Date:** 07/27/2022  
**Protocol #:** 2207409140  
**Study Title:** Identifying Predictors of Eventual Rural Practice Among Female Osteopathic Medical Students

The above-referenced protocol has been determined to be exempt.

If you wish to make any modifications in the approved protocol that may affect the level of risk to your participants, you must seek approval prior to implementing those changes. All modifications must provide sufficient detail to assess the impact of the change.

If you have any questions or need any assistance from the IRB, please contact the IRB Coordinator at 109 MLKG Building, 5-2208, or [irb@uark.edu](mailto:irb@uark.edu).

cc: Kevin M Roessger, Investigator



Arkansas Colleges of Health Education  
 irb@acheedu.org  
 479-401-6011  
 June 24, 2022

## IRB EXEMPTION CERTIFICATE

Project title: *Identifying Predictors of Eventual Rural Practice Among Female Osteopathic Medical Students*  
 Project ID: ACHE-2022-0111  
 Principal Investigator: Dana Kahl, PT, DPT, NCS  
 Assistant Professor of Physical Therapy  
 Arkansas Colleges of Health Education

Dear Dr. Kahl,

Thank you for submitting your application to the Institutional Review Board at Arkansas Colleges of Health Education to evaluate the project's adherence to the federal, state, and institutional guidelines and set policies on the use of human subjects in research.

The aim of this survey study is to assess factors that influence a female osteopathic medical student's attitude towards practicing in a rural setting and use those factors to generate a predictive model. This approach helps quantify those factors so that schools can recruit and invest in the candidates who will be most likely to pursue rural medicine. Participation in the survey study is voluntary and no identifying information will be collected.

We are pleased to inform you that your project was carefully reviewed by the Institutional Review Board and was granted approval. This approval is for one year from the date of issuing this letter. It is the responsibility of the principal investigator to seek timely extension two months before it expires. The principal investigator shall make all effort to notify the board of any unforeseen problems or side effects to the participants also of any future changes to the protocol before such changes are implemented.

We thank you for your application and wish you the best of luck on your research.

LaVona Traywick, PhD  
 Chair, Institutional Review Board  
 Associate Professor of Physical Therapy  
 Arkansas Colleges of Health Education  
[lavona.traywick@acheedu.org](mailto:lavona.traywick@acheedu.org)

This letter was administratively prepared by IRB Coordinator Courtney Butler on behalf of the IRB.

## Appendix B

### Civic-Minded Professional Scale

Please read each statement and decide to what extent it describes you. You will probably agree with some of the statements and disagree with others. There is no right or wrong answer. Please describe yourself as you really are, not as you would like to be. Please indicate your level of agreement with each of the following items using the following scale:

**1 = Strongly Disagree; 2 = Disagree; 3 = Disagree Slightly; 4 = Neither Agree or Disagree;**

**5 = Agree Slightly; 6 = Agree; 7 = Strongly Agree**

1. Others I work with would likely describe me as someone who listens to conflicting opinions before reaching decisions.

2. I would describe myself as a politically active and engaged citizen.

3. I keep very well informed about current issues of social justice.

4. Others I work with would likely describe me as someone who is at ease working with people from diverse ethnic backgrounds.

5. When I look at myself in the mirror, I am very satisfied in reflecting on the work that I do.

6. I think that all professionals should give a portion of their time to community, voluntary, or pro bono service.

7. I feel confident in my ability to bring people together to address a community need.

8. I feel that my level of education places an additional responsibility upon me to serve others.

9. I keep very well informed about current public policy that directly relates to the type of work that I do.
10. I often feel a deep sense of purpose in the work that I do.
11. I feel very comfortable recruiting others to become more involved in the community.
12. Others would likely describe me as someone who is very passionate about my work.
13. Others would likely describe me as a person who is well informed about a variety of volunteer opportunities in the community.
14. I feel a strong sense of connectedness to others, even if they are quite different than me.
15. The education and knowledge that I have gained should be used to serve others.
16. I am well connected to a number of people who are active in their communities.
17. I often gain a deep sense of satisfaction from the work that I do.
18. I am very interested in current events.
19. My personal values and beliefs are well integrated and aligned with my work and career.
20. I am very familiar with a wide variety of nonprofit organizations.
21. I think that professionals have a civic responsibility to improve society by serving others.
22. I have a strong ability to come to consensus with others through dialogue and compromise.
23. I am aware of many opportunities to use my skills and abilities in community, voluntary, or pro bono service.

## Appendix C

### Student Attitudes to Rural Practice and Life Questionnaire

Please read each statement and decide to what extent it describes you. You will probably agree with some of the statements and disagree with others. There is no right or wrong answer. Please describe yourself as you really are, not as you would like to be. Please indicate your level of agreement with each of the following items using the following scale:

**1 = Very Strongly Disagree; 2 = Disagree strongly; 3 = Disagree; 4 = Agree; 5 = Agree Strongly ; 6 = Very Strongly Agree**

1. Working in a rural area provides more opportunity to practice a variety of skills.
2. There are good opportunities for employment in rural areas in my profession.
3. There are more opportunities for career advancement in rural areas.
4. Staff are more supportive of each other in rural areas.
5. Professional isolation is a problem when working in rural areas.
6. Rural practice provides greater opportunity for autonomy in work practice.
7. Employment in a rural area is very desirable.
8. There are things I enjoy doing in rural areas.
9. There are people in rural areas that I could be friends with.
10. There are limited places to go to socialize in rural areas.
11. There are poor recreational facilities in rural areas.
12. People in rural areas are very friendly.
13. In rural areas, new people are welcomed to the community.
14. Rural workplace settings are friendly environments.
15. Living in a rural area provides an enjoyable lifestyle.

16. There is a great sense of community in rural areas.
17. Working in a rural area means being too isolated from family.
18. Working in a rural area means being too isolated from friends.



## Appendix D

Email to students:

Subject: Take a Survey and Receive a FREE ACHE T-shirt

The AMA designates the month of September as Women in Medicine month to celebrate the accomplishments and contributions of women physicians like you. The survey below is being sent from a faculty member who is conducting research on women in medicine and their practice choices.

(link posted here)

The survey is 45 questions and takes 10-15 minutes to complete. By completing the survey, you are agreeing to allow your responses to be used in the research.

If you wish to receive this gift and be entered in a drawing for a \$100 gift card, please show your completed survey screen to the Office of Student Affairs.

Any questions related to the survey should be sent to [dana.kahl@achehealth.edu](mailto:dana.kahl@achehealth.edu) or (other institutional entity here). If you have any questions regarding your rights as a participant, please contact the Arkansas Colleges of Education Institutional Review Board at (email address here).

Thank you.

## Appendix E

Email to Office of Student Affairs:

Subject: Survey Sent to Students

Women osteopathic medical students across ARCOM received a survey sent on behalf of a faculty member at ACHE.

The purpose of the study is to examine what factors best predict favorable attitudes toward practicing in a rural setting in female osteopathic medical students at ACHE. The hope is that with a better understanding of these factors, the college can recruit and invest in future students who might be more likely to pursue rural medicine, thus progressing toward ARCOM's mission of service to the underserved.

Students who complete the survey will be eligible to receive a t-shirt with ACHE's branding and will be entered in a drawing for a \$100 gift card.

Please encourage your students to check their emails for details on the survey.

Any questions related to the survey should be sent to [dana.kahl@achehealth.edu](mailto:dana.kahl@achehealth.edu) or (other institutional entity here).

Thank you.

## Appendix F

Email to students one week after initial email:

Subject: Take a Survey and Receive a FREE ACHE T-shirt

One week ago, you received an invitation to participate in a survey designed for female osteopathic medical students. The survey hopes to learn more about women physicians like yourself and your future practice choices.

Thank you to those who have already responded to the survey. Your input is essential to the completion of this study.

However, additional responses are still needed. If you have not completed the survey yet, please use the link below.

(link here)

It takes only 10-15 minutes to complete. By completing the survey, you are agreeing to allow your responses to be used in the research.

If you wish to receive this gift and be entered in a drawing for a \$100 gift card, please show your completed survey screen to the Office of Student Affairs.

Any questions related to the survey should be sent to [dana.kahl@achehealth.edu](mailto:dana.kahl@achehealth.edu) or (other institutional entity here). If you have any questions regarding your rights as a participant, please contact the Arkansas Colleges of Education Institutional Review Board at (email address here).

Thank you.