A RETROSPECTIVE ANALYSIS OF THE EFFECTIVENESS OF AN ALTERNATIVE ADMISSIONS PROGRAM WHICH UTILIZES A DECELERATED CURRICULUM TO INCREASE THE ENROLLMENT AND SUCCESSFUL COMPLETION OF UNDERREPRESENTED MINORITIES IN AN OSTEOPATHIC MEDICAL SCHOOL IN THE SOUTH CENTRAL UNITED STATES

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Title of Study: A RETROSPECTIVE ANALYSIS OF THE EFFECTIVENESS OF AN ALTERNATIVE ADMISSIONS PROGRAM WHICH UTILIZES A DECELERATED CURRICULUM TO INCREASE THE ENROLLMENT AND SUCCESSFUL COMPLETION OF UNDERREPRESENTED MINORITIES IN AN OSTEOPATHIC MEDICAL SCHOOL IN THE SOUTH CENTRAL UNITED STATES

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Abstract: The purpose of this quantitative research study was to determine the effectiveness of an alternative admissions program that admits students with lower MCAT, overall undergraduate GPA and undergraduate science GPA into a decelerated medical education program designed to increase the number of students from underrepresented backgrounds (economic, educational and minority). More specifically, this study focused on whether or not this particular program successfully increased the number of underrepresented minorities at an osteopathic medical school in the south central United States and whether those admitted were able to successfully complete medical school coursework and necessary licensure examinations. The study also explored the specialty choices (primary care versus non-primary care) that graduates of the program chose. There has been very little research conducted on the effectiveness of individual programs designed to increase the number of underrepresented minorities in medical schools. It is imperative that studies such as this one be conducted to inform various stakeholders of the outcomes of these efforts. The research questions for this study were addressed using quantitative methodology and existing institutional data for students from entering Class of 2003 to entering Class of 2012. The total student population was 917 with 80 of those being admitted into the decelerated program. This study was a non-experimental study and exploratory in nature. Data analysis techniques included descriptive statistics, bivariate correlations, examining mean differences by conducting t-tests and examining median differences by utilizing the Mann Whitney U Test. The study found that individuals admitted to programs such as the this one do not perform as well on licensing examinations but they do not perform significantly different on medical school coursework as measured by class rank. They do have a slightly higher attrition rate but the ultimate outcome is that the majority can and do succeed in completing medical school and entering into medical practice. The study also examined the graduates of the decelerated program's specialty choices and found that they chose primary care specialties at a slightly lower rate than other graduates of the same medical school but at a much higher rate than the national average for osteopathic medical students.

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CHAPTER I

INTRODUCTION

The field of medicine remains a primarily White profession (Delany, 2004; Hurtado, 2005; Rubin, 2006). Although many efforts have been made at the local, state and federal levels, racial/ethnic underrepresented minorities continue to struggle to gain access to one of the most elite professional fields within society (Cohen, 1997). In contrast to racial/ethnic underrepresented minorities, women were historically underrepresented in the field of medicine but they now enter medical schools at similar rates as men (Andrews, 2007). The civil rights movement of the 1960's shed even more light on the disproportionate numbers of minorities in the field of medicine and the realizations of that era facilitated aggressive measures aimed towards increasing the presence of underrepresented minorities is the medical field (Cohen, 1997). The most notable and well-known efforts occurred by affirmative action measures. As time progressed, affirmative action began receiving significant societal attention and its use resulted in multiple lawsuits and legislative actions that ultimately restricted higher education institutions' ability to utilize it for diversifying the student body. With the use of affirmative action being restricted, and in some cases against the law, medical schools, professional organizations and policy leaders began looking for other ways to increase

the number of underrepresented minorities in the field of medicine. For example, in 1991, the Association of American Medical Colleges (AAMC) launched a program called *Project 3000 by 2000* which intended to increase the number of underrepresented minorities in the medical field by focusing on programs meant to provide longer term diversity improvements. These programs focused on what is referred to as "the pipeline" which are the various stages and pathways leading up to entering medical school such as improvements to K-12 preparation, arrangements with colleges, mentoring etc… Although the program initially saw very promising improvements in the number of matriculants into medical schools, the trend did not continue.

Affirmative action is credited with significantly increasing the number of underrepresented minorities in medical schools and the medical field from the 1960's until the 1990's, but throughout that timeframe, the practice of affirmative action was scrutinized by various factions of society and several court cases were filed that challenged the legitimacy of giving preference in admissions based on race and/or ethnicity (Knight & Hebl, 2005; Lakhan, 2003; Carlisle, Gardner & Liu, 1998; Cohen, 1997; Hurtado, 2005). As the anti-affirmative action movement progressed, many states even passed legislation that prohibited providing preference to underrepresented populations such as minorities and women (*Assessing Medical School Admissions Policies, 2003)*.

The scrutiny surrounding the use of affirmative action and the lawsuits and legislation that have resulted have spurred other efforts to diversify medical schools and the physician workforce (Lakhan, 2003). These alternative diversification efforts have included actions such as creating high school and junior high programs that increase

students' preparedness for the medical field, post-baccalaureate programs that provide disadvantaged and underrepresented populations with targeted studies that increase their likelihood of being admitted and being successful in medical school and alternative admission programs that admit students with lower academic credentials into medical school. One type of alternative admissions program admits students into decelerated medical education programs (McGrath & McQuail, 2004). These programs, as the name implies, reduce the course load that a student takes at a given time to increase the student's chance of success and they allow the students the ability to focus their efforts on fewer courses with the hopes that the student will have a higher likelihood of success. Other alternatives, which will be discussed further in Chapter 2, include percentage plans which admit students to college based on their ranking in high school and class-based plans that provide preference to individuals from lower socioeconomic statuses (Lakham, 2003).

The lack of diversity in the field of medicine is a longstanding societal issue. A wide variety of studies have been conducted focused on this issue and they typically are targeted at variables related to the causes of the problem such as poor K-12 preparation (Lewin & Rice, 1994), the financial burden of attending higher education (Smedley, Butler & Bristow, 2004) potentially biased admissions criteria (Frazer, 2005). Very few studies have been conducted on the effectiveness of programs targeted at addressing the issue of the underrepresentation of minorities in medical school and the medical profession. Even fewer studies have been conducted that look specifically at programs implemented at the medical school level such as alternative admissions and decelerated programs. In the following paragraphs, a study will be described that attempts to provide

insight into the effectiveness of a decelerated medical education program that admits underrepresented minority students using alternative admissions criteria. First, a brief description of the background for this study will be provided. Second, a brief and concise description of the research problem will be supplied. Third, there will be a discussion related to the professional significance of this study. Fourth, an overview of the methodology that was used will be provided. Fifth, the specific research questions that guided the study will be listed. Sixth, the limitations of the study will be detailed. Seventh, the definition of underrepresented minority, as it relates to this study, will be outlined. Finally, a summary will be provided that provides a roadmap for the remaining chapters of this dissertation.

Background

Society has focused significant attention on diversity for the last several decades. Many areas of society have shown significant gains with regard to diversity but the medical profession remains overwhelmingly White. The population of the United States is rapidly changing and this has highlighted the need for increasing the number of underrepresented minorities in the physician workforce. In order to gather evidence related to this societal phenomenon, targeted research studies need to be conducted. One such study will be detailed in the following pages. This study was conducted in the fall of 2014 and spring of 2015 at an osteopathic medical school in the south central United States. Although the lack of underrepresented minorities in medical education is an issue nationwide, the lack of population diversity within the central United States results in even less diversity within the medical school population and physician workforce in this area. Any cursory review of medical education journals will highlight that diversity is a

hot button topic in this field and highlight the need to identify successful strategies to address this issue. This topic's importance is evidenced by its prevalence in the literature. For example, the following two database searches found a total of 62 articles published in journals such as *Medical Education, Academic Medicine, Medical Teacher, New England Journal of Medicine* and several others related to this topic since August of 2012.

PubMed

((("outreach program*" OR pipeline* OR "disabled person*" OR racism OR inclusive* OR "vulnerable population*" OR "sex factor*" OR "affirmative action" OR "Minority Group*" OR "Cultural Diversity" OR "Cultural Competenc*" OR "Continental Population Group*" OR "Civil Right*" OR "Cultural Deprivation" OR "Cross-Cultural Comparison*" OR "Social Class*" OR "Socioeconomic Factor*" OR "affirmative action" OR diversity OR "holistic admission*" OR deceleration OR minorit*)) AND ("medical school*" OR "Medical Education" OR "Medical Student*")) AND "2012/08/01"[PDat] : "3000/12/31"[PDat]

Web of Science

TOPIC**:** ((((("outreach program*" OR pipeline* OR "disabled person*" OR racism OR inclusive* OR "vulnerable population*" OR "sex factor*" OR "affirmative action" OR "Minority Group*" OR "Cultural Diversity" OR "Cultural Competenc*" OR "Continental Population Group*" OR "Civil Right*" OR "Cultural Deprivation" OR "Cross-Cultural Comparison*" OR "Social Class*" OR "Socioeconomic Factor*" OR "affirmative action" OR diversity OR "holistic admission*" OR deceleration OR minorit*)) AND ("medical school*" OR "Medical Education" OR "Medical Student*")))

Problem Statement

Medical schools are failing to successfully matriculate adequate numbers of underrepresented minority students (Delany, 2004; Hurtado, 2005; Rubin, 2006). The number of underrepresented minority medical students does not match the diversity found within the United States (Cohen, 1997). For example, of all medical student accepted applicants in 2011, 0.2% were American Indian or Alaskan Native, 20.1% were Asian, 6.1% were Black or African American, 8.5% were Hispanic or Latino, .1% were Native Hawaiian and Other Pacific Islander, 57.5% were White, 3.0% were considered more than one non-Hispanic or Latino race, .02% were considered other non-Hispanic or Latino race, 3.2% did not respond regarding their race and 1.2% were considered foreign (*Diversity in Medical Education: Facts and Figures* 2012, 2012). These numbers are very far from matching the diversity within the population. According to the United States Census Bureau website, in 2012 Whites comprised 76.5% of the population, Black or African Americans comprised 13.6%, American Indian or Alaskan Natives comprised 1.6%, Asians comprised 5.6%, Native Hawaiian and other Pacific Islanders comprised 0.4% and Hispanic or Latino's comprised 16.4% (2012).

Until the mid-1960's, there were dismal numbers of minority students in U.S. medical schools however, after the Civil Rights Movement and due to affirmative action initiatives, the number of minorities entering the medical field rose rapidly (Cohen, 1997). From 1950-1966, the percentage of underrepresented minorities in medical school hovered at approximately 2% (Cohen, 1997). During that same timespan, the percentage of underrepresented minorities within the general population rose from approximately 10% in 1950 to approximately 15% in 1966 (Cohen, 1997). After the Civil Rights

Movement, the number of underrepresented minorities in medical school rose from approximately 2% in 1966 to 16% in 1975 (Cohen, 1997). The practice of using affirmative action to increase minority representation in medical schools, and other higher education institutions, has been scrutinized since its inception and the practice continues to be shadowed by heated controversy (Knight & Hebl, 2005).

Medical schools' effectiveness in matriculating underrepresented minority students varies significantly (Carlisle, Gardner & Liu, 1998). Research conducted by Carlisle et al., using data from every medical school in AAMC's directory, concluded that greater minority enrollment was significantly associated only with receipt of increasing amounts of federal research dollars and a greater percentage of minority residents in the medical schools' geographic area. Carlisle et al. also found that tuition, the ratio of applicants to entrants, degree of primary care orientation and the proportion of graduates serving as medical school faculty were found to not be significant predictors of minority medical student enrollment.

Lawsuits, state bans on affirmative action, and continued controversy have escalated the need for alternatives to affirmative action. Several programs at the federal, state and institution level have been created to achieve the same results of increasing minorities' presence in the elite field of medicine. These programs include summer institutes, mentoring programs, MCAT (Medical College Admission Test) preparation courses, decelerated medical education programs, post-baccalaureate programs, etc… There has been very little research conducted on the effectiveness of these various programs. In order to determine the most effective strategies for increasing

underrepresented minorities in medicine it is imperative that studies be conducted that inform various stakeholders of the outcomes of these efforts.

Professional significance

This study will hopefully provide valuable insight on this topic and add to the corpus of literature related to this topic. Many studies have been conducted that focus on the topic of underrepresented minorities and the findings of those studies have provided the academe with insight with regard to the roots of this problem as well as a foundation for future study. Although numerous studies have been published that document the extent of the problem and explore possible causes, very little research has been conducted on the effectiveness of individual programs at the medical school level. This study will attempt to provide more evidence related to the effectiveness of alternative admissions programs that utilized a decelerated curriculum. Beyond adding to the corpus of literature, the findings of this study may also prove valuable to practitioners that aspire to diversify medical school classes.

Methodology

This research study was conducted on subjects at an osteopathic medical school in the south central United States. This particular medical school had an alternative admissions program that was created to increase the number of medical students from disadvantaged backgrounds. The alternative admissions program at this medical school allowed students with economic and/or educational and/or those students from underrepresented racial/ethnic groups to be admitted with lower MCAT scores and GPA's. Specifically, to be eligible to apply for the Bridge Program an applicant must have had at least a 2.5 overall GPA, a 2.5 undergraduate science GPA and a minimum

average MCAT score of 5. Students admitted into the alternative admissions program, which was called the Bridge Program, participated in a decelerated curriculum so they took only a portion of the first year medical school curriculum during their Bridge year (their first year at the medical school). If they were successful in passing this reduced course load then they would become a member of the next year's first year medical school class. They were not required to repeat any of the previously taken courses that they earned over an 85% in during their Bridge year.

Decelerated programs are programs designed for at-risk medical students and have been found to be successful in helping at-risk students complete the medical school curriculum. The design of decelerated programs varies by school and some of these differences include student selection criteria and the timing of decelerated curriculum components (McGrath & McQuail, 2004). For instance, some schools allow students to volunteer for these programs and other schools require students who are struggling academically to participate in these program (McGrath & McQuail, 2004; Mork, A., Klement, B., Paulsen, D. & Wineski, L., 2014). Medical schools who choose to utilize decelerated programs should note that attrition rates for students enrolled in decelerated programs are greater than students in the traditional curriculum (McGrath & McQuail, 2004). The alternative admissions program at this particular school was established in 2002 through a federal HCOP (Health Careers Opportunity Program) grant and when the grant ended the administration institutionalized it. The program continued until a curriculum revision at the medical school made it impossible to utilize decelerated course load. During the Bridge Program's existence, the medical school utilized a discipline-based curriculum that had semester length courses. The Bridge students courseload was

divided so that they took half the typical first year medical school courses with the result that they had two years to complete the first year of medical school. The medical school has since transitioned to an organ system's based curriculum that utilizes block scheduling. The design of the new curriculum does not allow for the decelerated model to be applied so the last Bridge Program class was admitted in the fall of 2011 and after completing their Bridge year they became part of the entering medical school class of 2012.

The data that was analyzed for this study was existing data which included admissions data, medical school ranks, licensure board scores, specialty choice information and information regarding attrition. The data was retrieved from various offices within the medical school including Admissions, Student Affairs, Alumni Affairs as well as from the online licensure board website. The data was compiled into a single data file and de-identified.

This was an exploratory, non-experimental study. Quantitative methods were used to analyze the data employing SPSS Version 21.0. Specifically, descriptive statistics, bivariate correlations, t-tests, and the Mann Whitney U Test were used. A brief overview of the methodology of this study has been provided but a more detailed description will be provided in Chapter 3 of this dissertation.

Research Questions

The following research questions guided this study:

1. Do traditionally admitted and Bridge Program students differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3)?

2. Do traditionally admitted and Bridge Program students differ with regard to medical school performance as measured by class rank?
3. Do traditionally admitted and Bridge Program students differ with regard to attrition rate?
4. Do traditionally admitted and Bridge Program students differ with regard to their practice characteristics after graduation as measured by percentage choosing specialties in primary care.

H_0: $\mu_1 = \mu_2$ for all each hypothesis below:

- Traditionally admitted and Bridge Program students do not differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3).
- Traditionally admitted and Bridge Program students do not differ with regard to medical school performance as measured by class rank.
- Traditionally admitted and Bridge Program students do not differ with regard to attrition rate.
- Traditionally admitted and Bridge Program students do not differ with regard to their practice characteristics as measured by percentage choosing specialties in primary care.

Limitations

There are a few limitations that deserve mention related to this particular study. First, each medical school is different with regard to its focus on diversity. One would presume that varying levels of focus on diversity may affect outcomes related to a program that intends to diversify the medical school class. This particular study will

utilize data from only one osteopathic medical school so the generalizability of the findings to other medical schools is limited. Second, the geographic location of this particular medical school could also play a role in the findings. Third, each medical school determines their own admissions criteria and the criteria for this particular school could be different from other medical schools therefore limiting the applicability of these findings to other institutions. Fourth, medical school curricula vary across institutions and the structure of the decelerated program to be studied is unique to this medical school. Although the concept of reducing the course load for a student is a universal concept, the particular classes to be taken during a given semester and the rigor of particular classes varies widely across medical schools. Finally, this study provides a unique opportunity to utilize data from all medical students admitted from the entering class of 2003 to the entering class of 2012. In that sense, this study represents a summative evaluation of the Bridge Program since the program began. Students admitted through the Bridge Program are limited to approximately 10% of the incoming class so when comparing traditionally admitted students and Bridge Program there is a very large difference in the sample sizes (80 Bridge Program students and 837 traditionally admitted students).

Definitions

Before attempting to address this issue, it is important to understand which categories of people are considered underrepresented minorities. One association that offers a definition is the AAMC but many people do not agree with the AAMC's narrow restriction of affirmative action to four groups consisting of African-Americans, Native-Americans, Mexican-Americans and Puerto Ricans from the mainland United States

(Rodriguez, 2000; Carlisle et. al, 1998). Critics of this restriction claim that many other groups are underrepresented in the medical field and equal effort should be given to allow access for these individuals. (Rodriguez, 2000) "Under the narrow, 25-year-old definition of "under-represented minority" used by the group, students whose parents immigrated from the Caribbean, Central and South America, or Africa don't qualify for special aid, even though they often face social, cultural and economic hurdles that are just as high as those faced by more established minority groups." (Rodriguez, 2000, ¶ 3). The lack of a widely shared and accepted definition of underrepresented minority adds to the difficulty of addressing this issue (Rodriguez, 2000). The ethnic composition of the United States is changing (Cohen, 1997). For the purpose of this study, the AAMC's definition of underrepresented minorities was utilized.

Summary

In summary, the quantitative study that has been described in the previous paragraphs will hopefully contribute to the literature in the field of medical education and build upon the previous studies that have been conducted. Although this study has limitations, as with any study, there is a possibility that it could also provide practitioners with insight that may inform their decisions with regard to programming intended to diversify medical schools. This introduction is intended as a brief overview but the following chapters will provide a review of the literature related to this topic, a detailed description of the methodology utilized for this study, the findings of the study and a discussion of how these findings fit within the existing literature.

CHAPTER II

REVIEW OF THE LITERATURE

The vast majority of physicians in the United States are White but according to Cohen (1997), the physician workforce does not reflect the diversity within our society. The number of underrepresented minority medical students does not match the diversity found within the United States (Cohen, 1997). For example, of all medical student accepted applicants in 2011, 0.2% were American Indian or Alaskan Native, 20.1% were Asian, 6.1% were Black or African American, 8.5% were Hispanic or Latino, .1% were Native Hawaiian and Other Pacific Islander, 57.5% were White, 3.0% were considered more than one non-Hispanic or Latino race, .02% were considered other non-Hispanic or Latino race, 3.2% did not respond regarding their race and 1.2% were considered foreign (*Diversity in Medical Education: Facts and Figures* 2012, 2012). These numbers are very far from matching the diversity within the population. According to the United States Census Bureau website, in 2012 Whites comprised 76.5% of the population, Black or African Americans comprised 13.6%, American Indian or Alaskan Natives comprised 1.6%, Asians comprised 5.6%, Native Hawaiian and other Pacific Islanders comprised 0.4% and Hispanic or Latino's comprised 16.4% (2012). This review of the literature will attempt to provide an extensive overview of various factors to the

underrepresentation of minorities in medical education and medical practice. Previous researchers have attempted to shed light on this topic and the purpose of this literature review is to gain a comprehensive overview of what research has been conducted on the underrepresentation of minorities in medical education and the profession of medicine. The findings of these studies will be critical in determining what research still needs to be conducted in order to fully understand the complexities of this issue. In order to provide a roadmap for readers, a chronological outline of the contents of this literature review will be provided.

First, an overview of the theory that will be used for this study will be provided. Second, a description of the search process will be presented that outlines the strategies that were utilized to secure any relevant literature on this topic. Third, an overview of the historical context of this issue will be provided that guides readers through the various social initiatives, resulting court cases and state legislative actions that resulted by the aforementioned initiatives. Fourth, the societal benefits of diversity in medical education and medical practice will be highlighted. Fifth, alternatives to affirmative action will be described. Sixth, the societal barriers will be presented. Finally, a discussion of the special academic programs targeted at remedying this problem will be provided.

Theoretical Framework

The theoretical perspective that will be used for the purposes of this study is *Cultural and Social Reproduction Theory* which is commonly referred to simply as *Reproduction Theory*. This theory was developed by French sociologist Pierre Bourdieu. His theory essentially states that a hierarchical structure exists within society and that those at the top of the societal structure create and maintain systems that perpetuate their

dominant status within society (Bourdieu and Passeron, 1990). Bourdieu applied his theory to several social institutions including the education system. He states, "So it has to be asked whether the freedom the educational system is given to enforce its own standards and its own hierarchies, at the expense for example of the most evident demands of the economic system, is not the quid pro quo of the hidden services it renders to certain classes by concealing social selection under the guise of technical selection and legitimating the reproduction of the social hierarchies by transmuting them into academic hierarchies" (Bourdieu & Passeron, 1990, p. 153). It is a well-known fact that medicine is considered a very elite profession. A pivotal moment in medical education's history was Abraham Flexner's (1910) *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching*. In his report, he indicated that the majority of medical schools should be closed due to poor quality (Weiss & Miller, 2010). A disproportionate number of the medical schools that received the lower ratings were those open to training women and Blacks. Through the lens of *Reproduction Theory*, Flexner's "…actual intentions, however, may have been to reduce competition in the profession and by reserving it primarily for White males, raise its status" (Weiss & Miller, 2010, p. 557). *Reproduction Theory* is the most compelling explanation for the underrepresentation of racial and ethnic minorities in medical school and provides a critical theory perspective of the societal structure within the United States and particularly in regard to higher education.

The Search Process

The purpose of the literature review was to identify all relevant literature related to the topic of underrepresented minorities in medical education. On-line database

searches were conducted to identify articles, books and documents on this topic. Electronic searches were conducted in PubMed (Medline), ExLibris Voyager and ERIC using a variety of search terms such as *underrepresented minorities and medicine, underrepresented minorities and medical education, minorities and medical school, minority physicians, minority medical students, underrepresented minorities and medical school, diversity and medical school, diversity and medical practice, diversity and medical care etc…* The results of these searches were reviewed to identify studies that were relevant to this review. After relevant studies were identified, the bibliographies of these studies were reviewed to identify any additional sources that could help to illuminate the key factors related to this topic.

Historical Overview

Until the mid-1960's, there were dismal numbers of minority students in U.S. medical schools; however, after the Civil Rights Movement and due to affirmative action initiatives, the number of minorities entering the medical field rose rapidly (Cohen, 1997). From 1950-1966, the percentage of underrepresented minorities in medical school hovered at approximately 2% (Cohen, 1997). During that same timespan, the percentage of underrepresented minorities within the general population rose from approximately 10% in 1950 to approximately 15% in 1966 (Cohen, 1997). After the Civil Rights Movement, the number of underrepresented minorities in medical school rose from approximately 2% in 1966 to 16% in 1975 (Cohen, 1997). Although affirmative action was successful at increasing minority presence in medical schools, it has been scrutinized since its inception and continues to be characterized by controversy (Knight & Hebl, 2005; Lakhan, 2003; Carlisle, Gardner & Liu, 1998; Cohen, 1997; Hurtado, 2005).

Although Affirmative action was used as a primary method for ensuring diversity in the past but this practice has been altered (Carlisle et al., 1998; Cohen, 1997; Hurtado, 2005). Medical schools are faced with an immediate and pressing problem to identify ways to diversify student populations while avoiding reverse discrimination lawsuits (*Assessing Medical School Admissions Policies, 2003)*. Multiple court cases have been filed by plaintiffs claiming that affirmative action in admissions processes has caused them to be victims of reverse discrimination (Assessing Medical School Admissions Policies, 2003). On many occasions, these court cases have been decided in the favor of the plaintiff and these court rulings have pressured educational institutions to justify their diversity initiatives (Assessing Medical School Admissions Policies, 2003). Specific cases, legislative actions and their outcomes will be discussed in depth in the section *Legal Challenges to Affirmative Action*. The rapid growth of minority medical student numbers has ceased and many believe that the reduction in use of affirmative action is to blame (Carlise et al., 1998).

After the Civil Rights Movement, medical schools used the concept of compensating for social injustice and historical discrimination by using affirmative action in their admissions processes to admit historically underrepresented minority students (Hurtado, 2005). The specific methods used to give preference to minorities varied (Assessing Medical School Admissions Policies, 2003). Some schools would set aside a specific number of spots that were reserved for only minority applicants while others would use less obvious and blatant practices such as automatically adding preference points for underrepresented minority applicants. (Assessing Medical School Admissions

Policies, 2003). Regardless of the specific method used, the practice of using affirmative action to diversify medical schools has experienced criticism (Lakhan, 2003).

Differing Views on Affirmative Action

Society is strongly divided on more direct and controversial means of diversifying medical schools such as affirmative action. There are multiple arguments for and against the practice in medical education (Cohen, 1997; Hurtado, 2005). Proponents of using affirmative action in medical school admissions argue that the diversity within the student body creates a more valuable learning environment for all students (Bollinger, 2003). Advocates for diverse medical schools argue that interaction with people of other backgrounds assists medical students in understanding people from backgrounds different than their own (Lakhan, 2003). Advocates also claim that due to longstanding discrimination and social inequities within the United States, sufficient numbers of minorities would not be admitted to medical schools without affirmative action (Bollinger, 2003).The aforementioned criticism has, in some cases, escalated to lawsuits which will be discussed in-depth in the following section.

Legal Challenges to Affirmative Action

One such lawsuit was *Regents of the University of California v. Bakke*. Allan Bakke, the plaintiff in the case, was denied admission to Davis Medical School on two separate occasions (Schwartz, 1988). Schwartz contends that Bakke was a qualified applicant but due to the use of a quota system by the school's admissions committee, minority applicants with lower qualifications were admitted before him. Consequently, Bakke filed a case that eventually went to the Supreme Court where it was decided in his favor (Schwartz, 1998). This Supreme Court ruling had a significant impact on the use of

affirmative action in admissions processes because it set specific parameters for when and how higher education institutions could use affirmative action (Lakhan, 2003). The ruling did not prohibit institutions from granting racial preferences but it did put an end to the use of quota systems (Lakhan, 2003). After the *Bakke* case, institutions were held accountable to justify their diversification efforts and methods (Lakhan, 2003). The ruling on this case provided institutions with the first significant insight regarding how affirmative action could be used to diversify higher education (Assessing Medical School Admissions Policies, 2003).

Grutter v. Bollinger, et al, and *Gratz, et al v. Bollinger, et al*., lawsuits filed against the University of Michigan, also assisted higher education institutions with determining the legal boundaries of affirmative action in admissions practices ("Assessing Medical School," 2003). The ruling on the *Grutter* case, dealing with the law school's admissions policies, upheld the school's use of race as a plus factor in the admissions process (Assessing Medical School Admissions Policies, 2003). Justice Sandra Day O'Connor, the Supreme Court's majority opinion, expressed that the case was ruled in favor of the law school because of the use of race in the school's admissions policy was "narrowly tailored" and furthered "a compelling interest in obtaining the educational benefits that flow from a diverse student body" (Assessing Medical School Admissions Policies, 2003, p. 8). The *Gratz, et al. v. Bollinger, et al*. case was filed by two unsuccessful applicants to an undergraduate program because the undergraduate program used a point system to make admissions decisions and minority applicants were given automatic bonus points (Assessing Medical School Admissions Policies, 2003). The Supreme Court ruled against the school in this case because the "point system was

too mechanistic" and didn't lend itself to "individualized consideration of applicants" (Assessing Medical School Admissions Policies, 2003, p. 9).

Most recently, the United States Supreme Court heard the case of *Fisher v. University of Texas.* This case was filed because the University of Texas used race-conscious admissions practices for their medical school admissions process (Rosenbaum, Teitelbaum & Scott, 2013). Abigail Fisher, an applicant that was not admitted to the medical school filed a lawsuit against the university. The court ultimately found in favor of the university but other outcomes of the case are noteworthy. The Supreme Court added an additional burden to colleges and universities by making them have to prove that no race neutral alternative would result in the necessary diversity to reap the educational benefits being sought. Although the Supreme Court previously made a ruling on this case, they recently agreed to hear the case again in the 2015 – 2016.

State Legislative Actions

In addition to court cases, three state legislative actions have also impacted the use of affirmative action in the higher education system (Assessing Medical School Admissions Policies, 2003). California's Proposition 209 was voted into law in 1996 and made it illegal to use race or gender as a basis for preference in public contracting, public employment and public education (Assessing Medical School Admissions Policies, 2003). The Washington State Initiative 200, which became law in 1998, was very similar to California's proposition and prohibited public agencies from giving preferential treatment on the basis of race, sex, color, ethnicity or national origin (Assessing Medical School Admissions Policies, 2003). The "One Florida" Initiative, becoming law in 2000, banned affirmative action in contracting and state college admissions (Assessing Medical

School Admissions Policies, 2003). The passing of these three legislative actions provides evidence that the practice of affirmative action to diversify institutions is becoming less acceptable to society.

Benefits of Diversity in Medical School and Medical Practice

A diverse physician workforce is imperative for numerous reasons such as minority access to elite fields and minority healthcare (Cohen, 1997). According to Hurtado (2006), racial and minority medical school graduates are more likely to practice in predominately minority and underserved communities which addresses an immediate need for the country. Additionally, patients from minority populations are more satisfied with their medical care when it is provided by a physician with their same race or ethnicity (Rubin, 2006). Currently, medical researchers have been criticized for not providing adequate attention to medical conditions that affect minorities and advocates of diversity in medicine claim that with a more proportionate mix of the physician workforce, medical research would become more diversified as well (Cohen, 1997). Some claim that increasing diversity in medical school not only benefits minority populations but also enhances the learning environment and cultural competence of all students (Bollinger, 2003). In many areas, society is still very geographically and socially segregated which prevents individuals from having the opportunity to learn about people different than themselves. "Admitting a racially diverse group of students enables a school to do a better job of preparing students to be effective doctors or lawyers or citizens. Students are exposed to classmates, who have had different life experiences, and their prior assumptions are challenged" (Bollinger, 2003). Practicing physicians

need to be able to effectively relate to patients from all backgrounds and be knowledgeable about different cultures (Bollinger, 2003).

Alternatives to Affirmative Action

In an attempt to strike a balance between traditional affirmative action and no preference for minorities at all, two alternatives to affirmative action have been explored; percentage plans and class-based preference plans (Lakhan, 2003). Percentage plans guarantee students admission to a higher education institution if they are within the top percentages of their graduating class and proponents of percentage plans argue that comparing students to others in their own school is an appropriate way to judge achievement of students (Lakhan, 2003). Some states that have recently banned affirmative action have turned to this strategy in attempts to diversify higher education institutions but two criticisms of this method for adaptation to medical school are that undergraduate programs are not diverse enough for it to work successfully and that a student being at the top of their graduating class does not guarantee they would make a competent, well-rounded physician (Lakhan, 2003).

The second alternative to affirmative action is class-based preference which involves using socioeconomic status as a basis for preference in the admissions process (Lakhan, 2003). This approach is intended to address the socioeconomic disparity that exists between the majority and minority populations within the United States and this disparity is often noted as one of the most significant underlying reasons for the lack of diversity in higher education (Lakhan, 2003). Minority populations are more likely to live in poor communities with poor school systems and advocates of class-based preference feel that this method "levels the playing field" without using race as a

preference (Lakhan, 2003). One advantage of this system is that disadvantaged non-minority applicants, who don't benefit from affirmative action practices do benefit from this type of system. A key argument against using socioeconomic status for preference is that it does not address inequity issues such as the effects of discrimination for middle-class minorities (Lakhan, 2003). These strategies are under-researched and the effects of class-based preference are largely unknown. Since it is not focused on race or ethnicity it appears that it is less controversial than more overt methods of affirmative action.

Societal Barriers

The educational stages leading to the medical degree are often referred to as "the pipeline". The pipeline begins with K-12 education, continues through undergraduate education and ends with completion of the medical degree (Lewin & Rice, 1994). Several barriers to minority success have been identified within this continuum such as lack of financial resources, lower-quality K-12 preparation, and medical schools' extensive reliance on standardized tests in the admissions process.

The financial burden of attending higher education institutions continues to rise and this presents a problem in regard to matriculating underrepresented minority students (Smedley, Butler & Bristow, 2004). "The trends toward increased tuition costs and decreased need-based aid have resulted in higher levels of unmet need for lower-income students. The impact of high unmet need can be considerable on low-income students, even those who are academically prepared for the challenges of higher education." (Smedley, Butler & Bristow, 2004, p.6). Financial support, such as financial aid and scholarships, should not be overlooked as a contributing factor in allowing access for minorities to medical school.

K-12 education has been noted by many as a significant contributor to the insignificant number of underrepresented minorities in the physician workforce (Lewin & Rice, 1994). Minority students are more likely than Whites to attend poor quality K-12 institutions (Cohen, 1997). Significant improvement in enrollment numbers for underrepresented minority medical students can only be achieved if more minorities have access to quality education and encouraging environments (Lewin & Rice, 1994). Several attempts have been made to address the disparities in K-12 education for underrepresented minorities to include the creation of magnet health science high schools, articulation agreements and science education programs but no significant positive results have been seen from these attempts even though they establish mentoring relationships, encourage students to take science courses and related offerings and provide adequate counseling regarding the path to medical school (Cohen, 1997).

In addition to initiatives in the K-12 arena, significant attention is being devoted to the potentially biased admissions criteria for medical schools. Each medical school develops its own admissions formulas and typically the MCAT is a large part of this calculation (Frazer, 2005). This practice of significant reliance on MCAT scores has been criticized because of evidence that some minority groups typically do not score as well as majority groups on standardized tests and also because some argue there is no strong link between MCAT scores and success in medical school or medical practice (Frazer, 2005). Frazer (2005) urged that a conceptual model for minority admissions is needed which gives more weight to the non-cognitive strengths of applicants and associates abilities needed for successful medical school completion to various skills and abilities indicative of a good physician. Proponents who argue for widespread adoption of these models in

medical schools argue that this type of model would not only increase the number of underrepresented minorities but also increase the number of physicians with good bedside manners (Frazer, 2005). "Non-cognitive strengths are being used by many schools as important additional and supplementary admission criteria to evaluate candidates for medical school. Non-cognitive attributes and qualifications include: leadership, realistic self-appraisal, determination and motivation, family and community support, social interest, maturity and coping capability, and communication skill" (AAMC, 2002, cited in Delany, 2004, p.79).

Carlisle, Gardner and Liu (1998) contend that medical schools' effectiveness in matriculating underrepresented minority students vary significantly. They conducted a quantitative study using data from every medical school in AAMC's directory and concluded that greater minority enrollment was associated with receipt of increasing amounts of federal research dollars and percentage of minority residents in the medical schools' reference populations (surrounding area). They also found that tuition, the ratio of applicants to entrants, degree of primary care orientation and the proportion of graduates serving as medical school faculty were not significant predictors of minority medical student enrollment.

Other studies such as (Agrawal, Vlaicu and Carrasquillo, 2005) contradict this notion and identify a variety of specific factors that affect institutions' abilities to matriculate minority medical students. Agrawal, Vlaicu and Carrasquillo (2005) conducted a quantitative, survey-based study to inventory the different strategies that medical schools were using to increase minority enrollment and also to identify potential barriers to enrolling minority students. To gather the data for their study, the authors

developed the American Medical Student Association Diversity Survey (AMSA-DS) and sent this survey to the Dean of Student Affairs at each medical school in the United States. In regard to the potential barriers, statistical analysis of the data received from the medical schools produced five primary barriers to recruiting underrepresented minorities (low MCAT scores, low undergraduate GPAs, poor science preparation, absence of role models and a deficiency of minority faculty members) all of which were identified by over fifty-percent of medical schools as problematic at their institution (Agrawal, Vlaicu & Carrasquillo, 2005).

These findings indicating low MCAT scores are a barrier are not surprising after reviewing current literature on this topic. Each medical school develops their own admissions formulas, and typically the MCAT is a large part of this calculation (Frazer, 2005). "For a range of reasons, including efficiency in sorting through a large number of applicants, and to attain a reasonable expectation of how applicants can be expected to perform…, many admissions committees rely heavily on quantitative information, such as applicants' prior grades and standardized test scores, in identifying those applicants that will receive serious consideration" (Smedley, Butler & Bristow, 2004, p. 6). This practice of significant reliance on MCAT scores has been criticized because of evidence that some minority groups typically do not score as well as majority groups on standardized tests and also because many people question the link between MCAT scores and success in medical school or medical practice (Frazer, 2005).

Julian (2005) conducted a quantitative study of two medical student cohorts at 14 medical schools to test the MCAT's accuracy in predicting performance related to medical school and board performance. Specifically, the researcher was interested in

looking at various combinations of undergraduate grade point averages (both science and nonscience), MCAT scores and undergraduate institution selectivity to determine which combination of these items was the most accurate in predicting medical school and board exam success. To analyze the data, the researcher used both descriptive statistics and regression analyses and found that the MCAT produces very high regression coefficients when used to predict medical school grades and board scores and thus, is a very strong predictor of both performance in medical school and performance on board exams (Julian, 2005). The findings from this study indicate that the MCAT is a good predictor of success in medical school and on board exams and the significant weight given to the MCAT in admissions processes may be justifiable.

Even though the MCAT appears to be a good predictor of medical school and board exam success, the problem of it being a barrier for underrepresented minorities still exists. Much of the literature refers to the MCAT as an obstacle to underrepresented minorities in achieving their goal of becoming a physician (Grumbach & Chen, 2006; Henry, 2006; Frazer, 2005; Agrawal, Vlaicu & Carrasquillo, 2005). This indicates that the appropriate solution may be to retain the MCAT criteria at medical schools but also to implement strategies that would assist underrepresented minorities in performing better on MCAT. This is exactly what has been done at several medical schools with the implementation of premedical education preparatory programs which are also sometimes referred to as postbaccalaureate programs. These types of programs offer disadvantaged and minority students with assistance in areas such as test taking, interviewing, and MCAT preparation to help them become more competitive in the medical school admissions process.

Special Programs to Increase Underrepresented Minorities in Medical Schools

Grumbach & Chen (2006) conducted a quantitative study on the postbaccalaureate premedical program at the University of California. The objective of their study was to measure the effectiveness of the program by analyzing the matriculation rates for both program participants and a control group of nonparticipants (Grumbach & Chen, 2006). The participant sample for this study consisted of 265 program participants from 1999 to 2002 and the control group consisted of 396 applicants to the program that had not participated. The study found that "By 2005, 67.6% of participants and 22.5% of controls had matriculated into medical school (P<.001)" (Grumbach & Chen, 2006, p. 1079). Agrawal, Vlaicu and Carrasquillo (2005) surveyed all medical schools in the United States and found that sixty-six percent of medical schools have an enrichment program intended to increase underrepresented minority enrollment and fifty-six percent of these schools rated their programs as "very effective" (p. 1229). These studies seem to indicate that specialized programs that target underrepresented applicants' needs can be effective in increasing minority matriculation. When creating specialized programs to increase underrepresented minority enrollment it is important to realize that simply admitting a student does not guarantee success with the medical school curriculum.

A study involving medical students at the University of North Carolina at Chapel Hill School of Medicine found that underrepresented minorities who were admitted using preference are more likely to experience difficulty in completing medical school coursework (Cummings, 1999). This would seem logical considering these students were admitted using preference which implied that they would not have been admitted based

on standard admissions criteria such as academic achievement and MCAT scores. Also, underrepresented minority students are disproportionately represented in programs for at-risk students such as decelerated programs (McGrath & McQuail, 2004). Decelerated programs are programs designed for at-risk medical students and have been found to be successful in helping at-risk students complete the medical school curriculum. The design of decelerated programs varies by school and some of these differences include student selection criteria and the timing of decelerated curriculum components (McGrath & McQuail, 2004). For instance, some schools allow students to volunteer for these programs and other schools require students who are struggling academically participate in these program (McGrath & McQuail, 2004). Medical schools who choose to utilize decelerated programs should note that attrition rates for students enrolled in decelerated programs are greater than students in the traditional curriculum (McGrath & McQuail, 2004).

Conclusion

In conclusion, the previous paragraphs have provided an overview of the published studies examining the issue of medical student diversification. As you can see, this topic has been a longstanding societal issue within the United States and particularly within medical schools and the medical profession. Additional research is needed that focuses specifically on the outcomes of various types of diversification programs at medical schools to identify the most effective and efficient strategies for increasing underrepresented minority enrollment.

CHAPTER III

METHODOLOGY

As evidenced by the review of the literature in the previous chapter, more studies are needed that address specific programs that are targeted towards addressing the underrepresentation of minorities in medical education and the profession of medicine. This study will attempt to contribute to the literature with regard to the effectiveness of a decelerated program in addressing the academic disadvantage of underrepresented minorities in medical education. In the following paragraphs, a description of this particular study will be provided, followed by a statement of the problem, the purpose of the study; and finally, the specific research questions and hypotheses associated with those questions. Next, the data analysis techniques will be explained followed by a description of the research site and participants. Finally, a discussion of how the data was collected and a chapter summary will follow. Overall, after reviewing this chapter, the reader will fully comprehend how this study was conducted and how it attempted to answer the research questions that were outlined. Overall, the intention of this study was to determine whether this decelerated program and the admissions criteria associated with it effectively addressed the problem at hand by not only admitting a more diverse student body but also ensuring that those admitted to the program were successful in completing

medical school. This study also compared students admitted to the Bridge Program's medical school performance to those that were traditionally admitted, compared Bridge Program students' performance on licensure examinations to those admitted traditionally and also examined Bridge Program students' specialty choices.

Methodology

The research questions for this study were addressed using quantitative methodology. This study was a non-experimental study. More specifically, this study was exploratory in nature. Data analysis techniques included descriptive statistics, bivariate correlations, t-tests and the Mann Whitney U Test.

Problem Statement

Medical schools are failing to successfully matriculate adequate numbers of underrepresented minority students (Delany, 2004; Hurtado, 2005; Rubin, 2006). The number of underrepresented minority medical students does not match the diversity found within the United States (Cohen, 1997). For example, of all medical student accepted applicants in 2011, 0.2% were American Indian or Alaskan Native, 20.1% were Asian, 6.1% were Black or African American, 8.5% were Hispanic or Latino, 0.1% were Native Hawaiian and Other Pacific Islander, 57.5% were White, 3.0% were considered more than one non-Hispanic or Latino race, 0.02% were considered other non-Hispanic or Latino race, 3.2% did not respond regarding their race and 1.2% were considered foreign (*Diversity in Medical Education: Facts and Figures* 2012, 2012). These numbers are very far from matching the diversity within the population. According to the United States Census Bureau website, in 2012 Whites comprised 76.5% of the population, Black or African Americans comprised 13.6%, American Indian or Alaskan Natives comprised

1.6%, Asians comprised 5.6%, Native Hawaiian and other Pacific Islanders comprised 0.4% and Hispanic or Latino's comprised 16.4% (2012). Until the mid-1960's, there were dismal numbers of minority students in U.S. medical schools however, after the Civil Rights Movement and due to affirmative action initiatives, the number of minorities entering the medical field rose rapidly (Cohen, 1997). From 1950-1966, the percentage of underrepresented minorities in medical school hovered at approximately 2% (Cohen, 1997). During that same timespan, the percentage of underrepresented minorities within the general population rose from approximately 10% in 1950 to approximately 15% in 1966 (Cohen, 1997). After the Civil Rights Movement, the number of underrepresented minorities in medical school rose from approximately 2% in 1966 to 16% in 1975 (Cohen, 1997). The practice of using affirmative action to increase minority representation in medical schools, and other higher education institutions, has been scrutinized since its inception and the practice continues to be shadowed by heated controversy (Knight & Hebl, 2005). A diverse physician workforce is imperative for numerous reasons such as minority access to elite fields and minority healthcare (Cohen, 1997). In contrast to racial/ethnic underrepresented minorities, women were historically underrepresented in the field of medicine but they now enter medical schools at similar rates as men (Andrews, 2007).

Medical schools' effectiveness in matriculating underrepresented minority students varies significantly (Carlisle, Gardner & Liu, 1998). Research conducted by Carlisle et al., using data from every medical school in AAMC's directory, concluded that greater minority enrollment was significantly associated only with receipt of increasing amounts of federal research dollars and a greater percentage of minority

residents in the medical schools' reference populations (geographic location). Carlisle et al. also found that tuition, the ratio of applicants to entrants, degree of primary care orientation and the proportion of graduates serving as medical school faculty were found to not be significant predictors of minority medical student enrollment. There are a multitude of variables that affect an institution's ability to matriculate minority medical students and this variability adds to difficulty in widespread strategy development.

Lawsuits, state bans on affirmative action, and continued controversy have escalated the need for alternatives to affirmative action. Several programs at the federal, state and institution level have been created to achieve the same results of increasing minorities' presence in the field of medicine. These programs include summer institutes, mentoring programs, MCAT preparation courses, decelerated medical education programs, post-baccalaureate programs etc… There has been very little research conducted on the effectiveness of these various programs. In order to determine the appropriate strategies for increasing underrepresented minorities in medicine it is imperative that studies be conducted that inform various stakeholders of the outcomes of these efforts.

Purpose Statement

The purpose of this quantitative research study was to determine the effectiveness of an alternative admissions decelerated medical education program designed to increase the number of medical students from underrepresented backgrounds at an osteopathic medical school in the south central United States. This alternative admission program is called the Bridge Program and it began when the medical school applied for and received a Health Careers Opportunity (HCOP) Grant in 2002. The wording from the original

grant application stated that the program's objective was to "assist in admitting and retaining 10 applicants from disadvantaged backgrounds who had attempted but had been unsuccessful in being admitted to the medical school program" (Oklahoma State University College of Osteopathic Medicine HCOP Grant Application, 2002). The grant application also provided additional information regarding the intention and structure of the program. The original grant application outlined that students accepted to the program would participate in two six-week summer programs and also two semesters of coursework. The program provided retention services such as counseling and advising to the students in the program. It the students were successful in completing the program they were allowed to fully matriculate into medical school (Oklahoma State University College of Osteopathic Medicine HCOP Grant Application, 2002). Overall, the intention of this study was to determine whether this decelerated program and the admissions criteria associated with it effectively addressed the problem at hand by not only admitting a more diverse student body but also ensuring that those admitted to the program were successful in completing medical school. This study also compared students admitted to the Bridge Program's medical school performance to those that were traditionally admitted, compared Bridge Program students' performance on licensure examinations to those admitted traditionally and also examined Bridge Program students' specialty choices (primary care versus non-primary care. This particular program admitted students from disadvantaged backgrounds by lowering particular admissions criteria such as MCAT, overall undergraduate GPA and undergraduate science GPA. It goes without saying that these admissions criteria were established to ensure students admitted into the program are capable of being successful with regard to the rigor of a medical school

program. This study is targeted at determining whether academic performance differences existed between underrepresented minorities who were admitted to osteopathic medical schools through an alternative admissions program (decelerated) and students who were admitted through the traditional admissions process. The study also explored whether or not this program has resulted in a larger underrepresented minority enrollment since its inception. Finally, the study will report the practice characteristics of the graduates as measured by percentage choosing specialties in primary care.

Research Questions

The following research questions guided this study:

1. Do traditionally admitted and Bridge Program students differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3)?
2. Do traditionally admitted and Bridge Program students differ with regard to medical school performance as measured by class rank?
3. Do traditionally admitted and Bridge Program students differ with regard to attrition rate?
4. Do traditionally admitted and Bridge Program students differ with regard to their practice characteristics after graduation as measured by percentage choosing specialties in primary care.

H_0: $\mu_1 = \mu_2$ for all each hypothesis below:

- Traditionally admitted and Bridge Program students do not differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3).

- Traditionally admitted and Bridge Program students do not differ with regard to medical school performance as measured by class rank.
- Traditionally admitted and Bridge Program students do not differ with regard to attrition rate.
- Traditionally admitted and Bridge Program students do not differ with regard to their practice characteristics as measured by percentage choosing specialties in primary care.

Study Site

The site for this study is an osteopathic medical school that was founded in 1972. This particular medical school is in the south central United States. The class size of students was 88 per year until the school was approved for an increase in class size by their accrediting body. In 2010, the school admitted 92 students. In 2011, the school admitted 96 students and in 2012, the school admitted 115 students; the class size limit approved by their accrediting body.

Subjects

At this particular institution, a file existed that served as a repository of data for the incoming classes from 2003 to 2009. A cursory review of this data provided by this medical school provided the following insights regarding the subjects for this study. The subjects for this study included all osteopathic medical students enrolled from the entering class of 2003 through the entering class of 2012. The total number of subjects was 917. The vast majority of students in the sample (837), approximately 90 percent, were admitted through the traditional admissions process. The remaining students (80), approximately 10 percent, were admitted through an alternative admissions program

called the Bridge Program. The Bridge Program was designed to increase the number of students from disadvantaged backgrounds. In order to be admitted to the medical school students must have at least 90 undergraduate credit hours although the overwhelming majority of students admitted have at least a bachelor's degree prior to their admission to the medical school.

Data

Prior to collecting data, Institutional Review Board approval through the researcher's university was sought and received. Institutional Review Board approval was also sought and received at the medical school where the research was conducted. Data was requested from the Director of Admissions, Registrar, Director of Alumni Affairs. Licensing exam data was also downloaded from the National Board of Osteopathic Medical Examiners online system. The data was compiled into a single SPSS file by a designated medical school official, de-identified and then provided to the researcher for analysis.

Data collection

The specific data that was requested included licensing exam scores for COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3, all class ranks, enrollment status (enrolled, graduated, withdrawn and dismissed), age, gender, ethnicity designation of Bridge Program or traditional admissions and admissions data (MCAT score, undergraduate GPA, undergraduate science GPA etc…). Class rank is being requested to compare medical school course performance between the two groups. Since GPA has such a limited range and virtually all of the medical students have between a 3.00 and 4.00, the GPA provides minimal, if any, useful information for comparison of medical

students. Class rank is a much better indicator of how a particular student or a group of students compares with regard to medical school course performance. For graduates of the program, data was also requested that indicated the specialty choice.

Data analysis

The data that was collected was analyzed using the Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistics were calculated for each group to provide information related to age, gender, MCAT scores, licensure exam scores, attrition rate, overall undergraduate GPA, undergraduate science GPA and specialty choice. Independent samples t-tests, which are designed to compare two groups, were conducted on the data to determine if statistically significant differences existed between the students from the two groups on these variables. The Mann Whitney U Test was utilized to compare median class ranks between the two groups to determine if there were statistically significant differences.

Significance

This study attempted to provide valuable insight regarding whether alternative admissions programs utilizing a decelerated curriculum are successful and viable options for increasing the presence of underrepresented minorities in osteopathic medical schools. The findings of this study may prove to be valuable to leaders making decisions to either implement or discontinue alternative admissions programs that utilize decelerated curriculum models.

Limitations of the Study

There are several other performance factors that are not in the scope of this study such as participation in leadership activities and non-cognitive performance components

by each group. Also, although medical schools share similar qualities in many aspects, the findings of this study may have limited generalizability because of institutional differences in areas such as demographics in the region, curricula, institutional support and faculty diversity. Finally, this study provides a unique opportunity to utilize data from all medical students admitted from the entering class of 2003 to the entering class of 2012. Students admitted through the Bridge Program are limited to approximately 10% of the incoming class so when comparing traditionally admitted students and Bridge Program there is a very large difference in the sample sizes (80 Bridge Program students and 837 traditionally admitted students).

Conclusion

In conclusion, the previous paragraphs have provided a description of how this particular study was conducted. They have provided the methodology that was utilized, the problem statement, the purpose of this research, the specific research questions the study attempted to answer, the specific research techniques and analysis methods that were utilized and a description of the study site and subjects and how data was collected. In the following chapters, the reader will be provided with the results of this study as well as a thorough discussion regarding how the results of this study either agree with or contradict other studies that have been conducted on this issue.

CHAPTER IV

FINDINGS

The purpose of this study was to determine whether this medical school's alternative admissions, decelerated program and the admissions criteria associated with it did effectively increase the number of underrepresented minorities in medicine by not only admitting a more diverse student body but also ensuring that those admitted are successful in completing medical school, passing required licensing exams, and comparing differences in licensing exam performance and specialty choice as measured by percentage of program graduates entering primary care specialties.

Methodology

The research questions for this study were addressed using quantitative methodology. This study was a non-experimental study. More specifically, this study was exploratory in nature. Data analysis techniques included descriptive statistics, bivariate correlations, examining mean differences on specific variables using t-tests and examining median differences using the Mann Whitney U Test. This study and analysis of the data was guided by the following research questions and associated hypotheses.

Research Questions

The following research questions guided this study:

1. Do traditionally admitted and Bridge Program students differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3)?
2. Do traditionally admitted and Bridge Program students differ with regard to medical school performance as measured by class rank?
3. Do traditionally admitted and Bridge Program students differ with regard to attrition rate?
4. Do traditionally admitted and Bridge Program students differ with regard to their practice characteristics after graduation as measured by percentage choosing specialties in primary care.

H_0: $\mu_1 = \mu_2$ for all each hypothesis below:

- Traditionally admitted and Bridge Program students do not differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3).
- Traditionally admitted and Bridge Program students do not differ with regard to medical school performance as measured by class rank.
- Traditionally admitted and Bridge Program students do not differ with regard to attrition rate.
- Traditionally admitted and Bridge Program students do not differ with regard to their practice characteristics as measured by percentage choosing specialties in primary care.

In the following paragraphs, descriptive statistics of the entire student population from entering Class of 2003 to entering Class of 2012 are provided. The descriptive statistics include class size by year, age, gender, race, MCAT scores, undergraduate GPA, undergraduate science GPA, COMLEX Level 1 scores, COMLEX Level 2 CE scores, COMLEX Level 2 PE pass rate and COMLEX Level 3 scores. A table of bivariate correlations between admissions variables and academic outcomes for the entire student population is presented below (see Table 1).

Table 1

Correlations for Entire Data

	Undergraduate GPA	Undergraduate Science GPA	MCAT	Class Rank	COMLEX Level 1	COMLEX Level 2 CE
Undergraduate Science GPA	.833**					
MCAT	.059	.082*				
Class Rank	.269**	-.261**	-.148**			
COMLEX Level 1	.192**	.216**	.370**	-.705**		
COMLEX Level 2 CE	.179**	.184**	.351**	-.629**	.760**	
COMLEX Level 3	.228**	.225**	.366**	-.552**	.679**	.725**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

NOTE: N for correlations ranged from 629 to 912 depending on available information (i.e., not all students have completed COMLEX exams etc.)

After the descriptive statistics for the overall student population of the medical school are presented, descriptive statistics for the two subgroups of traditionally admitted students and alternatively admitted students are individually presented. Finally, each hypothesis is addressed by providing the outcomes of statistical analysis on the associated data.

Aggregate Data on All Medical Students

The total number of students that entered the medical school from the entering Class of 2003 to the entering Class of 2012 was 917. Out of the total 917 students, 99 (10.8%) entered in 2003; 87 (9.5%) entered in 2004; 86 (9.4%) entered in 2005; 87 (9.5%) entered in 2006; 99 (10.8%) entered in 2007; 80 (8.7%) entered in 2008; 103 (11.2%) entered in 2009; 83 (9.1%) entered in 2010; 96 (10.5%) entered in 2011; and 97 (10.6%) entered in 2012. A breakdown of the student numbers by entering class year can be seen in Table 2.

Table 2

Class Size by Entering Class

Class Year	N (%)
2003	99 (10.8)
2004	87 (9.5)
2005	86 (9.4)
2006	87 (9.5)
2007	99 (10.8)
2008	80 (8.7)
2009	103 (11.2)
2010	83 (9.1)
2011	96 (10.5)
2012	97 (10.6)
Total	**917 (100.0)**

The mean age of the 917 medical students was 24.59 with the youngest student admitted being 19 and the oldest student admitted being 47 as can be seen in Table 3. The age distribution of the student population can be seen in Figure 1. The distribution of gender within the population of students was fairly even with 430 (46.9%) females and 487 (53.1%) males as can be seen in Table 4.

Table 3

Participant Age

	N	Minimum	Maximum	Mean	Standard Deviation
Age	917	19	47	24.59	4.329

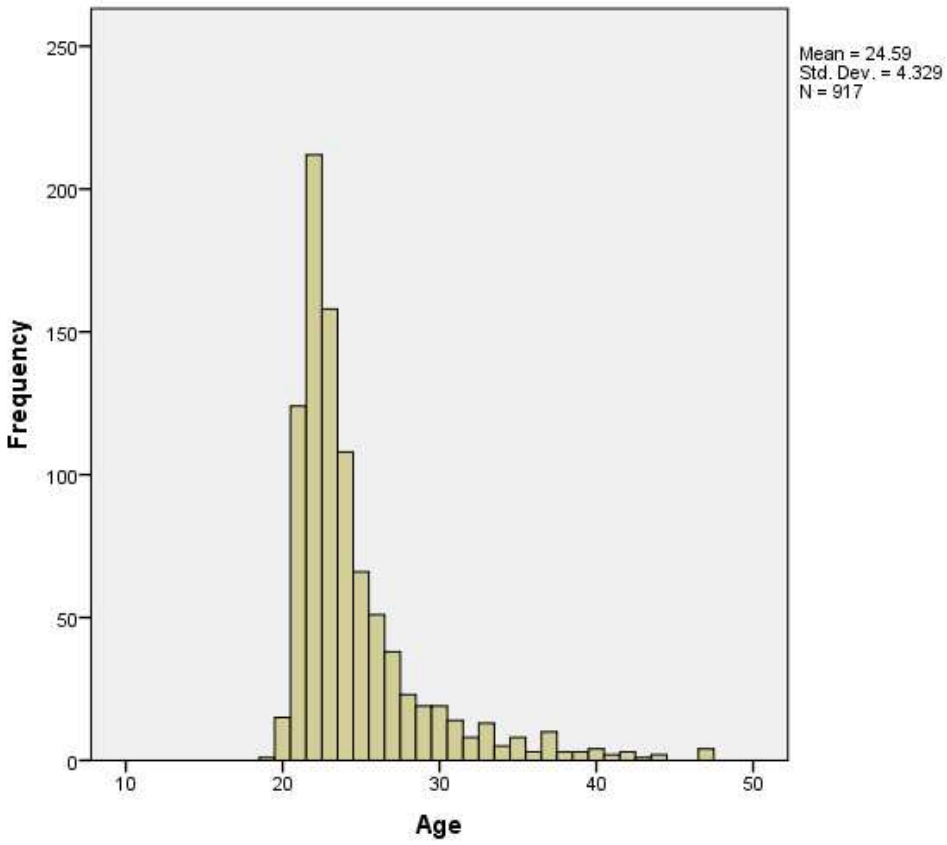

Figure 1. Histogram – Participant Age

Table 4

Distribution by Gender

Gender	N (%)
Female	430 (46.9)
Male	487 (53.1)
Total	**917 (100.0)**

The vast majority of medical students admitted between 2003 and 2012 are White (see Table 5). Of the 917 medical students admitted into this medical school between 2003 and 2012, 676 (73.7%) are White, 101 (11.0%) are American Indian, 64 (7%) are Asian, 37 (4.0%) are Black, 31 (3.4%) are Hispanic and 8 (0.9%) refused to identify their race.

Table 5

Distribution by Race

Race	N (%)
Asian	64 (7.0)
American Indian	101 (11.0)
Black	37 (4.0)
Hispanic	31 (3.4)
White	676 (73.7)
Declined to respond	8 (0.9)
Total	**917 (100.0)**

Admission to medical school relies heavily on quantitative admissions variables such as MCAT scores, overall undergraduate GPA and undergraduate science GPA. As seen in Table 6, the entering classes of 2003 through 2012 had MCAT scores ranging from 5 to 13 with a mean of 8.3 and standard deviation equal to 1.1. The distribution of MCAT scores can be seen in Figure 2. Their overall undergraduate GPAs ranged from 2.75 to 4.00 with a mean of 3.610 and standard deviation equal to 0.246. Their undergraduate science GPAs ranged from 2.54 to 4.00 with a mean of 3.539 and standard deviation equal to 0.294 (see Table 6).

Table 6

Descriptive Statistics – MCAT, Undergrad GPA, and Science GPA

	N	Minimum	Maximum	Mean	Standard Deviation
MCAT	912	5	13	8.3	1.1
Undergraduate GPA	912	2.75	4.00	3.610	0.246
Undergraduate Science GPA	912	2.54	4.00	3.539	0.294

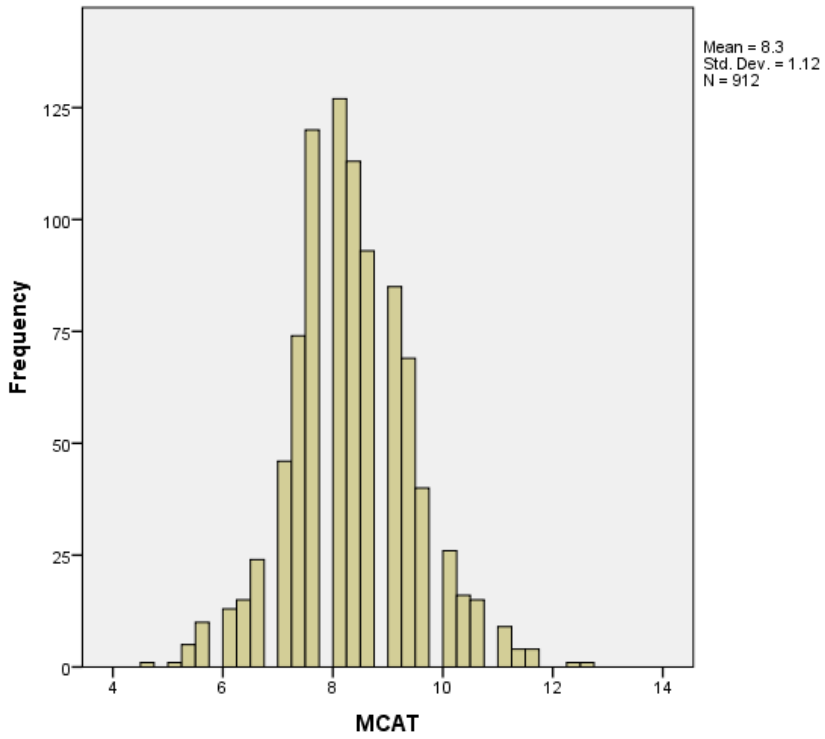

Figure 2. Histogram – Participant MCAT

During medical school, students must take and pass the National Board of Osteopathic Medical Examiner's (NBOME's) COMLEX Level 1, Level 2 CE and Level 2 PE in order to graduate. The descriptive statistics for each of these exams for this population of medical school students are provided in Table 7. As can be seen in Table 7, first attempt COMLEX Level 1 scores ranged from 272 to 803 with a mean of 512.3 and standard deviation of 82.9. A distribution of COMLEX Level 1 scores can be seen in Figure 3. For COMLEX Level 1 scores the N=787. The total size of the population in the data set is 917 but some students did not continue in medical school long enough to take the COMLEX Level 1 due to reasons such as dismissal or withdrawal. Also, some students have not reached the point in their medical education (between their 2nd and 3rd years of medical school) to take the COMLEX Level 1. The passing score for COMLEX

Level 1 is 400. As can be seen in Table 8, 733 (93.10%) of these students passed the COMLEX Level 1 on their first attempt while 54 (6.90%) failed on their first attempt. It is critically important for students to pass all levels of the COMLEX examinations on the first attempt. When students fail their first attempt at any level of COMLEX, they encounter problems with finding a residency program that will accept them, they limit their possibility of specialty choices and if they fail any level three times then they are dismissed from the medical school. The stakes for not only passing but also performing well are very high for these examinations.

Table 7

Descriptive Statistics for COMLEX Level 1

	N	Minimum	Maximum	Mean	Standard Deviation
COMLEX Level 1	787	272	803	512.3	82.9

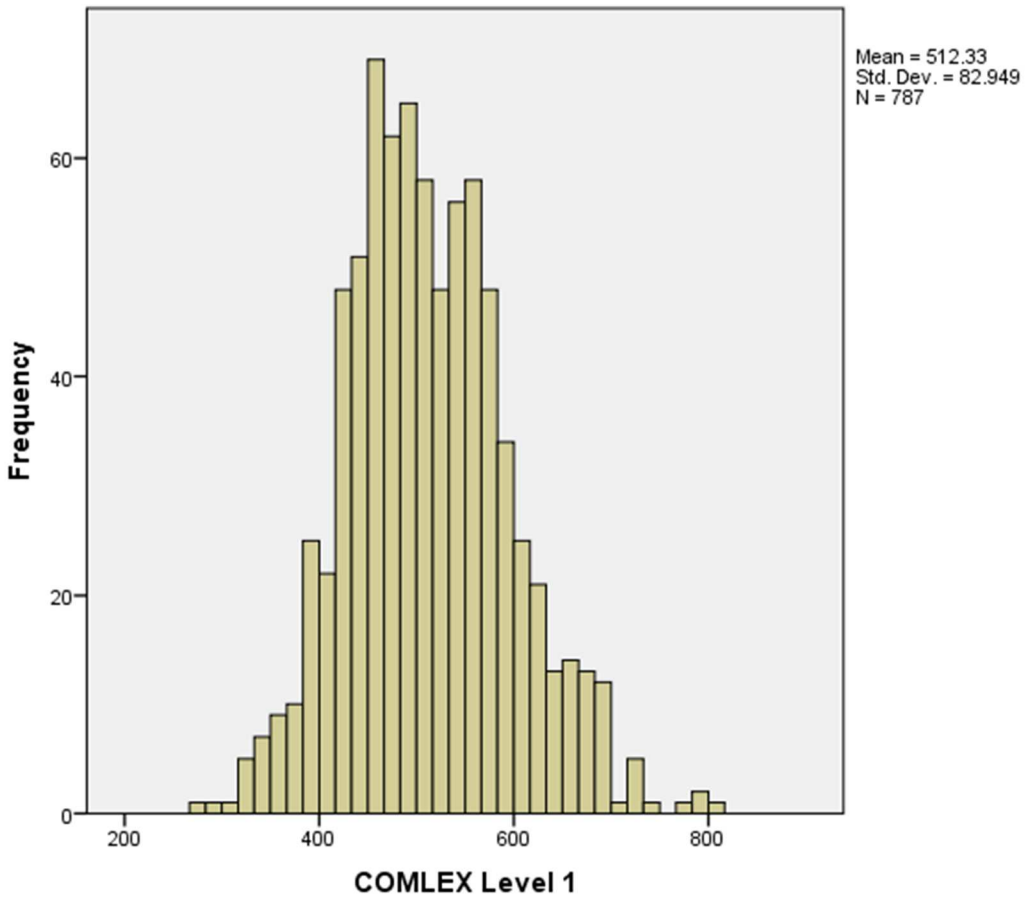

Figure 3. Histogram – Participant COMLEX Level 1

Table 8

COMLEX Level 1 First Time Pass Versus Fail Rates

	N (%)
Pass	733 (93.1)
Fail	54 (6.9)
Total	787 (100.0)

The COMLEX Level 2 CE is a computer-based exam that-tests students' medical knowledge and diagnostic skills. Medical students take this exam in their fourth year of

medical school and must make a minimum passing score of 400. For this population of medical students, their first attempt COMLEX Level 2 CE scores ranged from 290 to 810 with a mean of 516.8 and standard deviation of 92.9 (see Table 9). The distribution of COMLEX Level 2 scores can be seen in Figure 4. The number of students that took the COMLEX Level 2 CE was 755 out of the total population of 917. As mentioned with regard to COMLEX Level 1, some students do not make it through medical school long enough to take the COMLEX Level 2 CE and others within this population are not at the stage in their training where they have taken it yet. As can be seen in Table 10, 678 (89.8%) of the medical students in this population passed the COMLEX Level 2 CE on their first attempt while 77 (10.2%) failed on their first attempt.

Table 9

Descriptive Statistics for COMLEX Level 2 CE

	N	Minimum	Maximum	Mean	Standard Deviation
COMLEX Level 2 CE	755	290	810	516.8	92.9

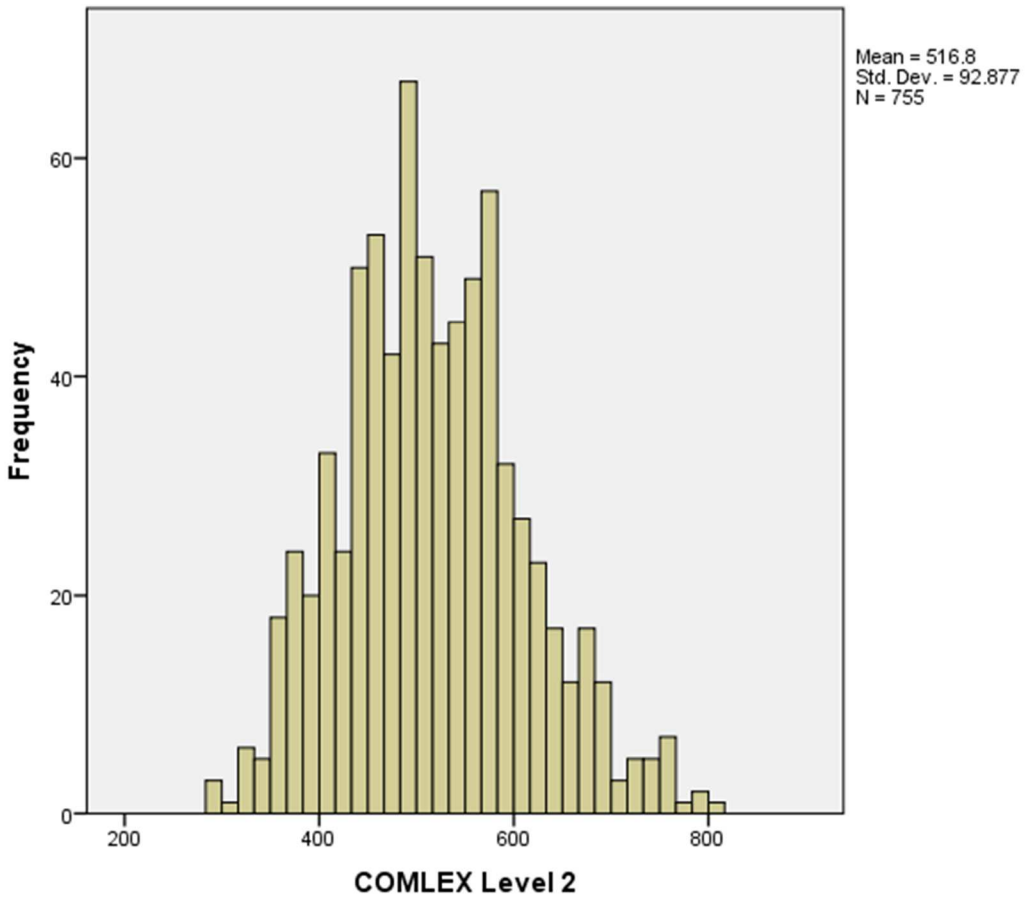

Figure 4. Histogram – Participant COMLEX Level 2 CE

Table 10

COMLEX Level 2 CE First Time Pass Versus Fail Rates

	N (%)
Pass	678 (89.8)
Fail	77 (10.2)
Total	755 (100.0)

The COMLEX Level 2 PE is a hands on practical examination in which medical students must show their ability to complete a history, physical exam and establish differential diagnoses during standardized patient encounters. Of the 917 students in the population, 756 students took the COMLEX Level 2 PE. Some students encounter issues such as dismissal or withdrawal and do not make it to the stage in their medical education where they would take the COMLEX Level 2 PE. Other students have not made it to the point in their training where they are allowed to take the examination. The COMLEX Level 2 PE is a pass/fail examination, so students do not receive a numeric score. As can be seen in Table 11, 726 (96.0%) of the medical students in this population passed the COMLEX Level 2 PE on their first attempt while 30 (4.0%) of the students failed on their first attempt.

Table 11

COMLEX Level 2 PE First Time Pass Versus Fail Rates

	N (%)
Pass	726 (96.0)
Fail	30 (4.0)
Total	756 (100.0)

After medical school, osteopathic medical students must pass NBOME's COMLEX Level 3. The COMLEX Level 3 is a computer-based exam that typically is taken during the first year of graduate medical education training. This is the last examination in the series of COMLEX testing. Of the total population of 917 students, 631 took the COMLEX Level 3 examination. Some students from the population left the

medical school for reasons such as dismissal or withdrawal while others had not made it to the stage of the medical education training where they are allowed to take the COMLEX Level 3. The minimum passing score for the COMLEX Level 3 is 350. As can be seen in Table 12, the mean first attempt COMLEX Level 3 score for this population ranged from 213 to 963 and the mean was 534.4 with a standard deviation equal to 127.9. A distribution of COMLEX Level 3 scores can be seen in Figure 5. As can be seen in Table 13, 593 (94.0%) of the medical school graduates in this population passed their first attempt on the COMLEX Level 3 while 38 (6.0%) failed on their first attempt.

Table 12

Descriptive Statistics for COMLEX Level 3

	N	Minimum	Maximum	Mean	Standard Deviation
COMLEX Level 3	631	213	963	534.4	127.9

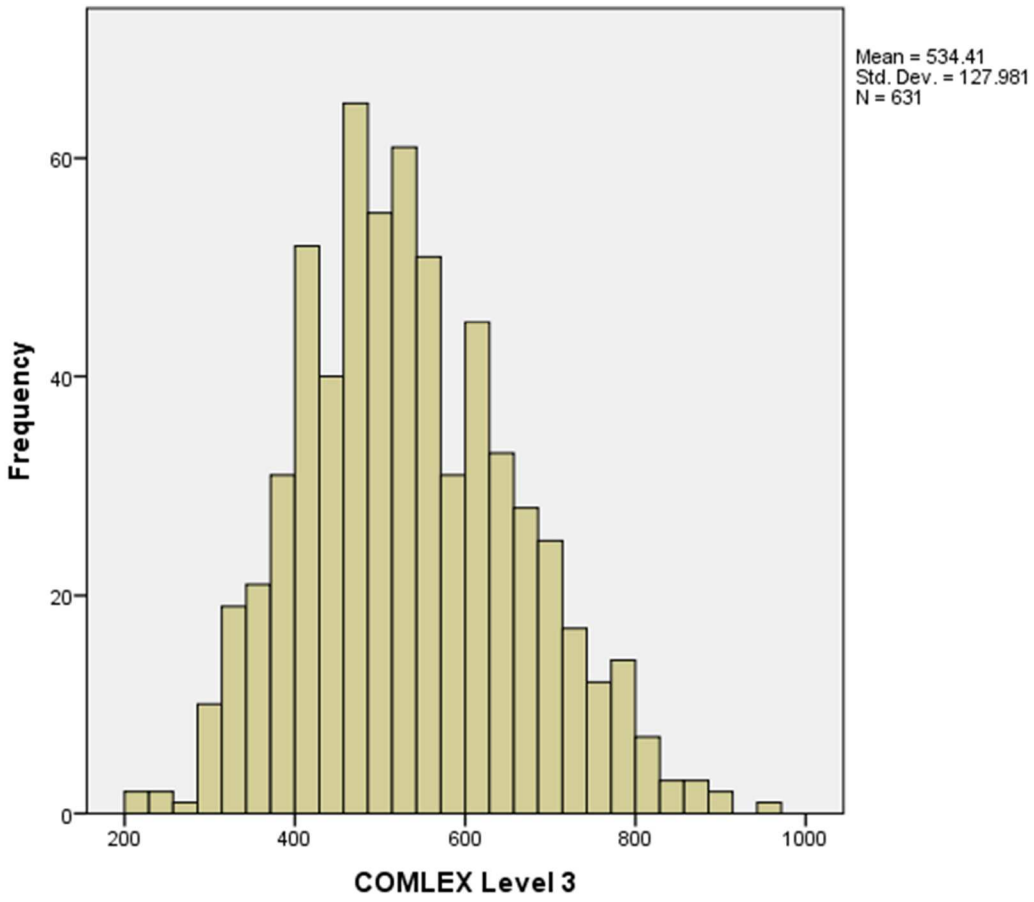

Figure 5. Histogram – Participant COMLEX Level 3

Table 13

COMLEX Level 3 First Time Pass Versus Fail Rates

	N (%)
Pass	593 (94.0)
Fail	38 (6.0)
Total	631 (100.0)

Comparisons Between Bridge Students and Traditionally Admitted Students

As previously mentioned, the total population of students admitted to this medical school between 2003 and 2012 was 917. Of those students, 837 (91.30%) were admitted through the traditional admissions process while 80 (8.70%) were admitted into the alternative admissions (Bridge Program) process (see Table 14). As can be seen in Table 15, the number of Bridge Program students admitted ranged from 8 to 10 annually or 10% to 12.5% respectively. The mean age of students admitted through the traditional admissions process was 24.48. The minimum age for that population of students was 19 and the maximum age was 47. For the students admitted to the Bridge Program, the mean age was 25.69 with a minimum age of 21 and a maximum age of 38 (see Table 16). An independent –samples t-test was calculated comparing the mean ages of students admitted through the traditional admissions process and students admitted to the Bridge Program and found a significant difference between the average age of the two groups ($t(915) = -2.389$, $p = .02$). The mean of the students admitted through the traditional admissions program was significantly lower ($M = 24.48$, $SD = 4.34$) than the mean of the students admitted into the Bridge Program ($M = 25.69$, $SD = 4.06$). Effect size was calculated using Cohen's *d*. The effect size d=.14 is typically considered to be small (Cohen, 1988).

Table 14

Distribution by Student Type

Student Type	**N (%)**
Traditional	837 (91.3)
Bridge	80 (8.7)
Total	**917 (100.0)**

Table 15

Number of Students by Entering Year

	Bridge	Traditional
Year	**N (%)**	**N (%)**
2003	10 (12.5)	89 (10.6)
2004	10 (12.5)	77 (9.2)
2005	8 (10)	78 (9.3)
2006	8 (10)	79 (9.4)
2007	9 (11.3)	90 (10.8)
2008	9 (11.3)	71 (8.5)
2009	8 (10)	95 (11.4)
2010	9 (11.3)	74 (8.8)
2011	9 (11.3%)	87 (10.4)
2012	80 (100)	97 (11.6)
Total	10 (12.5)	837 (100.0)

Table 16

Comparison of Bridge Versus Traditional Students by Age

Student Type	**N**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Traditional	837	19	47	24.48	4.34
Bridge	80	21	38	25.69	4.06

As explained in Chapter 1, students are allowed to apply to the Bridge Program if they have one or more disadvantages. The Bridge Program recognizes three categories of disadvantage (economic, educational and underrepresented minority). Of the 80 students admitted to the Bridge Program, 22 (27.5%) claimed an economic disadvantage; 20 (25%) claimed an educational disadvantage; 15 (18.8%) claimed an economic and educational disadvantage; 14 (17.5%) claimed a minority disadvantage; 5 (6.3%) claimed an educational, economic and minority disadvantage; 3 (3.8%) claimed an educational and minority disadvantage; 3 (3.8%) claimed an educational and minority disadvantage and 1 (1.3%) claimed an economic and minority disadvantage (see Table 17).

Table 17

Breakdown of Disadvantages for Bridge Students

Type of Disadvantage	**N (%)**
Economic	22 (27.5)
Education	20 (25)
Economic/Education	15 (18.8)
Minority	14 (17.5)
Education/Economic/Minority	5 (6.3)
Education/Minority	3 (3.8)
Economic/Minority	1 (1.3)
Total	**80 (100.0)**

Frequencies were calculated to determine the numbers and percentages of men versus women that were admitted through the traditional admissions program and the

Bridge Program. A total of 837 students were admitted through the traditional admissions process between 2003 and 2012. Of those students 452 (54.00%) were male, and 385 (46.00%) were female. During that same time, 80 students were admitted to the Bridge Program. Of the students admitted to the Bridge Program, 34 (42.50%) were male, and 46 (57.50%) were female (See table 18). It is interesting to note that although there are more male students admitted through the traditional process, a majority of the Bridge students were female.

The focus of this study is to evaluate the effectiveness of the Bridge Program to increase the number of underrepresented minorities into this medical school. Frequencies were calculated to determine the differences in diversity between the students admitted through the traditional admissions process and the students admitted to the Bridge Program. Of the 837 students admitted through the traditional admissions program during the timeframe studied, 651 (77.80%) were White, 88 (10.5%) were American Indian, 58 (6.9%) were Asian, 18 (2.2%) were Hispanic, 14 (1.7%) were Black and 8 (1%) refused to identify with any race (see Table 19). Of the 80 students admitted to the Bridge Program, 25 (31.3%) were White, 13 (16.3%) were American Indian, 6 (7.5%) were Asian, 13 (16.3%) were Hispanic and 23 (28.8%) were Black (see Table 19). It is apparent that the students admitted through the Bridge Program are far more diverse than students admitted though the traditional admissions process. A bar chart comparing the diversity of the traditional admissions program and the Bridge Program can be seen in Figure 6.

Table 18

Comparison of Student Type by Gender

	Traditional	**Bridge**
	N (%)	**N(%)**
Female	385 (46.0)	46 (57.5)
Male	452 (54.0)	34 (42.5)
Total	837 (100.0)	80 (100.0)

Table 19

Comparison of Student Type by Race

	Traditional	**Bridge**
	N (%)	**N (%)**
Asian	58 (6.9)	6 (7.5)
American Indian	88 (10.5)	13 (16.3)
Black	14 (1.7)	23 (28.8)
Hispanic	18 (2.2)	13 (16.3)
White	651 (77.8)	25 (31.3)
Declined to respond	8 (1)	0 (0.0)
Total Students	837 (100)	80 (100.0)

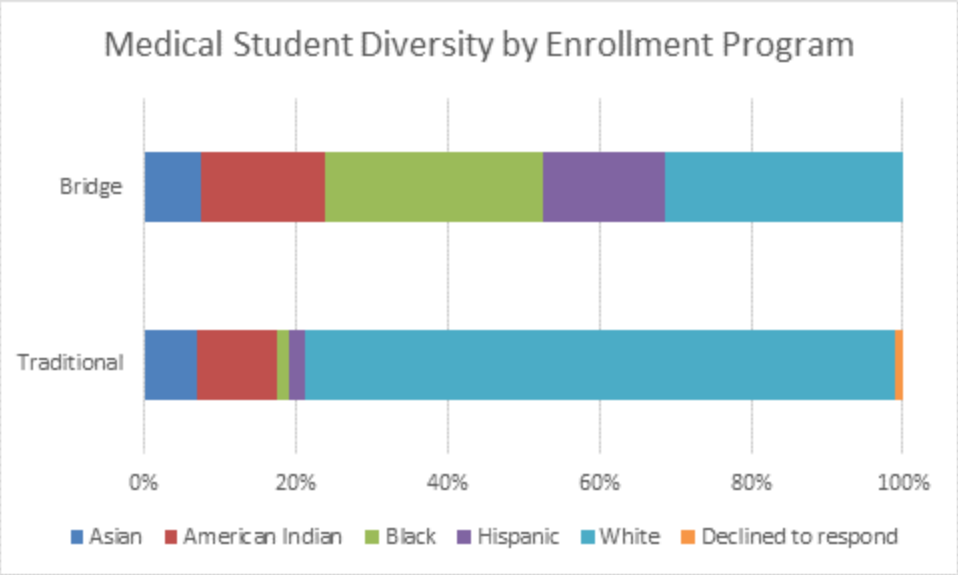

Figure 6. Bar Chart – Medical Student Diversity by Enrollment Program

Descriptive statistics were computed on MCAT scores, undergraduate GPA and undergraduate science GPA for both traditionally admitted students and Bridge students. A table of bivariate correlations between admissions variables and academic outcomes for the traditionally admitted students and for Bridge Program students is presented below (see Table 20).

MCAT scores for traditionally admitted students range from 6 to 13 and the mean is 8.46 with a standard deviation of 1.00. (see Table 21). MCAT scores for Bridge students range from 5 to 10 with a mean of 6.62 and a standard deviation of 0.89 (Table 21). An independent –samples *t-test* was calculated comparing the mean MCAT scores of students admitted through the traditional admissions process and students admitted to the Bridge Program and found a significant difference between the means of the two groups ($t(910) = 15.910$, $p < .001$). The mean of the students admitted through the Bridge Program was significantly lower ($M = 6.62$, $SD = .899$) than the mean of the students

Table 20

Correlations on Admissions Variables and Academic Outcomes

		Overall Undergraduate GPA	Undergraduate Science GPA	MCAT	Class Rank	COMLEX Level 1	COMLEX Level 2 CE
Traditional #	Undergraduate Science GPA	.824**					
	MCAT	-.031	.008				
	Class Rank	-.280**	-.283**	-.153**			
	COMLEX Level 1	.175**	.201**	.346**	-.712**		
	COMLEX Level 2 CE	.171**	.185**	.310**	-.636**	.758**	
	COMLEX Level 3	.222**	.223**	.324**	-.564**	.672**	.725**
Bridge +	Undergraduate Science GPA	.825**					
	MCAT	-.290**	-.394**				
	Class Rank	-.158	-.081	-.089			
	COMLEX Level 1	.013	.038	.212	-.695**		
	COMLEX Level 2 CE	-.083	-.142	.286*	-.601**	.691**	
	COMLEX Level 3	-.149	-.184	.203	-.400**	.573**	.550**

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
N for correlations ranged from 574 to 832 depending on available information (i.e., not all students have completed COMLEX exams etc.)
+ N for correlations ranged from 55 to 80 depending on available information (i.e., not all students have completed COMLEX exams etc.)

admitted into the traditional admissions program (M = 8.46, SD = 1.00). Effect size was calculated using Cohen's *d.* The effect size d=1.94 is typically considered to be large (Cohen, 1988).

The minimum undergraduate GPA for traditionally admitted students is 2.80 and the maximum is 4.00 with the mean being 3.628. The minimum GPA for students admitted through the Bridge Program is 2.75 and the maximum is 4.00 with the mean being 3.432 (see Table 21). An independent –samples *t-test* was calculated comparing the mean undergraduate GPAs of students admitted through the traditional admissions process and students admitted to the Bridge Program and found a significant difference between the means of the two groups ($t(910) = 6.980$, $p < .001$). The mean of the students admitted through the Bridge Program was significantly lower (M = 3.432, SD = .266) than the mean of the students admitted into the traditional admissions program (M = 3.628, SD = .237). Effect size was calculated using Cohen's *d.* The effect size d= .78 is typically considered to be medium (Cohen, 1988).

The minimum undergraduate science GPA for this group of students is 2.68 and the maximum is 4.00 resulting with a mean of 3.560. The minimum undergraduate science GPA for students admitted through the Bridge Program is 2.54 and the maximum is 4.00 with a mean of 3.317 (see Table 21). An independent –samples *t-test* was calculated comparing the mean undergraduate science GPAs of students admitted through the traditional admissions process and students admitted to the Bridge Program and found a significant difference between the means of the two groups ($t(910) = 7.256$, $p < .001$) The mean of the students admitted through the Bridge Program was significantly lower (M = 3.317, SD = .355) than the mean of the students admitted into the traditional

admissions program (M = 3.560, SD = .279). Effect size was calculated using Cohen's *d.* The effect size d= .76 is typically considered to be medium (Cohen, 1988). The results of this analysis on preadmissions variables is not surprising considering that a key component of the Bridge Program is to admit disadvantaged students that have lower MCAT scores, undergraduate GPAs and undergraduate science GPAs.

Table 21

Bridge Versus Traditional – MCAT, Undergraduate GPA, and Science GPA

MCAT					
Student Type	**N**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Traditional	832	6	13	8.5	1.000
Bridge	80	5	10	6.6	0.899
Overall undergraduate GPA					
Traditional	832	2.80	4.00	3.628	0.237
Bridge	80	2.75	4.00	3.432	0.266
Undergraduate Science GPA					
Traditional	832	2.68	4.00	3.560	0.279
Bridge	80	2.54	4.00	3.317	0.355

Hypothesis Testing

Hypothesis 1 - Traditional and alternative admissions students do not differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3).

The mean COMLEX Level 1 score for traditionally admitted students is 516.71 with a minimum score of 290 and the maximum score is 803. The mean COMLEX Level 1 score for Bridge students is 470.08 with a minimum score of 272 and a maximum score of 647 (see Table 22). An independent –samples *t-test* was calculated comparing the mean COMLEX Level 1 scores of students admitted through the traditional admissions process and students admitted to the Bridge Program and found a significant difference between the means of the two groups ($t(785) = 4.663$, $p < .001$). The mean of the students admitted through the Bridge Program was significantly lower ($M = 470.08$, $SD = 72.335$) than the mean of the students admitted into the traditional admissions program ($M = 516.71$, $SD = 82.791$). Additionally, the traditionally admitted students had a 93.8% first attempt pass rate on COMLEX Level 1 while the Bridge Program students had an 86.6% first attempt pass rate (see Table 23).

Table 22

Comparison of Bridge Versus Traditional Students on COMLEX Level 1

Student Type	N	Minimum	Maximum	Mean	Standard Deviation
Traditional	713	290	803	516.71	82.791
Bridge	74	272	647	470.08	72.335

Table 23

Comparison of Student Type by Pass/Fail COMLEX Level 1

	Traditional	Bridge
	N (%)	N (%)
Failure on First Attempt	44 (6.2)	10 (13.5)
Pass on First Attempt	669 (93.8)	64 (86.6)
Total	713 (100.0)	74 (100.0)

The mean COMLEX Level 2 CE score for traditionally admitted students is 521.85 with a minimum score is 294 and the maximum score is 810 (see Table 24). The mean COMLEX Level 2 CE score for Bridge students is 463.15 with a minimum score of 290 and a maximum score of 695 (see Table 24). An independent –samples *t-test* was calculated comparing the mean COMLEX Level 2 CE scores of students admitted through the traditional admissions process and students admitted to the Bridge Program and found a significant difference between the means of the two groups ($t(753) = 4.946$, $p < .001$). The mean of the students admitted through the Bridge Program was significantly lower ($M = 463.15$, $SD = 89.982$) than the mean of the students admitted into the traditional admissions program ($M = 521.85$, $SD = 91.602$). The traditionally admitted students had a 91.4% first attempt pass rate on COMLEX Level 2 CE while the Bridge Program students had a 72.3% first attempt pass rate (see Table 25). Additionally, traditionally admitted students had a 96.2% first attempt pass rate on COMLEX Level 2 PE while the Bridge Program students had a 93.8% first attempt pass rate (see Table 26).

Table 24

Comparison of Bridge Versus Traditional Students on COMLEX Level 2 CE

Student Type	**N**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Traditional	690	294	810	521.85	91.602
Bridge	65	290	695	463.15	89.982

Table 25

Comparison of Student Type by Pass/Fail COMLEX Level 2 CE

	Traditional	**Bridge**
	N (%)	**N (%)**
Failure on First Attempt	59 (8.6)	18 (27.7)
Pass on First Attempt	631 (91.4)	47 (72.3)
Total	690 (100.0)	65 (100.0)

Table 26

Comparison of Student Type by Pass/Fail First Attempt COMLEX Level 2 PE

	Traditional	**Bridge**
	N (%)	**N (%)**
Failure on First Attempt	26 (3.8)	4 (6.2)
Pass on First Attempt	665 (96.2)	61 (93.8)
Total	691 (100.0)	65 (100.0)

The mean COMLEX Level 3 score for traditionally admitted students is 542.25 with a minimum score is 213 and the maximum score is 963 (see Table 27). The mean COMLEX Level 3 score for Bridge students is 452.36 with a minimum score of 242 and a maximum score of 715 (see Table 27). An independent –samples t-test was calculated comparing the mean COMLEX Level 3 scores of students admitted through the traditional admissions process and students admitted to the Bridge Program and found a

significant difference between the means of the two groups ($t(629) = 5.073$, $p < .001$). The mean of the students admitted through the Bridge Program was significantly lower ($M = 452.36$, $SD = 105.391$) than the mean of the students admitted into the traditional admissions program ($M = 542.25$, $SD = 127.269$). Additionally, the traditionally admitted students had a 95.1% first attempt pass rate on COMLEX Level 3 while the Bridge Program students had an 81.8% first attempt pass rate (see Table 28).

Table 27

Comparison of Bridge Versus Traditional Students on COMLEX Level 3

Student Type	N	Minimum	Maximum	Mean	Standard Deviation
Traditional	576	213	963	542.25	127.269
Bridge	55	242	715	452.36	105.391

Table 28

Comparison of Student Type by Pass/Fail First Attempt COMLEX Level 3

	Traditional	Bridge
	N (%)	N (%)
Failure on First Attempt	28 (4.9)	10 (18.2)
Pass on First Attempt	548 (95.1)	45 (81.8)
Total	576 (100)	55 (100.0)

Due to the findings of this study related to COMLEX Level 1, COMLEX Level 2 CE, COMLEX Level 2 PE and COMLEX Level 3, the null hypothesis must be rejected. Statistically significant differences were found between mean scores of traditionally admitted students and Bridge students on COMLEX Level 1, Level 2 CE and Level 3. Additionally, first attempt pass rates were found to be lower for Bridge Program students on all levels of the COMLEX examinations including the COMLEX Level 2 PE.

Hypothesis 2 - Traditional and alternative admissions students do not differ with regard to medical school performance as measured by class rank.

A Mann Whitney U Test was performed on the class rank data to determine if the median differences between the traditional admissions and Bridge Program groups were statistically significant. This independent samples median test determined that the medians of class rank for traditional and Bridge Program students were not significantly different $p = .395$. The result of this test supports the null hypothesis. A breakdown of Bridge Program student rank can be seen below in Table 29. As can be seen in Table 29, students who were admitted to the Bridge Program are spread across the distribution of ranks. A large number of these students are even in the top ranks of the class.

Table 29

Bridge Class Ranks by Range

Range of Class Ranks	Number of Bridge Students
1- 10	9
11- 20	6
21- 30	7
31- 40	8
41- 50	7
51– 60	12
61– 70	8
71– 80	8
81– 90	5
91 – 100	2
Greater than 100	2

Hypothesis 3 - Traditionally admitted students and underrepresented minorities admitted through the alternative admissions process do not differ with regard to attrition rate.

Of the 837 traditionally admitted students, 31 (3.70%) discontinued their medical school training. There are a variety of reasons for their departure as can be seen in Table 30. The most common reason for a traditionally admitted student to discontinue their training was dismissal which affected 15 students. Additional reasons for students to not continue their medical school training included withdrawal (9 students), leave of absence (2 students) and death (2 students). The reason for 3 traditionally admitted students'

discontinuation of the medical school program is unknown. Of the 80 students admitted into the Bridge Program, 5 (6.25%) discontinued their medical school training (see Table 30). Due to these findings, the null hypothesis must be rejected. Bridge Program students have close to twice the attrition rate as traditionally admitted students (6.25% compared to 3.70%).

Table 30

Reasons for Exit by Student Type

Student Type	N (%)
Traditional	
Dismissed	15 (48.4)
Withdrawal	9 (29.0)
Leave of Absence	2 (6.5)
Exit (reason unknown)	3 (9.7)
Deceased	2 (6.5)
Total	31 (100.0)
Attrition rate for Traditional	*3.70%*
Bridge	
Dismissed	5 (100.0)
Total	5 (100.0)
Attrition rate for Bridge	*6.25%*

Hypothesis 4 - Traditional and alternative admissions students do not differ with regard to their practice characteristics as measured by percentage choosing specialties in primary care.

As mentioned previously, specialties that are categorized as primary care include family medicine, general internal medicine, OB/Gyn and Pediatrics. As can be seen in Table 31 below, graduates of the Bridge Program entered a variety of specialties. Of the 80 students admitted to the Bridge Program, 66 have graduated and entered into a specialty. Of those 66 students, 37 (57.8%) have entered into specialties that are categorized as primary care (see Table 32). The osteopathic medical school where this study was conducted has a history of graduating a higher than typical number of students that choose primary care specialties. For example, of the students that graduated from this medical school between 2013 and 2015, 59% entered into residencies that are categorized as primary care (OSU College of Osteopathic Medicine Graduating Medical Student Statistics 2013-2015, 2015). Since Bridge Program students actually enter primary care specialties at a lower percentage rate (57.8%) than the total population of students at this medical school (59.0%), the null hypothesis must be rejected. The difference is extremely small and the available data for the entire population consists of only three graduating classes while the data for the Bridge Program graduates includes a larger number of graduating classes.

Table 31

Bridge Student Specialty Choice

	N (%)
Bridge	
Family Medicine	20 (25.0)
Internal Medicine	12 (15.0)
Emergency Medicine	7 (8.8)
Anesthesiology	5 (6.3)
Traditional Rotating Internship	4 (5.0)
OB/GYN	3 (3.8)
Pediatrics	3 (3.8)
Psychiatry	3 (3.8)
Surgery (General)	3 (3.8)
Diagnostic Radiology	1 (1.3)
Neurology	1 (1.3)
Otolaryngology and Facial	1 (1.3)
Plastic Surgery	1 (1.3)
Otolaryngology	1 (1.3)
Pain Management	1 (1.3)
Total Bridge Students	**66 (100.0)**

Table 32

Bridge Student by Classification of Specialty

	N (%)
Bridge	
Primary Care	37 (57.8)
Non Primary Care	27 (42.2)
Total	64 (100.0)

In closing, in the previous paragraphs, each of the study's hypotheses has been tested. First, the results of the hypothesis testing showed that Bridge Program students and traditionally admitted students do differ in COMLEX testing performance. Second, the results also showed that the Bridge Program students and traditionally admitted students do not differ significantly in their medical school course performance as measured by class rank. Third, the results also showed that Bridge Program students do have a higher attrition rate than traditionally admitted students. Finally, the results showed that Bridge Program students and traditionally admitted students differ slightly in regard to specialty choice categorized as primary care with traditionally admitted students choosing primary care at a slightly higher percentage rate than Bridge Program students.

CHAPTER V

SUMMARY AND DISCUSSION

In this final chapter of this dissertation, the research problem is restated to refresh the reader. Second, a brief overview of the methodology utilized is reviewed. Third, a summary of the results of the study is provided. Fourth, a thorough discussion of the results occurs; this discussion includes an interpretation of the findings, explanation of the relationship between the findings of the current study and previous studies, the theoretical implications of the study, recommendations for policy-makers and medical school leaders, and limitations of the study. Finally, suggestions for additional studies on this topic are provided.

Statement of the Problem

Medical schools are failing to successfully matriculate adequate numbers of underrepresented minority students (Delany, 2004; Hurtado, 2005; Rubin, 2006). The number of underrepresented minority medical students does not match the diversity found within the United States (Cohen, 1997). Until the mid-1960's, there were dismal numbers of minority students in U.S. medical schools however, after the Civil Rights Movement and due to affirmative action initiatives, the number of minorities entering the medical field rapidly rose (Cohen, 1997). The practice of using affirmative action to increase minority representation in medical schools, and other higher education institutions, has been scrutinized since its inception and the practice continues to be shadowed by heated controversy (Knight & Hebl, 2005). Lawsuits, state bans on

affirmative action, and continued controversy have escalated the need for alternatives to affirmative action. Several programs at the federal, state and institution level have been created to achieve the same results of increasing minorities' presence in the elite field of medicine. Some examples of these programs include summer institutes, mentoring programs, MCAT (Medical College Admission Test) preparation courses, decelerated medical education programs, post-baccalaureate programs. Very little research has been conducted on the effectiveness of these various programs. In order to determine the most effective strategies for increasing underrepresented minorities in medicine it is imperative that studies be conducted that inform various stakeholders of the outcomes of these efforts.

Review of the Methodology

The research questions for this study were addressed using quantitative methodology. This study was a non-experimental study and exploratory in nature. Data analysis techniques included descriptive statistics, bivariate correlations, examining mean differences by conducting t-tests and examining median differences by utilizing the Mann Whitney U Test.

The study site for this dissertation was an osteopathic medical school in the south central United States. Because this study was a retrospective analysis, it used existing data from the entering Class of 2003 to the entering Class of 2012 to answer the research questions and associated hypotheses. The existing data utilized for this study included MCAT scores, overall undergraduate GPA, undergraduate science GPA, class rank, COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3 performance and specialty choice of graduates. During that timeframe, this medical school admitted 88 to 115

medical students each year. Of those admitted, approximately 10% were admitted through the alternative admissions program known as the Bridge Program.

Summary of Results

In this study, the first research question explored was "Do traditional and alternative admissions students differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3)?" Specifically, the following hypothesis was tested: Traditional and alternative admissions students do not differ in performance on standardized licensure examinations (e.g. COMLEX Level 1, Level 2 CE, Level 2 PE and Level 3). The results of the analysis indicate that traditional and alternative admissions students do differ in performance on standardized licensure examinations. More specifically, Bridge Program students performed significantly lower on COMLEX Level 1, Level 2 CE and Level 3. Bridge Program students also had a much higher first time failure rate on COMLEX Level 2 PE. Bivariate correlations were calculated for Bridge Program students for MCAT and COMLEX Level 1, Level 2 CE, Level 3 and medical school performance as measured by class rank. The only significant correlation was between MCAT and Level 2 CE. These findings contradict those of Julian (2005) which found that the MCAT is a good predictor of medical school performance and performance on licensure examinations. It is possible that the MCAT scores for Bridge Program students were not as predictive with regard to licensing exams because of the specific design of the program which decelerated the curriculum. It is also possible that the Bridge Program students may have unique non-cognitive characteristics that were not a part of this study.

In fact, the MCAT did not function with the same predictor power for Bridge Program students as it did for traditionally admitted students. For traditionally admitted students, the MCAT showed significant correlations for COMLEX Level 1, Level 2 PE and Level 3. For the Bridge Program, there was no significant correlation between MCAT and COMLEX Level 1 or Level 3 and the correlation for Level 2 CE was modest. The lowering of the MCAT requirements, when reviewing the differences in ethnicity and MCAT scores between traditionally admitted and Bridge Program students, would lead one to believe that the MCAT could be a barrier to not only minority students but also students from other disadvantaged backgrounds. The findings of this study support the findings of Agrawal, Vlaicu and Carrasquillo (2005) that the MCAT is one of many barriers to medical school for underrepresented minorities but expands on those findings to show that it was not a strong predictor of licensure exam performance for the Bridge Program students. The MCAT is typically a significant factor in the admissions process. Admissions criteria are set by each medical school by those in powerful and influential positions. By using MCAT performance as a significant portion of admissions decisions, knowing that those from disadvantaged backgrounds do not typically perform as well on standardized exams, one could claim that this is a systematic and mechanistic result of the principles of *Reproduction Theory*.

The second research question explored was "Do traditional and alternative admissions students differ with regard to medical school performance as measured by class rank?" Specifically, the following hypothesis was tested: Traditional and alternative admissions students do not differ with regard to medical school performance as measured by class rank. Testing of this hypothesis supported the null hypothesis because Bridge

Program students and traditional medical students do not perform significantly different on class rank. These findings contradict those of Cummings (1999) who found that students admitted through programs that provide preference to students that are from historically underrepresented groups are more likely to experience difficulty completing medical school coursework as measured by passing all courses. Bridge Program students did not have significantly different class ranks. If Bridge Program students regularly experienced issues with failing courses then that would obviously affect their class ranks in a negative way and significant differences would exist between Bridge Program students and traditionally admitted students. The Bridge Program admits students with preference that are from disadvantaged backgrounds. Although all of the students admitted to the Bridge Program are not underrepresented minorities, there are a significant number of underrepresented minorities that were admitted to the program.

The third research question explored was "Do traditionally admitted students and underrepresented minorities admitted through the alternative admissions process differ with regard to attrition rate?" Specifically, the following hypothesis was tested: Traditionally admitted students and underrepresented minorities admitted through the alternative admissions process do not differ with regard to attrition rate. Results suggest that Bridge Program students and traditional medical students do show different attrition rates. The attrition rate for Bridge Program students was 6.25% while the attrition rate for traditionally admitted students was 3.70%. These findings parallel those of McGrath and McQuail (2004) who found that medical schools that choose to utilize decelerated programs should note that attrition rates for students enrolled in decelerated programs are greater than students in the traditional curriculum. The results of attrition are arguably

far worse for medical students and medical schools than mainstream traditional higher education. Medical school is very expensive and most students accumulate a large amount of student loan debt. If they do not finish the medical school program they still have to pay back the debt which is very difficult without earning the salary of a physician. Also, training medical students is very expensive and when a student does not complete the program, it is a waste of the medical school's financial resources. Medical schools admit students that they feel will support the mission of the medical school (i.e. go into primary care, stay within the state, practice in underserved areas) so a student not completing the program actually reduces the positive impact that the medical school intends to have on the communities they serve.

The fourth research question explored was "Do traditional and alternative admissions students differ with regard to their practice characteristics after graduation as measured by percentage choosing specialties in primary care?" Specifically, the following hypothesis was tested: Traditional and alternative admissions students do not differ with regard to their practice characteristics as measured by percentage choosing specialties in primary care. Results indicate that Bridge Program students and traditional medical students do show different practice characteristics as measured by percentage choosing specialties in primary care. In addition, according to the AACOM 2013-14 Academic Yeah Survey of Graduating Seniors Summary Report, during the 2011 – 2012, 2012 – 2013 and 2013 – 2014 academic years, from 31% to 32% of graduating seniors from osteopathic medical schools claimed that they planned to enter primary care specialties (AACOM, 2014). AACOM considers family practice, general internal medicine and general pediatrics as the only primary care specialties. It is also common for OB/Gyn to

be classified as primary care. When OB/Gyn and its subspecialties are added to the total percentage it raises the academic year averages above by 5% - 6%. AACOM's survey is completed by 4th year graduating students so the responses should be accurate with the actual outcomes of the student choices because the residency matching processes occur in late winter of a medical student's 4th year. Students admitted through the Bridge Program enter primary care specialties at a slightly lower rate than do students admitted to the same medical school overall but both Bridge Program students and traditionally admitted students from this medical school enter primary care at a much higher percentage rate than the national average.

Primary care physicians are very important to the health outcomes of America's citizens (Macinko, J., Starfield, B. & Shi, L, (2007). According to Hurtado (2006), racial and minority medial school graduates are more likely to practice in predominantly minority and underserved communities. Additionally, patients from minority populations are more satisfied with their medical care when it is provided by a physician with their same race or ethnicity (Rubin, 2006). Literature on this topic suggests that if medical schools increase the number of underrepresented minority graduates; particularly ones that enter into primary care specialties, then it could have a significant impact on the health outcomes of the minority and underserved populations.

Discussion and Interpretation of the Findings

The use of affirmative action continues to be controversial within medical schools and higher education overall. As recently as mid-2015, medical schools and ultimately the United States Supreme Court continue to struggle regarding the most appropriate and legal avenues to address minority underrepresentation in medical schools and the

medical field. One could claim that the resistance to affirmative action practices to diversify the medical field are a result of *Reproduction Theory* because the predominantly White, elite individuals that yield the influence and power wish to maintain the field to themselves and their offspring. Several alternatives to affirmative action have been explored, but the overall effectiveness has been minimal. Agrawal, Vlaicu and Carrasquillo (2005), found five barriers to minority enrollment (MCAT scores, low undergraduate GPAs, poor science preparation, absence of role models and a deficiency of minority faculty members).

This particular study explored three of the areas identified by Agrawal, Vlaicu and Carrasquillo (2005). Preadmissions academic data collected and analyzed for the current study (MCAT, undergraduate GPA and undergraduate science GPA) show significantly lower performance for Bridge Program students than for traditionally admitted students. Once admitted, however, there were no significant differences in course performance, as measured by class rank, between students admitted through the Bridge Program and students admitted through the traditional admissions process. This study provides evidence that an alternative admissions program that admits medical students that have lower preadmissions variables can increase the number of underrepresented minorities into medical school and ultimately into the medical field. The Bridge Program admitted students who had statistically lower mean MCAT scores, overall undergraduate GPA's and undergraduate science GPA's; however the vast majority of students admitted into the program were successful in completing medical school.

This study's findings contrast with the findings of Julian (2005) because the correlations between MCAT and overall undergraduate GPA and undergraduate science GPA differed with respect to either traditional admissions or Bridge admissions categories. There correlations between MCAT and class rank, COMLEX Level 1, Level 2 and Level 3 were all significant for students who were traditionally admitted. The correlations for MCAT for those admitted to the Bridge Program were not statistically significant for class rank, COMLEX Level 1 or Level 3 and were only statistically significant for COMLEX Level 2 CE. Much of the existing literature highlights the MCAT as an obstacle to underrepresented minorities in achieving the goal of becoming a physician (Grumbach & Chen, 2006; Henry, 2006; Frazer, 2005; Agrawal, Vlaicu & Carrasquillo, 2005). The findings of this study indicate that the obstacle of the MCAT may be an unnecessary one due to its limited predictive power when dealing with individuals from disadvantaged backgrounds such as underrepresented minorities. The findings of this study show that the MCAT may be highly correlated with medical school performance and board performance for traditionally admitted students but is only statistically significantly correlated to Level 2 CE performance for Bridge students.

Theoretical Implications

The findings of this study are both contrary to and supportive of *Reproduction Theory* depending on which angle the analysis is approached. One could say that the study supports *Reproduction Theory* because the Bridge Program is not currently an active program due to a recent curriculum revision and the fact that an alternative program structure has not been developed. It could be argued that individuals at the top of the societal class structure (decision-makers within the medical school) have not

created an alternative system in order to keep the current class structures in place. An alternative view, contrary to *Reproduction Theory,* is that programs such as the Bridge Program have been created and have given students from disadvantaged backgrounds with high potential the ability to pursue medical training. From this viewpoint, one would have to conclude that the findings of this study do not support *Reproduction Theory*. The development of the Bridge Program could also be seen as directly contradicting *Reproduction Theory* because the Bridge Program was specifically designed by those in power (decision-makers in influential and powerful positions) to offer disadvantaged individuals an opportunity to earn a medical degree. When those in power create programming and structures that perpetuate disadvantaged individuals' ascent into higher social status, it is the direct opposite of *Reproduction Theory*. Individuals admitted to programs such as the Bridge Program may not perform as well on licensing examinations and may have a slightly higher attrition rate, but the ultimate outcome is that the majority can and do succeed in completing medical school and entering into medical practice.

Recommendations for Policy-Makers and Medical School Leaders

Policy-makers and medical school leaders should strive to increase the number programs such as the Bridge Program as well as expand existing programs. It is evident by the results of this study that the vast majority of qualified students from disadvantaged backgrounds, including underrepresented minorities, can be successful in completing medical school and the necessary licensing examinations if they are given the opportunity. Societal and institutional barriers, which were described in Chapter 2, currently prevent adequate numbers of underrepresented minorities from having the

opportunity to be admitted to medical school. The fact that these societal barriers continue to exist would support Bourdieu's *Reproduction Theory*. Programs such as the Bridge Program only address the issue at the stage where underrepresented minorities and students from other disadvantaged backgrounds are applying to medical school and during their medical education. The physician workforce within the United States continues to be overwhelmingly White, although that does not reflect current composition of the population. As can be seen with the Bridge Program, this type of approach can be an effective way to increase the number of underrepresented minorities in medical school and medical practice. The societal barriers that occur at the earlier stages of an underrepresented minority's path to medical school are much more difficult to address. These societal barriers include factors such as lower socioeconomic status of minorities, lower-quality K-12 preparation and the extensive reliance on standardized tests in admissions processes for all levels of higher education. These types of issues take decades to address. In the meantime, some changes can be made at the medical school stages which are feasible and likely to have positive outcomes while the societal issues are still being addressed.

It is apparent that the MCAT is a barrier to medical school entrance for underrepresented minorities. It is also apparent from the results of this study that the MCAT has a lesser predictive power for students from disadvantaged backgrounds performance in medical school coursework and performance on licensing examinations. Medical school leaders should strongly consider evaluating their admissions criteria and make data-driven decisions regarding the appropriate mix and level of admissions criteria. This is not to say that the MCAT should not be part of the admissions criteria.

The MCAT did show strong correlations for traditionally admitted students for medical school performance as measure by class rank and for all three levels of COMLEX examinations.

This study also found that students admitted through the Bridge Program did score significantly lower on all three levels of the computer-based COMLEX examinations (Level 1, Level 2 CE and Level 3) as well as had lower first-attempt pass rates. The Bridge Program students also had a much lower first-time pass rate on COMLEX Level 2 PE. Outside of the decelerated curriculum, the Bridge Program has no additional support elements for students that are admitted into the program. Leaders at this medical school, as well as other medical schools with similar programs, should consider creating programming focused on standardized and high stakes test-taking skills for students admitted into alternative admissions program. Since there were no statistically significant differences in the medians of Bridge Students and Traditional students with regard to class rank, it appears that a significant focus should be given to supporting and preparing alternatively admitted students for licensing examinations.

Limitations

There are a few limitations that deserve mention as related to this particular study. First, each medical school is different with regard to its focus on diversity. One would presume that varying levels of focus on diversity may affect outcomes related to a program that intends to diversify the medical school class. This particular study utilized data from only one osteopathic medical school, so the generalizability of the findings to other medical schools is limited. Second, the geographic location of this particular medical school could also play a role in the findings. The diversity in each medical

school's recruiting area and the diversity in the surrounding area of the medical school could impact the diversity of the medical school population. Third, each medical school determines their own admissions criteria and the criteria for this particular school could be different than other medical schools therefore limiting the applicability of these findings to other institutions. Fourth, certain individual characteristics of students admitted to the Bridge Program were not part of this study but be related to the variables. These characteristics include things such as whether they have a parent that is a physician, the quality of their undergraduate training etc…). Finally, medical school curricula vary across institutions and the structure of the decelerated program studied is unique to this medical school. Although the concept of reducing the course load for a student (decelerated programming) is a common concept, the particular classes to be taken during a given semester and the rigor of particular classes varies widely across medical schools.

Suggestions for Additional Research

The MCAT did not function with the same predictor power for Bridge Program students as it did for traditionally admitted students. For traditionally admitted students, the MCAT was significantly correlated with COMLEX Level 1, Level 2 PE and Level 3. For the Bridge Program, there was no significant correlation between MCAT and COMLEX Level 1 or Level 3 and only a modest correlation with Level 2 CE. Future research should explore why the MCAT has very strong predictive power on academic performance for traditionally admitted students but very limited predictive power for Bridge Program (alternatively admitted) students. As part of the study, statistical comparisons could be made between Bridge Program students and traditionally admitted

students on outcome variables while controlling for combinations of incoming admissions credentials (MCAT, undergraduate GPA and undergraduate science GPA) Another suggestion for future research is to establish a representative sample (age, gender and race) from the traditionally admitted students and compare their academic outcomes to those of the Bridge Program students. This study found that there was a higher number of men admitted through the traditional admissions process but that there was a higher percentage of women admitted into the Bridge Program. Future research could explore the differences in program participation by sex.

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APPENDICES

APPENDIX A

Office of Research and Sponsored Programs
1111 West 17th Street
Tulsa, Oklahoma 74107-1898
(918) 561-1400
Fax (918) 561-1416

Institutional Review Board
FWA # 00005037

To: Johnathan Franklin, MS

From: Richard Wansley, Ph. D.
Chairman, Institutional Review Board

Date: December 12, 2014

Re: **Exempt Review Certification of IRB Protocol # 2014028**

Titled: **Retrospective Analysis of the Effectiveness of an Alternative Admissions Program to Increase the Enrollment of Disadvantaged Groups in an Osteopathic Medical School in the South Central United States**

Board members of the OSU-CHS, Institutional Review Board (IRB), reviewed your protocol entitled *"Retrospective Analysis of the Effectiveness of an Alternative Admissions Program to Increase the Enrollment of Disadvantaged Groups in an Osteopathic Medical School in the South Central United States"* and determined it meets exempted criteria under federal guidelines, 45CFR 46.101 (b); therefore, you are free to begin the study.

As principal investigator of this protocol, it is your responsibility to ensure that this study is conducted as approved. Please submit changes or revisions to the IRB on the Modifications of Approved Human Research form found at: www.healthsciences.okstate.edu/research/irb/forms.php. Prior IRB approval is required before implementing changes.

When your study is completed, please notify the IRB.

If you have questions please contact Amber Hood, IRB Administrator, at 918-561-1413 or amber.hood@okstate.edu.

REC'D URC
JAN 0 6 2015

Oklahoma State University Institutional Review Board

Request for Determination of Non-Research or Non-Human Subject

Federal regulations and OSU policy require IRB review of all research involving human subjects. Some categories of research are difficult to discern as to whether they qualify as human subject research. Therefore, the IRB has established policies and procedures to assist in this determination.

1. Principal Investigator Information

First Name: Johnathan	G.	Last Name: Franklin
Department/Division: Student - School of Educational Studies – Educational Leadership – Higher Education Administration – Employee – OSU Center for Health Sciences		College: Education
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Complete if PI does not have campus address:		
Address:		City:
State:	Zip:	Phone:

2. Faculty Advisor (complete if PI is a student, resident, or fellow) ☐ **NA**

Faculty Advisor's name: Denna Wheeler, Ph.D.		Title: Director of Rural Research and Evaluation Clinical Assistant Professor of Rural Health
Department/Division: OSU Center for Rural Health		College: OSU Center for Health Sciences
Campus Address: 1111 West 17th Street Tulsa, OK		Zip+4: 74107
Campus Phone: 918-584-4323	Fax: 918-584-4391	Email: denna.wheeler@okstate.edu

3. Study Information:

A. Title
A Retrospective Analysis of the Effectiveness of an Alternative Admissions Program to Increase the Enrollment of Disadvantaged Groups in an Osteopathic Medical School in the South Central United States.

B. Give a brief summary of the project.
The purpose of this quantitative research study is to determine the effectiveness of a decelerated medical education program designed to increase the number of medical students from underrepresented backgrounds. More specifically, this study will focus on whether or not this program successfully increases the number of underrepresented minorities at an osteopathic medical school in the south central United States and whether those admitted are able to successfully complete medical school coursework and be successful in their careers.This study is a non-experimental study. More specifically, this study is exploratory in nature. Data analysis techniques will include descriptive statistics, correlation, t-tests, analysis of variance, analysis of covariance and multiple regression.

Oklahoma State University Institutional Review Board

Request for Determination of Non-Research or Non-Human Subject

C. Describe the subject population/type of data/specimens to be studied. (See instructions for guidance)
All medical students (approximately 900) from entering Class of 2003 to entering Class of 2012.

4. Determination of "Research".
One of the following must be "no" to qualify as "non-research":

A. Will the data/specimen(s) be obtained in a systematic manner?
☐ No ☒ Yes

B. Will the intent of the data/specimen collection be for the purpose of contributing to generalizable knowledge (the results (or conclusions) of the activity are intended to be extended beyond a single individual or an internal program, i.e. widely or universally applicable)?
☐ No ☒ Yes

5. Determination of "Human Subject".

A. Does the research involve obtaining information about living individuals?
☐ No ☒ Yes
If no, then research does not involve human subjects, no other information is required.
If yes, proceed to the following questions.

All of the following must be "no" to qualify as "non-human subject":

B. Does the study involve intervention or interaction with a "human subject"?
☒ No ☐ Yes

C. Does the study involve access to identifiable private information?
☒ No ☐ Yes

D. Are data/specimens received by the Investigator with identifiable private information?
☒ No ☐ Yes

E. Are the data/specimen(s) coded such that a link exists that could allow the data/specimen(s) to be re-identified?
☒ No ☐ Yes
If "*Yes*," is there a written agreement that prohibits the PI and his/her staff access to the link?
☐ No ☐ Yes

6. Signatures

Signature of PI Johnathan Franklin **Date** 1/6/2014

Signature of Faculty Advisor (If PI is a student) Deena Wheeler **Date** 1/6/2014

Oklahoma State University Institutional Review Board

Request for Determination of Non-Research or Non-Human Subject

☒ Based on the information provided, the OSU-Stillwater IRB has determined that this project **does not** qualify as human subject research as defined in 45 CFR 46.102(d) and (f) and **is not subject to oversight by the OSU IRB.**

☐ Based on the information provided, the OSU-Stillwater IRB has determined that this research **does** qualify as human subject research and **submission of an application for review by the IRB is required.**

Dr. Hugh Crethar, IRB Chair

1-7-15
Date

VITA

Johnathan Garrett Franklin

Candidate for the Degree of

Doctor of Education

Thesis: A RETROSPECTIVE ANALYSIS OF THE EFFECTIVENESS OF AN ALTERNATIVE ADMISSIONS PROGRAM WHICH UTILIZES A DECELERATED CURRICULUM TO INCREASE THE ENROLLMENT AND SUCCESSFUL COMPLETION OF UNDERREPRESENTED MINORITIES IN AN OSTEOPATHIC MEDICAL SCHOOL IN THE SOUTH CENTRAL UNITED STATES

Major Field: Higher Education

Biographical:

Education:

Completed the requirements for the Doctor of Education in Higher Education at Oklahoma State University, Tulsa, Oklahoma in July, 2015.

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