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Medical/Dental Education Preparatory Program Students: Making a Difference in Health Professional Shortage Areas

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MEDICAL/DENTAL EDUCATION PREPARATORY PROGRAM STUDENTS: MAKING A DIFFERENCE IN HEALTH PROFESSIONAL SHORTAGE AREAS

by

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The Medical/Dental Education Preparatory Program (MEDPREP) was established by the Southern Illinois University School of Medicine (SIU SOM) in 1972. MEDPREP is a two-year postbaccalaureate program for students who may have encountered academic barriers in pursuit of careers in medicine or dentistry. The MEDPREP mission is to increase the numbers of underrepresented minority and disadvantaged students from southern and central Illinois who will enter and graduate from health professions schools and who will serve in U.S. health professions shortage areas.

This research paper focuses on the component of the MEDPREP mission concerning service in U.S. health professions shortage areas by examining factors that influence MEDPREP students' interests prior to medical or dental school, if any, to practice in underserved areas. To explore possible factors, a 26-question survey was administered to SIU SOM MEDPREP students from the classes of 2015, 2016, and 2017. Respondents reported a strong interest in underserved practice. Medically-related volunteer experiences; health professions shadowing experiences; participation in enrichment or pipeline programs; and relationships with advisors, teachers, instructors, or professors were reported as influential factors in MEDPREP students' interests in underserved practice prior to medical or dental school.

These results have implications for early identification and nurturing of premedical students, admissions policies of health professions schools, as well as implications for greater

diversification among health professions students and practicing physicians and dentists. Greater awareness of needs and exposure through "hands-on" opportunities and enrichment or pipeline program experiences prior to medical or dental school may be important factors in increasing the number of health professions students interested in underserved practice.

DEDICATION

This research paper is dedicated to the MEDPREP students who currently make a difference and those that in the future will make a difference in the provision of health care nationwide, particularly those who choose to serve in underserved areas. A number of MEDPREP faculty and staff through the years have helped students achieve their dreams of careers in the health professions. In particular, this research paper is dedicated in memory of Mrs. Shirley J. McGlinn whose passion for both MEDPREP and research inspired me to continue my educational journey.

Many other individuals helped me in my educational journey. Harold R. Bardo, Ph.D., provided me the opportunity to be a part of the MEDPREP family. The faculty and staff from MEDPREP, the Department of History, and the Department of Political Science Master of Public Administration program taught me so much and encouraged me along the way. Without the loving words of encouragement and support from C. Patrick Sullivan, who helped me push on when I was exhausted and ready to quit school (and there were many times!), I would never have been able to accomplish this educational milestone.

ACKNOWLEDGMENTS

In addition to data obtained from surveys completed by MEDPREP students in the classes of 2015, 2016, and 2017, other data included in this research paper were available due to the efforts of Dr. Leon McDougle and his colleagues at The Ohio State University College of Medicine, the schools that participated in the study "A National Evaluation of Long-Term Outcomes for Premedical Postbaccalaureate Programs Designed to Advance Workforce Diversity and Health Equity," and the practicing physicians that responded to that survey.

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CHAPTER 1

INTRODUCTION

A number of studies in academic medicine have explored characteristics of individuals or factors that are seen as predictors of service of medical or dental care to those in underserved areas. For example, a study in 2008 by Somnath Saha and Scott Shipman suggested that underrepresented minority status is more predictive of service in underserved areas than socioeconomic status or participation in the National Health Service Corps (NHSC). Prior research data published in 2000 by Howard K. Rabinowitz, M.D., identified four independent predictors for generalist physicians caring for underserved populations: being a member of an underserved ethnic/minority group, having participated in the NHSC, having a strong interest in practicing in an underserved area prior to attending medical school, and growing up in an underserved area (Rabinowitz, Diamond, Veloski, & Gayle, 2000). The Rabinowitz study found that gender, family income while growing up, and exposure to underserved populations during medical school were not independent factors predicting provision of medical care for underserved populations (Rabinowitz et al., 2000). Other research has also indicated that students who have participated in a postbaccalaureate premedical program are more likely to practice in health professions shortage areas (Andriole & Jeffe, 2011; Blakely & Broussard, 2003; McDougle, Way, & Rucker, 2010).

Data from a survey of practicing physicians conducted by The Ohio State University College of Medicine (OSU COM) indicated that 53.3% of former Southern Illinois University School of Medicine (SIU SOM) Medical/Dental Education Preparatory Program (MEDPREP)

postbaccalaureate program respondents serve in federally designated underserved areas versus 18.5% from a control group of non-postbaccalaureate program respondents from SIU SOM (National Postbaccalaureate Study, 2013). Data from practicing physicians from all 10 participating schools in that same survey indicated that 36.6% of physician respondents who had participated in postbaccalaureate programs serve in federally designated underserved areas versus 17.1% of physician respondents who had not participated in such programs (National Postbaccalaureate Study, 2013).

Data from the OSU COM survey not only showed that a larger number of postbaccalaureate program alumni provide medical care in federally underserved areas than their non-postbaccalaureate program colleagues, but that 77.8% of SIU SOM postbaccalaureate program survey respondents reported an interest in underserved practice prior to medical school versus 44.6% of SIU SOM non-postbaccalaureate program survey respondents. Similarly, 74.6% of survey respondents from all 10 participating schools' postbaccalaureate programs reported an interest in underserved practice prior to medical school versus 38.6% of all schools' non-postbaccalaureate program survey respondents (National Postbaccalaureate Survey, 2013). These data indicate that approximately three quarters of the survey respondents who participated in postbaccalaureate programs reported an interest in underserved care prior to medical school. The purpose of this research paper is to examine factors, if any, that influence MEDPREP students' interests in underserved practice prior to medical or dental school.

The road to becoming a health care professional for many students is a difficult path to travel. Educational barriers, lackluster academic performance, and inadequate advisement have contributed to the difficulties that some students face in their pursuit of careers in medicine or dentistry. Many aspiring students who have faced health professions school roadblocks have

utilized premedical postbaccalaureate programs to help them realize their dreams of becoming physicians or dentists. More premedical postbaccalaureate programs exist than ever before. The Association of American Medical Colleges (AAMC) website includes some 200 premedical postbaccalaureate programs, 46 that are designed for economically and disadvantaged students (AAMC, n.d.).

The literature review of this research paper provides a brief introduction to the history of medical education, health professions school barriers, enrichment and pipeline programs, and current health professions workforce needs. However, an introduction to MEDPREP may help illuminate the important role such premedical postbaccalaureate programs play in preparation of students who provide much needed medical and dental care to the underserved.

MEDPREP has a 42-year history of providing educational opportunities that help prepare students for health professions schools. In 1972, the SIU SOM established a premedical postbaccalaureate program to assist economically and educationally disadvantaged students in their pursuit of entrance into health professions schools. MEDPREP is a two-year postbaccalaureate program located on the Southern Illinois University Carbondale (SIUC) campus. Since its inception, over 1,000 participants of MEDPREP have gained entry into over 100 different health professions schools nationwide (MEDPREP, 2014). MEDPREP's mission is to increase the numbers of underrepresented minority and disadvantaged students from southern and central Illinois who will enter and graduate from health professions schools and who will serve in U.S. health professions shortage areas (MEDPREP, n.d.). This mission addresses three important stages in the career pathway of students—entrance into professional school, graduation from professional school, and service as health care professionals.

MEDPREP is a non-degree granting program; however, students that meet academic requirements may also complete the recently added concurrent master's degree programs in Public Health or Biological Sciences. Students enter MEDPREP to improve grade point averages (GPAs) and/or Medical College Admission Test (MCAT) or Dental Admissions Test (DAT) scores. Many MEDPREP applicants have taken the MCAT or DAT prior to applying to the program, but it is not a requirement to have taken the exams prior to application.

Application requirements include completing an online application, sending official transcripts for all college credit coursework, and submitting two letters of recommendation. Applicants should have successfully completed (with a grade of "C" or better) medical or dental school prerequisite courses (such as Biology, Chemistry, and Physics) by the time of entrance into the program. Minimum overall and science course (Biology, Chemistry, Physics, and Mathematics) GPAs of 2.2 are required. Students must be from educationally or economically disadvantaged backgrounds. MEDPREP typically receives over 150 applications annually for approximately 36 seats in the program.

New students admitted to MEDPREP begin in June of each year. Each student is assigned a MEDPREP faculty member who serves as an advisor. MEDPREP advisors assist students in determining coursework to improve academic deficiencies and provide guidance throughout the two-year program. The first year of the program consists of three semesters: summer, fall, and spring. The focus in the first year is on preparation for the MCAT or DAT with review courses in psychology/sociology, biology, chemistry, and physics as well as courses designed to improve critical analysis and reading skills and to enhance study techniques. Seminar courses provide opportunities for students to continue their exploration of the field of

medicine or dentistry through physician or dentist shadowing experiences and the assessment of professional schools that best match each student's career objectives.

During the fall and spring semesters in the second year of the program, MEDPREP participants typically enroll in upper level science courses on the SIUC campus. The aim of the second year is to enhance students' knowledge in the sciences to aid their transition to medical or dental schools. Also during the second year, the interview process at various medical and dental schools begins for students who have achieved competitive MCAT/DAT scores and GPAs while participating in MEDPREP.

In addition to academic progress, student professionalism is monitored each semester by the MEDPREP Student Progress Committee (SPC). Professional qualities such as integrity, honor, excellence, altruism, accountability, respect, and sense of duty are important characteristics that future physicians and dentists should possess (MEDPREP, 2010). Academic or professional behavior concerns are addressed by a Student Transitional Services (STS) staffing (a meeting composed of the student, faculty advisor, MEDPREP Counselor/Recruiter, and the MEDPREP Director) resulting in an action plan monitored by faculty and staff.

In the second year of the program, as part of the professional school admissions process, students may request a MEDPREP SPC composite letter of recommendation. The SPC recommendation levels for admission to medical or dental school are Recommend with Enthusiasm, Recommend with Confidence, Recommend, Recommend with Reservations, or Not Recommended. These decisions are based on holistic review of a MEDPREP student's file. Academic record, test scores, professional behavior, written statements, and letters of recommendation are all considered in determining the recommendation level.

MEDPREP students meeting eligibility requirements may choose to attend SIU SOM, but students have matriculated to over 100 different medical, osteopathic, or dental schools across the country (MEDPREP, 2014). Participation in MEDPREP is one step on the road that helps prepare economically and educationally disadvantaged students for a career in medicine or dentistry.

Examining factors that influence MEDPREP participants' interests in future practice in medically underserved areas is important for ongoing recruitment and in the admissions process of new students for the program. On a broader scale, however, addressing the need for more trained health professionals in shortage areas is important for our state and nation in the midst of changing health care policies, an increasing number of older adults that are expected to require more health care, and an increasingly diverse population. The U.S. Department of Health and Human Services (HHS) Health Resources and Services Administration (HRSA) established designations of Health Professional Shortage Areas (HPSAs) and Medically Underserved Areas or Populations (MUA/MUP) as indicators of areas and populations in the U.S. that face a shortage of health care providers or access to medical facilities. Populations affected include those in high poverty or high elderly populations, areas with high infant mortality, and may be urban or rural locations (HRSA, n.d.; HRSA, n.d.).

MEDPREP plays an important role in preparing future physicians and dentists for service in health care professions. Many of these students, who are underrepresented minority and disadvantaged students, will enter and graduate from health professions schools and ultimately choose to serve in U.S. HPSAs. Diversification of the health care workforce is critical in addressing the medical needs of the nation. Identifying factors that may influence students' interests in underserved care prior to medical or dental school and implementing similar

opportunities for students considering careers in medicine or dentistry may prove helpful in addressing current and anticipated health care needs of our nation.

CHAPTER 2

LITERATURE REVIEW

Aspiring students who have faced health professions school roadblocks due to educational barriers may find that premedical postbaccalaureate programs can help them realize their dreams of becoming physicians or dentists. The Southern Illinois University School of Medicine's (SIU SOM) Medical/Dental Education Preparatory Program (MEDPREP) is one such program. MEDPREP is designed to provide academic assistance to educationally and economically disadvantaged students in their pursuit of careers in medicine or dentistry. MEDPREP's mission is to increase the numbers of underrepresented minority and disadvantaged students from southern and central Illinois who will enter and graduate from health professions schools and who will serve in U.S. health professions shortage areas (MEDPREP, n.d.).

MEDPREP participant achievement in terms of entrance to and completion of health professions schools is detailed in various sources: published literature (Jackson, McGlinn, Rainey, & Bardo, 2003; Metz, 2013), recruitment materials, and the department website. This research paper examines the component of the MEDPREP mission concerning service in U.S. health professions shortage areas. A survey administered to MEDPREP students from the classes of 2015, 2016, and 2017 examined factors that may influence students' interests prior to medical or dental school, if any, to practice in underserved areas.

Literature surrounding medical education shows the difficulties some students experience on the road to health professions school and the role of premedical postbaccalaureate programs like MEDPREP in helping students improve professional school application credentials. The

first section of the literature review will provide a brief history and background of medical education in the U.S. Next, the literature review will focus on barriers some students face in pursuit of careers in the health professions and how these barriers impact the ability of these students to meet health professions school admissions standards. The third section of the literature review will focus on the role of enrichment or pipeline programs in preparing students for medical or dental school. The fourth section of the literature review will focus on current medical workforce needs such as increasing diversification in the health professions, increasing the number of health care professionals to combat ongoing shortages, and improving provision of health care in underserved areas. The final section of the literature review will focus on factors that may be predictors of service in underserved areas and populations.

History and Background of Medical Education

The Flexner Report, written by Abraham Flexner in 1910, is often seen as instituting modern medical education practices in the U.S. One consequence of the Flexner Report was the reduction from seven to only two predominantly black medical schools—Howard University Medical College in Washington, DC, and Meharry Medical College in Nashville, Tennessee, (Sullivan & Mittman, 2010). According to Sullivan and Mittman, the Flexner report also led to the development of admissions standards that were considered difficult for a number of blacks to attain (2010).

During the 1950s and 1960s, only 2.2% of physicians were black even though blacks made up 10% of the U.S. population at that time (Sullivan & Mittman, 2010). The numbers were similar for Mexican Americans, mainland Puerto Ricans, and Native Americans—these groups made up about 3% of the population yet only 0.2% of medical students (Sullivan & Mittman,

2010). It was not until 1966 that all U.S. medical schools admitted black students (Sullivan & Mittman, 2010).

Even though medical schools were admitting minority students, a disparity remained in the representation of minority physicians and the minority population. For example, in 1969 the African American population in Michigan was 11% while only 2% of physicians in the state were African American (Whitten, 1999). To help address this disparity in Michigan, Wayne State University School of Medicine in Detroit, Michigan, established a postbaccalaureate program in 1969 with a focus on improving medical school application credentials for African American students (Whitten, 1999). For a number of students, improving medical or dental school application credentials requires addressing educational deficiencies experienced on the road to health professions school.

Health Professions School Barriers

Educational barriers that create achievement gaps tend to begin in primary education and follow students throughout the educational pipeline (Cohen, Gabriel, & Terrell, 2002; Cooper, 2003; Grumbach & Mendoza, 2008; Williams, 2011). Single parent households, low level of parental education, and insufficient family income contribute to these educational barriers (Cooper, 2003). Despite improvements in test scores in math and science categories, a gap between the academic performance of white students and minority student groups remains, leaving a number of underrepresented in medicine (UIM) students unprepared academically for college (Alexander, Chen, & Grumbach, 2009; Williams, 2011).

In addition to facing academic barriers, students, particularly minority students, often become discouraged due to their educational financial constraints (Giordani, Edwards, Segal, Gillum, Lindsay, & Johnson, 2001). For example, financial barriers are seen as a top factor in

discouraging underrepresented minority students from applying to medical school (Dickins, Levinson, Smith, & Humphrey, 2013). Because of financial barriers, students UIM are less likely to apply to medical school than their majority peers, reducing the overall pool of applicants.

The Association of American Medical Colleges (AAMC) reported that of the 49,480 applicants to medical schools for 2014-2015, only 8.1% of the applicants self-identified as black or African American, and only 8.9% self-identified as Hispanic, Latino, or of Spanish origin (AAMC, 2014). In the same year, the percentage of medical school applicants who self-identified as white was 54.2% (AAMC, 2014).

The ability to perform well academically in health professions school is certainly important in selection of the individuals who will be trained to provide quality health care. Admissions personnel in health professions schools have traditionally relied heavily upon grade point averages (GPAs) and Medical College Admissions Test (MCAT) or Dental Admissions Test (DAT) scores to determine eligibility of applicants to their schools. A comparison among three groups of medical school applicants demonstrates the differences in GPAs. AAMC data indicate that the mean GPA total for applicants to medical schools in 2014 who self-identified as black or African American was 3.27, and the mean GPA total for Hispanic, Latino, or of Spanish origin applicants was 3.41 (AAMC, 2014). For the same year, the mean total GPA total for self-identified white applicants was 3.60 (AAMC, 2014).

Similarly, a comparison among three groups of medical school applicants demonstrates the differences in MCAT score averages across racial and ethnic groups. AAMC data indicate that the mean total MCAT score for black or African American applicants to medical schools for 2014 was 22.5, and the mean total MCAT score for Hispanic, Latino, or of Spanish origin

applicants was 24.7 (AAMC, 2014). For self-identified white applicants to medical school for the same year, the mean total MCAT score was 29.3 (AAMC, 2014).

Other factors in addition to GPA and MCAT scores, however, may serve as indicators of academic promise or ability to successfully complete health professions school. For this reason, health professions schools utilize a holistic approach in admissions decisions. The AAMC defines holistic review as "a flexible individualized way of assessing an applicant's capabilities by which balanced consideration is given to experiences, attributes, and academic metrics and, when considered in combination, how the individual might contribute value as a medical student and physician" (AAMC, n.d.). Applicants' character, life experiences, ability to overcome adversity (Grumbach & Mendoza, 2008); teamwork and communication skills, compassion, empathy, and integrity (Monroe, Quinn, Samuelson, Dunleavy, & Dowd, 2013); fields of interest, languages spoken, and gender identity (Witzburg & Sondheimer, 2013) are attributes that may receive consideration for professional school admissions along with academics. Ongoing research concerning use of experiences and attributes in admissions decisions as well as methods of assessment will help determine the impact of these alternative considerations in admissions decisions and the future success of students in health professions schools (Hojat, 2014; Humphrey-Murto, Leddy, Wood, Puddester, & Moineau, 2014; Kirch, 2012).

Role of Enrichment and Pipeline Programs

Enrichment and pipeline programs designed to enhance student knowledge of science, math, and health careers may help reduce academic gaps by providing opportunities for students to participate in activities such as premedical coursework, seminars, physician shadowing, research experiences, and mentor/mentee relationships. Various pipeline programs may benefit students through the primary, middle, and high school years and continue through the

undergraduate and postbaccalaureate level, helping to prepare students academically and often helping to increase diversity in health professions schools (Alexander et al, 2009; Grumbach, 2011; Grumbach & Mendoza, 2008; Heller, Rúa, Mazumdar, Moon, Bardes, & Gotto, 2014; Reiter, Lockyer, Ziola, Courneya, & Eva, 2012;).

Students experiencing academic difficulties may turn to postbaccalaureate premedical programs like MEDPREP to address the academic deficiencies that have hindered them from their dreams of becoming health care professionals. Postbaccalaureate premedical programs provide an opportunity for students to master academic strategies that aid students to not only become competitive candidates for professional school entry but to also be successful in completing medical or dental schools and residency training programs.

Premedical postbaccalaureate programs have been in existence in the U.S. for a number of years. Columbia University Postbaccalaureate Premedical Program boasts that it is the oldest (established in 1955) and the largest program of its kind in the U.S. (Columbia Postbaccalaureate Premedical Program, n.d.). While programs vary by duration, curriculum, size, need of students, and cost, numerous premedical postbaccalaureate programs have proven success in preparing students for health professions schools. Programs exist for career changers, academic record enhancers, groups underrepresented in medicine, and economically and educationally disadvantaged students. Currently the AAMC website lists nearly 200 premedical postbaccalaureate programs, of which 46 are designed for economically and disadvantaged students (AAMC, n.d.). Perseverance, hard work, and skills developed through a premedical postbaccalaureate program experience help numerous students overcome academic roadblocks.

Admission requirements, duration of the program, focus, and potential for conditional acceptances to supporting medical schools also vary in premedical postbaccalaureate programs.

A number of long-standing postbaccalaureate programs report high rates of success in the numbers of matriculants and graduates of medical school. For example, approximately 80% of MEDPREP program participants enter medical or dental schools, and a vast majority successfully complete medical or dental school (Metz, 2013).

Another example of a successful postbaccalaureate program is the Post-Baccalaureate Premedical Fellowship Program (UM-PB) at the University of Michigan Medical School. UM-PB participants benefit from a curriculum that helps to improve study skills and reading strengths, teaches coping techniques, and enhances basic science knowledge (Giordani et al., 2001). A 2001 study of the program found that despite lower undergraduate GPAs and MCAT scores upon entering medical school, when compared with medical students in the same class, UM-PB program participants' academic performance was similar to the academic performance of classmates who had not participated in a postbaccalaureate program (Giordani et al., 2001).

Michigan State University College of Human Medicine's (MSUCHM) Advanced Baccalaureate Learning Experience (ABLE) started as a pilot program in 1986 with only four students (Lipscomb, Mavis, Fowler, Green, & Brooks, 2009). In an 18-year retrospective analysis (1991-2008), researchers reported that 97% (172 of 178) of ABLE participants completed the program and matriculated to medical schools (Lipscomb et al., 2009). Of the total number, 167 chose to matriculate to MSUCHM, and five matriculated to other medical schools (Lipscomb et al., 2009).

Premedical postbaccalaureate programs allow students the opportunity to gain valuable professional skills while participating in such programs. Manusov, Livingston, Wang, Berne-Anderson, Alston, Foster, and Hurt (2011) polled students from the Florida State University College of Medicine Bridge Program and found that participation in the

postbaccalaureate premedical program helped students' academic success through group cohesion, development of shared goals, focus, and proving capability to others. Reeves, Vishwanatha, Yorio, Budd, and Sheedlo (2008) reported that students participating in the Post-Baccalaureate Premedical Certification Program at the University of North Texas Health Service Center not only performed well academically but also assumed leadership positions in medical school. While premedical postbaccalaureate programs help to develop student academic and professional skills, many postbaccalaureate programs also help to enhance diversity in health professions schools and eventually in the workplace.

Medical Workforce Needs

Physician diversity is currently not keeping pace with the growing population. It is estimated that 37% of the U.S. population currently consists of racial and ethnic minorities with the expectation that this number will increase to 57% by 2060 (Xierali, Castillo-Page, Zhang, Gampfer, & Nivet, 2014). However, in 2010 the number of black and Hispanic medical school graduates was only 6.8% of total graduates (Xierali, Castillo-Page, Zhang, Gampfer, & Nivet, 2014). Further, debilitating diseases such as obesity, cancer, diabetes, and AIDS reportedly affect adult racial and ethnic minorities at a higher rate than the general population (Halle, Lewis, & Seshamani, n.d.). For example, 48% of African American adults suffer from chronic disease compared to 39% of the general population (Halle et al., n.d.).

Groups underrepresented in medicine (UIM) typically include African Americans, Hispanic Americans, Native Americans, Alaskan natives, Native Hawaiians and other Pacific Islanders, and Asian subgroups such as Vietnamese, Hmong, and Cambodian (Sullivan & Mittman, 2010). Increasing the numbers of medical and dental UIM students is important. According to a HRSA report on diversity in health professions (2006), health professionals UIM

"disproportionately serve minority and other medically underserved populations" and "minority patients tend to receive better interpersonal care from practitioners of their own race or ethnicity" (p. 3).

Benefits of a diversified medical workforce include greater patient access to health care, improved patient-provider interactions including increased trust and satisfaction, greater cultural sensitivity, improved compliance with physician's suggested treatment plan, and expanded research in diseases affecting minority populations (Cohen et al., 2002; Grumbach & Mendoza, 2008; Sullivan & Mittman, 2010). Increasing the numbers of minority and disadvantaged students who enter and graduate from health professions schools may help meet the increasing need for a more diverse medical workforce. As the number of racial and ethnic minority populations increases, the gap between minority health professionals and minority patients will continue to grow without increasing the diversity of medical and dental school graduates.

In addition to a lack of diversity among providers, sources believe that the nation will soon be facing an even greater shortage of health care providers (AAMC, n.d.; Petterson, Liaw, Phillips, Rabin, Meyers, & Bazemore, 2012; Xierali, Nivet, & Fair, 2014). In the mid-1990s, research indicated that black and Hispanic communities were four times more likely to have a shortage of physicians (Komaromy, Grumbach, Drake, Vranizan, Lurie, Keane, & Bindman, 1996). Today many of these same communities continue to face physician shortages.

A report by the AAMC concerning the shortage of residency slots and the effects on physician shortages indicates that the U.S. will face a serious shortage of primary care and specialist physicians, with those individuals in HPSAs most likely to be severely impacted (AAMC, n.d.). According to AAMC data, the shortage will amount to some 130,000 active care physicians and 66,000 primary care physicians by 2025 (Xierali, Nivet, & Fair, 2014). The aging

general U.S. population and government health care reforms will continue to increase the demands placed on physicians as well (Petterson et al., 2012).

The U.S. Department of Health and Human Services (HHS) Health Resources Services Administration (HRSA) defines HPSAs as an area or population group that is experiencing a shortage of either medical, dental, or mental health care providers (2014). According to U.S. Department of HHS reports in August 2014, some 8,102 primary medical care practitioners were needed to eliminate the 6,084 HPSA designations across the nation. For the same period in Illinois, there were 226 HPSA primary care designations (47 geographic, 72 population group, and 107 facility) requiring 442 additional practitioners to achieve the population-to-primary care physician ratio of 3,500 to 1 (HRSA, 2014). In addition to primary medical care shortage areas, HPSA shortages exist for dental and mental health professionals as well. Nationwide some 7,300 dental practitioners are needed to remove the current 4,968 dental HPSA designations (HRSA, 2014). For the same period in Illinois, there were 160 HPSA dental care designations (8 geographic, 73 population group, and 79 facility) requiring 400 additional practitioners to achieve the population-to-dentist ratio of 5,000 to 1 (HRSA, 2014).

One means to encourage health professionals to serve in shortage areas is education financial assistance in exchange for a commitment of service. The National Health Service Corps (NHSC) provides loan repayment programs and scholarships to students and grant funds to states to help attract individuals to primary care practices in HPSAs (HRSA, 2013). While financial incentives offered by the NHSC in exchange for service is one predictor of service in underserved areas, other factors and characteristics may serve as predictors of the types of individuals who provide care for the underserved.

Predictors of Service for Physicians

Many studies have explored characteristics of individuals or factors as predictors of care for the underserved. Data indicate that minorities are more likely than non-minority physicians to practice in areas considered to be underserved (Andriole & Jeffe, 2011; Cohen et al., 2002; Grumbach & Mendoza, 2008; Xierali, Castillo-Page, Conrad, & Nivet, 2014), and are more likely than white physicians to select primary care specialties (Sullivan & Mittman, 2010). Data also indicate that participants in premedical postbaccalaureate programs are more likely to practice among those who are medically indigent and/or poor (McDougle, Way, & Rucker, 2010) and to return to medically underserved communities (Blakely & Broussard, 2003).

A study in 2008 by Somnath Saha and Scott Shipman suggested that underrepresented minority status is more predictive of service in underserved areas than socioeconomic status or participation in the NHSC. Prior research data published in 2000 by Howard K. Rabinowitz, M.D., however, identified four independent predictors for generalist physicians caring for underserved populations: being a member of an underserved ethnic/minority group, having participated in the NHSC, having a strong interest in practicing in an underserved area prior to attending medical school, and growing up in an underserved area (Rabinowitz, Diamond, Veloski, & Gayle, 2000). Rabinowitz and his colleagues reported that 86% of generalist physicians with four of the predictors provided substantial care to underserved communities compared to 65% with three of the four predictors, 49% with two of the four predictors, 34% with one predictor, and 22% with no predictors (Rabinowitz et al., 2000). The Rabinowitz study found that gender, family income while growing up, and exposure to underserved populations during medical school were not independent factors for providing medical care for underserved populations (Rabinowitz et al., 2000).

Dr. Leon McDougle and colleagues at The Ohio State University College of Medicine (OSU COM) conducted a similar study of The OSU COM MEDPATH postbaccalaureate program in 2008. McDougle and his colleagues found that former MEDPATH program participants were more likely to practice in federally designated underserved areas, more likely to provide services where 40% or more of the patients are medically indigent or poor, and more likely to volunteer their services to indigent patients than their non-postbaccalaureate program colleagues (McDougle et al., 2010).

McDougle and colleagues broadened the study to include other postbaccalaureate programs. "A National Evaluation of Long-Term Outcomes for Premedical Postbaccalaureate Programs Designed to Advance Workforce Diversity and Health Equity" (National Postbaccalaureate Study) extended McDougle and colleagues' research nationwide (2013). The self-administered questionnaire used in the national postbaccalaureate collaborative study was modeled after one used in the study by Rabinowitz and colleagues (Rabinowitz et al., 2000).

McDougle and colleagues identified postbaccalaureate programs from AAMC schools that focused on students from underrepresented and disadvantaged backgrounds. Premedical postbaccalaureate programs participating in the survey included Georgetown University, University of Hawaii, Michigan State University, The Ohio State University, Southern Illinois University, University of California-Davis, University of California-Irvine, University of California-San Diego, Wake Forest University, and Wayne State University. Responses to Question 4 from the National Postbaccalaureate Survey provided data for the Rabinowitz predictor item, "Did you have a strong interest in underserved practice prior to medical school?" Data indicated that 74.6% of all schools' postbaccalaureate program survey respondents reported an interest in underserved practice prior to medical school versus 38.6% of all schools'

non-postbaccalaureate survey respondents while 77.8% of SIU SOM postbaccalaureate survey respondents reported an interest in underserved practice prior to medical school versus 44.6% of SIU SOM non-postbaccalaureate survey respondents (National Postbaccalaureate Survey, 2013).

It is not difficult to see that some students encounter barriers that may impede their dreams of becoming health care professionals. Likewise, the need for a more diverse, well-trained health professions workforce is well documented. Identifying factors that influence students' interests in serving in underserved areas and the potential for implementing similar opportunities for additional students may help address contemporary issues such as the need for medical and dental care professionals in underserved areas, increasing the numbers of health care providers, and the need for greater diversity in the provision of health care in the U.S.

CHAPTER 3

METHODS

The purpose of this research paper is to explore factors that may influence the interests, if any, of students enrolled in the Medical/Dental Education Preparatory Program (MEDPREP) in serving in Health Professional Shortage Areas (HPSAs), Medically Underserved Areas (MUAs), and with Medically Underserved Populations (MUPs) prior to medical school.

Participants

Students enrolled in MEDPREP at the Southern Illinois University School of Medicine (SIU SOM) at Southern Illinois University Carbondale (SIUC) were asked to voluntarily complete a survey of 26 questions designed to explore factors that may influence MEDPREP students' interests, if any, in serving in HPSAs, MUAs, and with MUPs prior to medical school. A total of 23 students in the MEDPREP Class of 2015 completed the survey in May 2015. A total of 56 students in the MEDPREP Classes of 2016 and 2017 completed the survey in September 2015.

Materials and Procedure

This project was reviewed and approved by the Southern Illinois University Carbondale (SIUC) Human Subjects Committee. A consent form (see Appendix A, page 42) and survey (see Appendix B, page 43) consisting of Likert-style questions were distributed to SIU SOM MEDPREP students. Surveys and consent forms were administered by the researcher.

The survey was first administered in May 2015 to second year students, the MEDPREP Class of 2015, during MEDPREP Biochemistry (MEDP 404E/504E) in Wheeler Hall Room 107.

During the Spring 2015 semester, MEDPREP second year student enrollment was 29 students. Enrollment in this particular second year curriculum course was 24 students. On the day of administration of consent form and survey, 23 students were present. All 23 students completed the consent form and survey.

In September 2015, the survey was administered to students in the MEDPREP Classes of 2016 and 2017 during MEDPREP Convocation (MEDP 401E) in Guyon Auditorium in Morris Library. Convocation is a required course for all MEDPREP students. Convocation enrollment for Fall 2015 was 59—27 second year students (Class of 2016) and 32 first year students (Class of 2017). On the day of administration of consent form and survey, 56 students were present. All 56 students completed the consent form and survey.

All respondents were advised that participation was voluntary, that respondents could skip any question they were uncomfortable with, and that respondents could withdraw from the survey at any time. The consent forms and surveys were collected during the class period in which they were distributed.

After all consent forms and survey instruments were collected, the researcher assigned each survey instrument a number for data entry purposes. Data were entered into SPSS and analyzed by the researcher. Factors that influence MEDPREP students' interests, if any, in serving in underserved areas prior to medical or dental school are evaluated in the following Results and Discussion section of this research paper.

CHAPTER 4

RESULTS AND DISCUSSION

The mission of the Southern Illinois University School of Medicine (SIU SOM) Medical/Dental Education Preparatory Program (MEDPREP) addresses three important stages in the career pathway of students—entrance into professional school, graduation from professional school, and service as health care professionals. The purpose of this research paper is to explore factors that may influence MEDPREP students' interests prior to medical school or dental school, if any, in serving in Health Professional Shortage Areas (HPSAs), Medically Underserved Areas (MUAs), and with Medically Underserved Populations (MUPs).

The survey was completed by 79 SIU SOM MEDPREP students. All respondents were postbaccalaureate MEDPREP students seeking careers in medicine or dentistry and at the time of the survey not attending medical or dental school. Twenty-two (27.8%) respondents were male, and 57 (72.2%) respondents were female. Seventy (88.6%) respondents were African American or Black, African American or Black and American Indian or Alaskan Indian or Alaskan Native, African American or Black and White, African American or Black and Hispanic or Latino, or African American or Black and Asian American; six (7.6%) were Hispanic or Latino, Hispanic or Latino and Trinidadian/Puerto Rican, or Hispanic or Latino and White; one (1.3%) respondent was Native Hawaiian or Pacific Islander; and two (2.5%) respondents identified as "Other."

MEDPREP student responses to geographic residence prior to participating in MEDPREP included 35 respondents (44.3%) from urban geographic locations (population greater than 50,000), 35 (44.3%) from suburban geographic locations (population between 2,500 and 49,999),

and six (7.6%) from a rural geographic location (population fewer than 2,499). Two respondents (2.5%) reported both urban and suburban geographic locations, and one response was missing.

The survey also included a question regarding respondent preference for community type to practice medicine or dentistry. Forty-five respondents (57.0%) indicated that they preferred an urban setting, nine (11.4%) preferred a suburban setting, three (3.8%) preferred a rural setting, six (7.6%) reported no preference, three (3.8%) were undecided, 10 (12.7%) indicated preference for an urban or suburban setting, two (2.5%) indicated urban or rural setting, and one (1.3%) indicated preference for a suburban or rural setting.

In response to annual family income while growing up, seven (8.9%) respondents reported an annual family income of less than $24,999, 25 (31.6%) respondents reported an annual family income between $25,000 and $49,999, 13 (16.5%) respondents reported an annual family income between $50,000 and $74,999, six (7.6%) respondents reported an annual family income between $75,000 and $99,999, and 17 (21.5%) respondents reported an annual family income of $100,000 or more. Nine (11.4%) respondents reported that they did not know their family income, and two (2.5%) respondents declined to answer. See Appendix C on page 45 for a summary of the demographic characteristics of SIU SOM MEDPREP student survey respondents.

Seventy-four (93.7%) respondents replied “yes” to question 3, “Do you have a strong interest in underserved practice?”; five respondents (6.3%) were “undecided.” There were zero “no” responses to this question. Respondents who chose “no” or “undecided” for this question were instructed on the survey to continue to question 22. All 74 (100%) respondents who indicated a strong interest in underserved practice also indicated that they strongly agree or agree

that concerns for the health care needs of individuals in underserved areas have influenced their interest in underserved practice.

More than half of the 74 respondents who indicated they had a desire to practice in underserved areas strongly agreed or agreed that their interest in underserved practice was influenced by an advisor, teacher, instructor, or professor during college as well as during postbaccalaureate program experiences (50/67.6%). Respondents reported less influence by an advisor, teacher, instructor, or professor during elementary school, middle school, or high school (strongly agree/agree 17/23.0%, 19/25.7%, and 29/39.2% respectively). A summary of survey responses for influence by a relationship with an advisor, teacher, instructor, or professor follows (Table 1) showing number of responses per category with percentages in parentheses.

Table 1

Influence of MEDPREP Students' Interest in Underserved Practice Due to a Relationship with an Advisor, Teacher, Instructor, or Professor

	Strongly Agree/Agree	Neither Agree Nor Disagree	Disagree/ Strongly Disagree	Not Applicable	Missing
Elementary School	17 (23.0%)	12 (16.2%)	36 (48.7%)	8 (10.8%)	1 (1.4%)
Middle School	19 (25.7%)	12 (16.2%)	35 (47.3%)	8 (10.8%)	0 (0.0%)
High School	29 (39.2%)	13 (17.6%)	27 (36.5%)	5 (6.8%)	0 (0.0%)
College	50 (67.6%)	11 (14.9%)	13 (17.6%)	0 (0.0%)	0 (0.0%)
Postbaccalaureate Program	50 (67.6%)	13 (17.6%)	9 (12.2%)	2 (2.7%)	0 (0.0%

For the 74 respondents who indicated an interest in underserved practice, participation in a science or health professions enrichment or pipeline program at higher levels of education show greater influence on interest in underserved care: college (56/75.7% strongly agree or agree) and postbaccalaureate programs (48/64.9% strongly agree or agree). Several respondents selected "not applicable" prior to college for this category, which suggests that these types of programs were not available to them during elementary school (26/35.1%), middle school

(24/32.4%), and high school (19/25.7%). A summary of survey responses follows (Table 2) for influence by participation in a science or health professions enrichment or pipeline program showing number of responses per category with percentages in parentheses.

Table 2

Influence of MEDPREP Students' Interest in Underserved Practice Due to Participation in a Science or Health Professions Enrichment or Pipeline Program

	Strongly Agree/Agree	Neither Agree Nor Disagree	Disagree/Strongly Disagree	Not Applicable	Missing
Elementary School	8 (10.8%)	14 (18.9%)	23 (31.1%)	26 (35.1%)	3 (4.1%)
Middle School	10 (13.6%)	15 (20.3%)	22 (29.7%)	24 (32.4%)	3 (4.1%)
High School	26 (35.1%)	8 (10.8%)	19 (25.7%)	19 (25.7%)	2 (2.7%)
College	56 (75.7%)	5 (6.8%)	8 (10.8%)	4 (5.4%)	1 (1.4%)
Postbaccalaureate Program	48 (64.9%)	14 (18.9%)	5 (6.8%)	5 (6.8%)	2 (2.7%)

A large number of the 74 respondents who reported a strong interest in underserved practice indicated that a personal or family member medically-related experience influenced their interests in underserved care (64 strongly agree or agree/86.5%). These respondents also indicated that health professions shadowing experiences (61 strongly agree or agree/82.4%) and mentor/mentee relationships (46 strongly agree or agree/62.2%) influenced their interests in underserved care. The largest percentage for responses for influence in the area of experiences, however, was medically-related volunteer experiences, with 66 or 89.2% of respondents reporting that they strongly agree or agree with this statement.

Over half of MEDPREP respondents (47 strongly agree or agree/63.5%) indicated that guest speakers were influential in their interests in underserved care. Responses for health professions recruitment or career fairs indicate less influence (23 strongly agree or agree/31.1%), yet were positive influences for nearly one third of survey respondents. A summary of survey

responses for influence of MEDPREP students' experiences follows (Table 3) showing number of responses per category with percentages in parentheses.

Table 3

Influence of MEDPREP Students' Interest in Underserved Practice Due to Experiences

	Strongly Agree/Agree	Neither Agree Nor Disagree	Disagree/ Strongly Disagree	Not Applicable
Personal or Family Member Medically-Related Experience	64 (86.5%)	4 (5.4%)	5 (6.8%)	1 (1.4%)
Health Professions Shadowing Experience	61 (82.4%)	8 (10.8%)	2 (2.7%)	3 (4.1%)
Mentor/Mentee Relationship	46 (62.2%)	17 (23.0%)	7 (9.5%)	4 (5.4%)
Health Professions Recruitment or Career Fair	23 (31.1%)	26 (35.1%)	17 (23.0%)	8 (10.8%)
Guest Speaker	47 (63.5%)	11 (14.9%)	13 (17.6%)	3 (4.1%)
Medically-Related Volunteer Experience	66 (89.2%)	3 (4.1%)	2 (2.7%)	3 (4.1%)

Responses to "other" types of influence included first-hand experience being from an underserved community, growing up medically underserved, cultural experience, the documentary *The Pact*, volunteering in programs (one specific example noted was "One 7"), and learning about health disparities in college.

MEDPREP students were also asked to indicate their current area of interest in health professions fields. Some students reported multiple areas of interest, while nine respondents selected "undecided." One respondent reported an interest in academic medicine. Table 4 summarizes respondents' choices by primary care specialties and other specialties.

Table 4

MEDPREP Student Current Areas of Interest in Health Professions Fields

Primary Care Specialties:			
General Pediatrics	18	General Internal Medicine	5
Obstetrics/Gynecology	13	Dentistry	1
Family Practice	12		
Other Specialties:			
Surgery	20	Geriatric Internal	1
Emergency Medicine	14	Hospitalist	1
Cardiology	6	Neonatology	1
Dermatology	6	Neuro Pediatrics	1
Hematology/Oncology	3	Orthopedics	1
Psychiatry	3	Otorhinolaryngology	1
Anesthesiology	2	Trauma	1
Gastroenterology	1	Urology	1

CHAPTER 5

CONCLUSION

The Medical/Dental Education Preparatory Program (MEDPREP) mission is to increase the numbers of underrepresented minority and disadvantaged students from southern and central Illinois who will enter and graduate from health professions schools and who will serve in U.S. health professions shortage areas (MEDPREP, n.d.). The purpose of this research paper is to explore factors that may influence MEDPREP students' interests in underserved practice prior to medical or dental school. To ascertain what factors influence students' interests in underserved care, MEDPREP students were asked to voluntarily complete a 26-question survey that explored types of influence at various levels of education as well as medically-related experiences. Medical and dental schools often provide some types of exposure to service in underserved communities for students while participating in health professions schools; however, MEDPREP student survey results indicate awareness and exposure through "hands on" experiences prior to health professions school may be influential in increasing the interests of students to practice among the underserved.

First, participation in a science or health professions enrichment or pipeline program seems to positively influence students' interests in underserved care. Data from previous studies suggests that the students served by pipeline programs go on to make a difference in medically underserved areas (Andriole & Jeffe, 2011; Blakely & Broussard, 2003; McDougle, Way, & Rucker, 2010). Therefore, this pipeline is an important avenue for increasing the numbers of physicians and dentists that serve in Health Professional Shortage Areas (HPSAs), Medically

Underserved Areas (MUAs), and with Medically Underserved Populations (MUPs). MEDPREP student respondents show similar potential. MEDPREP students indicated participation in science or health professions enrichment or pipeline programs during college (56 strongly agree or agree/75.7%) and at the postbaccalaureate level (48 strongly agree or agree/64.9%) as factors that influenced their interests in underserved practice. A large majority of MEDPREP survey respondents (74/93.7%) indicated that they currently have a strong interest in underserved practice in medical or dental medicine, and a number indicated an interest in primary care specialties such as pediatrics, internal medicine, family practice, and obstetrics/gynecology. For these students, many opportunities lie ahead of them, and choices about the types of practice and location of their practice may change over time due to these experiences. Nonetheless, the awareness gained through some aspect of their pipeline experience has been influential in MEDPREP students' interests in underserved care.

Second, interest in underserved practice may also be influenced by relationships with individuals such as advisors, teachers, instructors, professors, or mentors. These individuals have the potential to affect students' interests through academic or career advisement or classroom instruction. For example, one MEDPREP respondent reported learning about health disparities while in college as an influence in underserved practice. MEDPREP respondents strongly agreed or agreed that relationships with advisors, teachers, instructors, or professors influenced their interests in underserved care particularly at the college (50/67.6%) and postbaccalaureate (50/67.6%) levels. More than half (46/62.2%) of the MEDPREP respondents strongly agreed or agreed that a mentor/mentee relationship influenced their interests in underserved care.

Third, MEDPREP student responses to medically-related volunteer experiences (66 strongly agree or agree/89.2%) and health professions shadowing experiences (61 strongly agree

or agree/82.4%) indicate the importance of these types of "hands-on" experiences as influential in their interests in underserved care. Cultivating awareness and interest among a greater number of students through these types of experiences, particularly at the college level and prior to medical or dental school, holds great promise. Identifying and nurturing students' interests coupled with volunteer and shadowing experiences for a greater number of premedical or predental students may help to increase the overall numbers of physicians and dentists who ultimately choose to practice in underserved areas.

Finally, students must have the strong academic skills to successfully complete the rigors of medical or dental school. In addition to academic skills, however, medical and dental school admissions committees should continue to expand consideration of other experiences and attributes of applicants in selecting students for health professions schools. Resiliency, perseverance, desire, and drive are traits often seen in students who have taken a non-traditional path to health professions school, and personal or family member medically-related experiences help develop empathy for the care of others. Giving greater weight to these factors in the medical and dental school admissions process could help to produce more medical and dental school matriculants who are likely to provide health care services in underserved areas and reduce the gap between minority physicians and minority patients. This increased interest in underserved practice holds the promise to improve access to health care and to increase patient trust and satisfaction.

Since the focus of this research is on MEDPREP students' interests, and nearly all respondents reported they were members of minority groups, no comparisons can be made to non-minority and non-MEDPREP student interests or influences to practice medicine or dentistry in HPSAs, MUAs, or with MUPs.

The magnitude of the anticipated primary care physician shortage, the effects of the Affordable Care Act, and the impact of increasing aging and minority populations are yet to be seen. Health care professionals from all population groups are needed to care for patients. There is a need for not only more physicians and dentists but a more diverse health care workforce to meet the changing medical needs of the U.S. population. Increasing the numbers of students who will enter and graduate from health professions schools and who will serve in U.S. HPSAs, MUAs, and with MUPs is an important step in improving patient access to health care. MEDPREP alumni are making valuable contributions in these areas of need, and respondents to this recent survey provide bright promise for the future in these areas as well.

The motto of MEDPREP is "Making a difference since 1972" (MEDPREP, 2014). Since the inception of the program, numerous students, many of whom were previously rejected by medical or dental schools, have found the academic tools necessary to become competitive applicants to health professions schools, successful practicing physicians and dentists, and individuals who are making a difference across the nation. Making the opportunity available for even more capable premedical and predental students to matriculate into and successfully complete medical or dental school, with or without participation in a pipeline or premedical postbaccalaureate program, would be a major step on the road to meeting urgent health care needs.

Future Directions

A future study to examine retention of physicians and dentists in HPSAs would informative. Of interest would be length of stay and reasons for transitions in or out of in HPSAs (Walker, Ryan, Ramey, Nunez, Beltran, Splawn, & Brown, 2010). In addition, the survey used in this research paper did not examine specific aspects of the pipeline experience that students

felt were influential in their interests in underserved care. Pinpointing and introducing those aspects to additional students could help increase interest in underserved care.

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APPENDICES

Appendix A
CONSENT FORM

My name is Glenda D. Sullivan. I am a graduate student at Southern Illinois University-Carbondale.

I am asking you to participate in my research study. The purpose of this study is to explore factors that may influence MEDPREP students' interests, if any, in serving in Health Professional Shortage Areas (HPSAs), Medically Underserved Areas (MUAs), and with Medically Underserved Populations (MUPS) prior to medical school. Participation is voluntary. If you choose to participate in the study, it will take approximately 10 minutes of your time. You will complete a written survey consisting of 26 questions.

All your responses will be kept confidential within reasonable limits. Only those directly involved with this project will have access to the data.

If you have any questions about the study, please contact me, Glenda D. Sullivan, (618) 453-1650, or my advisor LaShonda Stewart, Director, MPA Program, SIU Carbondale, (618) 536-2371.

Thank you for taking the time to assist me in this research.

Participant Signature and Date

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

Appendix B
Survey

1. Please circle your preference for a community type in which to practice medicine.

   Urban Suburban Rural No Preference Undecided

2. Please circle your preference for a geographic location in which to practice medicine.

   East Coast West Coast Northwest Southwest Midwest South Undecided

3. Do you have a strong interest in underserved practice? (Please circle your response.)

   Yes No Undecided

If your response to Question 3 is No or Undecided, please continue with question 22.

If your response to Question 3 is Yes, please continue.

For questions 4 through 21 listed below, please circle your response to indicate the extent you agree or disagree with each statement concerning factors that may have influenced your interest in underserved practice prior to medical school.

A relationship with an Advisor, Teacher, Instructor, or Professor during:	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Not Applicable
4. Elementary School	SA	A	N	D	SD	NA
5. Middle School	SA	A	N	D	SD	NA
6. High School	SA	A	N	D	SD	NA
7. College	SA	A	N	D	SD	NA
8. Postbaccalaureate Program	SA	A	N	D	SD	NA

Participation in a Science or Health Professions Enrichment or Pipeline Program during:						
9. Elementary School	SA	A	N	D	SD	NA
10. Middle School	SA	A	N	D	SD	NA
11. High School	SA	A	N	D	SD	NA
12. College	SA	A	N	D	SD	NA
13. Postbaccalaureate Program	SA	A	N	D	SD	NA

14. Personal or family member medically-related experience.	SA	A	N	D	SD	NA
15. Health professions shadowing experience.	SA	A	N	D	SD	NA
16. Mentor/mentee relationship.	SA	A	N	D	SD	NA
17. Health professions recruitment or career fair.	SA	A	N	D	SD	NA
18. Guest speaker.	SA	A	N	D	SD	NA

19. Medically-related volunteer experience.	SA	A	N	D	SD	NA
20. Concern for the healthcare needs of individuals in underserved areas.	SA	A	N	D	SD	NA
21. Other (please describe):	SA	A	N	D	SD	NA

For the following questions, please indicate your answers by placing a check mark (√) or an X in the box beside the appropriate responses.

22. What is your gender?	□ Male □ Female □ No Answer
23. Please specify your race.	□ African American or Black □ American Indian or Alaskan Native □ Hispanic or Latino □ Native Hawaiian or Pacific Islander □ White □ Other: please specify _____ □ No Answer
24. Please describe the geographic location that you grew up in before coming to MEDPREP.	□ Urban (population greater than 50,000) □ Suburban (population between 2,500 and 49,999) □ Rural (population fewer than 2,499) □ Other: please specify _____ □ No answer
25. Your annual family income when growing up?	□ Less than $24,999 □ $25,000 to $49,999 □ $50,000 to $74,999 □ $75,000 to $99,999 □ $100,000 or more □ I do not know. □ I decline to answer.
26. What is your current area of interest in the medical field?	□ Family Practice □ Cardiology □ Dermatology □ Emergency Medicine □ General Internal Medicine □ General Pediatrics □ Hospitalist □ Obstetrics/Gynecology □ Surgery □ Other (please specify): _____ □ Undecided

Thank you for participating in this survey.

Appendix C
Demographic Characteristics of SIU SOM MEDPREP Student Survey Respondents

	No.	% of 79
Gender		
Female	57	72.2%
Male	22	27.8%
	79	100.0%
Race/Ethnicity		
African American or Black, African American or Black & American Indian or Alaskan Native, African American or Black & White, African American or Black & Hispanic or Latino, African American or Black & Asian American	70	88.6%
Hispanic or Latino, Hispanic or Latino & Trinidadian/Puerto Rican, Hispanic or Latino & White	6	7.6%
Native Hawaiian or Pacific Islander	1	1.3%
Other (Malaysian, Black, White Venezuelan; African)	2	2.5%
	79	100.0%
Geographic Location Grew Up in Before Coming to MEDPREP		
Urban (population greater than 50,000)	35	44.3%
Suburban (population between 2,500 and 49,999)	35	44.3%
Rural (population fewer than 2,499)	6	7.6%
Urban and Suburban	2	2.5%
Missing	1	1.3%
	79	100.0%
Annual Family Income When Growing Up		
Less than $24,999	7	8.9%
$25,000 to $49,999	25	31.6%
$50,000 to $74,999	13	16.5%
$75,000 to $99,999	6	7.6%
$100,000 or More	17	21.5%
I do not know.	9	11.4%
I decline to answer.	2	2.5%
	79	100.0%

VITA

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Glenda D. Sullivan

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Bachelor of Arts in History, Minor in Women's Studies, Honors Certificate: May 2010

Special Honors and Awards:

Public Service Award, American Society for Public Administration, 2015.

Research Paper Title:

Medical/Dental Education Preparatory Program Students: Making a Difference in Health Professional Shortage Areas.

Major Professor: LaShonda M. Stewart, Ph.D.