PIPELINE PROGRAMS OPTIMIZING UNDERREPRESENTED MINORITY
MATRICULATION TO MEDICAL SCHOOLS

A Thesis

Presented to the faculty of the Department of Educational Leadership and Policy Studies
California State University, Sacramento

Submitted in partial satisfaction of
the requirement for the degree of

MASTER OF ARTS

in

Education

(Educational Leadership)

by

Tucker Stevenson Farrar

SPRING
2012
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Department of Educational Leadership and Policy Studies
Abstract

of

PIPELINE PROGRAMS OPTIMIZING UNDERREPRESENTED MINORITY MATRICULATION TO MEDICAL SCHOOLS

by

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Brief Literature Review

Healthcare disparities are the unequal health outcomes of specific groups of the population based on race, ethnicity, culture, or country of origin. Of the many strategies researched that disable and reduce these disparities are to increase the diversity of the healthcare workforce. Medical pipeline programs targeting underrepresented minorities play a key role in increasing medical workforce diversity. Some colleges, universities, medical education institutions and secondary schools have these medical pipeline programs aimed at equipping underrepresented minorities with the tools necessary to gain medical school acceptance.

Statement of Problem

The objective of this study was to identify medical pipeline programs in existence that optimized underrepresented minorities matriculation to medical school. In such, this study was designed to compare and identify the relative effectiveness between three types of medical pipeline programs, K-12 level, college/university level, and post-baccalaureate level. This study also identified characteristics of effective medical pipeline programs
and hopes to further the knowledge base used for evaluating medical pipeline programs targeting underrepresented minorities in medicine.

**Methodology**

This study employed two methodologies to collect data: survey instrumentation and personal interviews (transcript review). An optional online survey was distributed through the College of California’s Medical School office of diversity and volunteer participants were selected from this sample for personal interviews.

**Conclusions and Recommendations**

Almost two-thirds of underrepresented minority medical students participated in some form of medical pipeline program, which they reported as having helped them gain admission into medical school. Less than 30% of students participated in college/university level pipeline program; however, greater than 70% indicated they believed college/university level type of programs to be the most effective type of pipeline program for preparing underrepresented minorities for acceptance into medical school. The large majority of students reported a strong motivational influence from a college level professor or advisor. Lastly, interview transcripts indicated the most powerful components for pipeline programs are the advising ones (academic, financial, medical school admissions, and life issues).

*, Committee Chair
José Chávez, Ed.D.

Date
DEDICATION

I dedicate this work to my grandfather, Robert H. Tucker. Grandpa Tucker was a man of unsurpassed honor and integrity. His commitments to hard work and loyalty were equaled by his faithfulness as a husband, his dedication as a father and for his unwavering, extravagant.

Grandpa Tucker always used to say “There is no substitute for scholarship.” I know he lived his own advice from his stories of being a young adult going to college and then on to law school. He worked hard to build a career based not only on his strong intellect and work ethic but above all for his tenacious commitment to honesty, integrity and servant leadership.

During my undergraduate years he supported me both financially and through letters of encouragement. During the past two years my hard work and dedication to my master’s studies have, in part, been to honor his memory. I will always remember and revere the way he held fast to his responsibilities as a husband, father and provider for his family.

Grandpa Tucker was a man of his word and lived his convictions of service, compassion and honesty. He role modeled for me and everyone the way a man can honor God and family in everything he does. His dedication to family and God was beyond my scope of understanding as a child, teenager and young adult. Growing up I only knew him as an
incredible grandpa who always made time for me, was patient, loved his wife and adored his children and grandchildren.

It is only now, as a grown man, a husband and father that, I am able to reflect on the depth of his incredible life. In recalling my memories of him I can begin to comprehend the remarkable quality of his character and the extent of his humility. An incredibly accomplished lawyer, loving father and dedicated husband he walked “humbly in the Lord.” A true man of God he lived out the scripture “I tell you the truth, whatever you did for the least of these brothers of mine, you did for me.”

It is with great honor and pride that I am able to write this short but justified praise for the man who continues to shape my character and integrity.

Thank you Grandpa!
ACKNOWLEDGMENTS

I would first like to thank my wife, Jen. Thank you for supporting me through this process and for giving me the endless support and encouragement to study, read and write my way to the end. Always giving me the green light to “work” and never second guessing the times I needed to hole up and study.

Thank you Greyson and Levi for giving up precious “tackle” and “wrestle” time so Daddy could study and write his thesis. Thank you Charlie for your willingness to get fewer runs this past 2 years. I will try to make it up to you starting now!

Thank you Mom, for being my sounding board and commuter landing zone (borrowing your bike and getting rides to and from the train and school). Thank you for help with editing papers and supporting me in so many ways through this program.

Marilyn, thank you for encouraging me to charge the finish line in those final weeks and days. Thank you for always giving me the praise to continue and allowing me to my juggle between work and thesis writing.

Thank you Kell-Bell for being my second reader. I know that reading 100 plus pages of thesis writing must have taken some time and I really appreciate you doing that for me. You are an amazing big sister and role model to me.

Dad, thanks for letting me usurp the Sony digital recorder to conduct my interviews.
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Chapter 1
INTRODUCTION

Background

Healthcare disparities are widespread, pervasive, and complex. These inequalities in health care, treatment of illness, and health outcomes have existed for centuries (Grumbach & Mendoza, 2008). While the inequalities have been studied for decades, solutions are still evasive. Meanwhile, underrepresented constituents consistently and continually receive lower quality of care for a number of complex social, economic, geographic, and training issues (Sequist & Association of American Medical Colleges, 2009).

Much of the debate over healthcare disparities has moved away from the question of if the disparities exist to why and what can be done about them. In the pages that follow and included literature review, some key studies are identified showing strong evidence that disparities do exist in many arenas within healthcare (Augustin, 2010; Grumbach & Chen, 2006; Grumbach & Mendoza, 2008; Logan, Davis, & Parker, 2010; Shavers & Shavers, 2006). Also currently advocated solutions addressing the problem from many angles are discussed. Among the solutions is the increased diversity of healthcare providers.

With elimination of healthcare disparities being a shared goal, many experts, lawmakers, healthcare providers, medical institutions, and healthcare networks are
collaborating to tackle this complex and systemic issue (Agrawal, Vlaicu, & Carrasquillo, 2005; Blakely & Broussard, 2003; Grumbach & Chen, 2006; Lipscomb, Mavis, Fowler, Green, & Brooks, 2009; McDougle, Way, & Yash, 2008; Villarejo, Barlow, Kogan, Veazey, & Sweeney, 2008). Current research reflects an increasing momentum to act for both the long-term health of our country as well as the reduction of hidden financial burdens created by endemic healthcare disparities (Sequist & Schneider, 2006).

A movement to reverse the trend and eliminate healthcare disparities has been widely researched with many effective strategies developed and implemented. Medical schools incorporate cultural care training and some require service in urban clinics as a medical rotation. Research shows that another component in helping to reduce healthcare disparities are “pipeline” programs increasing the number of underrepresented minorities gaining acceptance and matriculating into medical schools. Literature reviewed in Chapter 2 shows how this factor, underrepresented minority success in medical school matriculation, can make a significant impact on this public health issue.

Three theoretical frameworks structure the discussion about healthcare disparities and workforce diversity within healthcare. The three frameworks are social capitol theory, critical race theory, and transcultural nursing theory. Chapter 2 is organized into three main subtopics: 1) theoretical frameworks applying to the topic, 2) healthcare disparities, and 3) medical pipeline programs. The healthcare disparities section has two sections: healthcare disparities and healthcare workforce diversity. The last subtopic is medical pipeline programs, which is split into three sections: 1) K-12 programs, 2)
College/University programs, and 3) Post-baccalaureate programs. Effective medical pipeline programs targeting underrepresented minorities are necessary tools for addressing the long-term issue of healthcare disparities (Sequist & Schneider, 2006). Within the three sub-categories, there are many varied pipeline programs that exist to increase the number of underrepresented minority applicants successfully matriculating into medical institutions. In this research study, the phrase underrepresented minority refers specifically to the healthcare industry and even more specifically refers to African Americans, Alaska/Native Americans, and Latinos(as) (Grumbach & Mendoza, 2008).

Medical pipeline programs range from kindergarten science programs in urban schools, themed high schools strategically located in inner city neighborhoods, medically themed high school academies, undergraduate biology scholars programs, university/medical school collaborative programs, and post-baccalaureate pipeline programs (Grumbach & Chen, 2006). In light of the data suggesting sluggish progress in the area of underrepresented minorities in the health professions, the need exists to evaluate such programs with the goal of identifying which programs are being truly effective.

Infant mortality among African Americans dropped significantly between 1950 and 1998. The rate dropped from 43.9 deaths per thousand in 1950 to 13.8 in 1998. Despite this drastic and hopeful gain in infant outcomes this disconcerting fact remains: the infant mortality rate for African Americans was 130% higher than that of Whites as recently as 1998 (Cohen, Gabriel, & Terrell, 2002). African Americans have a lower life
expectancy than Whites; African Americans are more likely to die from cancer, diabetes mellitus, and stroke (Grumbach & Mendoza, 2008). African American women are twice as likely as White women to die from cervical cancer (Nickens, Smedley, & Institute of Medicine (U.S.), 2001).

The startling statistics are merely the tip of the iceberg regarding healthcare disparities in the United States. Inequalities exist in the resources available to urban hospitals and clinics in low-income areas serving primarily underrepresented minorities (Sequist, 2010). A disproportionate number of physicians, nurses, and healthcare providers lack the proper cultural competence necessary to deliver high quality care to the extremely diverse population existing in California while the medical research agenda in the United States is biased toward issues affecting Whites and majority groups (Leininger & McFarland, 2006). With an increased representation of underrepresented minorities in healthcare fields ranging from physicians, researchers, medical policymakers, to medical school leadership, there will be an increased focus in medical research to address the diseases and issues primarily effecting underrepresented minorities and largely going under-researched and underfunded (Augustin, 2010).
The focus of this study is the pipeline programs aimed at increasing healthcare workforce diversity as it relates to the reduction of healthcare disparities. The following research questions are addressed:

1. Which (if any) types of medical pipeline programs appear most effective in optimizing medical school matriculation for underrepresented minorities?

2. If a type of pipeline program appears superior to the others, what are the characteristics that make the program effective?

If a medical pipeline program exists to optimize matriculation, then ongoing comparative assessment of such programs is built into the structure of the programs from the onset. In these times of lean budgets, rising healthcare costs and arguably a society becoming increasingly obese, sedentary, and subsisting on fast food diets, we cannot afford the cost of ineffective medical pipeline programs. By distinguishing those programs optimizing matriculation into medical school, the effective programmatic characteristics can be studied, modeled, and reproduced.

Lest we become impatient, the issue of healthcare disparities in the United States will ultimately be solved through decades of political effort and progressive policies. The time has come to respond to the data. Efforts to streamline the money, time, and resources spent addressing healthcare disparities will manifest with a healthier population of underrepresented minorities nationwide, better healthcare research, and saved
resources (time and money) in the treatment of preventable diseases for all Americans (Subban, Terwoord, & Schuster, 2008).

Statement of the Problem

The objective of this study is to identify medical pipeline programs currently in existence that optimize underrepresented minority matriculation to medical school for those wishing to pursue careers in medicine. This study hopes to further the knowledge base used for addressing healthcare disparities. As previously stated, two research questions outline this study. Which (if any) types of medical pipeline programs appear most effective in optimizing medical school matriculation for underrepresented minorities? Expanding on this question leads to several prongs of additional questions. Which measurement methods will accurately assess the effectiveness of medical pipeline programs? How can measurements assess which pipeline programs are most effective in increasing the number of underrepresented minority students who successfully matriculate? How can specific research methods separate the effective programs that actually increase the underrepresented minorities from entering medicine from the programs that simply channel those gifted and bright underrepresented minority students who already had an interest in medicine?

Frameworks to codify the study include Critical Race Theory, Social Capitol Theory, and Transcultural Nursing Theory. Critical Race Theory has been recently developed at institutions of law analyzing the way in which White supremacy, White
privilege, and racial power are propagated over time and, specifically, how the law plays a role in the process (Delgado & Stefancic, 2000). Social Capital Theory refers to the connections within the affected cultures and, in this case, underrepresented minorities. Increased numbers of social contacts for an individual mean more power and improved opportunity for advancement (Jones, 2011). These connections have intrinsic value and in effect amplify or reduce the medical pipeline volume of underrepresented minorities. Transcultural Nursing Theory is a body of knowledge and field of nursing that assists in providing culturally appropriate nursing care. Providing culturally relevant care is a focal point of transcultural nursing and highlights the need for a diverse healthcare workforce (Leininger & McFarland, 2006).

Definition of Terms

Allied Health Careers

Allied health professions are clinical health care professions distinct from dentistry, nursing, and medicine. Allied health professionals make up 60% of the total health workforce (Chapman, Bates, O’Neil, Chan, & Donini-Lenhoff, 2008). They work in healthcare teams to make the healthcare system function by providing a range of diagnostic, technical, therapeutic and direct patient care and support services critical to the other health professionals with whom they work and the patients they serve.
Allopathic Medicine

Mainstream medicine as viewed from a western perspective, a biologically based approach to healing (Budd, Fisher, Parrinder, & Price, 1990).

Cultural Competence

Knowledge, skills, attitudes, and behaviors required of a practitioner to provide optimal healthcare services to persons from a wide range of cultural and ethnic backgrounds (Cohen et al., 2002).

Health Disparities

Differences in the incidence, prevalence, and burden of diseases, mortality, and other adverse health conditions that exist among specific population groups in the United States as defined by social, demographic, geographic, and environmental attributes (Grumbach & Mendoza, 2008). The key is there are differences between populations in measures of health (e.g., access to care, health outcomes, rates of chronic disease).

Health Equity

The absence of systemic disparities or differences in healthcare between populations (Sequist & Association of American Medical Colleges, 2009).

Health Inequalities

Sometimes used interchangeably with the term health disparities, is more often used in the scientific and economic literature to refer to summary measures of
population health associated with individual- or group-specific attributes (e.g., income, education, or race/ethnicity) (Centers for Disease Control, 2011)

Health Inequities

Many of the factors associated with health inequalities are correlated with social disadvantage and lower socioeconomic status. Health inequities are considered ethically unfair and, therefore, represent a social injustice or lack of fairness or justice in regard to the quality and access of care based on ethnicity, culture, or socioeconomic status. This term refers to the rights of people to access quality healthcare (Augustin, 2010).

Matriculate

To attain an academic standard required for enrollment into an institution, especially a college or university

Medical Pipeline Program or “Pipeline Program”

A course or program of individual advancement or development, especially to fill organizational or societal needs. The “medical pipeline” refers to programs or lack thereof and the number and quality of individuals applying to medical schools. Medical Pipeline programs facilitate the process of underrepresented minorities becoming well prepared and motivated to succeed in candidacy to medical school (Grumbach & Chen, 2006; Grumbach & Mendoza, 2008; Sequist & Association of American Medical Colleges, 2009; Sequist & Schneider, 2006).
Transcultural Nursing Theory

A substantive area of study and practice focused on comparative cultural values, beliefs, and practices of individuals or groups of similar or different cultures with the goal of providing culture-specific and universal nursing care practices in promoting health or well-being or to help people face unfavorable human conditions, illness, or death in culturally meaningful ways (Leininger, 2001)

Underrepresented Medicine

Underrepresented minority physicians or underrepresented minority medical school students. For the purposes of this research study, the above stated definition for underrepresented minority will be applied and extended to the phrase underrepresented medicine as well.

Underrepresented Minority

The definition of underrepresented minority (URM) varies slightly depending on the source, author, or study. According to the U.S. Department of Health and Human Services (2011), the term URM is defined as “racial and ethnic populations who are underrepresented in a designated health profession discipline relative to the percentage of that racial or ethnic group in the total population” (Grumback, 2008, p. 416). Included in this definition are Black or African American, American Indian or Alaska Natives, Native Hawaiian or other Pacific Islanders, Hispanic or Latinos, and any Asian other than Chinese, Philipino,
Japanese, Korean, Asian Indian, Thai, or Vietnamese/Southeast Asian (Merchant & Omary, 2010).

Workforce

The labor pool or force of workers available to effectively supply the needs of a specific industry, geographic area, or both.

Limitations

There were several limitations to this study and some factors that limited the sample size for this study, the first of which is access to medical students in the population. The survey instrument was distributed to students only attending the College of California Medical School. No other populations of medical students were included in the study in part due to the scope of this thesis and in part due to difficulty in gaining access to the students attending other medical schools.

A second reason why the sample size is limited was because the survey was optional for participants, thus data were collected from only those subjects willing to participate for no compensation or inducements. These factors contributed to a decreased sample size and might be skewing the interpretation of the data and, thus limit the accuracy of rendered conclusions.

Another limitation involved the diversity of the sample population. The survey was sent via email to the medical students at the College of California School of medicine who participate in the school Office of Diversity programs and self-identified as
underrepresented minorities in medicine. It is not guaranteed the included students are
the type of underrepresented minorities as defined by the scope of this study, and this
factor was not controlled for in the survey instrument.

Lesbian/Gay/Bisexual/Transgender communities are considered underrepresented
minorities; however, they were not included as part of the data set for the survey and
literature review. Therefore, potentially valuable data on effective pipeline programs was
not collected from 1) students considered to be in a majority group, 2) students not
willing to take the survey, or 3) medical students outside the College of California
Medical School.

This study is not an exhaustive comparison of all medical pipeline programs. It
will help shed light on the relative effectiveness of those pipeline programs on which the
survey respondents reported. Survey results are limited to what participants have
experienced and cannot take into account the complex role of multiple pipeline programs
from the pathway of an individual student.

While a renowned medical school like the College of California School of
Medicine draws students from all over the world, there were limitations based on the
geographic representation of the respondents. A large proportion of medical students at
the College of California School are residents of California, which then presents another
aspect of data collection for which the data cannot be controlled. Factors and/or
programs specific to California will render results that are potentially California specific
and cannot and should not be applied nationally.
In an effort to keep the survey instrument short and, thus increase the likelihood of participation, there were relatively few questions designed to tease out specific details of the pipeline programs. Instead, the researcher, through the survey, attempted to draw out a holistic effectiveness of the various categories of pipeline programs reported. Collecting large amounts of quantitative data on detailed aspects of the pipeline programs was beyond the scope of this research project.

Significance of the Study

The current research on underrepresented minorities and healthcare disparities denotes the significant financial impact of unaddressed nationwide healthcare disparities (Rosenthal, Landon, Normand, Ahmad, & Epstein, 2009). This issue, if left unresolved, has long-term consequences regarding the growing gap between the lower class and upper class, racially divided life expectancies, and overall health outcomes for minority groups (Rosenthal et al., 2009).

This research inspects the problem of healthcare disparities and underrepresented minorities in medicine from a “what is working” standpoint and tries to identify some common trends or programmatic themes. Industry leaders and politicians can demonstrate a commitment to fairness and equality by reforming medical school pathways and improving the pipeline programs to better serve the healthcare needs of all Americans. By valuing healthcare diversity in this way, our nation will create the integrity that honors its citizens by which a just and fair society can stabilize and flourish.
The field of educational leadership will benefit from this study in several ways. Medical students earn their undergraduate degrees from institutions all over the United States. Some colleges and universities have incredible pre-medical school pipeline programs while many institutions cannot afford such programs or do not value such programs. It behooves leaders in higher education to become aware of the importance of specific programs aimed at increasing underrepresented minority success in the sciences and medicine. Success or failure of pre-medical and post-baccalaureate programs at universities will inevitably be linked to the upper management and top-level leadership within that institution. Said leadership can create wise and informed policies on the political and social importance of these university programs as they relate to healthcare disparities and issues of health equity.

Additionally, from the standpoint of an admissions officer or college dean, data-driven decision making with relation to the effective recruitment of highly qualified, underrepresented minority high school seniors will most certainly garner support from alumni and shareholders. The students who will fill undergraduate medical pipeline programs will later be the incoming first-year medical students. If a diverse pool of high-potential incoming freshman increases the number of underrepresented minorities gaining acceptance into medical school, and this trend is based on progressive university leadership and policy decisions, then the popularity and public perception of a president and her/his administration will improve.
The need for this study is evidenced in part by the disproportionately small amount of literature dedicated to evaluating the relative effectiveness of the various pipeline programs. While individual programs have been and are constantly under evaluation there are relatively few studies doing program comparisons. Few studies have been conducted on pipeline programs’ abilities to increase the volume of the students within the pipeline and not simply successfully place the gifted minority students into medical school. This study aims to increase the body of research identifying which medical pipeline programs appear to be optimizing medical school matriculation.

This research will contribute to the field of higher education at both the university level and the medical school level informing leadership and policymakers about the importance of and need to improve aforementioned medical pipeline programs. Specifically, colleges or medical schools who have a large proportion of underrepresented minorities have an untapped opportunity to implement a high impact medical pipeline program. The practical application of a working body of knowledge about medical pipeline programs can aid in the creation of new or improved programs meeting the specific needs of individual colleges or universities. Theories of what constitutes effective pipeline programs must be broadened when data suggest pre-high school programs having a potentially significant impact. Transformational and innovative leaders in higher education will stand to improve their professional practices by developing a proficient if not thorough understanding of the issues involving
healthcare disparities and the vital role higher education plays toward the reduction and elimination of these healthcare disparities.

Organization of the Remainder of the Study

The remainder of this study will be presented in four chapters. Chapter 2 reviews literature related to medical pipeline programs that target underrepresented minorities and their role in increasing healthcare workforce diversity. Healthcare disparities are also covered in the review of related literature as these issues of inequality relate directly to workforce diversity and the need for effective pipeline program for underrepresented minorities. These topics also provide a rationale for the study.

Chapter 3 describes the methodology of the study including the setting, population, sample selection, data collection, and data analysis procedures. Chapter 4 presents the study results organized in two sections by research question. Finally, Chapter 5 provides a study summary, conclusions, and recommendations for further study of effective medical pipeline programs targeting underrepresented minorities.
Chapter 2

REVIEW OF RELATED LITERATURE

Introduction

The United States faces the significant challenge of addressing the disproportionate representation of underrepresented minority populations in medical professions. The underrepresented minority populations for the medical workforce, particularly physicians, include African Americans, Latino/as, and Native Americans. An alarming fact is that while one in eight Americans is African American, only 1 in 20 is a doctor or a dentist (Augustin, 2010). Additionally, Latinos comprise 12% of the United States population; however, they make up only 2% of physicians (Logan et al., 2010).

The consequences of such underrepresentation follow in the subsequent literature review. The complex issue of healthcare disparities has a myriad of data-driven policies, one of which focuses on addressing workforce diversity. This strategy, discussed in this chapter, refers to medical pipeline programs intended to increase underrepresented minority acceptance into medical school. For the purpose of this study, these pipeline programs fall into three categories: 1) Kindergarten-12th grade, 2) College/University level, and 3) Post-baccalaureate programs.

Three theoretical frameworks are discussed in relation to the issues of health care diversity and increasing medical workforce diversity, specifically physician diversity.
The three discussed theoretical frameworks are Social Capital Theory, Critical Race Theory, and Transcultural Nursing Theory. A discussion on healthcare disparities is followed by a review of related literature for the three categories of pipeline programs, K-12 programs, college/university programs, and post-baccalaureate programs.

**Theoretical Frameworks Relating to Healthcare Disparities**

*Social Capital Theory*

Virtually every piece of empirical research on social capital has concluded that education, and particularly university education is associated with higher levels of social capital at the individual level. (Halpern, 2005, p. 233)

Social Capital Theory addresses the construct or idea that in communities where human beings interact, and in the context of diversity, there are expectations of trust and interconnectedness. Social networks are created (i.e., social capital) and give value to participants within communities and societies in which we live (Pattussi, Hardy, & Sheiham, 2006a). The underpinnings of Social Capital Theory are widespread throughout varied domains of social and economic theory. Much research applications have linked social capital to personal and societal advancements from a wide range of subject matters such as education, politics, manufacturing, and economics (Halpern, 2005). Threads of Social Capital also articulate within the domain of healthcare disparities and that of medical pipeline programs.
A reductionist definition of social capital theory can simply be stated as “it’s not what you know it’s who you know” (Jones, 2011, p. 118), but the simplicity of this model does not continue in its application to many disciplines, politics, economics, business, developments, health, and education (Fine & Saad-Filho, 2010). According to Jones (2011), “social capital is the social structure that individuals build and maintain to seek the things they value” (p. 46). Social capital also refers to the connections within and between social networks. In many cases, social capital is defined by its function and has been called the connective tissue of society (Jones, 2011).

The strength of social capital theory can be its weakness as just about any topic of study can be looked at through the lens of social capital. Since no real social dynamic occurs with an individual in isolation from others or society, the exchange of capital through ideas, leadership, interaction, or power can always be linked to fit into the changing landscape of the social capital framework (Jones, 2011). Jones (2011) presented a model of social capital comprised of four categories, 1) Voluntary Associations, 2) Family, 3) Social Networks, and 4) Work. Within each of the following categories is a discussion and application of Social Capital with regard to pipeline programs and the increasing of underrepresented minority success in medicine.

A premise of American society is our freedom to voluntarily form groups and associations (Tocqueville, 1835). Through extensive research and reasoning, Alexis De Tocqueville, in *Democracy in America*, refers to a specific American response to form groups rather than rely on oneself or the government (Tocqueville, 1835). For better or
worse, America has been built on our voluntary associations: churches, PTAs, neighborhood associations, and book clubs. Social capital is created and passed on through these voluntary groups, committees, unions, etc. (Jones, 2011).

If social capital is gained by voluntarily joining a group or organization, there must be a connection or a link of some sort to initiate the association. A person will not join a Future Factors of America or the America Coalition of Physicians if their social network or sphere of influence has no connectedness to such a group. Nor might such a person have access to learn about such an association. In part, the barrier of access takes the form of awareness, and many underrepresented minorities are unable to participate in a group or association they know nothing about.

The second and perhaps most significant foundation of the social capital framework is that of the family. Arguably, the building block of modern society, the family unit is a primary source of social capital for individuals and groups (Astone, Nathanson, Schoen, & Kim, 1999). The family unit is perhaps the single most important investment made to societies, and we currently see a dramatic decrease in the foundational structure of these systems. Common family behaviors, marriage and childrearing, remain the hallmarks for unparalleled increases in social capital (Astone et al., 1999).

A decrease in the social capital of a group or individual can be in part due to the decline of the core family unit of 21st-century American society. According to Putnam,
(2000) the destabilization of this form of social capital comes on the heels of more single-parent homes, broken families, mothers working full-time, and absentee or jailed fathers.

Both underrepresented minority groups and majority groups are suffering due to this epidemic decline in the lost capital through the destabilization of the family unit. However, for minority groups already at a disadvantage, either educationally or socioeconomically, the disadvantage created by the broken family syndrome can be insurmountable in a bid to pursue and navigate the challenging educational pathway to a career in medicine. Additionally, without adequate male role models, many adolescent boys turn away from academics and turn toward gangs or drop out of school altogether. Broken families can create an instability that can make goal setting and academic success extremely difficult (Jones, 2011).

Social Networks, the third category of Jones’s (2011) model, address the resources of social networking. It brings us back to an earlier definition of social capital and the familiar saying, “it’s not what you know it’s who you know” (Jones, 2011, p. 118). In today’s economic downturn, this facet becomes even more pervasive as jobs are scarce and the income gap between rich and poor continues to widen. The “haves” hold on tight to what they have and continue to network within the groups and sub groups of “haves” while the “have-nots” continue to slip further behind economically and educationally in their access to jobs, inherited resources, property ownership, and wealth (Jones, 2011).
According to Teachman, Paasch, and Carver (1996), there is a finite amount of social capital available within families; therefore, in difficult times, economic or otherwise, or with each additional sibling in the household, there exists more sibling competition and less capital is available to each child. The social networks within the modern day recession create very real barriers to educational success and a college education becomes a privilege to the wealthy more than an equal access opportunity for all (Teachman et al., 1996).

The fourth and last category for Jones’s (2011) social capital model is work. Work is inherently social by nature, even for seemingly isolated jobs such as a university professor. On the surface, a professor lectures and spends much of her/his time alone doing research. Yet, behind the scenes are meetings, committees, advising of graduate students, and supervising departments. Work is also the clearinghouse for individuals to produce intangible yet very real entities like trust, efficiency, knowledge sharing, and action taking (Cento & Jones, 2006).

Work creates capital within groups and cultures that can propagate throughout the group and intersecting groups. For example, ethnically based social ties serve as obstructions to keep ethnic outsiders from breaking into specific job markets. In a study of labor markets in large U.S. cities (New York and Miami), ethnically based social ties prevent ethnic outsiders from joining a specific labor market (Wells, Seifert, Padgett, Park, & Umbach, 2011).
The same can be said in regard to the current state of diversity in research medicine. People in a classification within medicine very much dominated by White males are slowly becoming aware of their ethnic misrepresentation. On average, one out of 10 medical school admission committee members are physicians from underrepresented minority groups, and Blacks, Hispanics, and Native Americans comprise only 6.4% of practicing U.S. physicians. These populations make up 27% of the total general U.S. population (Sequist & Schneider, 2006). Additionally, as recently as 2000, only 7.3% of all medical school faculty were underrepresented minorities (Williams & Rucker, 2000). Having keen awareness of these troubling statistics can start the leadership process of looking back on medical school admission policies or pipeline funding practices that may have limited a school’s diversification. Subsequent evaluation of the site-specific data will shed light on the need and benefits of a diverse medical school faculty and student body.

**Social Capital and Health Disparities**

Social capital has also been linked with improved health outcomes ranging from universally significant (explaining the differential survival of holocaust twins) to the potentially insignificant (improved dental outcomes based on increased social capital (Pattussi, Hardy, & Sheiham, 2006b). Thus, the more social capital a person has, the healthier he/she will be. Those with less social capital have less knowledge about healthcare, are more likely to have inadequate health insurance, and are less likely to see
a doctor; all factors leading to depressed health outcomes (Pattussi, Moyses, Junges, & Sheiham, 2006).

In the current study on the medical pipeline program, the framework on social capital is applied to the quality and presence of a social network or lack thereof promoting underrepresented minority students to successfully matriculate to medical school. The process of bridging, bonding, or linking an individual to their greater community then creates the opportunities for advancement and greater success (Pattussi et al., 2006a). Bonding refers to the capital across groups whereas bridging refers to the connections within groups. Individuals with more social capital, greater connections to the larger community, mentors, family mentors, etc. will have greater access to the educational pipelines, community networks, and university services. These connections will undoubtedly increase the chances of medical school admissions.

*Social Capital and Underrepresented Minority Medical Students*

Underrepresented minorities seeking to pursue careers in medicine have, on average, significantly fewer social capital networks than their White counterparts (Astone, Schoen, Ensminger, & Rothert, 2000). Social capital networks in this context refers to doctors, nurses, teaching doctors, medical school deans, etc., who represent any given underrepresented minority group in the given industry. This also refers to the social capital within a given community to support or encourage individuals to pursue a passion or career. There are a disproportionate number of underrepresented minorities
currently in medically related fields with which students can seek social networking opportunities (Grumbach & Mendoza, 2008).

With regard to underrepresented minority students seeking medical school admission, there can be a complex array of variables forming the networks that lead or do not lead to success. For student A, increased social capital could lead to family or community connections that inspire a talented student to pursue science in college. These networks might connect student A with a family friend or mentor who is in the medical field (a lab technician, physician’s assistant, pediatric nurse, cardiologist, etc.) to mentor and direct high-potential student A to navigate the complicated medical school pathway. Student B might also have a high level of social capital within his/her community; however, the direction from the community leaders might be to remain in the community as a community organizer and help rebuild the community with natural leadership abilities. Or perhaps student B, because of a high level of social capital, will be drawn to stay and directly serve the needs of their immediate community instead of pursuing personal goals of a career in medicine.

Social capital as it relates to the educational process of students in urban areas has been studied extensively in a variety of permutations. Butler and Robson (2001) conducted research and identified that local schools in the urban area slowly lost quality teachers and continued to lose funding. Through this, and the process of gentrification, certain pockets of the urban population sent their children to private schools and, thus removed themselves from educational and social settings (within the same
neighborhoods) in which they would otherwise interact with those families who could not afford private school (Robinson, 2001).

Thus, Social capital that would otherwise be present in schools and pockets within school communities is then segregated and transplanted. The social capital is made available only to certain pockets or areas linked with the highest performing schools in the area (Robinson, 2001). Students who have reduced social capital in the pathways leading to medicine would have decreased chances of using capital to help their career paths since that social capital “moved” to the school neighborhood next door. Additionally, students with less social capital learn less about the pipeline programs that exist to help them succeed in the medical school matriculation; pipelines would then not be as easily accessed.

In summary, lack of social capital for underrepresented minority populations continues to create barriers for students to pursuing passions and careers. The complex web of social interactions at play within social capital is, thus used as a framework by which to view and discuss the issues of healthcare disparities and investigate the effectiveness of medical pipeline programs.

Critical Race Theory

Critical Race Theory…contend(s) that the perspective of the discriminated-against, oppressed individual or group **must** be better understood by the larger
society and that the\textbf{law} should look not to the wrong of perpetrators but to helping those who have been victims of discrimination. (Asch, 2001, p. 1)

Critical Race Theory (CRT), a relatively new framework for the landscape of race and power struggles in this country, dates back to the mid 1970s in its origin. CRT scholars emerged from the continued efforts for racial and ethnic equality and ever-present struggles with civil rights. CRT is a movement typically marked by younger writers, engaged in an effort to challenge the status quo of race relations, the role of the law and legal structures in perpetuating systemic racism, and challenging effectiveness of the comfortable liberal platform “color blind” (Smith, Hutchison, & Mairs, 2004).

The literature presents several definitions of CRT. Whichever definition one chooses to use, the topic has the ability and tendency to make people uncomfortable. CRT has been classified as a grassroots movement by people of color for people of color to: 1) address systemic racism from a legal standpoint and 2) critically analyze the “color blind” structures in place that supposedly minimize the effects of ingrained societal racism (Smith et al., 2004). Indeed many scholars and authors of color have made contributions to CRT over the past 30 plus years; however, now contributors to CRT come from all races and ethnic backgrounds (Harper, Patton, & Wooden, 2009).

According to Vaught and Costagno (2008), the theoretical framework of CRT operates within three suppositions: 1) that racism is pervasive, 2) that racism is permanent, and 3) that racism must be challenged. At the core of CRT is the idea that racism is pervasive and more than a peripheral issue isolated to pockets or individuals.
CRT contends racism is widespread, systemic, and not quantifiable to select regions or entities. Second, racism has a way of adapting the acceptable norms and/or the current society; thus discrimination manifests in ways so as to legally pass under the proverbial radar. So, according to CRT theorists, by altering its expression, racism is able to adapt to changing socio-cultural norms and never really disappears (Vaught & Castagno, 2008). CRT theorists argue that racism must be challenged from legal, legislative, holistic, and systemic perspectives. Finally, CRT maintains “colorblindness” has neither reduced nor eliminated the need to address racism and racially inequality must be scholastically argued (Delgado & Stefancic, 2000).

Earlier CRT founders echoed similar themes in their assessment of how Critical Legal Studies are applied to race and racism. CRT attacks structures in the law, calling it racialized law, which gives advantages to privileged, majority groups and the wealthy in the United States (Crenshaw, 2002). According to Crenshaw (2002), early foundations of CRT took the forms of four arguments:

1) Racism is a norm of daily life, almost accepted and in the background, an ingrained part of our political and legal structures in a way that it is almost camouflaged.

2) CRT challenges the supposition that the experience of the White European Americans is the standard against which all experiences are compared, a normative standard.
3) CRT seeks to render a distinct framework to the experiences of people of color and use this to challenge the existing construction of race.

4) CRT attacks liberalism and the belief that the law can be used to create a just, equitable, and racist-free society, exposing the shortcoming of laws that prevent blatant acts of racism but allow for the expunging of rights for racially marginalized groups. (Crenshaw, 2002, pp. 1366-1367)

The application of CRT to the successful admission of underrepresented minority groups into higher education and/or medical school has implications for this study and future studies on the topic. Higher education opportunity gaps persist for African Americans, Latino(a)s, Native Americans, and Alaska Natives despite the many programs and laws put in place to create equity in access; 21% of White adults have attained bachelor’s degrees whereas only 13% of Black adults, 9% of Native American and Alaska Native adults, and 9% of Hispanic and Latino adults (Harper et al., 2009). The long-standing issues of access inequality prove the access gap persistence is perpetuated at both the institutional and societal levels.

Despite adopted institutional values on equity, fairness, and student acceptance based on merit, veiled forms of racism persist in higher education and medical school admission policies (Harper et al., 2009). Colorblind admissions policies and social policies, for that matter, tend to only address the most blatant forms of racism and leave the more surreptitious forms of racism behind, many of which can be subconscious and/or go undetected by those in power. This subconscious way of embracing colorblind
ideologies can serve as a way to unknowingly propagate the privilege of Whiteness without being held accountable (Harper et al., 2011).

The aforementioned issue has been and continues to be an area of struggle for medical school boards and Deans of admission as they seek to select the best and the brightest to become the next generation of doctors, research physicians, and medical school faculty. Viewing applicants through colorblind lenses continues to be controversial. The ability to reduce healthcare disparities through increased workforce diversity has been proven time and again in the literature and yet there continues to be dramatic misrepresentations of people of color (underrepresented minorities) in medical school across the country (Constantine, Myers, Kindaichi, & Moore, 2004).

CRT creates a lens through which the unique experiences and voices of underrepresented minorities can be viewed and heard. Racial subordination is particularly powerful in the field of education and must be taken into consideration. For example, when assessing an applicant’s abilities and aptitudes for success in medical school, an admission team, according to CRT, must consider the racial subordination that individual has experienced in the educational path (Harper et al., 2011). Lived experiences of racism and subordination are legitimate and often difficult to overcome; hence, by organizing and articulating this dynamic into the framework of CRT, theorists hope to create a more comprehensive picture of race and education (Harper et al., 2009). As such, CRT can use scholarly journals to argue the presence of discrimination in current policies and the universal assumption of race.
A compelling, if not heated, process of CRT is called interest-convergence by which the White power structure will “tolerate or encourage racial advantages for blacks only when these advantages also promote white self-interests” (Delgado & Stefancic, 2000, p. 17). The argument remains that efforts to reduce the hidden forms of racism have produced minimal results because there has been insufficient convergence of interest between White elites and African Americans. For example, promoting equality in neighborhood schools or health clinics would negatively impact the financial advantage of the White majority groups and would, thus not be a policy supported by White elites. Point-of-interest convergence would be when an outside grant funded the health clinic for an underserved Black community and the result was the rerouting of the Black community to another available clinic (a White clinic) in the next neighborhood over.

CRT also takes the responsibility for reexamining, reinterpreting, and scrutinizing the way history was written in attempts to create a more factual representation. CRT argues that American history has been written from a majority perspective in a way that does not accurately portray the experiences and viewpoints of minorities throughout history (Crenshaw, 2002). One aspect of this argument refers to the voice and portrayal of historical events surrounding slavery in the United States. CRT aims to look at oppression through the eyes of the oppressed; therefore, instead of referring to a person as a “slave,” as if the claim to their identity stops there, that person is referred to as a
person in the “process of being enslaved” (Crenshaw, 2002, p. 1349). This word choice supports the oppressed and creates a different lens through which history can be depicted.

CRT theorists and scholars argue racism is a way in which power and authority is allocated across society. They contend that a hierarchy decided who will receive the benefits of racism and when and to what extent these benefits will be given. Many Critical Race theorists continue to argue that racism is a real and permanent fixture not only in American society, but on college and university campuses (Harper et al., 2009).

As mentioned earlier, CRT elicits emotion and defensiveness, yet requires any dean, provost, president, or leader in higher education to address and assess the current state of their institution with regard to race and racism. The nature of CRT requires admissions officers, academic officers, and student affairs teams to look under the surface of their programs and policies the way CRT scholars investigate race relations and racism at all levels.

**Critical Race Theory and Underrepresented Minorities Medical Students**

CRT scholars would argue that admission policies for medical school need a top-down assessment of their overall role in addressing healthcare disparities by increasing the number of underrepresented minority students admitted. This challenge points directly to a leak in the medical pipeline – loss of volume (Augustin, 2010). The challenge of medical school admissions is to maintain the highest of standards to ensure only the best and brightest be accepted into medical school. If there is not a large enough
supply of qualified underrepresented minorities (loss of volume in the pipeline), what are admissions officers to do?

The best pipeline programs and innovative policies are needed to increase the volume of qualified underrepresented minorities. Additionally, for medical school leadership teams, deans and presidents, a working knowledge of CRT and the impact of discrete racism on the institution’s recruitment, admissions, retention, and student support is critically important for long-term success of their medical schools as well as long-term public health and the wellness of the nation.

Transcultural Nursing Theory

The goal of transcultural nursing is to discover and creatively use culturally based research knowledge in order to provide culturally congruent care to people of diverse cultures (Leininger, 2006, p. 34). Madeleine Leininger, founder and leader of the field, defined transcultural nursing as:

A substantive area of study and practice focused on comparative cultural care (caring) values, beliefs and practices of individuals or groups of similar or different cultures. Transcultural nursing's goal is to provide culture specific and universal nursing care practices for the health and well-being of people or to help them face unfavorable human conditions, illness or death in culturally meaningful ways. (Leininger, 2001, p. 37)
Transcultural nursing theory was born of the work by Madeleine Leininger over 60 years ago. During this time, the theoretical framework has gained tremendous traction and validity in global nursing and for all levels of healthcare providers. The research shows that being culturally aware of health care and healing practices can take two distinct perspectives: 1) the emic-perspective focuses on the local, indigenous, and insider's culture while 2) the etic-perspective focuses on the outsider's world and professional views (Leininger, 2000).

Transcultural nursing is both a mindset and set of skills. It is a specific type of training, an education, and a worldview. Transcultural nursing represents openness to other cultures and accepts that the responsibility to learn about other cultures to achieve the highest health outcomes lies in the hands of the healthcare provider (Leininger & McFarland, 2006). Often, the paradigm exists where the responsibility of health outcomes lies solely with the patient and the healthcare provider simply delivers the western based/allopathic medical treatment plan. This type of medical assessment and delivery of information, while medically sound, does not take into consideration the cultural factors at play that can limit positive health outcomes on many levels (Alligood, 2010).

Patients may have ethical issues with a specific medical plan precluding them from following part or all of the prescriptions or treatment plans. This same patient might have a deep respect for doctors and, thus not dare challenge a doctor’s authority face-to-face risking showing dishonor. Instead the patient chooses which parts of the
treatment plan to follow and which parts to ignore; thus, possibly making the illness or condition far worse. Had the doctor or healthcare provider known of the potential cultural barriers existing for that patient (taking pills, for example) the healthcare provider could have engaged the patient in a dialogue to determine which cultural practices were at play and how to best work around any ethical issues there might be with the initial treatment plan. The healthcare provider could then create a customized health plan for that patient with a culturally relevant and sensitive treatment plan, increasing the chances the patient would follow the prescribed plan. Hence, the possibility that improved health outcomes would be achieved was much higher. This patient would then have a drastically different experience with the healthcare provider because the provider was aware of the cultural issues at play or was at least aware of transcultural nursing theory to investigate any cultural issues with the patient.

Leininger’s frame of reference was from that of a nurse practitioner, and she coined the phrase culturally congruent care:

Together the nurse and the client creatively design a new or different care lifestyle for the health or well-being of the client. This mode requires the use of both generic and professional knowledge and ways to fit such diverse ideas into nursing care actions and goals. Care knowledge and skill are often re-patterned for the best interest of the clients. Thus all care modalities require co-participation of the nurse and clients (consumers) working together to identify, plan, implement, and evaluate each caring mode for culturally congruent nursing care.
These modes can stimulate nurses to design nursing actions and decisions using new knowledge and culturally based ways to provide meaningful and satisfying holistic care to individuals, groups or institutions. (Leininger & McFarland, 2006, p. 32)

One dimension of cultural care theory addresses the way cultures trust the authority of someone outside their cultures or how an authority can display no apparent understanding of the culture in question (Leininger, 2001). If a lack of trust exists for the patient due to a cultural barrier, the treatment plan might not be followed. With culturally congruent care, however, the healthcare provider would work with the patient to create rapport and trust, thus promoting higher levels of health outcomes (Leininger, 2001). Transcultural nursing theory, Culturally Congruent Care, and Cultural Care Theory are all synonyms for the same culture-based healthcare phenomenon and practice in which health outcomes are improved when the healthcare provider has been properly trained in culturally congruent care and practices medicine with an open mind, focusing on the greatest possible patient outcomes.

Healthcare Disparities

The literature review now turns to the pressing national epidemic of healthcare disparities. Much of the national discussion over healthcare disparities has moved to the question of what can be done about the issue. An exhaustive number of peer-reviewed studies and documents have identified strong evidence that disparities or discrepancies in
health outcomes exist across all arenas within health care (Shavers & Shavers, 2006).
Also included in the review of related literature is the strategy to increase healthcare workforce diversity. This policy addresses many of the associated problems of healthcare disparities. Additionally, the strategy of how to employ highly effective medical pipeline programs to increase the diversity of healthcare providers is central to the theme of this project.

According to Smedley, Stith, and Nelson (2003), members of underrepresented minority groups who do gain access to quality health care providers are shown to receive lower quality care compared with members of a majority group, even when controlling for such factors as insurance levels and income. Sufficient evidence of racial disparities in physician treatment recommendations exists. For patients with late-stage renal disease, physicians are less likely to refer African American patient for renal transplants compared to White patients (Epstein et al., 2000). Similar referral patterns have been observed regarding coronary artery disease in which African Americans and Latinos are less likely to receive bypass surgery (Nickens et al., 2001). Additionally, when compared with majority populations, African Americans and Latinos are less likely to receive medication for HIV, less likely to receive proper prescriptions for pain medication, less likely to receive adequate diabetes management medication and more likely to report inferior emergency outcome (Sequist et al., 2008).

Troubling statistics also include infant mortality among African Americans as compared with infant mortality in Whites. While infant mortality in African Americans
has dropped from 43.9 deaths/thousand in 1950 to 13.8 deaths/thousand in 1998, the startling fact remains the infant mortality rate for Whites was 5.7 as recently as 2005, less than half the rate for African Americans in the same year (Cohen et al., 2002). These data also show the insignificant gain over a seven-year period from 1998 to 2005. The 2011 Centers for Disease Control “Health Disparities and Inequalities Report” indicated the infant mortality rate for African Americans was 139% higher than that of Whites (MacDorman & Mathews, 2011).

Figure 1 Infant Mortality Rates by Race and Ethnicity: United States 2000-2005

The trends in infant mortality over the previous 60 years are not promising for many racial and ethnic minority groups, particularly Blacks. The experienced downward trend has not affected Blacks and Whites equally. The Black/White disparity in mortality has actually widened over the past 50 years with current infant mortality levels for African Americans being where they were 15 years ago (Kitsantas & Gaffney, 2010)
African Americans have lower life expectancy than Whites, African Americans are more likely to die from cancer, diabetes mellitus, and stroke (Grumbach & Mendoza, 2008). African American women are twice as likely as White women to die from cervical cancer (Nickens et al., 2001).

African American, Hispanic, and Native American physicians are much more likely than White physicians to work in underserved, low income, and inner city communities and, thus treat a larger proportion of underserved minorities. Furthermore, African American, Hispanic, Native Americans and women physicians are more likely than White male physicians to treat patients with Medicaid (Cohen et al., 2002). In general minority patients report better health outcomes when treated by physicians from their own culture or ethnicity as compared to treatment from White physicians. A logical conclusion would then be that an increase in diversity in the healthcare workforce would improve health outcomes for minority patients and reduce the gap in healthcare disparities (Cohen et al., 2002).

There are two distinct factors in which healthcare disparities can manifest in patient outcomes. When there is a difference in quality of care between hospital A and hospital B, it is known as between-provider disparity. Alternatively, disparities occurring when the same provider – be it a hospital, health plan, or physician – delivers different levels care are known as within-provider disparities (Sequist, 2010).

The occurrence of between-provider disparities manifests within two distinct concepts. First, minority patients tend to receive treatment by a relatively small and
concentrated number of hospitals, health plans, and clinicians across the nation. Second, quality of care at these institutions is lower than quality of care serving predominantly White communities (Sequist, 2010). This data suggested the difference in care is based on the location from which minorities seek out care. Another interesting factor in health outcomes as related to hospital location is that Whites and minorities at these same hospitals tend to receive the same care regardless of skin color (Sequist, 2010). So the pressing issue remains that urban clinics and hospitals primarily serving racial and ethnic minorities tend to have lower health outcomes than hospitals and clinics serving mixed race or all White communities.

Despite ample evidence of the existence and effects of between-provider differences in care, this phenomenon cannot account for all disparities. An abundance of studies documented the existing disparities when patients from different ethnic and/or racial backgrounds are being treated by the same physician (Sequist et al., 2008). These within-provider disparities bring decisions of individual physicians under the microscope. Some physician may harbor subconscious biases or stereotypes unconsciously influencing their decisions on treatment plans. Additionally, issues of trust between minority patients and physicians persist. These issues of trust are related to differences in ethnicity, communication difficulties via language barriers, and reports of minority patients’ experiences of discrimination, which leads to patients’ further lack of trust in physicians and the health care system (Trivedi & Ayanian, 2006).
Workforce Diversity

More than 25% of the U.S. population is African American, Latino, and of American Indian descent but these groups make up only 9% of the nation’s nurses, 6% of its physicians, and 5% of its dentists (Zayas & McGuigan, 2006). In fact, the rapid growth in the country’s minority population has so outpaced the growth of underrepresented minorities in healthcare that by 1990, the level of minority underrepresentation was worse than in 1975 (Terrell & Beaudreau, 2003) (see Figure 2). The phrase underrepresented minority in this study refers specifically to the healthcare industry and even more specifically refers to African Americans, Alaska/Native Americans, and Latinos(as).

In 1991, the Association of American Medical Colleges (AAMC) (as cited in Terrell & Beaudreau, 2003) made a statement about the need to increase workforce diversity by introducing a national program to enroll 3,000 underrepresented minority students in medical school by the year 2000. Similar to this study, the AAMC defined underrepresented minorities as African Americans, Mexican Americans, mainland Puerto Ricans, and Native Americans, which includes American Indians, Alaska Natives, and Native Hawaiians (Terrell & Beaudreau, 2003). The group then called “mainland Puerto Rican” is now considered Latino(a) both in this literature review and in the current research.

Project 3000 by 2000 focused a national campaign primarily on the creation and sustainability of “educational-pipeline interventions” (Terrell & Beaudreau, 2003, p.
Largely due to a court decision hindering affirmative action policies in institutions of higher education, the project did not reach its goal though brought the social obligation of increasing healthcare workforce diversity to the public (Terrell & Beaudreau, 2003).

For industry leaders and policymakers in healthcare, one obvious cause of healthcare disparities is a workforce inadequately representing the diversity of the population. Next, the complex and compelling issues of healthcare disparities are discussed as they specifically relate to healthcare worker diversity.

Figure 2 Percentage of underrepresented minorities among medical school matriculants and in the U.S. population, 1950-2001

There are several reasons why increasing workforce diversity in healthcare is beneficial to the health of individuals and the health of society, in general. First, according to Terrell and Beaudreau (2003), diversity in the health professions educational arena helps shape and improve the quality and depth of the education. To prepare for
their future occupational challenges, healthcare providers (physicians, dentists, nurses, etc.) need to learn how other cultures, belief systems, ethnic origins, family belief structures and other culturally determined factors influence the way people receive care and interact with healthcare providers (Terrell & Beaudreaux, 2003). As was mentioned earlier within the framework of the Transcultural Nursing Theory, the presence of diversity in healthcare education is crucial to physicians and other providers to develop their cultural competencies as healthcare providers (Leininger & McFarland, 2006).

Attaining greater diversity in the healthcare workforce will enhance cultural competency for healthcare providers. This happens in the educational setting when exposure to and interactions with individuals from a variety of racial and ethnic backgrounds are common in everyday educational experiences (George, 2011). Physicians who attend medical school with students truly representing the diverse cross-section of society will have the ability to see beyond their own viewpoints and biases to better understand and ultimately give optimal treatment to a diverse population of patients (Cohen et al., 2002). In this way, healthcare providers will develop cultural competencies throughout their medical school and residency training. Such competencies will, in turn, create a physician workforce more suitable to serve the healthcare needs of underrepresented minorities and thus, contribute to the reduction in healthcare disparities (Augustin, 2010; Sequist & Schneider, 2006; Sequist et al., 2008).

The health professions research workforce leads the way for public health research. Research agendas are largely determined by the individual researchers and
research teams conducting the research. The pathway in becoming a medical researcher is by first being a physician, so the medical research population has historically been overrepresented by White males (Grumbach, Coffman, Liu, & Mertz, 1999). When the medical research workforce becomes more diverse, resulting from an increased physician workforce, research will reflect the diverse and varied health issues affecting underrepresented minority group and sub-groups (Terrell & Beaudreau, 2003). In order to develop this type of research workforce, however, medical policymakers and leaders in higher education must begin ensuring a diverse stream of students being admitted into medical schools and health professions programs that can, in time, become the next generation of medical researchers (Terrell & Beaudreau, 2003).

A disproportionate sector of our society continues to have impaired access to high quality healthcare in part because health professional shortage areas (HPSAs) remain chiefly populated by minorities (Sequist & Schneider, 2006). Thus, in areas where minority groups live, there simply are not enough physicians and quality health providers to adequately treat the healthcare demands of the population. Another argument for greater diversity among healthcare providers is the need to improve this access for these underserved populations since underrepresented minorities are more likely to serve in HPSAs (Nickens et al., 2001).

The Council on Graduate Medical Education has identified four major barriers to providing an adequate physician supply to inner cities: 1) poor attitudes towards and lack
of exposure to underserved populations, 2) challenging patient population, 3) poor working conditions, and 4) poor reimbursement (Bindman, Yoon, & Grumbach, 2003).

Physician shortages are not only an issue in the inner city but also common in rural, low-income communities. Rural, underserved areas, known in the industry as healthcare provider shortage areas (HPSAs) have a hard time retaining physicians for some of the same reasons, i.e., poor working conditions, poor reimbursements and lack of adequate funding (Sequist & Association of American Medical Colleges, 2009). Additionally, in small rural communities, physicians have difficulty getting substitutes in the case of vacation or trainings. Healthcare providers in rural areas can feel isolated from others in the field in terms of professional collaboration. This isolation manifests in the difficulties faced when accessing medical specialists. These specialists, often only available in hospitals in larger, metropolitan areas, must travel long distances to access remote communities, thus making access to these specialists difficult and costly for patients (Grumbach et al., 1999).

Medical Pipeline Programs

Introduction

Medical pipeline programs can fall into three categories. There are those programs, often associated with Science, Technology, Engineering, and Math, intended for the kindergarten through high-school aged student. This review considers secondary pipeline programs only, which reflect grades 6-12. Second, there exist pipeline programs
embedded within the undergraduate experience at many colleges and universities, intended to specifically prepare students of color and underrepresented minority students for the intense challenge of being accepted into medical school (Rumala & Cason, 2007). Some of these medical pipeline programs are embedded within Historically Black colleges while others heavily recruit minority students for their pre-medical school programs (Agrawal et al., 2005).

Lastly, post-baccalaureate medical pipeline programs have become an increasingly viable option for many students from diverse backgrounds, as well as for the traditional, highly represented types of medical students. These programs enroll and solely prepare motivated college graduates, typically in year-long programs academically, emotionally, and logistically for the rigors of the medical school application and interview process. While Project 3000 by 2000 ended in 2000, two major programs continue to this day. The Health Professions Partnership Initiative (HPPI) and the Minority Medical Education Program (MMEP); both are discussed in the respective section of this chapter.

Secondary School (K-12) Medical Pipeline Programs

The single biggest obstacle to improving physician diversity in this country is the failure of our education systems to adequately meet the needs of our minority and low-income student population (Grumbach & Mendoza, 2008). By high school, nearly one in five Latinos and 1 in 10 African Americans has dropped out of school (Grumbach & Mendoza, 2008). The research literature points to measurable and obvious differences in
academic achievement as early as kindergarten. The obvious result of these statistics is a significantly reduced number of skilled and potentially qualified minority students that might otherwise enter careers of medicine (Grumbach & Mendoza, 2008).

Latino, African-American, and Native American youth comprise 40% of the current U.S. adolescent population, but only 14% of medical, 10% of allied health, and 17% of nursing students (Oscós-Sánchez, Oscós-Flores, & Burge, 2008). The number of health career students from Latino, African-American, and Native American backgrounds would have to triple to approach population equality. The ethnic disparity in the American healthcare workforce is worsening because the number of minority students pursuing health careers has stagnated while their representation in the general population continues to increase (Oscós-Sánchez et al., 2008).

While health care “themed” high schools and secondary STEM (science, technology, engineering, and math) programs for underrepresented minorities exist, they are still inadequate and are relatively new additions to the educational landscape within the last 15 years (Christian & Chapman, 2009).

Greenhalgh et al. (2006) performed an action research study offering a one-week medical enrichment program for 16-year-olds from socioeconomically disadvantaged areas for underrepresented minority groups. The study found the students reported highly impacting experiences when interviewed and surveyed about their experiences (Greenhalgh et al., 2006). Students were interviewed and 40 were accepted into the summer program, which included workshops on medicine, seminars taught by medical
students and healthcare professionals, and interviews about student interest in pursuing careers in medicine (Greenhalgh et al., 2006).

Another study (Zayas & McGuigan, 2006) assessed and examined experiences that influence healthcare career interest among high school students. The study formed seven study groups with 51 participants, all from healthcare provider shortage areas. The sample was comprised of 41% African American, 10% Latino, and 45% Whites. The study revealed sources of interest in healthcare derived from family role modeling structure (i.e., a family member in healthcare), STEM and medically related school programs, and beneficial/positive experiences within the healthcare system (Zayas & McGuigan, 2006).

Interestingly, the study also analyzed experiences that discourage interest in medicine and healthcare careers. Those experiences and factors were perceived level of academic commitment, education cost for healthcare, lack of school support, limited social support networks, racism and discrimination in society, geographic isolation from healthcare sites, and inadequate information about diversity of healthcare careers (Zayas & McGuigan, 2006).

A collaboration with the Medical College of Georgia was created by the Health Professions Partnership Initiative in 1996 targeting area high schools comprised of primarily underrepresented minorities, historically Black universities in the area, and other community organizations to help increase the number of underrepresented minority students eligible and motivated to become healthcare professionals. One of the high
school level programs therein was the Health Sciences Learning Academy (HSLA) designed to strengthen the student’s interest in health care professions through a variety of programs (Fincher, Marie, Sykes-Brown, & Allen-Noble, 2002).

Additional goals included a way to track student progress up and through the medical pipeline (university through medical school in this context). The HSLA hosted 18 Saturday enrichment classes throughout the year, each meeting for three hours. These classes included online SAT tutorials, grade specific tutoring, and advanced math and biology enrichment (Fincher et al., 2002). The mean SAT scores for those attending the HSLA was higher than for non-HSLA students and the mean increase in SAT scores for students was 9%. At the time of publication, the cohort of 38 students who completed the four-year high school program were enrolled in a university. The program has since lost funding and, thus longitudinal data are not available.

Perhaps one of the longest running and most effective high school medical pipeline programs is the Stanford Medical Youth Science Program (SMYSP). Between 1988 and 2007, a total of 405 students had completed the summer enrichment program between 1988 and 2007 (Winkleby, 2007). Each year for the past 23 years, a summer cohort of 24 students from over 250 California high schools attend a five-week residential program hosted by Stanford Medical School. Similar to other pipeline programs, the summer program included seminars taught by undergraduates, medical workshops, and SAT prep classes. Unlike previously mentioned summer bridge programs, the SMYSP places high school students in hospital job shadows, allows
students to conduct anatomy practicums, and conducts college advising for the program participants (Winkleby, 2007).

The results of the program are impressive; 81% of the 405 who have attended have earned a college degree and, of those, 52% are attending or have completed medical school. The study rightly addresses the need to conduct accurate long-term tracking of students for proper assessment of program effectiveness (Winkleby, 2007). Often college graduation, medical school admission, and graduation are 10-15 years down the time track. The study did not, however, address the argument that the SMYSP simply recruits the best and brightest underrepresented minority students from around California that would have successfully matriculated into medical schools regardless of their participation in the SMYSP. The need remains for pipeline programs to create a larger volume of motivated and qualified underrepresented minority applicants. Hence, these pipeline programs must legitimately increase the number of qualified medical school applicants from racially/ethnically diverse backgrounds.

Many health career magnet high schools, health career academies (within comprehensive schools), and California Partnership Academies have been created at the High School level within the past 10 years, thus longitudinal data is not readily available for these sites for a comparison of their effectiveness over pipeline programs (Christian & Chapman, 2009). An estimated 100 health career programs are now open to California’s secondary students. Most of these are academies (Small Learning Community), housed within larger comprehensive high schools. Three stand-alone health professions high
schools in Northern California serve 400-500 students each, helping prepare students on a medical school track (Christian & Chapman, 2009).

One example of such a stand-alone high school is Arthur A. Benjamin Health Professions High School (AABHPS) in Sacramento, California. Founded in 2005, the school aims to integrate health professions and medical themes into each class (all “A-G” required for CSU and UC), each day of instruction, as well as incorporate integrated units pertaining to special healthcare topics. AABHPS utilizes the legally approved method of the multiple pathways (a.k.a., linked learning) approach, which prepares students for college and careers in medicine regardless of their postsecondary goals (Christian & Chapman, 2009).

The Health Professions Partnership Initiative (HPPI), funded by the Robert Wood Johnson Foundation and the W. K. Kellogg Foundation, provides funding to medical and other health professions schools. In the HPPI, medical school collaborate with local K-12 schools and undergraduate colleges as partner institutions to improve curricula and provide new learning opportunities and improve the academic performance of underrepresented students (Terrell & Beaudreau, 2003).

The University of Texas, San Antonio sponsors a program at their University of Texas Health Science Center Called the Teen Health Academy. In this nine-month medical enrichment academy, students attend one all-day Saturday class per month throughout the school year. The academy, held at the Health Sciences Center, high school students from 12 counties in South Texas learn clinical anatomy, physiology, and
pathology using hands-on workshops led by medical students as well as doctors (Oscós-Sánchez et al., 2008).

Oscós-Sánchez et al. (2008) surveyed 232 economically disadvantaged ethnic minority students who had participated in the Teen Medical Academy during the first three years to examine program effects on attitude. The results of the survey indicated students in the TMA had a greater interest in medical and allied health careers and had a greater confidence in the ability to achieve a health career. Results showed an increased desire to learn surgical skills and other health career-related technical skills. The TMA also shaped a sense of belongingness for the participants in a health career and among doctors. Lastly, students reported higher grade point averages, a commitment to achieve a health career and meaningful work (Oscós-Sánchez et al., 2008).

University/College Level Pipeline Programs

Many University Medical School Partnership programs exist in the aims of preparing underrepresented minorities for successful admissions into Medical School. Often these programs are collaborations between Universities and medical centers, which house medical schools. Many of such partnerships have been created in recent years due to the growing demand to diversify the healthcare workforce.

One such partnership exists between Texas A&M Health Science Center College of Medicine and nearby Prairie View A&M University (PVAMU), a historically Black college. The partnership was created in 2003 with an undergraduate medical academy (UMA), which serves to nurture the campus-to-campus relationship between the two
institutions (Parrish, Daniels, Hester, & Colenda, 2008). Students in the UMA receive intensive academic counseling, participate in summer programs, get MCAT preparation, participate in clinical internships, and attend seminar series with medically relevant curricula. The first class of UMA students graduated in 2007 with a successful medical school acceptance rate of 64%. Given the overall national average for medical school acceptance rate of 45%, this and other types of partnerships between medical schools and undergraduate institutions is very effective in increasing diversity in medicine assuming the target population for the programs are underrepresented minorities (Parrish et al., 2008).

The University of California at Davis runs a program called The Biology Undergraduate Scholars Program (BUSP), another successful program that serves to increase the diversity in healthcare through a university level pipeline. The BUSP program augments the undergraduate experience within the Biology department at UC Davis for first- and second-year students through enrichment and support networks. The program is not limited to underrepresented minorities (the program welcomes all undergraduates), however, it does publicly recruit underrepresented minorities. The BUSP program articulates with the Special Transitional Enrichment Program (STEP) at UC Davis. The STEP program offers a four-week residential program for incoming students allowing a transition for them to become accustomed to dorm life, teach them study skills, and offer intensive counseling and academic advising (Villarejo, Barlow, Kogan, Veazey, & Sweeney, 2008).
Xavier University is another historically Black college with an impressive record of accomplishment for their pre-medical preparation programs. Each year, Xavier University sends a disproportionately higher number of Black students to medical school when compared with other historically Black colleges and other colleges and universities. For the past 15 years, Xavier has sent more African Americans to medical school than any other university in the country. Their innovative program caters to specific science and math skills needed for high achievement on MCAT scores. Xavier University offers specific science courses needed for success in medical school and offers year-round support for the medical school application process (Wesley Schultz et al., 2011). In 2008, the university placed 56 of its students into medical schools, a record high number of African American students from a single university in a given year. Over the past five years, 81% of Xavier students who applied to medical school were accepted compared with 45% of all applicants nationally (Villarejo et al., 2008).

California State University, Los Angeles and California State University, Fresno have Health Careers Opportunity Program (HCOP). Starting in 1984 and 1981, respectively, both CSULA and CSUF HCOP (grant funded programs) were pipeline programs created with early entry points in elementary, middle, and high schools (Augustin, 2010). In 1999, 79% of CSULA pipeline participants were accepted into medical schools versus 47% of non-HCOP CSULA students. In April 2009, the last fiscal year CSUF had funding for their pipeline program, 40% of the HCOP students
were accepted into health professions schools, as compared with the previously mentioned national average for medical school admission rate of 45% (Augustin, 2010).

While the success rates from schools like Xavier and CSULA are great trends in the right direction, a sobering fact remains; acceptance rates for underrepresented minorities were 3% in 1969 and improved to 11% by 1992. Acceptance rates for underrepresented minorities were still only at 13% by 2000 (Jolly, 2000). The total enrollment in medical schools (includes all students currently enrolled as medical students) for 2010 indicates paltry gains toward an equality that reflects actual U.S. population – Latino(a) 7.5%, African American 6.8%, American Indian/Alaska Native 0.8%, Asian 22%, and White 59% (Association of American Medical Colleges [AACM], 2010; Huntoon et al., 2011). The above enrollment data indicates the importance for multilayered strategies, among these is the continued funding and implementation of medical pipeline programs.

The Biology Scholars Program (BSP) at UC Berkeley is also a noteworthy university-level pipeline program making significant contributions to the flow of underrepresented minorities matriculating into medical school. Since 1992, the BSP has supported 2650 undergraduate students from UC Berkeley. These students come from economic, gender, ethnic, and cultural groups historically underrepresented in biology.

In a comparative study of the BSP at UC Berkeley, Matsui, Liu, and Kane (2003) found students in BSP graduated with a degree in biology at significantly higher rates than students not in BSP regardless of race/ethnicity. Additionally, African American
and Hispanic students who joined BSP graduated with significantly higher UC Berkeley biology GPAs than non-BSP African American and Hispanic students, respectively (Matsui et al., 2003).

There are currently 725 active BSP members, of which 80% are first-generation/low income, 70% are women, and 60% are underrepresented minorities. Since 2004, the Biology Scholars program specific medical school pipeline known as the Pre-Health Pathway Program has helped 230 BSP members enter medical school at an admission-to-application success rate of 90% (as compared to a national rate of 50% and a UCB rate of 55%). Of the 230 students, 116 were underrepresented minority students and 131 attended medical schools in California (UCBerkeley, 2011).

Between the 2005-2010 school years, 58% of BSP students from disadvantaged backgrounds (underrepresented minority, low-income, and/or first-generation) who were awarded biology degrees at UC Berkeley graduated with a 3.0 or higher compared to 27% of non-BSP students from disadvantaged backgrounds (UCBerkeley, 2011).

The Minority Medical Education Program (MMEP) is a six-week residency enrichment program offering college students intensive medical school preparation during the summer months. Funded by the Robert Wood Johnson Foundation, this national program is offered at 11 medical school sites around the country to address underrepresentation in medicine (Villarejo et al., 2008).

Many universities and medical centers around the country offer summer health and medical enrichment programs through the Association of American Medical Colleges
(AAMC). Most of these programs are open to all who qualify, but some specifically target underrepresented minorities. The Medical Minority Applicant Registry (Med-MAR) is another service provided by the AAMC which serves to connect applicants who self-identify as underrepresented in medicine and/or as economically disadvantaged with minority affairs and admissions offices interested in increasing opportunities for students self-identified as underrepresented (Sullivan, 2007).

**Post-Baccalaureate Medical Pipeline Programs**

Students who decide after college to pursue careers in medicine have the option of enrolling in what is known as a post-baccalaureate program. These programs, when targeting underrepresented minorities, aim to increase the diversity of the pipeline of qualified medical school applicants and create pathways by which college graduates can pursue careers in medicine. Programs exist nationwide to serve the academic, advising, and preparation needs of these post-college students, and many of the post-baccalaureate programs have tremendously high rates of success. The key distinction to be made within the medical community is determining which programs are effective at increasing the actual volume of underrepresented minorities matriculating into medical school and which simply optimize matriculation for the population at large. The former serves as a solution to healthcare disparities while the latter simply helps motivate individuals to gain medical school acceptance.

Another factor is to determine the degree to which the positive program outcomes are in fact a result of the program characteristics and interventions rather than a
program’s recruiting and admissions process where the best and brightest students are admitted, i.e., those who already have the skills and attributes that will make them successful in gaining acceptance into medical school (Grumbach & Chen, 2006). In summary, the effectiveness of these and other pipeline programs of actually increasing the “volume” of the underrepresented minority pipeline must be measured, not simply the successful channeling of those underrepresented minority students already interested in and qualified to pursue medicine. The latter maintains the status quo of current healthcare workforce representation.

One such study conducted in 2006 compared the effectiveness of the University of California post-baccalaureate programs for minority and disadvantaged students (Grumbach & Chen, 2006). The University of California operates medical schools at five of its UC campuses, Davis, San Francisco, Irvine, San Diego, and Los Angeles. The programs admit applicants who express interest in practicing medicine in underserved areas, reside in California and come from disadvantaged backgrounds. The five programs use relatively standardized curricula and admission criteria.

The study selected a cohort of 265 participants who participated in a post-baccalaureate program between the years of 1999 and 2002 and a control group of 396 college graduates who applied to the post-baccalaureate program but did not participate. The primary measured outcome was matriculation by 2005 into an accredited U.S. medical school. By 2005, 67% of participants and 22% of the controls had successfully matriculated into medical schools (Grumbach & Chen, 2006).
While the Grumbach and Chen (2006) study was peer reviewed, published by a very reputable journal (*Journal of the American Medical Association*), and authored by two highly renowned physicians researching in the field of healthcare disparities and physician diversity, one question remains. The study selected the control group from students who had applied to post-baccalaureate programs but did not attend. Further, all the controls had been denied admissions into the post-baccalaureate programs and only four had been accepted but, for undisclosed reasons, did not attend. Could the results be skewed, as those accepted into a post-baccalaureate program (n=265) were the top qualified applicants and were already at an advantage for medical school admissions? And were those not admitted (n=396) the weaker applicants and, thus had lower chances of acceptance from the outset?

Despite this small criticism of the study, the post-baccalaureate programs are extremely successful in the goal of preparing underrepresented minority students not only for successful admission but also for successful completion of medical school. The study found that of the participants who matriculated by 2000 and 2001, 91% had graduated by 2005 (Grumbach & Chen, 2006).

UCDavis Medical School has a different type of post-baccalaureate program addressing the needs of the re-applicant student population of underrepresented minorities. That is, students who had previously been denied admission to medical school for one reason or another (low MCAT scores, weak interview or application essay, etc.). The UCDavis Reapplicant Program consistently matriculates over 80% of its
students into medical school and/or health professional curricula (e.g., master’s in public health or physician’s assistant programs) (Blakely & Broussard, 2003). This program has since been absorbed into the University of California Postbaccalaureate Consortium, which provides a clearinghouse for all UC Medical school programs and focuses on students from educationally and economically disadvantaged backgrounds. Current programs can seek students committed to practicing in underserved communities of California and reap the ancillary benefit of diversifying the workforce since statistically these two go hand-in-hand (Blakely & Broussard, 2003).

Nationwide, dozens of such postbaccalaureate programs are linked with Universities. Michigan State University has a program called Advanced Baccalaureate Learning Experience (ABLE), and for 25 years has specifically targeted disadvantaged and URM students. ABLE students demonstrated significantly higher performance than non-ABLE minority students (Lipscomb, Mullan, Zepeda, & Price, 1993). An 18-year longitudinal study (Lipscomb, Mavis, Fowler, Green, & Brooks, 2009) on the effectiveness of a post-baccalaureate program for students from disadvantaged backgrounds found that 94% of underrepresented students successfully completed the post-baccalaureate program and were matriculated into medical school.

The programs, offered through the Michigan State University College of Human Medicine (MSUCHM), offers conditional admittance into their medical school to post-baccalaureate participants who successfully complete the program requirements. As of publication of this particular article (October 2009), 64% of matriculants had graduated
from medical school, and 26% were still enrolled. In conclusion, implementation of post-baccalaureate programs is an effective strategy for increasing the number of physicians from disadvantaged backgrounds. As studies show, these individuals are more likely to practice medicine in medically underserved and economically depressed areas where health disparities are most pervasive (Logan et al., 2010). Brown University, State University of New York, Mills College, Indiana University, and Harvard University (just to name a few) also have long-standing post-baccalaureate programs in place for recruiting and preparing underrepresented minority students for matriculation.

In review, there is an extensive network of medical pipeline programs across the country. While current trends appear promising, the data on the current diversity of the healthcare workforce reveal the truth. More must be done to address the underrepresented minority healthcare workforce population if we hope to engage in the long-term campaign to end healthcare disparities.

Rationale for Study

During a meeting in the fall of 2010 with the Assistant Dean for Student and Resident Diversity at the College of California, Dr. Latimore, the researcher discussed issues of diversity, retention, and underrepresented minorities in medicine in general and, specifically, those issues at College of California. During an hour-long interview discussing issues of diversity in the healthcare workforce relating to healthcare disparities, several themes surfaced.
From Dr. Larimore’s perspective, a primary issue facing the medical school was the development of a program to recruit and retain educational coaches to assist medical students in their studies. Second, the pipeline for underrepresented minority students needs “widening,” meaning reforms need to take place in primary and secondary educational and medical pipeline programs throughout the systems. And third, Dr. Latimore was interested in investigating which types of pipeline programs were most effective in optimizing underrepresented minorities and how more of such programs could be developed and financially sustained.

Dr. Latimore shared with the researcher some copies of his presentations on diversity and healthcare disparities, issues specific to physician diversity and the idea of a health professional shortage areas in California. A separate topic altogether is how to recruit physicians and healthcare providers to work in rural or urban settings. As previously mentioned, this growing issue faces many challenges of finding qualified and willing healthcare workers to work in health professional shortage areas.

Based on this interview with Dr. Latimore, the researcher decided to focus on the issues of effective medical pipeline programs. The other issues of healthcare provider shortage areas, educational reform for K-12, and educational assistants at the medical school level were all research topics set aside for a later time.

In conclusion, the issue of healthcare disparities is increasingly vast and complex. The researcher chose this topic because 1) there was a suggestion by a professional in the field that this topic needed investigation and 2) this study provided a concrete movement
in the right direction in one small area of increasing healthcare workforce diversity to reduce healthcare disparities.

Summary

While much of the literature serves to identify the inequities in the healthcare system and the lack of minority students in the medical pipeline and medical pipeline programs, relatively few comparative studies identify which of the many pipeline programs are the most effective at optimizing matriculation. In review, the theories of Social Capital, Critical Race, and Transcultural Nursing all shed pertinent perspectives on the challenges of healthcare disparities and increasing workforce diversity. By considering the social, cultural, and economic issues at play, policymakers can better understand some of the root causes of the issues of health inequality, differential patient treatment and workforce diversity.

The appearance of the healthcare workforce in the United States barely resembles the nation’s ethnic and racial composition. Whether it is dentists, nurses, pharmacists, or physicians, African Americans, Latinos, and American Indians/Alaskan Natives are markedly underrepresented relative to their share in the overall U.S. population. As evidenced by hundreds of research studies, the presence of healthcare disparities is undisputable, and one primary cause is the lack of workforce diversity. The elephant in the room is the timeframe for action, how to pay for it, and just how to address the complex issues. As evidenced above, employing and engaging effective pipeline
programs is a proven strategy for increasing physician diversity in medical school and other professional health care training schools.
Chapter 3

METHODOLOGY

Introduction

The purpose of this study was to gain perspective on the relative effectiveness of various pipeline programs designed to prepare underrepresented minority students for successful acceptance into medical school. The current state of healthcare disparities and the clear link between increased physician diversity and improved health incomes for underrepresented minorities make this type of study important, thus determining the effectiveness of current programs, policies, and efforts. This study involved a sample of current medical students at the College of California Medical School in Sacramento, California.

Research Design

Setting of the Study

The narrow scope of this study included the experiences and opinions of current medical students at the College of California Medical School. The study took place at the Medical School Education building and over the Internet. In 2010, the College of California Medical School interviewed 501 candidates, of which 96 matriculated (Medical School Admissions Requirements, 2012). Of the 3615 applicants, 897 were from out of state and 84 were international. Of the 96 first-year students entering medical
school during the fall of 2010, 60 were women and 36 were men, with the average age being 25. Ten were reported as underrepresented minorities and 14 were reported as disadvantaged. Fifty percent of the incoming first years were White, 31% Asian, 15% Latino or Hispanic, 14% Chinese, 10% African American, and 2% Native American or Alaska Native. Sixty percent had a Bachelor’s of Science and 40% had a Bachelor’s of Arts, while 13% had a Master’s Degrees and 3% had already earned Ph.D.s in other specialties (Medical School Admissions Requirements, 2012).

Population and Sample

The population in the study was all the current medical students at the College of California Medical School. The sample of the population was those who voluntarily completed the online survey and were self-reported as underrepresented minority. The total number from the sample who responded was 25, two of which were subsequently selected for interviews. This sample is relatively small for two reasons. Primarily, medical schools are typically small, 100 or so students in each class. Second, the researcher was not able to develop any relationships at any other medical school, namely University of California, San Francisco and Stanford Medical School. After repeated attempts to contact persons at the aforementioned institutions, the focus turned to the College of California Medical School where the relationship was already underway.

Design of Study

The study integrated both qualitative and quantitative data collection. This style of research, known as a mixed methods approach, would prove to be an effective way of
collecting data. Quantitative research has to do with quantifying data and analyzing that data (Cowan, 2007). Often, this process involves statistical analysis, mathematical or computational techniques, and/or descriptive statistics. Some characteristics of quantitative data are random samples starting with specific hypothesis(es), use of a relatively larger sample using instruments that can be scored objectively, and a distance between researcher and subject (Cowan, 2007). Descriptive statistical analysis was used to describe and summarize the data collected in the current study.

The study also demanded the acquisition of qualitative data for purposes of adding a needed level of narrative and detail to the medical student experience. Life stories of actual medical students and their pathways to medical school are key components of starting to round out the data. Qualitative data used a relatively small sample size in which the researcher often came face-to-face with the subjects. In the collection of qualitative data, the researcher must remain aware of his/her bias and orientation on the subject lest the subjective data lose validity through inadvertent researcher filtration (Cowan, 2007).

Qualitative results from interviewing two medical students are presented in narrative form, whereas for quantitative data, charts, graphs, numerical results in conjunction with narrative are the preferred method for presenting the data. Additionally, the quantitative methods are streamlined to address only the research questions and thus, there were no control groups, nor were there independent or dependent variables.
The researcher identified several prerequisites to capturing appropriate and meaningful data that would address the research questions. First, there would need to be a relationship developed with a medical school(s) to allow access to self-reported underrepresented minorities who were also currently enrolled medical students. Second, a succinct survey would need delivery in very efficient, user-friendly format. Third, interviews would need to take place with two to three willing participants to learn of their specific experiences within their own pipeline programs and pathways.

The groundwork for the collection of data for this project started 12-14 months prior to the period of time when the data was actually collected. During the fall of 2010, the researcher made initial contact with the outreach coordinator at College of California Medical School. She was able to connect the researcher with the Assistant Dean for Student and Resident Diversity at the College of California School of Medicine. The initial point of contact was an informational interview on the issues surrounding healthcare disparities and increasing the numbers of underrepresented minorities in medical school. Issues discussed in the interview were those facing the leaders of medical education institutions across the country as well as those specific to College of California Medical School. It was during this interview and subsequent emails and phone conversations that layers of trust developed between the researcher and the Assistant Dean for Student and Resident Diversity.

Subsequent communications with the Dean rendered positive feedback on potential support from the College of California Medical School Office of Diversity in a
research study designed to measure relative effectiveness of various educational pipeline programs for current medical students at College of California Medical School. This relationship proved invaluable in the sense of gaining access to the thoughts, opinions and life stories of the medical students.

By mid-spring 2011, the Dean had indicated his intention to distribute the survey instrument to all the medical students who self-identified as underrepresented minority. At this point, the researcher began working closely with the Dean’s secretary. She became the liaison between the researcher and the busy Dean in moving ahead with the project.

The survey design, process, and questionnaire were developed throughout the spring of 2011 with regular feedback from both the Dean and the secretary. In late spring 2011, the researcher received a verbal agreement from the Dean that when verification of the Institutional Review Board at California State University, Sacramento for the human subject research had been approved, the survey instrument could be distributed.

Data Collection

As previously mentioned, consent to approach the sample population via email was granted by the Dean of the College of California Medical School. The online survey service Survey Monkey® was used to create and distribute the survey instrument (see Appendix). Consent was determined on the second page of the survey where participants were required to check a box confirming an agreement to participate in the survey, giving consent for their responses to be used in the research.
Instrumentation

The survey instrument was designed to obtain data to help answer the previously stated research questions. The instrument was planned and edited in Microsoft Word and was cleared for delivery by the Dean and his secretary. A web logic-model survey was then created for distribution. Logic models utilize a process that differentiates pathways depending on responses. For example if a participant reports that a post-baccalaureate pipeline program was most beneficial in their successful matriculation to medical school then the logic model survey automatically skips questions pertaining to, for example, a college or high school level pipeline program.

The researcher interviewed two medical students who had volunteered for a face-to-face interview. Both students are underrepresented minority students, one Latina the other Latino. The interviews took place on the College of California Medical School Campus in the Scrubs Cafe on the first floor of the Education Building. Interview subjects approved of having responses recorded on a Sony digital recorder. Six individuals from the online survey indicated a willingness to give an interview. The first two individuals to respond to a follow-up email were the two scheduled for the interviews. The subjects were asked the following questions:

Describe the pipeline program(s) in which your participated prior to medical school.

Describe the characteristics of that program?
What were other beneficial pipeline programs that helped you gain acceptance into medical school?

On a scale of 1-10, 10 being the best possible program and 1 being the worst, how would you rate your experience in this pipeline program?

Describe what it was about the pipeline programs you found most helpful for you personally.

Describe other influential and important factors that either helped you academically or motivated you to apply to medical school.

Data Analysis Procedures

For the quantitative data, the researcher used descriptive statistics and cross tabbing. Quantitative data is presented in a narrative and graphical format to display any trends and significant findings. For the qualitative data, the researcher recorded two interviews and coded the data for themes and highlights.

The interview data was reviewed several times using Creswell’s Data Analysis Spiral (2007) addressing the data in a circular method of revisiting the data over and over again looking for patterns and themes. The next step was coding, synthesizing, and presenting the data in a descriptive, summative format within Chapter 4.

Summary

The guidelines for addressing the research questions around the topic of underrepresented minorities optimizing matriculation into medical school utilized
specific components of educational research. Such methods included a survey of the population and collecting both quantitative and qualitative data. Results discussed in Chapter 4 offer insight into the areas of progress and shed light on additional topics to further the body of knowledge pertaining to medical pipeline programs for underrepresented minorities.
Chapter 4
DATA ANALYSIS AND FINDINGS

Introduction

In this chapter, the results from the survey instrument and the interviews are presented and discussed. Connections to the literature reviewed in Chapter 2 and the data are presented in narrative and graphical form with figures and graphs. The survey data resulted in several insights into the pathways and pipeline choices of current medical students at College of California Medical School. The purpose of this study was to determine which types of medical pipeline programs optimized matriculation to medical school for underrepresented minorities. The following findings represent an interesting set of data collected through both quantitative and qualitative methods. The findings are organized by research question with the quantitative data addressing research question #1 and the qualitative data addressing research question #2.

Research Question #1

Which (if any) types of pipeline programs appear most effective in optimizing medical school matriculation for underrepresented minorities?

In attempting to answer this research question, it was necessary to unpack the facets of the question. First, how are the underrepresented minorities defined, how is matriculation verified, and how is legal access to the population gained? Gaining access to the appropriate population and determining the appropriate ways to gain access to said
population was no easy feat. As previously stated, this involved developing a relationship with key leaders at the College of California Medical School. This, in turn, led to a successful collaboration by which the researcher was permitted access to their medical students for research. The population was current students at a nationally accredited medical school who self-identified as underrepresented minorities and were willing to participate in the online survey and/or face-to-face interviews.

Of 396 medical students enrolled at the College of California Medical School at the time of the study, 25 medical students participated in the survey. Of those who participated in the survey, 24 self-identified as underrepresented minorities. The survey used a logic model, which then directed this sample of 24 students to continue with the survey. Sixty percent of the respondents were women and 40% were men. Fifty-two percent considered themselves Latino(a), and 16% of the Latino(a) respondents specified the “other” category on the race question as Latino, Mexican, Latino, Mexican American and mixed (mixed being African American, Japanese, and Caucasian). The remaining race breakdowns for the 38% who answered (62% elected not to answer the race question) were as follows: 11.1% American Indian or Alaska Native, 0% Asian, 22.2% Black or African American, 0% Native Hawaiian or other Pacific Islander, and 56% White.

Interestingly, while the survey had specified that for this project underrepresented minority populations in medicine were defined as African American, Latino(a), and American Indian or Alaska Native, 55% of respondents reported being White. This
might be explained in several ways. First, early in the survey there was a page dedicated
to a brief explanation of the survey and a brief definition of underrepresented minorities
in medicine. The survey page following asked “Do you consider yourself an
underrepresented minority in medicine?” If the respondent answered NO to this
question, they skipped directly to the final thank you page, bypassing the entire survey,
and if they answered YES they continued with the survey. It was not until late in the
survey when the race/ethnicity question was asked. Apparently, many White
respondents, 55%, considered themselves underrepresented minorities in medicine due to
some factor other than race/ethnicity. Additional research is necessary to tease out just
what factors are influencing that cohort of White respondents to self-identify as
underrepresented minorities.

Survey results indicated 62.5% of respondents reported having participated in
some type of medical pipeline program between elementary school and their acceptance
into medical school. Figure 3 shows the breakdown of medical school students who
participated in medical pipeline programs between their elementary education and the
start of the medical school experience.
Figure 3  Underrepresented minority medical students who participated in a medical pipeline program

The pipeline program participation chart in Figure 3 also indicates that quite a large portion of the self-reported underrepresented minority students did not participate in any type pipeline program whatsoever and were still able to gain medical school acceptance. This shows that almost 40% of the underrepresented minorities who participated in the survey were able to matriculate to medical school without any additional support from a designated pipeline program outside the normal high school and university academic pathways.

This relatively large percentage of non-participation in pipeline programs represents a potential area for expansion in the category of effective pipeline programs. If 100% of URM students reported having participated in a medical pipeline program, then it can be assumed the only way to increase URM enrollment in medical school would be to expand the breadth of current pipeline programs. However, since the data indicate that roughly one-third of underrepresented minorities who successfully gained
admission and matriculated to medical school without the benefits of a pipeline program is can be argued that both types of participants, pipeline participators and non-participators could be increased.

As shown in Figure 4, post-baccalaureate programs were the type of pipeline program the sample participated in the most. Sixty-seven percent of the respondents reported having participated in a post-baccalaureate program, 28% participated in an undergraduate pipeline program, and only 7% reported having participated in a K-12 level program.

**Figure 4  Type of pipeline program most participated in**

One student selected “other” and then specified in an additional typed narrative on the survey, “Pre-Medical Enrichment Program.” The program was reported as an eight-week program at UCLA designed to help underrepresented minorities and disadvantaged
students gain acceptance to Medical School. This was included in the “other” category; however, this type of program is considered a post-baccalaureate program based on the predetermined parameters of this study.

One student reported having experienced a high school pipeline program (falling into the K-12 program category) that was most effective in assisting his/her be accepted into medical school. The student reported a positive influence of that program, however, did not “strongly agree” with the statement that “My high school pipeline program was effective in preparing me for successful admission to medical school.”

All, 100%, of respondents answering the question about being contacted while in high school reported that a college or university made contact or attempted to make contact with them while they were still in high school. This information is relevant as it indicates this component of recruitment may be a substantially effective method of recruitment or that the sample size was too small to produce reliable results for this supposition. Further investigation on this would be needed to determine the value of recruiting at the high school level.

There was, however, strong evidence to suggest that post-baccalaureate programs do not make efforts to contact and or actively recruit underrepresented minority undergraduates from their colleges or universities (see Figure 5).
As shown in Figure 5, only 12% of post-baccalaureate respondents were contacted and/or recruited by post-baccalaureate programs while they were undergraduates, which suggests an area of expansion for post-baccalaureate programs. Either the niche for post-baccalaureate programs is so small they remain at capacity or there is an opportunity for high caliber undergraduates to be recruited in these types of programs.

All, or 100%, of respondents in the college/university pipeline program category reported having positive or strongly positive correlations between their effective success in medical school acceptance and their experience in their undergraduate medical pipeline program.
All, or 100%, of the respondents either agreed or strongly agreed at having experienced a medical pipeline program that was “instrumental in my medical school acceptance.” Seventy-eight percent of those surveyed either agreed or strongly agreed that their pipeline program targeted ethnic/racial minorities, underrepresented students, or disadvantaged students. As shown in Figure 6, only 21% reported their pipeline program did not target ethnic/racial minorities, underrepresented students, or disadvantaged students.

Figure 6  Reported pipeline program targeted underrepresented, disadvantaged, or minority students

The majority of respondents (71%) agreed that a college/university type medical pipeline program was currently the most effective in increasing preparedness and enrollment of underrepresented minorities into medical school. Interestingly, the majority of those surveyed, 61%, participated in a post-baccalaureate programs and yet, as shown in Figure 7, only 7% were of the opinion that post-baccalaureate programs were
currently the most effective types of programs when compared with K-12 and college/university level programs.

Figure 7  Most effective type of pipeline program

Comparing Figure 4 with Figure 7 shows a dramatic difference between what students perceive as being the most effective college/university pipeline programs at increasing medical school matriculation and their actual participation. Seventy-two percent of students perceived college/university pipeline programs as being the most effective; however, only 26% of these same students reported actually having participated in such a program. This data seems to reveal one of two things.

Once the students begin medical school and learn about the depth and characteristics of other pipeline programs types from their classmates, they may reflect on their previous pipeline experiences and decide that another type of pipeline program, in general, would in fact be more effective than the one they experienced. In this case,
students might learn about the Biology Scholars Program or the Biology Undergraduate Scholars Program and develop the perception that these or other programs are, in fact, more effective than the post-baccalaureate program in which they participated. Student may wish they had experienced a successful college program so they didn’t have to do the extra post-baccalaureate program. Another way to explain this interesting differential in the data would be that in answering these specific survey questions, the students thought they were rating the second most effective program, after their previously stated program.

In Figure 8, respondents gave the average response rates for their various sources of inspiration for pursuing careers in medicine. Numerical values of 1-5 were assigned to the possible responses with corresponding values; very inspired=5, somewhat inspired=4, natural=3, somewhat uninspired=2, and very uninspired=1. Data were then averaged to receive an R-value (relative value) for each inspiration category on a scale of 0-5. One respondent selected “other” and wrote in the “family physician.”
Figure 8  Response rates for source of student inspiration to pursue medicine

The data from Figure 8 corroborate with other research and from the research interviews indicating that more often students are inspired to pursue medicine and begin their academic pursuits towards this goal once in college or after college. It is less often that this inspiration happens via a high school counselor or principal during high school. College counselors and college professors appear to have high levels of influence as do parents and family members. The data indicate, as shown in Figure 8, that high school teachers have more influence on inspiration than do high school counselors or high school principals though the relative influence of those three was reportedly low when compared with categories like parents/family and college counselors/professors.

At the conclusion of the survey, respondents were given the opportunity to add any additional comments or thoughts. The one student who commented wrote, “Minority numbers in the medical field are low as it is, even with these pipeline programs recruiting minorities...imagine how much less that will be if these programs are cut.” The reality is
that with public funding diminishing for CSU and UCs across the state of California, these programs are in extreme jeopardy of being cut from the budget.

Research Question #2

*If a type of pipeline program appears superior to the others, what are the characteristics that make the program so effective?*

On January 19, 2012 research interviews were conducted with two individuals who had completed the online survey and volunteered for an interview. One-on-one interviews took place at the Scrubs Café in the Medical Education building on the College of California Medical School campus in Sacramento, CA between the researcher and each of the two medical students. The interviews were between 45 and 60 minutes in length.

Student A, a first-year Latina medical school student from Southern California had experienced two very effective medical pipeline programs, both considered college/university-level pipeline programs. One of which, according to her, was not only instrumental in her acceptance into medical school, but she referred to the program as having changed her life. Student B, also a first-year medical student at the College of California Medical School, and a Latino, had created quite a different pathway to medical school from Student A but had successfully matriculated nonetheless.

During high school in urban Los Angeles, Student A excelled in the sciences and math and, while participating in the Educational Opportunity Program (OEP) at her school, could not take full advantage of the college tours and EOP advising due to a busy
part-time job needed to pay the family bills. She recalls college students from the University of Santa Barbara coming to speak to her EOP group about college and while she received some resistance from her mom, student A had always planned to attend college.

Similarly, full-time work for student B was necessary to pay for his educational path. Throughout community college and his time at a CSU in the California central valley, he worked both as a caregiver and as an assistant in an emergency room. However, student B was not part of an EOP program nor did he receive what would be considered adequate or appropriate advising in high school for career or college. Student B recalled, much to his chagrin, learning about the SAT a week before the test, signing up that week and taking the test only to find out after that other people actually studied. “Nobody ever told me nor did I know that people actually studied for the SAT,” remarked student B, recollecting his pathways to college and medical school. “There is information out there that if your parents do not know…then you, as their child, will not really have a chance to know the information.”

As a first-generation college student, student A enrolled in a University of California school in northern California as a freshman and entered the department of Integrative Biology for her major. She recalled being recruited and joining the Biology Scholars Program (BSP) but not fully taking advantage of their resources and support until midway through her freshman year. She said the BSP was and remains an
incredible program (on a scale of 1-10 she rated it a 10) and credits her acceptance into medical school in large part to the outstanding program characteristics of the BSP.

After three years of community college in the Fresno area focusing on general education requirements, Student B entered a CSU as a history major. Having paid his way through community college and now college working full-time as a caregiver, the notion of becoming a doctor was preposterous to him, though he decided to take science class in college and see how he fared. He then took a series of science classes though never fully committing to the prospect of becoming “pre-med.”

During her freshman fall at the UC, student A experienced a strained relationship with her mother caused by distance and lack of her mother fully understanding she was following her educational dreams. Upon becoming aware of the strain the situation was placing on Student A, advisors from the BSP program paid to fly the mother up from Los Angeles to visit student A. Together, they did a campus tour and the mother was able to see her daughter’s new college life, which helped her better understand the opportunity for her daughter. The BSP has clearly developed a responsive, dynamic model to meet the needs of the students.

After several years at his State College, Student B attended a meeting with the Pre-Med Club. He was underwhelmed to say the least. The club, very much student-run, consisted of a primarily homogeneous set of students who would graduate in four years, knew they wanted to go into medical school, and appeared to have all the information they needed. According to Student B, the primary objectives for the club were to prepare
for, put on, and then analyze the effectiveness of a single medical conference hosted on campus once a year. There was an out-of-date website and, overall, student B did not find the club to be very helpful.

Student A applied for and was accepted into a paid summer internship program between her freshman and sophomore years. The Summer Medical and Dental Educational Program (SMDEP) was offered through a University in Washington State in conjunction with the Association of American Medical Colleges. The six-week, paid summer internship provided a myriad of experiences for future medical school applicants. Targeting underrepresented minorities, the SMDEP provided food, housing, job shadows experiences in emergency room, surgery shifts, a stipend, and experiences with migrant camps in poor, rural areas lacking sufficient primary care.

During the SMDEP summer program, Student A experienced her first dead body after an all-night shadowing shift in the ER and called it “an intense experience.” While she rated the SMDEP experience a 7 out of 10, she admitted the program lacked in the overall advising for students planning to attempt acceptance into medical school. She also noted an overall feel coming from the SMDEP affiliates regarding a glass ceiling. The underlying message was that if a student did not have or maintain a certain threshold of grades then they might as well forgo efforts to go to medical school. In contrast, what Student A appreciated about her Biology Scholars Program was the overarching message of “you can do whatever you put your mind to.”
While struggling in organic chemistry, Student B learned of a tutoring course offered in conjunction with the organic chemistry course offered through the Health Careers Opportunities Program (HCOP). Students desiring the extra help were required to enroll in the one-unit tutoring course, called Academic Enhancement Workshops, which met once a week in groups of 10 students to one mentor/undergraduate tutor. Objectives of these Academic Enhancement Workshops were to review and discuss materials covered in class. The tutors were undergraduates who had already taken organic chemistry and had a strong relationship with the professor teaching the class. This allowed for better access to information for students who might be struggling and in need of assistance.

Student B described in detail the HCOP Information Binder. This binder was made available to pre-med and future health occupation students and was filled with up-to-date opportunities in the fields. The binder included up-to-date summer internships, paid research positions, descriptions of how to apply to these positions, where/how to get funding to cover research, medicine-specific internships for underrepresented minorities, etc. Student B was extremely satisfied with the comprehensive clearinghouse binder making available information he considered important to access.

The Biology Scholars Program created a culture of support mechanisms and teamwork both peer-to-peer and from program advisors to students. The BSP also required students to give back to the program in some way during their time as an
undergrad, harvesting in each individual a pride in the program making the requirement
of giving back more of an honor than a burden.

The main themes that emerged from the interview results were: 1) advising
(covering various types: undergraduate coursework, financial aid, transition career
networking, research networking, etc.), 2) access to networking, 3) recruitment of
underrepresented minorities, and 4) medical school preparations such as MCAT and
interviews.

Advisors in the BSP appear to be the highlight of the program. Student A could
not stress enough her positive opinion of the advising in the BSP. Advisors took the
time to get to know their advisees quite well in an ongoing, multi-year type of mentoring
relationship. Advisors understand the changing emotional and academic needs of the
students in the program and work hard to meet their individual needs. For example, a
student in BSP experienced a death in the family at the onset of finals and BSP advisors
immediately found and paid for a grief counselor for the student and spoke with that
student’s professors to explain the situation, get extensions on the finals, and confirm
with the registrar that straight “Fs” would not appear on the transcript until the make-up
finals could be taken.

When asked how he would rate his experience in the Health Careers Opportunity
Program (HCOP), Student B chose three categories. For the academic advising he gave
HCOP 5 out of 10 and for both information provided and financial aid advising he gave it
9 out of 10. He perceived the problem with the academic advising was how HCOP
presented the bare minimum of medical school coursework requirements but failed to explain that a deeper level of science and math coursework would drastically improve medical school readiness.

According to Student B, the financial advising of HCOP was incredibly helpful due to his unique financial situation as an undergrad. Switching to pre-med late in his undergraduate work, he was well above the units required for graduation by the time he was taking his last few pre-med courses. Being awarded financial aid or loans becomes increasingly difficult if a student already has enough units to graduate. HCOP financial aid advisors wrote appeal after appeal to ensure financial aid needed for Student B to pay for and finish out the last few pre-med classes before graduation.

As far as medical school preparation, the BSP offers a rich diversity of on-campus workshops ranging from visiting speakers from California medical schools (which has included the Dean of Student and Resident Diversity from the College of California Medical School) to MCAT information workshops/preparation courses. BSP also has an established network of alumni and medical research professionals to connect undergraduates with medical research opportunities ranging from the laboratories in northern California to the Centers for Disease Control in Atlanta. This type of networking is invaluable in assisting student access to these opportunities, which will increase chances of acceptance into medical school. This networking also includes connections to transitional science/medical/research careers between undergraduate and medical school.
HCOP was also crucial in helping get Student B through the rigors of the science and math pre-requisites for medical school. These classes were a hurdle that would need to be jumped successfully numerous times before student B began to develop the academic confidence he felt he needed to pursue medicine.

Both HCOP and BSP displayed strength in their advising and financial aid advising; however, only the BSP appeared to have strong academic advising, according to the interviewees. The HCOP program does not appear to have an alumni or career network such as the robust networks reported by Student B in the BSP. However, both HCOP and BSP appeared to have the adequate human resources needed to support the students in their goals of pursuing medical school.

Student A shared her perspective that the BSP was effective in targeting, recruiting, and retaining underrepresented minorities in the program. This detail was corroborated by Student B when the BSP came into the conversation during his interview. He was duly impressed from what he heard about the BSP his first semester at medical school and remarked that perhaps as many as 10 of the 98 first-year students at the College of California Medical School had participated in the BSP, all of which are underrepresented minorities.

HCOP programs are funded to exist at select schools with diverse populations. In such, it appears HCOP diversity recruitment takes place when sites are selected rather than within the program itself. Student B explained that while there were minorities in the program, he did not witness a large emphasis on the recruitment of underrepresented
minorities. Both BSP and HCOP programs have strong support for MCAT preparation as far as discounted access to preparation courses. However, only the BSP appeared to help students prepare for medical school interviews.

Limitations

The data does not account for the possibility that participants may have participated in multiple pipeline programs. In the quantitative online survey, participants were channeled to pick the MOST effective program, based on their opinion, which then allowed that participant to only answer survey questions pertaining to their particular pipeline program. Thus, with a more involved survey instrument, participants might have indicated specific strengths and weaknesses between different programs or shed a more accurate picture of the total number of participants in each type of program. The data do not indicate a difference in gender attendees with regard to different types of pipeline programs nor is the data capable of correlating race/ethnicity to a certain type of pipeline program.

Medical students are extremely busy, and their time is tenaciously protected by administrators from their medical schools. As such, the longer, more involved type of survey would not have been accepted by the Dean of Student and Resident Diversity. This limited the scope of the questions in the survey to focus on differentiating effectiveness between the three types of pipeline programs, K-12, college/university, and post-baccalaureate. A more in-depth study to analyze the comparative effectiveness of
pipeline programs would have a more robust survey in which different characteristics of the specific pipeline programs were evaluated. Examples of program characteristics measured are: academic advising, financial assistance/advising, connected to research, alumni connections, and networking with local/national laboratories.

Conclusion

In conclusion, a large percentage of respondents (79%) either agreed or strongly agreed that their medical pipeline program targeted underrepresented minorities. Almost as many students, 62%, reported having participated in some type of pipeline program during their educational pathway to medical school. Interestingly, the majority of respondents participated in a post-baccalaureate program; however, when asked for their opinion on the most effective type of pipeline program, the majority of respondents, (72%) chose college/university-level pipeline programs. This may be caused by exposure to and learning about other pipeline programs during the first year of medical school.

Interviews revealed high levels of satisfaction in two separate college/university-level pipeline programs, the Biology Scholars Program and Health Careers Opportunity Program. Few respondents thought K-12 pipeline programs were effective in optimizing medical school matriculation and most students reported being more inspired to pursue medicine by parents/family members and college professors/counselors than by any high school specific influences (counselor/teacher/principal).
Chapter 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

Healthcare disparities are an issue of equality and fairness as well as political and economic imperative. Turning a blind eye to the injustices in medical treatment based on race and/or ethnicity can be likened to ignoring other forms of social injustice. Politically speaking, lawmakers have the choice of addressing the issue of healthcare disparities before these issues become a national crisis. Economically, the cost of treating sickness is far greater than the cost of teaching prevention, and any long-term solutions aimed at eliminating healthcare disparities will benefit the fiscal health of the country as well. Medical pipeline programs are a key component to addressing the issues of healthcare disparities. This study investigates comparative effectiveness between the different types of medical pipeline programs for current medical students.

Summary

Healthcare disparities are rooted in varied components of society from urban poverty to lack of medical access in rural communities. The purpose of this study was to determine which types of medical pipeline programs optimize matriculation of underrepresented minorities to medical school. Language and cultural barriers create inequalities in health outcomes as well as access to healthcare for minorities. Physician
and patient bias both play a role in healthcare disparities as does patient trust of physicians. Two main types of healthcare disparities, within-provider and between-provider, can both be addressed through increased medical workforce diversity, a direct outcome of medical pipeline programs that target underrepresented minorities.

As mentioned previously, workforce diversity has been linked to a reduction to healthcare disparities at all levels (Grumback, 2009). Increased workforce diversity for physicians and other medical care providers leads to greater trust and culturally congruent care for patients from diverse ethnic and socioeconomic backgrounds. Increasing the diversity of students in medical school creates the environment of cultural exchange within the medical context thereby creating a richer, more representative training environment for physicians. Additionally, physicians who grew up in urban areas or healthcare provider shortage areas are more likely to return to those areas when they start practicing medicine.

Increasing the workforce diversity via increased diversity in medical schools will lead to an increase in the representation of racially and ethnically diverse medical school teaching faculty as well as an increase in underrepresented minority issue medical research. Increasing diversity of medical school teaching faculty can further help in the eliminating of healthcare disparities by creating a more culturally sensitive, culturally appropriate training environment for medical students. This in turn will better represent the population at large in the upper echelons of medical school administration, deans, and
at the national research level. Employing medical pipeline programs is a proven strategy for increasing workforce diversity in medicine.

Data was gathered in the research study using a mixed method approach where both quantitative and qualitative data were collected. Current medical students were surveyed with an online instrument and two of those students were interviewed for one hour each. Data gathered created a platform from which to answer research questions, and additional research questions were developed for further research on the topic of effective pipeline programs optimizing medical school admission for underrepresented minorities.

The population was accessed through the Department of Diversity at a local medical school, and a personal relationship with the Dean of Resident and Student Diversity at the medical school was crucial to the design and dissemination of the survey instrument. Participation was optional, and while the response rate was low, there was still enough data for analysis and interpretation.

Conclusions

Almost two-thirds of medical students participated in some form of medical pipeline program they reported as having helped them gain admission into medical school. Additionally, almost two-thirds of respondents were women. Less than 10% of individuals reported having participated in a K-12 pipeline program that was instrumental
or highly effective in helping them gain admission to medical school whereas over 60% reported a post-baccalaureate program was pivotal in their medical school acceptance.

Interestingly, less than 30% reported having participated in a college/university level medical pipeline program but when asked to give their opinion of the most effective type of medical pipeline program, the overwhelming response was college/university level programs. Over 70% were of the opinion that college/university level programs were the most effective type of pipeline program for increasing underrepresented minority enrollment into medical schools.

Students were also much more likely to report being inspired to pursue medicine through some type of college/university level advisor, counselor, or professor as opposed to a high school counterpart. Parents and other family members also had high rates of influence and inspiration, according to the students surveyed.

Student interviews revealed a large emphasis on personal advising plays a strong role in how a student views a pipeline program. A program’s ability to meet specific and potentially out of the ordinary needs appears to dramatically increase the student’s favoritism of a given pipeline program. The term advising covers a multitude of areas: financial aid, undergraduate coursework success, and access to research and networking opportunities. Equally as important to general advising is the role programs play in assisting the process of medical school applications, preparing for MCATS and interviews, as well as networking for transitional careers.
Recommendations

A new model for underrepresented minority recruitment into health occupations and medical careers will involve an inter-departmental, inter-institutional effort. Universities, community colleges, private schools, state schools, research universities, and small liberal arts colleges all stand to share in the responsibility for improving methodologies and programs recruiting and preparing underrepresented minorities. High schools, middle schools, and elementary schools need also be held responsible for creating and implementing an educational system that can successfully lay the science and mathematical foundations necessary for the pursuit of medically related careers.

If this study were duplicated on a larger scale, continued research on effective employment of medical pipeline programs for underrepresented minorities could indicate where university leadership and resources should in fact be channeled to help address the issues of healthcare disparities from an educational level. With potentially thousands of medical students and perhaps even medical school graduates responding to a large scale study, much broader trends and correlations could be drawn to better understand the ways in which pipeline programs are effective.

Another recommendation would be for the American Association of Medical Colleges (AAMC), the preeminent clearinghouse for all things medical school related, to take on the role of collecting and making available the medical pipeline data for medical school applicants. The AAMC is an institution with the capacity to collect matriculation data for each and every medical student who gains or attempts to gain acceptance every
year. The imperative for increased workforce diversity is apparent in AAMC policies and publications, but should they be willing to collect this large amount of data for all the applicants, a significant amount of valuable information would be available.

By collecting nationwide, exhaustive medical pipeline data, the AAMC would have the capacity to make data-driven policy and program recommendations to colleges and universities around the country. By collecting data from underrepresented minorities who participated and did not participate in medical pipeline programs and who were both accepted and denied admissions to medical school, the data could be highly instructive. This type of data collection implementation would no doubt have significant financial impact on the AAMC and would require partnering with other governmental entities to defray the cost.

The result of collecting and analyzing this type of large-scale, longitudinal medical pipeline data would be improved access and participation for underrepresented minorities in medical pipeline programs and, thus better representation in medical school and the broader healthcare occupations. This would be a significant step toward eliminating the costly and unjust effects of healthcare disparities on American society.
APPENDIX

Survey

Thank You (page a)

Thank you so much for your willingness to take this short survey. It will take you 4-5 minutes.

Consent (page b)

You are invited to participate in a study conducted by Tucker Farrar of California State University Sacramento. We hope to learn details regarding the pathways that optimize underrepresented minorities acceptance into medical school. By completing this survey, you are agreeing to participate in the research. Your responses will be kept confidential to the degree permitted by the technology used. However, no absolute guarantees can be given for the confidentiality of electronic data. In this anonymous survey, the researcher team will be unable to remove anonymous data from the database should participants want to withdraw it.

____Agree   ____ Disagree

If you have any questions about this research, you may contact Tucker Farrar at [redacted] or by email at [redacted].
Pipeline Program Defined (page c)

The intention of an educational pipeline program is to increase the representation of underrepresented groups by creating an entry point. For purposes of this survey the “pipeline” programs are those intended to creating an entry point for successful pathways to medical school.

I consider myself an underrepresented minority.

YES (Go to Page 2)
NO (Go to last page-Thank you)

I participated in a pipeline program sometime between elementary school and acceptance into medical school.

YES (Go to page 3)
NO (Go to last page)

I participated in the following medical pipeline program (choose the program which you feel most help your acceptance into medical school)

K-12 Pipeline program
Undergrad Pipeline Program
Post-Baccalaureate Pipeline Program

My high school pipeline program was very effective.
Strongly Agree
Agree
Disagree
Strongly Disagree
My high school pipeline program was effective in preparing me for successful admission to medical school.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

I was in high school when I decided I wanted to become a physician.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

While I was in high school a college/university pipeline program contacted one of the following: me/my school/ my counselor/ my principal, to encourage me to pursue medicine.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

My college/university pipeline program was effective in preparing me for successful admission to medical school.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

I was in college when I decided I wanted to become a physician.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

My post-baccalaureate program was effective in preparing me for successful admission to medical school

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

A post-baccalaureate program contacted me while I was an undergrad inviting me to enroll in their program.
The pipeline program I participated in was instrumental in my medical school acceptance.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

The pipeline program I participated in targeted ethnic/racial minorities and unrepresented students.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

Based on my experiences, I believe the type of pipeline program that is currently MOST effective in increasing URM matriculation into medical school is:

- K-12 Pipeline Programs
- College/University Pipeline Programs
- Post-Baccalaureate Programs
- Other (explain)

I was inspired to pursue medicine through the support of a...(rank most to least)

- High school teacher
- High School Counselor
- High School Principal
- Family Member
- College Professor
- College Counselor
- Parent
- Other (type in)

Ethnicity

- Hispanic or Latino
- Non-Hispanic or Latino

Race

- American Indian or Alaska Native
Asian
Black or African American
Native Hawaiian or other pacific islander
White
Choose not to answer this question

Gender
Male
Female

Comments you would like to add
___________________________________

Would be willing to give a short interview (phone or in person) with the researchers to help inform qualitative data on this study of Underrepresented Medicine in an effort to reduce healthcare disparities
Name____________________ Email____________________
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