THE PRODUCTION OF PHYSICIANS FOR LOW-INCOME COMMUNITIES IN

PANAMA: A CASE STUDY

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ABSTRACT

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Gross inequality in access to health services is a common problem in developing countries like Panama. This study responds to the current shortage of physicians from economically depressed communities in Panama. By using qualitative research methods, I examined the personal, financial, curricular and environmental factors that shape low-income students' commitment to become physicians; the forces that shape these medical students to practice medicine once they graduate; and how policies and institutional practices in medical schools in Panama influence rates at which low-income students become physicians. Specifically, data sources were used to explore how the nation's educational policies, as well as recruitment, admissions, and student support practices in medical schools, influence rates at which low-income students become physicians. Documents were analyzed to determine statistical trends in medical school enrollment and completion for some of the selected medical schools; and the availability and effectiveness of various policy initiatives enacted to increase the production of physicians across the country.

Interviews were conducted with senior academic officers of medical schools (e.g., vice provost, deans and directors) and others who know much about the country's current

human resources challenges in medicine (e.g., a former minister of health, the deputy minister of education, and the health senior adviser to the president of Panama). Interviews with these stakeholders provided insights into the educational, political, and economic forces that shape whoever enrolls in and ultimately completes medical school. Additionally, recent graduates or students in their final year of medical school from four schools of medicine in the Republic of Panama participated in focus groups, to offer information into the personal, familiar and institutional factors that supported and undermined low-income students' goals of becoming doctors. Some attention was paid to socioeconomic demographics of communities in which certified physicians ultimately choose to practice.

The findings of this study provide Panamanian policymakers with valuable information for defining better approaches to train physicians for underserved areas and may help Panama achieve compliance with the millennium objectives that were agreed to by member countries of the World Health Organization in 2000. Finally, implications for future research on the training of low-income students to become physicians in underserved communities are proposed.

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CHAPTER 1

Introduction, Purpose, and Significance of the Study

Introduction

Pedro Marin was born 20 years ago in an isolated community within Ngäbe-Buglé, one of three native reserves in the Republic of Panama that together are home to 12% of the population and occupy 30% of the Panamanian territory. Pedro's mother died while giving birth to him; no physician was available to step in when it became clear that the birth was far too complicated for the local midwife to handle. Pedro and his five siblings grew under the guidance of their father, an Indigenous peasant who never went to school and who suffered frequently from diarrhea, viral infections, and malnutrition. In a world of economic limitations and scarcity, Pedro completed just 3 years of elementary school and, at age 14, started doing rudimentary agriculture with his father. Under these conditions, Pedro grew to be only 5 feet tall, and he suffers from malaria and asthma—all which are inadequately treated. Now, with just 2 decades behind him, Pedro already looks old and, like many of his peers, he will be lucky if he lives to see another 2 or 3 decades.

The same day that Pedro was born, Juan del Cid entered the world in one of the private hospitals of Panama City, 200 miles away from Pedro's small village. Juan's mother was assisted by an experienced obstetrician who was accompanied by a pediatrician for baby Juan. Until the age of 6, Juan underwent monthly health checkups. This level of care paid off when Juan was 5 years old. He was diagnosed with a respiratory problem which, without intervention, could have turned into a long-term asthma condition. Juan recovered fully, went to school in Panama City and after

graduating from high school, was awarded a scholarship from the Technological University of Panama, where he is a senior majoring in mechanical engineering.

Pedro and Juan are fictitious characters I created for this introduction. But the facts I use to describe the extreme disparities in their life circumstances—particularly their access to health services and subsequent health outcomes—are heartbreakingly real for many Panamanians. Pedro's life conditions resemble those of many poor indigenous people who are born in Panama and are trapped in a vicious cycle of illness, lack of education, and numerous inequalities. Juan's life conditions reflect those of Panamanians living in areas where health services and primary care physicians are widely available.

Remedies for the gross inequality in access to health services, as exemplified by the stories of Pedro and Juan, are the focus of this dissertation. Specifically, I focus on the ways that Panamanian medical schools' recruitment and retention efforts and curricula, along with national education policies, affect physicians' decisions to work in areas of the country where there is this unmet demand for health services. After describing the problem to be addressed, I provide details of the significance of my study for both the research and policymaking communities in Panama and around the world.

Statement of the Problem

The problem addressed in this study is perhaps best described in the 1978 Alma Ata Declaration as "the gross inequality in the health status of the people" caused by the inadequate and inequitable provision of health care services (International Conference on Primary Health Care, 1978, para. I). As clearly stated in the declaration, people in poor countries tend to have less access to health services than people living in wealthy

countries. And even within countries, the poor have less access to health services than those who are in better economic positions (Peters et al., 2008).

Inequitable access to healthcare across the globe has a profound impact on people's life expectancy and quality of life. In the period from 2000 to 2005, life expectancy was 46 years in sub-Saharan Africa, 67 years in Arab states, and 79 years in high-income countries that belong to the Organization for Economic Cooperation and Development (Marmot & Health, 2007; Simoens & Hurst, 2006). Life expectancy also varies considerably within countries, even if they are rich. Consider the city of Glasgow, in Scotland, from 1998 – 2002: the average life expectancy for people living in poor areas of the city was found to be 54. Affluent Glasgonians, on the other hand, could expect to live, on average, until age 82—an additional 28 years (Hanlon, Walsh, & Whyte, 2006). While gross inequalities and access to health care are not the only factors contributing to these disparities in life expectancy outcomes, research shows that when people have increased access to health services, rates of mortality and morbidity improve (Dussault & Franceschini, 2006).

Many factors contribute to peoples' limited access to health services. In some cases, people are simply unable to afford healthcare. When more than 1 billion people around the globe make less than the equivalent of US$1.25 per day (Deaton, 2010), it should come as no surprise that even the most basic health services are beyond the financial means of millions. But in many areas, the problem is less about affordability than it is about scarcity. Specifically, there simply are not enough hospitals and clinics—or physicians to staff these facilities—to meet people's healthcare needs. And even when the overall supply of physicians in a region or country might be sufficient to serve the

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population, the distribution of those physicians can make doing so extremely difficult (Dussault & Franceschini, 2006).

Physicians often cluster in affluent metropolitan areas, leaving people in isolated, rural areas or in urban areas with high concentrations of poverty with fewer options (Rosenblatt & Hart, 2000). The shortage of physicians in isolated communities and low-income metropolitan neighborhoods is a global problem (Jong-Wook, 2003). For example, in low-income countries there are 9 hospital beds for every 10,000 people and 0.49 doctors for every 1,000 people. In high-income countries those numbers rise to 57 and 2.67, respectively. And if we look at these indicators by regions of the world, we find wide differences in the number of hospital beds per 10,000 people—ranging from less than 1 for Africa, 25 for the Americas, and 64 for Europe. The rate of doctors per 1,000 people is just as distorted: 0.21 for Africa, 1.94 for the Americas, and 3.2 for Europe (Peters et al., 2008). This problem applies to developing as well as underdeveloped countries. For instance, in the United States, 20% of the population lives in rural areas but only 9% of physicians practice in these areas. In Europe, more than 75% of physicians practice in urban areas. Likewise, in some extreme cases like Kenya, only 25% of physicians practice in isolated areas (World Bank, 2014).

In Panama, which is the focus of this study, the differences in the regional distribution of physicians in the country are extreme. In the Indian communities of Guna Yala and Ngabe-Bugle, the ratios are 0.59 and 0.14 physicians per 1,000 inhabitants, respectively (Ministerio de Salud de Panama, 2013). The same low ratios can be found in isolated regions like Bocas del Toro, with 0.68 physicians per 1,000 people, or Darien,

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with 0.72 physicians per 1,000 people. These ratios are quite different from the ones in the metropolitan areas of Panama, with 2.07 physicians per 1,000 inhabitants.

Research shows that when people have increased access to health services, rates of mortality and morbidity improve (Dussault & Franceschini, 2006). In 1997, in Panama, when the ratio of physicians per 1,000 was 1.25, life expectancy reached 74.3 years. Sixteen years later, in 2013, the ratio of physicians per 1,000 had improved to 1.57 and average life expectancy of Panamanians increased to 76.8 (World Bank, 2015a). This improvement in life expectancy has not been achieved in the low-income areas in Panama where physician shortages remain pervasive, as described by a ratio of 0.25 physicians per 1,000 in 2013 (Ministerio de Salud de Panama, 2013).

Just as increasing people's access to healthcare is positively correlated with increased life expectancy, limiting individuals' access to care has negative consequences across the lifespan. Limited access to healthcare severely affects infants' health and mortality (Speybroeck, Kinfu, Dal Poz, & Evans, 2006), negatively influences individual growth and development (Rowland & Lyons, 1989) and diminishes the quality of care of the elderly with chronic conditions (Bodenheimer, 2006).

This assemblage of statistics makes it clear why the World Health Organization declared having access to health services a universal right—one that is fundamental for preserving people's well-being (World Health Organization, 1996). In 1978, Panama joined 133 other countries in signing the Alma-Ata Declaration. This declaration establishes primary health care as essential and universal to individuals and highlights the responsibility of governments "to formulate national policies, strategies and plans of action to launch and sustain primary health care as part of a comprehensive national

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health system…" (International Conference on Primary Health Care, 1978, para. VIII). Ever since it signed the declaration, Panama has followed the guidelines and objectives set by the World Health Organization in coping with the challenges of improving child health and people with acute and chronic diseases.

Although physician density has increased in the last decade in Panama, it remains below average when compared to averages in Latin America and the United States. For instance, the rate of physicians per 1,000 in Panama increased from 1.17 in 1990 to 1.49 in 2011. For Latin America as a whole, the average ratio for 1990 was 1.21 per 1,000, increasing to 1.85 per 1,000 in 2011. In the United States, the 1990 rate of physicians per 1,000 was 1.85 and rose to 2.45 in 2011. For other health indicators, like child mortality per 1,000, Panama in 1990 had a ratio of 31.1, while the number of infant deaths per 1,000 was 25.8. Sixteen years later, in 2013, child mortality per 1,000 decreased to 17.9 and infant mortality per 1,000 went down to 15.4 (World Bank, 2015a). For the United States, child mortality per 1,000 improved from 11.2 in 1990 to 6.9 in 2013, while infant mortality per 1,000 decreased from 9.4 in 1990 to 5.9 in 2013 (World Bank, 2015b). As these key health indicators clearly show, Panama's efforts have not succeeded in remedying the shortage of physicians in economically depressed and rurally isolated areas, particularly when compared with the U.S. and Latin America, and inequality in access to healthcare continues to plague the nation.

Purpose of the Study

The purpose of this study is to seek explanations for the shortage of physicians from economically depressed communities in the Republic of Panama. Specifically, I use

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case study methods to explore insights into the following research questions: What personal, financial and curricular factors shape low-income students' commitments to become physicians? How do policies and institutional practices in medical schools in Panama influence rates at which low-income students become physicians? Which forces shape medical students' interests in the contexts in which they subsequently practice medicine? The low production of physicians by medical schools in Panama and the maldistribution of physicians between urban and rural areas limit access to health services, widening the gap between the rich and the poor, and affecting quality of life of those living in underserved communities.

Significance of the Study

Although medical school administrators in Panama are likely aware that they are producing an insufficient supply of physicians to work in underserved communities, there is a lack of inquiry and empirical data to address this problem. This study is an important step in making the information available to those who are in a position to undertake programmatic interventions aimed at remedying the physician shortage in Panama, by increasing the number of physicians from and for low-income communities. The insights generated from this study have the potential to lead to innovative strategies and improved initiatives for recruiting and retaining medical students from underserved communities, thereby increasing the likelihood of reducing the shortage of physicians in those same communities.

The study includes qualitative assessments by top level authorities of medical schools in Panama, including presidents, provosts, deans, and others who are dealing with

current human resources challenges in medicine (e.g., ministers and hospital administrators) to gather insights into the different forces that shape enrollment and retention of students in medical schools. These data are complemented with interviews of a sample of graduates or students in their last year of the schools of medicine of the country, with a view to gathering valuable information about the production of physicians for underserved communities.

Contribution to the Literature on Physician Shortage

The scarcity of physicians in various regions or countries has been the subject of numerous studies. As shown by Wilson et al. (2009), the research literature dealing with the shortage and inequitable distribution of physicians may be classified into five different categories of intervention: selection, education, coercion, incentives, and support. These categories take into consideration different factors that have been shown, through research, to influence the shortage and maldistribution of physicians all over the world.

The *selection* category focuses on those elements involved in recruiting and enrolling medical school students who will work in underserved areas after graduation. Among other things, socioeconomic background, ethnicity, and gender are considered (Laven & Wilkinson, 2003; Rabinowitz, Diamond, Markham, & Paynter, 2001). The *education* category encompasses any approach used to motivate participation in primary care practice in underserved communities (Acosta, 2000; Brooks, Walsh, Mardon, Lewis, & Clawson, 2002). *Coercion* refers to those measures used by governments, professional bodies, and other regulators to make practice in rural areas compulsory. Some limited

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evidence has been found in specific developing countries such as Thailand that coercion factors can have a positive influence to lessen physician shortages in isolated areas (Wibulpolprasert & Pengpaibon, 2003). *Incentives*, on the other hand, relate to specific financial incentives and or reimbursements tied to physician practice in underserved areas (Hammer & Jack, 2002; Ross, 2007). Finally, *support* includes various approaches to back physicians' practice in isolated communities, such as family and lifestyle issues, accommodations, and health center infrastructure and availability (Jones, Humphreys, & Adena, 2004).

In most cases, research on physician shortages has concentrated on specific schools using just one of the categories identified by Wilson and colleagues in their 2009 literature review. In this study, in order to analyze the maldistribution of physicians in Panama, I use a blended approach that incorporates elements of the five strategies that have been tested in other contexts. That is, I review factors related to selection and education, analyzing them for different schools and student backgrounds. I also use statistical data from students and analysis of curricula in schools of medicine in Panama. In addition, incentive and support factors are researched using the expert opinions of provosts, deans, and government officials, as well as medical student performance.

In many ways, Panama is an ideal setting for such a study. It is a small country comprising just 77,000 square kilometers and 4 million people. The country's size makes it possible to consider, in depth, different spheres of the situation that have been examined in isolation in other research studies (Wilson et al., 2009). For example, I link the outcome of the medical schools to the curricula, the teaching methods, and the

professors in order to better understand the predominant factors in the production of physicians.

Contribution to Policymaking

Given the urgent need to improve healthcare in the Republic of Panama, as mentioned in the last yearly report of the Panamanian Ministry of Health (Ministerio de Salud de Panamá, 2014), this study contributes to existing evidence of the phenomenon to policymakers and likewise provides specific answers regarding the level of training and maldistribution of physicians in the country. Since education is of one of the strategies to improve the shortage of physicians in any country, and lessening health inequity should be a major objective of medical schools, my study provides some guidelines to adjust the curriculum, the teaching methods, and clinical practices within the schools of medicine in the Republic of Panama. But most important, it research approaches to improve recruitment and retention of medical students from low income and isolated areas.

The study is useful for different groups of interest within the higher and middle level education system in Panama, as well as for the government's policymaking entities. Currently in Panama, there is a great deal of policy variety and inconsistency regarding the preparation of physicians. By collecting and synthesizing the insights of Panamanian higher education executives and high level public officials, this study provides Panamanian policymakers with a great deal of valuable information for better defining approaches to train physicians for underserved areas.

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The potential influence of this study extends beyond Panama's national borders. It could contribute to the analysis of the phenomenon in other emerging countries, such as those in Central America that experience the same situation of physician shortage and geographic maldistribution. Furthermore, results of the study may contribute to improving the physician "pipeline" starting at the high school level, thereby allowing a better recruitment of students and improving performance within the schools of medicine. Additionally, the outcomes of the study could provide options for improving and adapting the medical school curricula in Panama, such as the inclusion of subjects and field experiences associated with the needs of the country, for a better "social accountability" of the medical schools in Panama.

Finally, analyzing medical students' profiles and highlighting the challenges they face in persisting through graduation and medical degree attainment may allow for new options to be considered for their preparation, student support and financial viability, especially for students from low socioeconomic groups. This adaptation and improvement exercise should contribute to the preparation of more physicians that can offer better access to healthcare and contribute to the improvement of health care indicators within the Republic of Panama.

Above all, the study has the potential to expand the objectives regarding the provision of primary health attention in Panama and help the nation achieve compliance with the millennium objectives that were agreed to by member countries of the World Health Organization in 2000.

CHAPTER 2

Literature Review

Introduction

Health care scarcity is one of the biggest challenges in rural Panama, where the density of inhabitants per physicians is five times higher in these areas compared to urban locations (Colon-Gonzalez, El Rayess, Guevara, & Anandarajah, 2015). This uneven distribution of physicians is not only limited to rural areas but also extends to economically depressed zones. Besides a shortage of physicians, rural locations and economically depressed areas are plagued with poor healthcare infrastructure and reduced affordability of, and accessibility to, primary care (Strasser, 2003). As such, for the purposes of this study, I consider rural locations and economically depressed areas to be *underserved communities* when it comes to health care.

Although my study focuses on the maldistribution of physicians in Panama, the health care issues faced by underserved communities are not unique to this country. Health care scarcity, which is largely associated with shortages of primary care specialists and family physicians, is a worldwide phenomenon (Strasser, 2003). As such, I reviewed a broad set of reports and studies based on empirical research which explore physician shortages in underserved communities worldwide. Another reason I draw on research from areas outside of Panama is that I have found very few rigorous, peer-reviewed studies of physician shortages in Panama. Thus, while recognizing that there are often substantial differences in culture, government structure, socioeconomic

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circumstances and technical capabilities from country to country, it is still the case that research on physician shortages in underserved communities across different contexts can inform the situation in Panama if used with an appropriate dose of caution.

In this review I highlight the predominant areas of research regarding the impact of these shortages on vulnerable groups. Next, I review global responses to the phenomenon of physician shortages as well as the latest efforts to close the gap in health professionals' presence in underserved communities versus urban areas. Finally, I describe the overall effort of medical schools in the United States and around the world in responding to the underproduction of physicians and some innovative approaches to mitigate this situation.

Reasons for Physician Shortages in Underserved Communities

Many research studies have highlighted the phenomenon of physician shortages in underserved areas. The three main reasons for these shortages are (a) lack of familiarity with the underserved areas, particularly with their health care needs; (b) inadequate incentives to encourage physicians to practice primary care in underserved communities; (c) poor distribution of physicians between urban and rural areas.

Lack of Familiarity with Underserved Communities

A physician's familiarity with underserved communities—whether that knowledge comes from growing up in such an area or from medical school training—has

been shown to play a significant role in a physician's choice to practice in underserved communities.

Personal background**.** The importance of familiarity with underserved communities was shown by Jarman et al., (2009), who found that among 84 Wisconsin surgery graduates interviewed between 1994 and 2008 there was a positive relationship between having a rural background and the likelihood of choosing rural practices. The influence of familiarity is further supported by another study (Rabinowitz, Diamond, Veloski, & Gayle, 2000) based on a stratified random sample of over 2,900 physicians whose self-reported practice dealt with primary care. In that study, four predictors were found to be associated with providing care to underserved communities. Of these four predictors two—whether the physician was from an underserved minority, or grew up in an underserved community—are directly related to the physician's formative environment.

Another important factor influencing the probability of a physician practicing in underserved communities has to do with the physician's interests and choice of specialty (Rabinowitz et al., 2000). A study involving 102,673 medical doctors who graduated between 1997 and 2006, found that graduates intending to practice in underserved communities were more likely to choose primary care specialties, among other predictors of primary care choice (Jeffe, Whelan, & Andriole, 2010). Furthermore, DeVries and Reid (2003) found that medical students from rural areas were more likely to choose primary care careers than students living in urban areas.

An important consequence of understanding the factors influencing the probability of physicians choosing to work in underserved communities is that medical schools could develop programs to increase recruitment of these physicians. For example, Rabinowitz et al. (2000) found that four of the predictors associated with working in underserved communities could be identified at the time of admission to medical school. In another study carried out in 121 medical schools in the United States, Senf and colleagues (Senf, Campos-Outcalt, Watkins, Bastacky, & Killian, 1997) collected data on curriculum, faculty, and student financing, while using questionnaires to obtain information regarding the choice of primary care as specialty in medical schools. On the basis of statistical analysis, the researchers concluded that an effective way to increase physicians with generalized preference in primary care was to increase the number of students interested in this type of career at the time of enrollment. Since the practice of primary care is strongly associated with physicians practicing in isolated areas, it stands to reason that increasing recruitment of students interested in primary care would increase the number of physicians interested in working in isolated areas.

Medical school curricula. Medical students who enter school with little firsthand experience with the health care needs of underserved areas can still become acquainted with these needs through curricular content and clinical experience within medical schools. In a literature review encompassing hundreds of studies devoted to medical curriculum and primary care specialty choice published from 1982 to 1993, Meurer (1995) found that specific curricular experiences may enhance interest in primary care careers. These included required family clerkships, continuous experience in primary care

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settings, and courses on primary care careers. Although these conclusions continue to be valid 20 years later (Pfarrwaller et al., 2015), it has not motivated enough actions to adequately address the need for more physicians in underserved areas and developing countries. In fact, some researchers claim that given the importance of primary care to solve major health needs of most of the population, medical schools must adapt their curriculum to include this type of training and that a significant proportion of the faculty should be primary care practitioners (Reinoso Medrano, Tamarit Díaz, & Perez Hoz, 2012).

Field experience. Lack of familiarity with underserved areas as a main reason for physician shortage in underserved communities is also linked to field experiences in underserved communities. In a study involving 450 family medicine residency programs in the United States, medical training rotations in underserved communities positively influenced physicians' decision to subsequently practice medicine in those settings (Tavernier, Connor, Gates, & Wan, 2003). Furthermore, in a review by Brooks et al. (2002) of 21 quantitative articles on recruitment and retention of primary care physicians in rural areas, it was found that requiring students to study rural health care and do clinical rotations in rural areas was strongly associated with physician retention in rural areas. Likewise, in a study assessing key factors associated with medical practice in rural areas of Florida, physicians who had been exposed to rural medical practice during medical school were more likely to practice medicine in rural areas (Brooks, Mardon, & Clawson, 2003). This idea is further supported by a study looking at general practitioners and specialists from 1996 to 2004 in Chile. The study found that the proportion of general

practitioners with respect to specialists was the inverse of what it was 50 years ago (Román, Pineda, & Señoret, 2007). The researchers suggested that one of the major reasons for this phenomenon was the fact that most medical training is carried out in laboratories and hospitals rather than in the field, thereby resulting in a lack of capabilities for undertaking primary care responsibilities in underserved communities (Román et al., 2007).

Inadequate Incentives and Support to Practice Medicine in Underserved Communities

It is not easy for physicians to practice medicine in underserved communities. Ninety years ago, Pearl noted that "the life and circumstances of physicians are subject to the flow and interplay of general circumstances" (Pearl, 1925, p. 1024). Several recent studies attest to Pearl's observation. A survey of graduating medical students from the University of California in San Francisco showed that students cited factors like insufficient prestige, low intellectual content, and having to master a broad area of health issues as reasons for not choosing primary care specialties (Schafer et al., 2000). These factors, as well as appropriate financial incentives, are highly valued by physicians when deciding to practice in underserved communities. Schafer et al. (2000) also found that students who persisted in primary care practice were influenced by clerkships in that area of medical practice.

Remuneration is considered to be a basic element in retaining physicians, while low compensation (along with too many clinical responsibilities) is believed to be one of the main reasons medical students do not choose primary care specialties (Cheng, 2012; Jutzi, Vogt, Drever, & Nisker, 2009). Different financial incentives—such as loan

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repayments, tuition waivers, and retention payments—have been used to try to recruit and retain physicians in rural and underserved communities, but these interventions have had limited success (Li, Scott, McGrail, Humphreys, & Witt, 2014; Scott et al., 2012). In a study of medical students from Texas, where 96% of them had loans, Price and colleagues (Price, Cohn, Love, Dent, & Esterl, 2009) found that half of the students said they would consider participating in a loan forgiveness program that required practice in an underserved area, but (Rosenblatt & Andrilla, 2005) suggested that the higher the debt level, the less likely the students would pursue a career in primary care. As for tuition waivers, Jichi Medical University in Japan has had limited success with a unique system whereby graduates are obliged to work in rural areas in exchange for tuition-free medical education (Matsumoto, Inoue, & Kajii, 2008).

Another set of factors that help explain physician shortages in underserved communities is related to personal and professional contexts. Urban areas are more attractive for physicians because they have more opportunities for developing specialty careers or entering private practice, as well as offering better employment prospects, lifestyle options and amenities, and education opportunities for the physicians' children (Dussault & Franceschini, 2006; Kiolbassa et al., 2011). In fact, some of the major complaints by physicians practicing in rural areas deal with academic isolation, family and lifestyle issues, poor recreational infrastructure, limited housing options and limited employment opportunities for their spouses (Wilson et al., 2009). A desire for better control of elements of their lifestyle, such as hobbies and entertainment options, is another reason why physicians avoid primary care careers, thereby contributing to the

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shortage of physicians in underserved communities (Creed, Searle, & Rogers, 2010; Mariolis et al., 2007).

Lack of adequate professional and clinical support is another organizational factor that discourages physicians from remaining in underserved communities. Heavy workloads, insufficient substitute doctors, and lack of equipment and facilities act as deterrents and motivate physicians to leave underserved communities and look for better working conditions elsewhere (Dussault & Franceschini, 2006). Furthermore, if continuing professional development and in-service training is inadequate, job satisfaction may decrease and also influence doctors' decision to pursue other endeavors (Wilson et al., 2009). There is evidence that after the physicians' basic needs are met, their decision to stay or leave a community shows a cost-benefit pattern (Hancock, Steinbach, Nesbitt, Adler, & Auerswald, 2009). For example, if the cost of living in an underserved community is much less than the one in an urban area, this fact may influence a physician to stay and practice medicine in that community.

Reasons for the Maldistribution of Physicians across Underserved Communities

As described in Chapter 1, the maldistribution of physicians across geographic areas is a worldwide problem with implications for equitable access to medical services and healthcare costs. In Panama, although the density of health professionals per 10,000 is 29.5 (in 2012), which is above the minimum of 25 recommended by the World Health Report of 2006, in indigenous regions like Ngäbe-Buglé and Guna Yala the density is 2.2

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and 11, respectively. Hence, maldistribution of physicians is a problem in the Republic of Panama (Ministerio de Salud de Panama, 2013). In the United States, while 20% of the population live in rural areas, including 20 million living in federally designated health professional shortage areas (HPSA), only 9% of health professionals practice there (Whitacre et al., 2011).

Underrepresentation of minority physicians. One of the reasons found by researchers in the maldistribution of physicians is the underrepresentation of minorities in the physician workforce (Biviano & Makarehchi, 2002). Minority physicians are important because of their role in underserved areas (Komaromy et al., 1996) and their propensity to care for more patients from underserved minority populations (Davidson & Montoya, 1987). Xu et al., (1997) carried out an empirical study to analyze the assumption that minority physicians would be more likely than White physicians to care for underserved populations in the United States. The results of this nationwide survey of general practice physicians confirmed the hypothesis that underrepresented-minority physicians were more likely to care for medically underserved patient populations. Bolstering this finding, Gray and Stoddard found that "minority patients are significantly more likely than non-minorities to report having a minority physician as their regular doctor" regardless of other socioeconomic factors, based on an examination of the 1987 National Medical Expenditure Survey in the United States (Gray & Stoddard, 1997, p. 247). These conclusions were further corroborated by Saha, Taggart, Komaromy, and Bindman (2000), who determined that Black and Hispanic patients sought health care from

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minority physicians because of language, personal preference and access, after analyzing data from a random survey sample of 3,789 adults from the 48 contiguous United States.

Despite these findings, there has been limited progress in achieving racial and ethnic diversity in the physician workforce in the United States (Lakhan & Laird, 2009). This has been partly due to challenges and opposition to policies, such as affirmative action, that were meant to increase said diversity. Cohen (2003) argued that limiting affirmative action would impact the future of medicine in the United States because adequate representation of diversity is important for quality medical education and for improving the access of vulnerable and underserved populations. Specific challenges to affirmative action such as the *Hopwood v. Texas* decision and the passage of the California Civil Rights Initiative (Proposition 209), both of which sought to ban the use of race and ethnicity in admission procedures, have been noted by Tienda (2001) to have resulted in a reduction of minority enrollment at the university level, thereby having cascading effects on the proportion of minorities seeking to enter health professions. In addition, the increasing cost of medical education, higher admission standards, and the extension of the graduation cycle continue to place minorities at a disadvantage and further compound enrollment issues (Lakhan, 2003; Jolly, 2005; Reinoso Medrano et al., 2012).

Growing number of female physicians. The increasing number of female medical school graduates is contributing to the widening gap between physician populations in underserved communities and urban areas because female physicians are more inclined to practice in urban areas (Colwill & Cultice, 2003). Fordyce, Chen, Doescher, & Hart,

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(2007) found that in 2005, fewer female physicians than males were willing to practice in small rural areas and in countries with persistent poverty. Since women constitute a majority of pediatricians but show little interest in rural practice, there is a maldistribution of primary care for children in the United States (Shipman, Lan, Chang, & Goodman, 2011).

<u>Decline in physicians specializing in primary care.</u> Among both female and male physicians, due to the significant and increasing difference in income between primary care and specialists and the heavy workload imposed on primary care physicians, most U.S. medical graduates have avoided adult primary care careers. Because of this decline in primary care physicians, there has been an increased difference in metrics between urban and rural areas, such as physician-to-population rate, thus confirming the maldistribution of physicians in underserved communities in the United States (Bodenheimer & Pham, 2010).

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After many years of research on the reasons for physician shortages in underserved areas, the current list of factors closely resembles the one described in a study by Forti and colleagues (1995), 20 years ago. In that study, among the numerous reasons for why physicians decided to leave practice in underserved areas, the researchers identified fear of professional, social, and cultural isolation; limited access to medical centers; lack of family time; spousal dissatisfaction; limited opportunities for partnerships or group practices; limited opportunities for continuing education; perception of not being appreciated; and excessive call hours (Forti et al., 1995). Overall, the shortage of

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physicians seems to be related to education, preferences, regulations, and migration of international medical graduates.

It is important to note that not everyone fully agrees with the notion that having more physicians would necessarily lead to better health performance. For instance, Goodman and Grumbach (2008) suggested that since every additional physician would generate increased health care costs throughout the life cycle of his or her professional career, it would limit the short-term capacity for training new physicians.

Consequences of Physician Shortages in Economically Depressed Contexts

The consequences of physician shortages in underserved communities are numerous and complex. They influence mortality and morbidity rates among vulnerable populations and negatively impact health care for the elderly. Furthermore, these conditions are highly prevalent in developing countries. The World Health Organization (WHO) confirmed that maldistribution of health care is a major social determinant of health, emphasizing that "the high burden of illness arises because of the conditions in which people are born, grow, live, work and age" (WHO, 2008, p. 26)

Reduced Access, Lower Quality Care, and Increased Medical Problems

Rowland and Lyons (1989) found that residents with the poorest health in isolated localities are less likely to have access to physician care. Likewise, the high concentration of poverty in rural areas and among minorities increased health problems because of malnutrition, lack of sanitation, and reduced access to health services. Researchers have

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noted substantial differences in health care by socioeconomic status, finding the largest negative effects at the lowest socioeconomic levels (Duncan, Daly, McDonough, & Williams, 2002) with consequences in shorter life span for lower socioeconomic groups and downward social mobility (Rowland & Lyons, 1989).

In Europe, all major causes of premature death, such as cardiovascular disease and cancer, are more common among people with lower levels of education and income, which are both familiar traits of underserved communities (Mackenbach, Bakker, Sihto, & Diderichsen, 2002). Most chronic conditions (e.g., heart disease, diseases of the nervous system, diabetes, arthritis), along with many mental problems, are also more prevalent in lower socioeconomic groups (Mackenbach et al., 2002).

Increased Mortality and Morbidity

As minority men and women, as well as individuals of low socioeconomic status, receive less intensive and poorer quality of care than Whites (Cooper & Roter, 2003; Van Ryn & Burke, 2000), the differences in health care by socioeconomic status and persistence of low income among selected population groups tend to predict higher mortality risk for those groups (McDonough, Duncan, Williams, & House, 1997). There is also evidence that end-of-life care has not improved for minority patients, that there are ethnic disparities to end-of-life care (Krakauer, Crenner, & Fox, 2002), and that mortality rates in underserved settings with physician shortages are higher than in communities

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where there are no shortages (Pathman, Fryer, Green, & Phillips, 2005). Shortage of health professionals in underserved communities is also correlated to maternal mortality (Gerein, Green, & Pearson, 2006), and infant mortality by ethnicity shows significant differences in underserved communities. For example, infant mortality in 1990 for Black infants was 2.4 times higher than for White infants, and the same metric was 7 to 1 Black–White in urban areas that were mostly segregated (Nickens, 1995). The relationship between physician shortages and infant mortality is a worldwide problem and can be highlighted by comparing rates in Europe and Africa. Infant mortality rates range from 16 per 1,000 in European countries to 91 per 1,000 in Africa. These rates mirror similar disparities in physician density: there are 40.3 medical doctors per 1,000 in Europe but only 2.2 per 1,000 in Africa (UNICEF, World Health Organization, The World Bank, & United Nations Population Division, 2015).

As for morbidity, researchers have found that primary care helps prevent illness and death (Starfield, Shi, & Macinko, 2005), that too few physicians limits patient access to health care and possibly increases morbidity risk (Mitka, 2007). For instance, Tarasenko and Schoenberg (2011) found that patients with multiple morbidity in underserved communities face competing demand for resources, limiting their willingness to undertake other examinations when an acute illness appears.

Outsized Impact on the Elderly

The impact of physician shortage can also be observed in the elderly. In sparsely populated regions of the United States that have been studied, some elderly population groups have impaired access to medical care (Rohrer, Kruse, Borders, & Kupersmith,

2003). This elderly population group needs the most health care and requires trained professionals in geriatrics and gerontology (Cohen, 2009). They will also require more surgical services as they live longer (Etzioni, Liu, Maggard, & Ko, 2003). Traditionally, the elderly have been neglected in areas where there are shortages of primary care physicians (Parchman & Culler, 1999) with no improvement over time (Rohrer et al., 2003), and the trend is that older patients with diabetes, coronary heart disease, arthritis, and depression will extend health care requirements (Bodenheimer, Chen, & Bennett, 2009). This situation will exert pressure on the quality of care as the majority of elderly patients with diabetes, heart failure, and other chronic conditions do not receive adequate clinical care (Bodenheimer, 2006). Hence, even though the literature addresses the consequences of physician shortages for different vulnerable groups, it is the elderly— with the potential combination of acute and chronic illness that require more critical care services—who experience some of the worst consequences (Kelley et al., 2004).

Physician Shortages in Depressed Contexts: The Case of Sub-Saharan Countries

The consequences of physician shortages in economically depressed contexts can also be highlighted by the situation in the sub-Saharan countries. In many cases, poor people are at daily risk of exposure to devastating diseases and avoidable death (Chen & Boufford, 2005). More than a dozen countries in this neglected region of the world have very low life expectancies as a result of HIV/AIDS. The situation is getting worse, as the list of communicable diseases include infections, long-standing malaria, and an upsurge of HIV/AIDS and tuberculosis rates. There is also a parallel emergence of non-communicable diseases such as epilepsy, diabetes, cardiovascular disease, and

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hypertension (Bangdiwala, Fonn, Okoye, & Tollman, 2010). For instance, out of 972 million persons with hypertension in the world, 639 million are in economically developing countries, with a projected rise of 80% (Kearney et al., 2005), showing a certain degree of neglect. In some cases, it is predicted that the aforementioned diseases, along with mental disorders, will increase with the aging of the population and the globalization of the health risk factors (Beaglehole & Yach, 2003). Besides, as HIV/AIDS becomes a chronic disease due to the surviving population, it is important to handle this disease within primary care but in a different fashion (Chen & Boufford, 2005), by identifying new models of HIV care (Chu & Selwyn, 2011).

With regard to the wide spread of Ebola, this disease was declared by the World Health Organization "a public health emergency of international concern" (Briand et al., 2014, p. 1180). As the occurrence of cases went epidemic in Guinea, Liberia, and Sierra Leone, the crisis emphasized the inability of resource-poor countries to quickly respond due to inadequate health infrastructure and scarcity of health workers (Fauci, 2014). That is, despite the fact that Ebola, as known today, was first described in 1976 and researchers confirmed that mortality rates in humans and nonhuman primates were up to 90% (Takada et al., 1997), it was not until the last 2 years that a formal international effort has been made to limit the consequences of the virus in other continents.

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As shown by the preceding research, vulnerable groups—no matter where they live—have shorter life expectancy and lower probability of surviving than their less-disadvantaged counterparts. If, in addition, they are underserved, then chances are these

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groups will face illness more frequently and will suffer chronic diseases and incapacities at an earlier age.

Responses to Physician Shortages in Underserved Communities

Health Inequalities, Access, and Improvement Goals: The Global Initiative

During the last 40 years, there has been a formal international effort to reduce health inequalities and improve health care worldwide. In the 1978 Declaration of Alma-Ata, the world embraced primary health care as a way to overcome gross health inequalities between and within countries to develop sustainable and equitable health systems (Jong-Wook, 2003). From then on, policies suggested by WHO changed from a risk-factor approach to strategies to establish the determinants of health and community participation in improving health (Kickbusch, 2003). The World Health report of 1996 called for closing the gap within one generation (WHO, 1996). In 1997, the Jakarta declaration was enacted to set the principles on leading health promotion into the 21st century and, in doing so, it confirmed that "the marked health inequities between countries are caused by the unequal distribution of power, income, goods and services, globally and nationally which immediately let people live in unequal access to health care, schools and education, which impacts conditions of work and leisure and affects quality of life" (WHO, 2008, p. 1).

The acknowledgement of unequal worldwide health experiences set the groundwork for developing the Millennium Development Goals, or MDGs, adopted by

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United Nations member countries in 2001. The MDGs were specific objectives related to health improvement in the world by 2015; objectives included reducing child mortality by 66%, maternal mortality rate by 75%, and controlling the pandemics of HIV, malaria, and tuberculosis (WHO, 2001). As part of achieving these goals, countries were to develop specific investment plans in hospitals, training centers, and the production of health professionals with a level of detail that can be implemented and financed (Sachs, 2004). Others cautiously noted that even if the goals were unrealistic, progress could be made (Haines & Cassels, 2004).

If we look at some of the health-related MDGs, progress has been made, although considerable inequalities persist. Child mortality fell globally from 90 per 1,000 children in 1990 to 65 per 1,000 children in 2008, but the African region is lagging, with child mortality above 81 per 1,000 (UNICEF et al., 2015). Maternal mortality is the health indicator that shows the widest gap between rich and poor, both between and within countries (WHO, 2005). For example, maternal mortality per 100,000 for the United States is 11 compared with 130 for Panama (World Health Organization, UNICEF, UNFPA, The World Bank, & United Nations Population Division, 2014). As for mortality and burden of disease, the gap between low-income and high-income countries remains the same, while mortality for children under age 5 has shown little progress. Cost, knowledge, and geographic access continue to influence whether vulnerable populations receive health intervention that could save their lives. Concurrently, many developing countries are experiencing the double burden of low personnel inflow and

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high health personnel outflow, lowering their capabilities for improving health care access (Wagstaff & Claeson, 2004).

One of the major criticisms of the MDGs is the difficulty in measuring the goals. It has been recommended that they be peer reviewed, that targets and indicators be set, and that stakeholders develop at least one way of measuring each goal and discarding or modifying the ones that cannot be measured. Critics consider this modification important, as what is at stake is the quality of life of millions of people who live in extreme poverty (Attaran, 2005). Researchers remind us that failure of states to ratify or comply with international legal regimes and treaties hinders the results of these worldwide initiatives (Fidler, 2001).

Physician Production, Skills, and Access: International Response

WHO has continued to research potential policies and suggest recommendations related to health care as shifting population growth and aging, lifestyle preferences, and income distribution impose new health care requirements. Recognizing the shift in need from acute to chronic health care, in 2005 the organization recommended that the skills of the health professionals be expanded to organize around the patient, assist patients across time, and use and share information to add basic competence in population-based care (WHO, 2005). In 2008, acknowledging that by 2025 the number of people over 60 will double from 600 million to 1.2 billion worldwide, WHO called for expanding educational opportunities in geriatrics and gerontology to be able to recognize risk factors associated with the health of the elderly and apply proper techniques to identify and avoid elder abuse. Increased dependence on others, social isolation, and frailty are traits of

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older people that have serious consequences for their health and well-being (WHO, 2010).

Finally, in 2010, WHO provided a complete set of global policy recommendations for increasing access to health workers in remote and rural areas through improved retention. These recommendations include targeted admission policies in medical programs, location of medical schools outside major cities, experiences of students in underserved settings, revision of postgraduate curricula to include rural health topics, as well as designing continuing education and professional development programs to fit the needs of rural health workers. As for regulatory recommendations, WHO suggested enhancing the rural medical experience to increase potential of job satisfaction, ensuring compulsory service requirements in underserved areas and introducing different types of health workers with appropriate training for rural practice. Other recommendations included financial incentives such as hardship allowances, housing, transportation and career development, together with outreach activities (WHO, 2010). Kirch, Henderson, and Dill (2012) recommended that forecasting physician requirements should be done with real data and proper assumptions, in order to understand how the supply and demand of physicians work, to in turn support policy making in searching for appropriate solutions.

Physician Production and Its Role in Health Care: Evidence from Around the World

The United States. To understand physician production and its implication in health care services in the United States, it is important to provide a historical perspective of the medical profession. Before the start of the twentieth century in the United States, for

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example, the supply of physicians was driven by the market and the ratio was 175 physicians for 100,000 U.S. inhabitants (Cooper, 2004). The Flexner report, which was published in 1910, signaled a different path in medical education for the next 50 years. Flexner insisted on setting stricter regulations for accrediting schools and standards for practicing medicine. Many medical schools closed as a result of these new regulations and, by 1930, the number of physicians per 100,000 had fallen to 125. Until the early 1960s, the supply was controlled, with rural areas in the United States experiencing a slow decrease of physicians. This situation eventually created a shortage of physicians and gave way to several planning commissions which intended to develop ways to produce more physicians. Several efforts in the last 50 years have been made to increase medical school capacity or the number of schools of medicine in the United States. After a cycle of growth when 44 new allopathic and 10 osteopathic schools were established by 1980, capacity grew from 8,250 medical students yearly to 18,200 by 1980, mostly funded by state initiatives. But in 1981, the Graduate Medical Education predicted physician surpluses, and for the next 20 years medical school's growth stopped (Beck, 2004).

Concurrently, from the mid-1960s through the mid-1970s, government agencies allocated resources to health care programs for low-income Americans, but the next 10 years found a decrease in health care resources for the inner city poor (McBride, 1993). Subsequently, advances in medicines, more insurance coverage, and investments in medical education by the federal government contributed to an increase in the per capita ratio of physicians from 115 in 1965 to 200 by the end of the 1990s. This unstable cycle

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of physician supply poses a potential shortage of 200,000 physicians by 2020-2025 (Cooper, 2004), which severely limits the optimal health care of the public, especially in areas of physician shortages, where 30 million Americans were living by 2006 (Kirch & Salsberg, 2007).

Regarding government policies, in 1998 President Clinton announced an initiative that set a long-term goal of eliminating longstanding racial/ethnic disparities in health status by 2010 (Ibrahim, Thomas, & Fine, 2003). Efforts to close the gap were reactivated by subsequent legislation, including the *Affordable Care Act* of 2010 and the U.S. Department of Health and Human Services' Action Plan to Reduce Racial and Ethnic Health Disparities, which included many considerations to close the gap in quality and results for underrepresented and vulnerable populations and initiatives to improve and diversify the healthcare force. For instance, the Health Resources and Services Administration, which is the U.S. federal agency charged with improving access to health care services uninsured, isolated, or medically vulnerable populations, implemented a $168-million program to expand the number of medical school graduates entering primary care (Petterson, Liaw, Tran, & Bazemore, 2015). In addition, proposed increases for primary care physician reimbursements, enactment of the national residency exchange (Cheng, 2012), as well as primary care extension services were established. In general, strategies to address physician shortages fell into three categories: inventory of applicants, medical education, and physicians practice environment (Grumbach, Coffman, Liu, & Mertz, 1999). Most of the efforts concentrated in adding educational experience in underserved contexts (Chan et al., 2005; Strasser & Neusy, 2010;

Woloschuk & Tarrant, 2002). Another interesting case was the development of comprehensive medical education programs with focus in rural education (Glasser, Hunsaker, Sweet, MacDowell, & Meurer, 2008). As populations grow older, there is the need to include geriatric care in medical curriculum, and care of the elderly should be a fundamental practice in primary care (Frank, 2010). Other researchers have suggested developing a framework to facilitate elimination of racial/ethnic disparities, defining a *culturally competent health care system* as one "that acknowledges and incorporates—at all levels—the importance of culture, assessment of cross-cultural relations, vigilance toward the dynamics coming from cultural differences, expansion of cultural knowledge and adaptation of health services to meet culturally unique needs in health" (Betancourt, Green, Carrillo, & Ananeh-Firempong, 2003, p. 294).

Elsewhere in the world. Over the last several decades, other countries have enacted policy instruments to influence the supply of physicians. These policy instruments include education, training, and migration policies, as well as policies affecting retention and retirement. For instance, most OECD countries experiencing a maldistribution of physicians that creates shortages in underserved areas have established successful policies such as financial incentives to stay in underserved areas, and giving doctors the opportunity to experience primary care practice (Simoens & Hurst, 2006). Other countries, like Chile, have established ambulatory care as the fundamental basis of healthcare of the country, stressing that interests of physicians to work in underserved areas should be improved by providing proper training, using modern technologies, and enacting adequate government policies for primary care practice (Román et al., 2007).

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According to WHO, the proportion of the population living in rural areas is greater in poorer countries than in rich areas, and many resources are needed to help compensate for the shortage of physicians in underserved areas. WHO has drawn multiple sets of strategies that include recruiting students who are motivated to practice in underserved areas and train them close to those communities with the appropriate curriculum and professional development. In addition, WHO experts recommended designing effective policies of compulsory services, linking educational subsidies to mandatory placements, and offering adequate work conditions and relationships that motivate health workers to practice and live in rural areas (WHO, 2010). Working toward these efforts, several years ago the European region of WHO set the goal of reducing socioeconomic disparities in all member states by 25%, by 2020 (WHO, 2005).

One country that appears to have had a great deal of success in improving physician distribution throughout communities is the United Kingdom (Baer, Konrad, & Miller, 1999). Since 1948, the United Kingdom has exercised a regulatory policy dealing with the distribution of primary care physicians. A major medical committee evaluates and approves applications for geographic assignment in shortage areas. In the first stage, the program had mixed results. It was reevaluated in the 1970s to make it more equitable, and created an initial allowance for establishing a practice. The Acheson report, requested by the British Government, concluded that to reduce any health inequalities it was important to analyze and intervene in the social factors that determine health (Newman, 2001). In addition, policymakers in the UK have emphasized the importance of public health education in developing future physicians (Gillam & Bagade, 2006).

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In general, researchers agree that rural background and specialty preference are strongly correlated with recruitment of physicians to work in rural areas (Brooks et al., 2002). Having a sense of and involvement in a community facilitates practice in underserved contexts (Hancock et al., 2009). In addition, including educational experience in rural contexts within medical education is a factor associated with graduates practicing in underserved settings (Strasser & Neusy, 2010). Hence, comprehensive programs like Rural Medical Education (RMED), with its rural-focused curriculum and indicators to track outcomes, can serve at many levels for recruitment, collaboration, and retention of physicians in underserved contexts (Glasser et al., 2008). Other studies have confirmed that this type of approach increases the likelihood of medical students becoming practitioners in rural areas (Williamson, Gormley, Bills, & Farry, 2003). In addition, some researchers have called for redefining the physician's role in underserved communities so that physicians may act as leaders for a well-trained, comprehensive group of health professionals (Margolius & Bodenheimer, 2010).

Other Initiatives Responding to Physician Shortages

Another approach to compensate for physician shortage in underserved contexts is the physician assistant model of health service as developed in the late 1960s in the United States. By using nurses and other health professionals, developed countries such as Scotland, the Netherlands, and Canada have been able to overcome physician shortages in underserved areas. The advantage of this program is that these professionals require less training time than physicians (O'Connor & Hooker, 2007). In 1972, the

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National Services Corporation was created in the United States to place health personnel in critical health-manpower-shortage areas or areas with less than one physician per 4,000 persons. This first attempt to mitigate the shortage found that income and health insurance coverage was more closely associated with access (Berk, Bernstein, & Taylor, 1983), after which some modifications and program updates have followed. Now, the most enduring initiative to compensate for physician shortage is the operation of the Community Health Centers, established in 1975, in many communities in the United States. These centers provide medical care for lower income minorities and migrants and their role has increased over time because of the difficulty of securing access to medical care. Since the centers have faced difficulty recruiting health professionals, the U.S. government unveiled a $2.2-billion plan to support those centers and staff them adequately (Rosenblatt, Andrilla, Curtin, & Hart, 2006). On a smaller scale, Independence at Home (IAH) operates in some U.S. communities as coordinated home-based medical care for seriously ill elders, reducing medical costs by up to 25% and improving patient satisfaction (DeJonge, Taler, & Boling, 2009). The latest trend is the use of telemedicine as partial successors of general practitioners. *Telemedicine* refers to all procedures that employ telecommunications as a link between patients and physicians. It has had mixed results due to the apprehensions of the elderly to adopt this approach (Terschüren, Mensing, & Mekel, 2012).

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As the findings described above suggest, the challenges remain the same for policymakers, academics, and government officials: recruiting students from minority

and underserved communities, expanding the scope of medical programs, introducing adequate technology and integrating physicians with other health professions to serve the health needs of underserved populations.

The Role of Medical Schools in Responding to Physician Shortages

Abraham Flexner's report in 1910 (Beck, 2004) set a milestone for changes in medical education in the United States in the last century. A review of the report shows three public health–oriented principles as pillars of his proposed reform (Maeshiro et al., 2010): "the training, quality and quantity of physicians should meet the health needs of the public, physicians have societal obligations to prevent disease and promote health, and medical training should include the breadth of knowledge necessary to meet these obligations and collaboration between the academic medical world and public health communities results in benefits for both parties" (p. 217). In the past 100 years, medical schools have been on a permanent quest to satisfy these three objectives, helping to improve health and life expectancy. At the same time, Flexner's report has had the long-lasting consequences for medical education. For instance, proprietary education, which was once a source for professional education such as medicine, has all but disappeared (Turner, 2006).

Sources of Physician Supply in the United States

During the latter part of the twentieth century, growth of medical schools was based on allopathic medical schools, with 131 traditional medical schools in the United

States. These schools constitute the backbone of medical education, producing well-trained physicians, but their output is not enough to satisfy the demand for physicians. In 2006, the Association of American Medical Colleges recommended an increase of medical school enrollments up to 30% by 2015 (AAMC, 2015). But even this proposed increase in enrollment may not be enough to satisfy the projected deficit of physicians by 2025 (Cooper, 2004). In fact, young physicians have more job offers, better compensation, and special payments because of the scarcity in specialties such as radiology, gastroenterology, and oncology thus tightening the physician market (Cooper, 2007).

The literature identifies three other sources of physicians that need to be considered as a means of closing the gap between physician supply and demand. The first source comes from osteopathic medical education. As opposed to allopathic medical education, which stresses the use of substances or techniques to suppress symptoms, osteopathy emphasizes helping each person achieve a level of wellness by focusing on prevention and the promotion of healthy habits. This type of training is not only expanding faster than traditional medical education but seems to bring a new model of medical education at a lower cost (Daniels, VanLeit, Skipper, Sanders, & Rhyne, 2007). Although only 7% of physicians in the United States are osteopathists, they take care of 16% of visits in communities with fewer than 2,500 persons and, as a group, they are more likely than allopathists to be generalists and practice in rural areas (Fordyce et al., 2007). Currently, there are 31 colleges of osteopathy with 24,000 students, or 20% of the total population of medical students. Still, it is felt that osteopathists are underutilized and

can help mitigate health care shortages in underserved communities (Lakhan & Laird, 2009). It should be emphasized that both systems of medical education share the same basic medical curriculum, and it is expected that a single unified accreditation system will go into effect (Mims, Wannamaker, & Bressler, 2015).

The next group of entities producing physicians for the United States medical system consists of medical schools established in the Caribbean and Mexico attended primarily by American students (Boulet, Bede, McKinley, & Norcini, 2007). For example, the Universidad Autonoma de Guadalajara, the oldest private medical school in Mexico has produced over 14,000 graduates, mostly Americans, practicing medicine in all 50 states of the United States and is a major producer of physicians for the United States (Boulet, Cooper, Seeling, Norcini, & McKinley, 2009). In addition, there are 56 medical schools that train American students in different islands of the Caribbean —30% of them are for-profit institutions—but only four had received full accreditation by 2009 from the U.S. Department of Education's National Committee on Foreign Medical Education and Accreditation (the organization that determines whether the educational program in a foreign medical school is comparable to those in the United States). Usually, graduates from these schools work in underserved communities (Norcini et al., 2010).

The last source of physicians for the American health system is graduates from other international medical schools. Historically, the United States has relied on foreign physicians who migrate to the United States to serve as family physicians, especially in underserved areas. In early 2000, one quarter of the active physicians in the United States

were international medical graduates (IMGs); 64% of them came from lower middle-income countries such as India, Philippines, and Mexico (Hart et al., 2007). The quality of care provided by IMGs has been followed up since the 1990s, showing equal or better performance than doctors who graduated from US medical schools (Norcini et al., 2010).

These professionals may obtain a visa waiver if they agree to practice for a specified period in a designated health-professional-shortage area (Rosenblatt et al., 2006). The challenge is to assimilate these groups of professionals, train them to practice in underserved areas and mitigate world pressure since most migration comes from countries with average physician density of 17 physicians per 100,000 persons to countries with densities of 300 physicians per 100,000 persons. This practice "undermines the ability of developing countries to meet agreed upon MDGs and creates untenable health conditions for the poorer sections of their populations" (Dovlo, 2005, p. 378).

Innovative Approaches to Medical Training

Some medical schools around the world have introduced different approaches and strategies to optimize medical training programs, with the objective of increasing participation of medical graduates in community-based health care practice to develop the required professional experience for underserved areas. For instance, in studies reviewing efforts in Australia, Canada, and the United States, researchers found that most of the schools have adopted a pipeline approach to meet the need for doctors in underserved areas, stressing early recruitment, special admission, clinical rotations in rural settings, adding a rural focus in the curriculum, and supporting initial rural

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assignment. Experience with healthcare in rural communities, learning another language, becoming aware of diversity, and attending schools with a higher social mission are factors associated with positive change and reaffirmation of the medical student's intention to practice in underserved areas (Boscardin, Grbic, Grumbach, & O'Sullivan, 2014).

At the same time, researchers claim that medical schools, as agents of change, should stress a socially accountable medical education (Mullan, Chen, Petterson, Kolsky, & Spagnola, 2010; Murray, Larkins, Russell, Ewen, & Prideaux, 2012). That is, graduates from medical schools should have and exercise competencies to improve health care of the population they serve, as every citizen has a right to receive quality, equitable, relevant, and effective health care (Boelen & Woollard, 2009). Based on these guidelines, some innovative medical schools have emerged in different countries around the world. Among these innovators there is a network of socially accountable medical schools, or a health equity network, comprising eight medical schools from around the world, whose main objective is recruiting students and producing physicians for underserved communities by going beyond the traditional curriculum (Neusy & Palsdottir, 2008).

One of these schools is the Northern Ontario School of Medicine (NOSM) in Canada, created by Laurentian University and Lakehead University. This innovative school of medicine has been created for a rural environment and utilizes virtual delivery methods, stressing social accountability of medical education (Strasser & Lanphear, 2008). Students in this university take a holistic curriculum consisting of five main topics: northern and rural health, personal and professional aspects of medical practice,

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social and population health, foundations of medicine, and clinical skills in health care. Results show that the school fulfills all MD accreditation programs (Strasser et al., 2009).

Another school in the consortium of socially accountable medical schools is La Escuela de Medicina de America Latina (ELAM), created in 2005 and located in Havana, Cuba. ELAM has become the world's largest medical school for developing professionals for underserved communities. It has graduated 23,000 physicians from low-income communities from America, Asia, and Africa, and its objective is to teach social relationships in medical practice, to be used in underserved communities in their countries (Fitz, 2011; Huish, 2009).

Another school in the network, Flenders University in Australia, set up the parallel rural community curriculum (PRCC), which consists of an entire year of clinical curriculum in Australian rural general practice. Results show that PRCC students have had the opportunity to learn "clinical decision-making in the context of the whole patients, their family and the available community resources" (Worley, Silagy, Prideaux, Newble, & Jones, 2000, p. 558). Twelve years after its creation, it was reported that 70% of students in the program chose to practice in rural locations, demonstrating that a "rural community-based clinical education can provide a high quality education, as well as a sustainable solution to the shortage in the rural medical workforce" (Worley, 2008, p. 30).

The Zamboanga University School of Medicine, located in an isolated region of Mindanao, Philippines, was set up in the early 1990s by a group of volunteer doctors as a way to secure doctors in the region. The basis of this medical school is a blend of

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problem- and community-based learning, with students spending much of the basic training in public health within the small communities and finishing their rural practice in a regional hospital (Strasser & Neusy, 2010). A retrospective study of the school has shown its positive impact in the region where it is located, confirming that 80% of the school's graduates are practicing in underserved areas, more municipalities in Zamboanga have a doctor and infant mortality in the area has decreased by 90% (Cristobal, Worley, & Worley, 2012).

Overall, the idea behind all of these schools is that through a combination of practices dealing with social accountability and by recruiting, educating, and retraining students to perform as physicians in underserved communities, the institution commits itself to improve the well-being of the community. However, despite the prevalence of this idea of medical schools being agents of social change, Puschel et al., (2014) found a significant gap between the measures and realities of practices implemented by medical schools in trying to reduce health disparities in Latin American countries. The authors point out that medical schools in Latin America are still trying to improve their academic programs, as well as their clinical training and they continue to give priority to specialty training over primary care training. Furthermore, despite being aware of the importance of medical schools in reducing health inequalities, little emphasis has been given to social accountability in the design of academic programs, or in the process of accreditation and quality evaluation of the schools in the region (Puschel et al., 2014).

Other efforts to increase the supply of physicians in underserved communities have been led by governments. In Thailand, after four decades of continuous work, the

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educational strategies to increase physicians in rural and isolated areas consist of rural recruitment of students who receive large subsidies to study in rural health facilities. After graduation, they are assigned to their hometown for 2 to 4 years, with limited possibilities of private practice. Results show that two thirds of graduates continued their rural assignment after the initial assignment expired. In addition, doctors who have more than 5 years of experience in a rural district hospital can pass an exam that certifies them in the preventive medicine specialty (Wibulpolprasert & Pengpaibon, 2003).

Jichi Medical University is an experimental medical school established in Japan in 1972, whose mission is to produce doctors with a 9-year obligation to practice in rural areas. A retrospective cohort study showed that graduates from this university were four times more likely than graduates from other universities to work in rural areas (Matsumoto et al., 2008). By establishing a selective admission policy, favoring students from rural areas, and exercising a unique contract system under which all graduates have the obligation to work in their home area in exchange for having a tuition fee waiver for their 6 years of medical training, the school has been able to produce doctors with over 70% of them staying in their rural settlements (Matsumoto et al., 2008).

Another initiative worth mentioning is that of the Republic of Congo, in Africa, where 70% of the population lives in rural areas. Although this is the only medical school located in a nonurban area, 98% of its graduates are employed in the rural location where they were trained. Furthermore, 81% of graduates from this school work in rural areas, as opposed to 14% of graduates from a comparable urban school, bolstering the hypothesis

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that uneven distribution of medical personnel is related to an urban-location bias of schools of medicine (Longombe, 2009).

In the case of efforts by urban medical schools in the United States, most of them have little or no experience in underserved areas. In Los Angeles, California, in a joint effort of the University of California, Los Angeles, and the Charles R. Drew University, a program was created to encourage medical students to practice in underserved communities. Ko et al. (2005) study of graduates from 1996 to 2002 suggests that a medical education program can have "a positive reinforcing effect on student goals to practice in underserved areas" (p. 806) and that, similar to results produced by rural medical education programs, "selective admissions and longitudinal experiences can be applied to inner city predominantly minority communities (p. 807).

Successful programs, such as the Physician Shortage Area Program (PSAP) at Jefferson Medical College, located in Philadelphia, Pennsylvania, include three fundamental elements: a strong institutional mission, careful selection of students who would like to practice in rural areas, and primary and family care as the major practice goal (Rabinowitz, Diamond, Markham, & Wortman, 2008). Some 11 to 16 years later, 68% of the PSAP physicians were still practicing medicine in the same rural area, making PSAP the only medical program that has resulted in multifold increases in recruitment and long-term retention. Replicating similar projects in other schools of medicine may make a substantial and long-lasting impact on the rural physician workforce (Rabinowitz, Diamond, Markham, & Rabinowitz, 2005).

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The preceding evidence suggests that medical students should receive relevant medical education that integrates rural topics in the curriculum and experimental learning in underserved areas for a better understanding of the community. This requires a rural medical education support structure that considers logistics, but also community engagement, postgraduate training that is relevant to the rural context and the involvement of rural physicians in student and resident teaching.

Specific courses on rural health and rural practice have been included in some undergraduate medical programs and in residence programs in family medicine. Exposing medical students to global health issues such as epidemics, global diseases, and infections may motivate medical students to choose primary care careers and practice medicine in underserved communities. Adding clinical experience in these areas may train students to recognize diseases and experience cultural diversity (Drain et al., 2007).

Thus, medical schools can contribute to their surrounding communities by integrating the rural context with relevant education and research in health care and by offering students from rural areas fair opportunities to enroll and perform. Some suggested measures include preparatory courses, tutorials, and admissions policies that recognize the diversity of geographic backgrounds and experiences.

In addition, there is a need to increase diversity in the physician work force since the ethnic composition of U.S. physicians does not reflect the population. Reede (2003) suggested that the effort to increase diversity "ensures high-quality medical education, access to health care for underserved populations" (p. 92).

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Considering the future of health care in underserved communities, some research studies suggest a new role for the physician, acting as the leader of a well-trained primary care team (Margolius & Bodenheimer, 2010; Reta, Dashtaei, Lim, Nguyen, & Bholat, 2012). Within this framework, as medication has an important role in acute and chronic diseases, pharmacists can complement primary care by physicians, helping to reduce physician shortages in underserved settings (Manolakis & Skelton, 2010). Technological innovations may also have a major effect on future demand for physician services. It has been said that telemedicine has the potential to change health care, alleviating the shortages of doctors in underserved areas. To achieve this goal, it is fundamental to enact proper legislation and provide adequate funding for required technological infrastructure and training needs (Manolakis & Skelton, 2010).

A good part of the literature enforces the idea set forth by(Cooper, 2003) that a nation's economy drives its demand for health care. But others suggest that measuring primary care in physicians per capita may be a mistake and forecasts are overestimated as the impact of a healthier population, new government policies, innovations and prices of health care services have not been fully researched (Goodman & Grumbach, 2008; Weiner, 2002).

Conclusion

This review of literature on the causes and consequences of the maldistribution of physicians sheds light on a few findings. First, the vast majority of the research has been

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conducted in highly developed regions of the world such as the United States where the need, while unquestionably present, is also unquestionably less urgent. Simply put, even the most underserved U.S. communities have higher physician-to-population ratios than entire regions and nations in Africa, Central America, and elsewhere. For Panama, the nation that is the focus of my research, the relevant literature is extremely limited and, for the most part, lacking in rigor. Clearly, not only is there room for more research on this topic, but there is a dire need for it.

A second insight from this review is more heartening. Despite the fact that traditional medical schools have not done enough to solve the problem of physician shortage and maldistribution in underserved communities, a small network of innovative medical schools around the globe have had some success. These schools have adopted recruitment and admissions policy that focus on students who want to practice in underserved communities and have tailored their curricula and clinical training to focus on the healthcare needs of these communities.

Taken together, these findings serve as fertile ground for my own proposed research on how Panama's education policies, as well as recruitment, admissions, and student support practices in medical schools, influence rates at which low-income students become physicians.

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CHAPTER 3

Research Methods

The purpose of this chapter is to describe the research design of this dissertation as well as the methods I applied to answer the research questions. As discussed in Chapter 1, I identified three research questions to study the phenomenon of interest: Which personal, financial, and curricular factors shape low-income students´ commitments to become physicians? How do policies and institutional practices in medical schools in Panama influence rates at which low-income students become physicians? And what forces shape medical students' interests in the contexts in which they subsequently practice medicine?

In this chapter, I first provide a rationale for the qualitative research techniques I used to undertake this study and then justify using the case study method. Next, I give a detailed description of data sources and explain how I recruited students to participate in the study and selected persons to be interviewed. The chapter continues with an explanation of how data was analyzed and concludes with a discussion of anticipated limitations and my role as a researcher.

Rationale for Qualitative Inquiry

Student performance in medical schools is a multidimensional phenomenon with complex interactions. Such a phenomenon lends itself to qualitative research. Despite having many definitions and characteristics (Merriam, 1998; Patton, 2005; Savenye & Robinson, 2005; Baxter & Jack, 2008; Creswell, 2012), qualitative research is typically

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conducted in settings that have not been modified by the researcher and that are closely linked to their surrounding environment. This allows the researcher to investigate phenomena that are representative of the social context in which they occur. Researchers describe, rather than predict, what they observe. By interacting with participants in the study, researchers also become part of the phenomenon under study (Savenge & Robinson, 2005). This interaction can be critical to interpreting data (Patton, 2005) and this approach is different from quantitative analysis, where measurement and reviewing trends, variations, and statistical analysis are fundamental. Hence, given my focus on understanding the contexts in which low-income students´ aspirations to pursue medical degrees are shaped, I used qualitative methods in this study.

<center>Rationale for Case Study Methods</center>

Case study is one of the most frequently used qualitative research methods when the goal is to understand complex social phenomena (Yin, 2015). Usually, case study focuses on contemporary events and does not require control of behavioral events. Merriam (1998) defined *case study* as "intensive, holistic description and analysis of bounded phenomenon such as a program, an institution, a person, a process or a social unit" (p. 9). Yin defined case study as stressing empirical inquiry in situations where context and phenomenon interact. he described the characteristics of case study as including multiple sources of evidence, involving a complex interaction of variables and benefitting from previous findings.

In the past, case study methodology was not considered robust enough to be used for rigorous scientific research (Diamend, 1996). Flyvbjerg (2006) has since provided

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detailed arguments to dispel general misconceptions regarding its use. Among the misconceptions are the notions that there is a higher value in theoretical knowledge than in context-dependent knowledge; that case study is more useful than other research methods for developing hypothesis and that it is difficult to summarize general theories on the basis of individual case studies. Recognizing that no predictive theory in social science is likely to exist, however, Flyvbjerg (2006) argued that case study may be a good approach for producing context-dependent knowledge.

I conducted a case study of the specific situations that influence low-income students' to become physicians and commit themselves to practice medicine in underserved areas. With this objective, the literature review has helped me conceptualize my inquiry into the phenomenon, and informed my research design. Recognizing the multiple sources of evidence and the influence that the Panamanian context has in understanding the phenomenon, the use of the case study methodology was appropriate for conducting this research and produced in-depth knowledge. To attain this objective, it was important to follow a rigorous case study methodology.

For a country-wide view of the phenomenon under study, I included four medical schools in the Republic of Panama, as part of my research. Table 3.1 lists the six medical schools of the Republic of Panama, their location, and the current enrollment, plus the year in which each school was founded. The selected medical schools are Universidad Nacional de Panama, Universidad Latina, Universidad Americana and Universidad Autónoma de Chiriquí.

Table 3.1. - Medical Schools in the Republic of Panama 2015

School	Status	Year created	Enrollment	Size of graduating class
U. Nacional	State	1949	1,410	200
U. Latina	Private	1997	950	100
Interamericana	Private	2003	150	20
U. Autónoma	State	2012	330	50
Americana	Private	2009	180	12
Columbus	Private	2004	300	25

Overview of Medical Schools Under Study

Five of the six medical schools in Panama are located in Panama City. The largest and oldest school of medicine in Panama is part of the Universidad Nacional de Panama, the largest state university in the Republic of Panama, which has over 50,000 students. The School of Medicine offers the Doctor of Medicine degree in 12 semesters with no previous undergraduate degree, requires an admission test and currently enrolls 1,410 students, graduating close to 200 students per year.

The second largest medical school in the country is part of Latina University of Panama, the largest private university, which enrolls over 12,000 students. Latina offers the Doctor of Medicine degree in 12 semesters and graduates 100 students per year. The other three medical schools in Panama City are Columbus University, Universidad Interamericana and Universidad Americana. Columbus University has a small school of medicine with an enrollment of 300 students and yearly graduation of 25 physicians. It has universal access, as does the other schools. The Universidad Interamericana, owned by Laureate Universities of the United States, is one of the smaller medical schools in Panama City with an estimated enrollment of 150 students and a graduating class of 20 physicians. Finally, the newest medical school in Panama City is the school of medicine of Universidad Americana, created in 2009. It recruits students from low-income areas and has open access. With a student enrollment of 180 students, it produced its first graduating class of 12 physicians in 2015. The only medical school located outside of Panama City, Universidad Autonoma de Chiriquí (UNACHI), is in the westernmost province of Panama. UNACHI is a regional state university founded in 1995 and opened its medical school in 2003. The school of medicine at UNACHI enrolls 330 medical students and graduates close to 40 students each year.

As can be observed, two of the selected schools, Universidad de Panama and Latina University of Panama enroll far more students than the other four. All but two are for-profit private schools. One is a state school in a regional area, and the other, Universidad Americana, is in the capital city and recruits students from low-income socioeconomic groups. All have 12 semester curricula and do clinical rotations as early as

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the seventh semester. Ii is important to mention that all medical schools in Panama have a program that does not require premedical studies or undergraduate degree. All students enroll in medical schools directly after they finish high school.

Data Collection

For data collection, I requested from the four selected medical schools, preselected students based on their low income level. For each school, a focus group was assembled and a set of leading questions were used to start the discussion. A modified version of the three-step process that Seidman (2005) describes was used. The first step discovered the context where the students' experiences have evolved. Then, every participant was allowed to describe his or her years in medical school. Finally, participating students reflected on the implications of being successful and achieving a medical degree. The whole approach was based on the idea that without context, the chances of exploring the meaning of an experience are slim (Patton, 1990).

This first group of participants included recent graduates or students in their final year of medical school who come from low income families. Usually these students are 18-19 years old when they start medical school and within the 24-27 year-old range when they finish. Student participation was important because they have the experience; through the study, they had the opportunity to reflect on their persistence efforts and the type of practice they intended to exercise during their medical career. To gain access to

the students, a formal request was forwarded to each university, confirming confidentiality and offering the opportunity to share results. I used the student focus groups to gather useful data on family background, socioeconomic status, student experience in underserved communities, and crucial insight into the financial, curricular, personal, and other factors that support the persistence of low-income students in Panamanian medical schools. For the purpose of this study, a low income student was characterized as one who comes from a family with a combined income below $17,000 USD per year, which corresponds to the lowest twenty percent of the population in Panama (Ministerio de Economia y Finanzas de Panama, 2015). I requested a list of students who fulfilled both requirements of attainment and income and each university selected five students from each school who volunteered to participate in the study.

After concluding the focus groups with the students, I started the cycle of interviews of higher education executives and policymakers. In this phase, the objective was to include all the deans and provosts of the different medical schools. In addition, I secured the participation of the former Minister of Health and the special advisor to the President of the Republic in health matters. The information obtained in these open ended interviews was twofold. It was used to understand institutional practices in medical schools in Panama, but also, the interviews helped gather knowledge regarding procedures, values, and ways of approaching the support of low-income medical students through their academic studies. In addition, special care was given to any program geared toward motivating low-income medical students to work in underserved areas after they graduate. Government officers and higher education executives were interviewed

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regarding policies and programs that influence rates at which low-income students become physicians. I encouraged officials to reflect on how various approaches and initiatives might help improve low-income medical students' persistence in medical school.

To complement the knowledge acquired from the interviews, I collected documents from each school (e.g., curricular information) to establish commonalities and look for courses and training with special emphasis on primary care or clinical rotation in underserved areas. I also gathered data regarding attainment, dropout, and retention for low-income students in some of the schools and I collected information on specific initiatives regarding recruitment and retention policies of low-income medical students.

Sampling of Students

In qualitative analysis, there is no specific rule for setting up a sample of individuals or cases for a research study. In this study, each participating school selected five students who fit the profile of being low-income students who recently finished or were about to finish medical school studies and who were willing to share their experiences and the factors that made them pursue a medical degree. The intention was to have a sample with individuals from whom a substantial amount of knowledge could be gained and to have a variety of cases that could provide insight into my first research question. Hence, the student sample was not based on the size of the student body but rather on the possibility of obtaining information regarding the phenomenon under study with potential variations in each medical school. Students were selected to participate on a voluntary basis, and confirmation of confidentiality was provided.

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To make best use of the data collected for this study, I followed well-proven techniques as depicted by Yin (2014). He suggests a first cycle where gathered data is categorized and manipulated in different ways, creating charts and statistical tables that may give meaning to some of the information gathered in the interviews. This effort was complemented with preliminary diagrams linking the main ideas coming from the interviews transcripts. The process was repeated in trying to approximate answers to the research questions.

After obtaining preliminary answers to the research questions, I developed a logical explanation of the findings, attempting to highlight any pattern in the factors associated with the phenomenon and corroborated this pattern with the findings in the interview sessions with higher education executives. Three iterations of this process were performed to improve confidence in the findings.

In addition, as I collected data, I used information from interviews with administrators of medical schools in Panama to validate the findings obtained from the focus groups of the students. This exercise of obtaining feedback from participants proved to be helpful in establishing the soundness of explanations and interpretations of data to be gathered (Maxwell, 2013).

Limitations

This study has several limitations. First, because the Republic of Panama is unique in its cultural context, it will be very hard to make any generalization from the

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findings that can directly apply to other countries or regions of the world. The second major limitation is possible selection bias with regard to the students participating in the interviews. As noted above, I recruited five students from each of the selected four schools, but it is important to note that this sampling does not take into account variations in the size of the schools. Furthermore, the only criterion used for selecting students (beyond their willingness to participate) is that they had the characteristic of being a successful low-income medical student in one of the four medical schools that were part of the study.

The next limitation is inherent in executing a case study. In this type of study, there is rich information in the outcome, but due to its parameters and analytical procedures, interpretation does have imbedded bias. In addition, using interview techniques to gather data posed a limitation with regard to the depth of the information obtained and my personal bias in interpreting the reflections of the persons being interviewed. Finally, although data was obtained from four medical schools in the country, to make a strict comparison of the outcomes from the different schools, more factors should be considered using multivariate analysis or a similar technique.

Researcher Positionality

In this type of qualitative study, the role of the researcher is highly important. In my case, there were many dimensions to my role as a researcher. As a former higher education faculty member in engineering schools, I was completely aware of the challenges faced by students enrolled in science majors such as medicine. I also come from a poor family from an underserved area. As a first generation college graduate, I

recognized the fundamentals of the persistence of low income students in college and factors that are influential in attaining a degree. When I have had the opportunity to visit my deceased father's birthplace, an isolated village in the mountains of Panama, I have seen firsthand physician scarcity and limitation of health services. At the same time, I have the opportunity of being president of the largest private university in Panama, knowing the challenges of low-income students in trying to attain a degree in medical school, which is the main focus of this study. I have also experienced the interaction with other higher education executives and government officials in reflecting on policies that affect student achievement and placement. My role as a researcher of this study should contribute to the use of the resulting findings to strengthen current policies or to foster new initiatives in curriculum, field experience, delivery methods and student support toward improving low-income student possibilities to obtain a medical degree and commit to practice in underserved areas.

CHAPTER 4

Findings

This chapter presents the findings from the student focus groups in the four medical schools as well as from the individual interviews with 10 academic officials associated with these schools. I first provide a conceptual framework for understanding the central phenomenon of this dissertation—the production of low-income doctors in medical schools in Panama. After that, I describe the components of the framework and their relationships, followed by a summary of my key findings.

Conceptual Framework

There are three main elements, or tranches, directly related to the production of low-income doctors that serve in underserved communities. The first, to which I refer as the *influence tranche,* is the number of low-income students who choose and are able to study medicine. The second element, the *transformation tranche,* is the number of low-income students who persist in medical school and decide to work in underserved communities. The third element, hereafter referred to as the *practice tranche,* is whether physicians decide to practice medicine in primary care units as a career or to continue and become specialists in a specific field of medicine after they graduate from medical school. Each of these elements is in turn affected by a series of factors.

The influence tranche—the desire and ability to study medicine—is affected by the following factors:

- Early life experiences within a medical context

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- Family or friends who served as role models

- Affinity for science and medical-related subjects

- Desire to help others

The transformation tranche—the ability to persist in medical school and the motivation to practice medicine in underserved communities—is influenced by the following factors:

- The medical curriculum and potential academic barriers to student persistence in medical schools

- Financial support to pursue a medical career

- Academic, family, and peer support

- Development of professional and life skills, such as time management, self-discipline, and study methods.

- Exposure to primary care practice and clinical rotations

Finally, the practice tranche—whether or not doctors choose to work in primary care in underserved communities or to specialize—includes the following factors:

- Availability and quality of work-related infrastructure and resources

- Personal connection to the communities

- Economic and professional incentives

- Prestige and recognition

Taken together, these three sets of factors help us understand how students from low-income families in Panama choose to study medicine, persist through the rigors and

stresses of medical school, and go on to work as primary care physicians in underserved communities throughout the country.

This framework suggests that in order to increase the number of doctors that choose to work in underserved communities, changes should be made that affect the number of low-income students who choose a career in medicine and the number of low-income medical students who are predisposed to work in underserved communities.

It is possible to visualize this framework in the context of a network (Meltzer et al., 2010). By using basic concepts of network theory and social networks, I can depict the factors as nodes, while the links represent connections between factors. Each factor is connected to at least one other factor. Eventually, all factors are directly or indirectly connected to each other. Likewise, these linkages may provide information about how strong factor interactions are and the impact of these interactions on student performance in medical school. Figure 1 visualizes the network that transports students from the influence tranche through their transformative years in medical school until they become practitioners.

By visualizing the framework within the context of a network, it is possible to see how the number of doctors in underserved communities can be influenced in various different ways and how policies can be enacted by taking into consideration the connectivity of the network, or the number of ways in which factors are related to each other. This approach may facilitate our understanding of how resilience can be created in the network and how to generate the ability to respond to and improve upon the number of graduating low-income students that go on to serve in underserved communities.

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The components of each tranche are presented and explained in the sections that follow

Figure 4.1 - Multifactor Network for Developing a Doctor
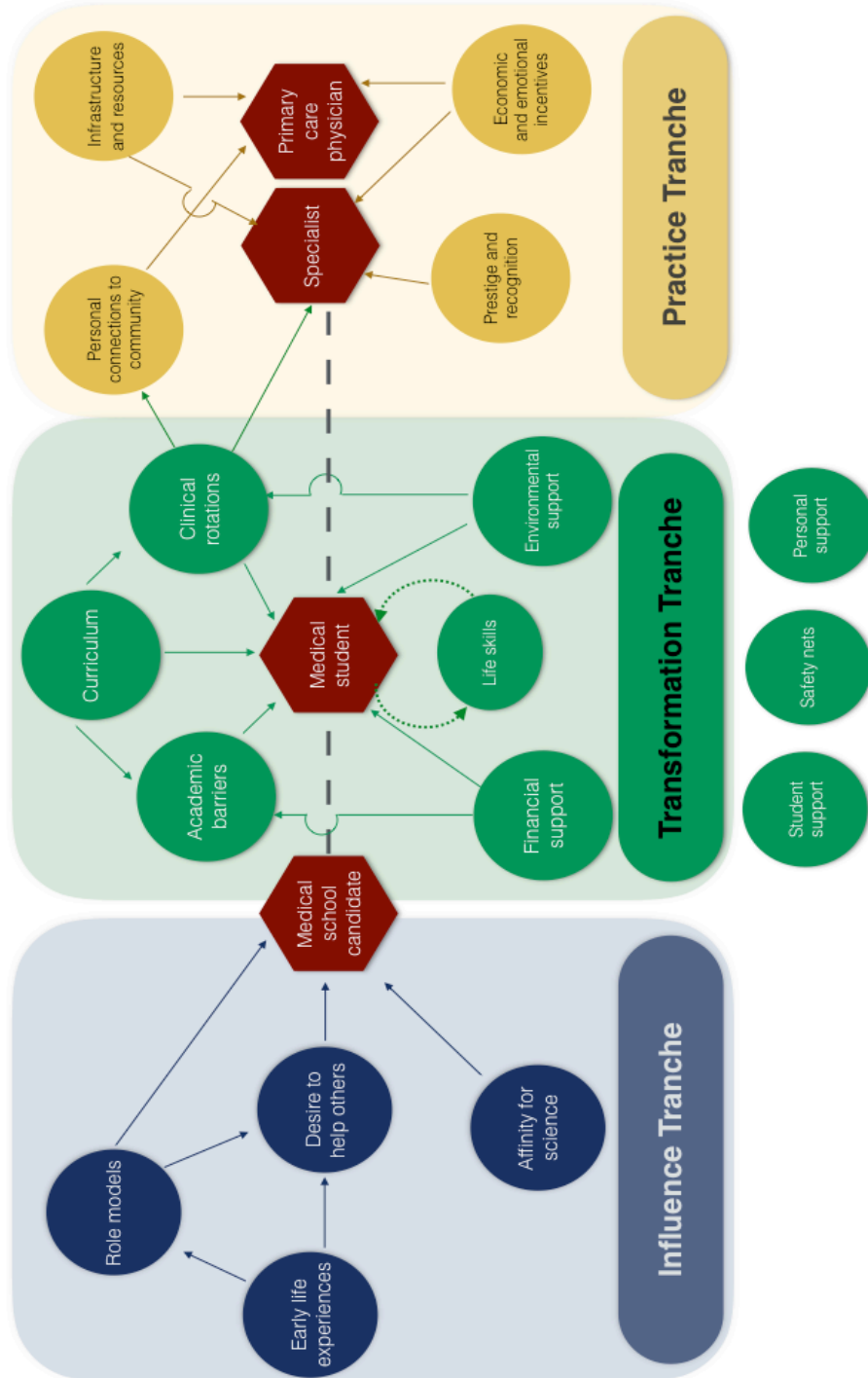
Influence Tranche

In this first section, I describe the main findings from the focus group interactions related to unique personal circumstances or specific events that made the individual desire to eventually study to be a physician and enroll in medical school. Factors that emerged as influential include experiences with personal or familial health problems, the presence of role models who are themselves in the medical field, a desire to help others, and a belief in the universal right to proper medical care.

Early Life Experiences

One finding that stood out from the focus group is that early experiences with health problems—either their own or those of loved ones—induced some students from different focus groups to pursue medical studies later in life. For instance, in one of the groups, a participant from the rural public school of medicine mentioned that seeing his mother dying of cancer marked him permanently. From then on, he wanted to study medicine. Within the same group, a participant coming from a small, isolated village described how experiencing the sickness and death of his grandfather, with whom he had a close relationship, inspired him to study medicine as a tribute to his beloved relative. Another student from the low-income medical school suggested that suffering from asthma throughout his youth and, as a consequence, spending frequent periods in hospitals, generated his interest in studying medicine. Finally, there is the case of a student from the elite private school who suffered from pneumonia and respiratory problems when she was a child and was struck by the lack of attention and proper care by

physicians and nurses in the hospitals. She reported that experiencing health problems throughout her childhood made her want to study medicine so that she could help others.

In the focus group held with graduating medical students from the elite state university, interviewees mentioned several early childhood experiences that predisposed them to eventually pursue a career in medicine. In one case, a student who suffered from meningitis and who saw many doctors working on his case, felt the inspiration to become a doctor like the ones treating him.

Another participant mentioned that she had dreamed of becoming a doctor ever since she was 5 years old, after witnessing how her grandfather experienced a long, painful decline while dying of cancer. In another revealing case, a participant reported that after listening to her parents describe how she survived a traumatic bout with health when she was born, she felt that her purpose in life was to study medicine, save lives and help other people.

Role Models

One important personal factor related to students choosing to pursue a career in medicine is the influence of family members and parents. One student from the focus group in the low-income medical school asserted:

> "My mother was a nurse in a local hospital. Ever since I was a child, I would see her wearing the white uniform and getting ready to go to the hospital for long hours. That frequent image of my mother made me want to play the role of a doctor when I was a kid and helped me decide to study medicine when I finished high school."

In another case from the same focus group, the influence came from both parents, as described by a student:

> "I grew up in an isolated small city in the westernmost province of Panama. My parents, a technician and a nurse, relocated there from Panama City to work in the local hospital. I grew up within this ambience, and many family activities were related to the community and the hospital. I also saw how my parents were well respected by the small city population. These experiences influenced my decision to study medicine."

There were some other cases where either one of the parents or a close relative of a student had been a health professional. Thus, this person served as a role model, influencing the student to pursue a career in medicine. For instance, a participant mentioned that her uncle is an internal medicine specialist, and the frequent experience of witnessing her uncle´s professional practice predisposed her to undertake medical studies.

Three interesting cases arise from students whose parents were not able to finish medical studies because of economic conditions. These students were influenced by their parents to enroll in medical school. In addition, in the case of the focus group from the medical school of the elite state university, four participants mentioned that having a close relative working in the health sector influenced them to study medicine. One student reported:

> "My godfather was a plastic surgeon, and at an early age he introduced me into the basics of medicine. This created an everlasting impression in me and an interest in medicine even though I had little affinity for the sciences in school."

Although not part of the scope of this study, there is evidence that in the elite private medical school, having one or two parents practice medicine influenced students to pursue medical studies. At the time of this study, 30% of the students in the elite

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private medical school had one or two parents who are doctors of medicine (ULAT MEDICINE, 2015).

Desire to Help Others and Medicine as a Social Duty

In all groups, a desire to help others surfaced as a factor influencing students to undertake medical studies. In the case of the school of medicine for low-income students, two participants stressed that they made the decision to study medicine based on the fact that in a medical career one can help others enjoy better health.

According to a participant from the elite private school of medicine:

"As a youth, there was no other career that interested me but medicine. I grew up in a community with no doctors. I was impressed by television programs that showed doctors helping save other people's lives. Eventually acknowledging the permanent lack of doctors in surrounding small communities like the one I grew up, convinced me to become a doctor and help my community access better health services."

Another student from the same group shared her experience:

"Ever since I was in elementary school, I have been engaged in groups volunteering to help the community and a participant in the traditional health and wellbeing fairs. I always felt a desire to help other people, developing an ability to interact and medicine provided me with a clear option to assist and interact with persons."

By the same token, several participants of the focus group from the isolated state school of medicine confirmed that an interest to help others was an important factor in deciding to study medicine. In one case, a student said:

"I come from a small community where there are no clinics or doctors. I have seen the difficulties of people when they get sick or basic health services are required. I wanted to help and helped my community that is why I decided to study medicine."

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Another participant in this focus group went further:

"After my mother died of cancer, I decided to research and learn how medicine worked. Little by little I became enthusiastic about being and working in a hospital. I feel medicine allows me the opportunity to do interesting and diverse things."

Finally, in the focus group in the medical school for low-income students, one

participant explained that:

"While working as a medical assistant with doctors in helping with surgical instruments, I realized that becoming a doctor will expand my ability to cure people and being a doctor will allow me to make the medical decisions, in the same way as the doctors I was assisting."

Participants from different schools of medicine suggested that access to medical

health is a universal right and a social responsibility. Students from the state school of

medicine in a rural community acknowledged their willingness to take care of needy

patients at no cost, and believed that physicians should have responsibility to help

improve the health of their communities. This belief was echoed in the focus group from

the low-income private school, where students suggested that helping the community

should be a duty beyond any profession. This belief was also voiced by a third student:

"I enjoy working and helping my patients. If I specialize, it will be to learn new medical technologies so I can bring knowledge to help more people. I fully understand that primary care should be the first line of action, although patients do not recognize the value of the general physician."

Another member from the same group gave the following opinion:

"Although I would like to pursue a specialty, I feel bad when I see the poor health service provided in the primary care unit close to my community, and that increases my desire to stay and work between the primary care center and the hospital even though patients are used to the specialists."

From the same focus group, another participant said that he became interested in family health after having faced the trauma of poverty and bad nutrition in his community. He said that he would like to work in an environment where he could help solve these problems. To complement working as a physician, he said that he wants to work to reduce the sociocultural factors that increase the possibility of epidemic diseases. He felt that identifying with patients is important and motivating. This last thought—of identifying with patients from low-income communities—was stressed by another participant as well.

In a different way but within the same context, a participant from the elite private school of medicine said: "Physician is a role career that should be replicated by other professions. To be successful you need to have vocation and have a desire to help."

Along the same lines, another of the students from the same focus group mentioned that:

"As a physician, God has provided me the opportunity to have a person's life in my hands and that implies a duty and responsibility. There is an obligation to provide health care to everybody and there should be creative ways to get income from patients who cannot afford to pay."

Finally, a third participant from this focus group shared the following reflection:

"Besides the academic part, what I really enjoy about medicine is that this field allows me to help other people.

Once I went to the emergency room of a general hospital to get treatment from a minor accident. While I was waiting, I saw several wounded persons from a car accident coming into the emergency ward for critical treatment. There were not enough doctors. You could hear people crying or asking for help. A thought came to my mind: If this is the experience in an urban general hospital, what can be expected in a rural hospital. Being a doctor is not only good for the community

but it also provides comfort for the family. Indeed, practicing medicine provides many options and opportunities."

In general, group participants asserted that physicians should exercise empathy in treating patients. Many also showed a desire to go back to their communities to help. For instance, a participant from the rural public school of medicine said:

> "There are many physicians that see the profession as a sincere way to help others. Others see the profession as a business. In my case, I would like to go back to my community to help ease the bad distribution of health care professionals in the country. I have a strong desire to help in many ways beyond being a physician and providing health care."

Affinity for Science

Within the focus groups, students discussed whether having an affinity for science factored into whether they undertook medical studies. Interestingly, only in the focus group from the low-income medical school did the majority of participants confirm that an interest in science subjects and a desire to understand diseases and potential treatment were major factors in their decision to pursue a medical degree. One student from the elite private school asserted:

> "I wanted to study genetic engineering, but it is nonexistent in Panama. Hence, because of my propensity to science subjects together with the possibility of helping people, I decided to study medicine."

In other focus groups, only a few students talked about an affinity for science playing a role in their quest to undertake medical studies. For example, one student from the focus group in the rural public school stressed her interest in science and the prospect of earning a high income as a doctor. In addition, the former minister of health noted that:

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"Affinity for science is much more important than childhood experience. In my experience not too many students end up studying medicine because of an early personal or family experience with sickness. As I said before, the problem is about readiness and not preference for studying science".

Transformation Tranche

The data indicate that the most influential factors affecting students in persisting through medical school are financial and student support, the medical school curriculum, the amount of time devoted to clinical rotations, academic preparation in the sciences, and student life skills.

Financial Support

Financial support is a critical factor in the transformation tranche. To understand the influence of this factor, it is important to keep in mind that in Panama, it is customary that parents pay for the university degree, even taking responsibility for student loans. Thus, financial support is a major factor in whether students can enroll and persist in medical school.

For low-income students, the financial burden of studying medicine is high. To attend a private medical school, the only way to pay for it is through a blend of scholarships and government loans from the state agency for human resource development (IFARHU). Even in public medical schools, which are tuition free, a student and his or her family must be able to afford housing expenses.

One student from the rural public school focus group asserted that his family "endured long sacrifices to fulfill the financial requirements of medical school." Another

participant, this one from the private elite medical school, said that "there are many persons from my community that wanted to study medicine, but lacking financial resources, they decided for other majors. Maybe the country is losing the opportunity to develop more physicians."

A student from the rural state medical school reported that his father did not have a job and his mother died some time ago. While tuition is free, the student has been working as a security guard or a packing assistant to pay for his living expenses. Another student from the elite private school, despite having financial aid, has had to take breaks in his schooling because of financial difficulties. He shared the following thoughts:

> "I enrolled in medical school after passing admission exams. My mother was paying for most of my schooling until the third semester when she died. My father began paying partly, until one day he told me he had his own life and family and could not support me anymore. For the next semester, I got help from family relatives and friends from my community, until one by one they told me they could not help me anymore. I ended up dropping from medical school and going to work for eighteen months until I had enough money and could afford coming back and paying for medical school. I had all kinds of jobs. Luckily, I am in the eleventh semester, but it has been a long road toward completion that has marked me forever."

In another case, a student maintained that during her medical school studies, the main items in her family's budget were housing mortgage, her school payments, and food—in that order. The student recalled that during her studies, her parents never went to see a movie or had a dinner or lunch out at a restaurant because of budget limitations. It is interesting to note that, in general, once the students in the focus groups were admitted and had begun medical studies, their families provided moral and economic support despite sometimes significant sacrifices. Academic officials from different schools of medicine addressed the economic burden of medical school for many students

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and their families. For instance, the dean of the elite private medical school indicated that:

> "The lack of economic resources is probably the first cause of students deserting medical studies. Students come to medical school without financial contingencies, and if they fail a course or they face an unexpected event, they are not able to cope with financial distress. This situation creates a vicious cycle, because stressful economic situations create unneeded pressure, and students waste time that can be devoted to their studies, many times failing a course as a consequence and delaying their progress in medical school. In many cases, they stop studying because living in the capital city to take one course becomes expensive and cannot be afforded."

Another problematic situation was exposed by the vice provost of the elite medical school. The officer, a former minister of health for the country, indicated that:

> "The student loan system works against the poor and students from isolated communities, since any student loan requires credit history and a guarantor that many students cannot provide. In addition, they move from the family premises, and living alone becomes almost economically impossible."

As these reports indicate, major factors affecting the progress of students through medical school are the lack of enough scholarship money and other financial aid to pay for course tuition and living expenses, and the lack of a mechanism for students to handle unexpected events and contingencies that affect their ability to pay for medical school.

<div align="center">Curriculum</div>

Curriculum is at the true heart of factors influencing students' pursuit and completion of medical studies. Medical school curricula in many ways influenced the formation of physicians and the decision to specialize or practice primary care (Brauer & Ferguson, 2015).

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In the four schools of medicine of interest in this study, the medical curriculum is a formal path to becoming a physician that encompasses three major phases: (a) an in-depth study and review of basic sciences that includes courses in chemistry, physics, biology, and mathematics; (b) advanced medical science courses related to the study of the human body (i.e., biochemistry, anatomy, physiology, microbiology and pharmacology) as well as courses in specialized areas of medicine; and (c) clinical studies and rotations in different medical units within a hospital, such as gynecology, pediatrics, cardiology, and intensive care.

What follows are the findings of reviewing and discussing the curricula of the four medical schools in the universities under study, with the objective of establishing differences and commonalities among the four curricula.

To review the curricula from the four medical schools, I grouped the coursework into four categories: (a) basic sciences, (b) basic courses in medicine, (c) humanities and support courses, and (d) clinical rotations. Basic science courses include all courses required in the curriculum to provide context for the practice of medicine, including anatomy, microbiology, chemistry, and physiology. Basic courses in medicine are courses in different functional areas of medicine such as parasitology, histology, and immunology as well as specialized courses in pediatrics, psychiatry, and general medicine. Both basic science and basic medicine courses are designed to set a robust medical knowledge foundation for the future physicians. Humanities and support courses are designed to provide the cultural context where physicians will be exposed to important concepts required to provide good patient care. Also included are courses in

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anthropology and psychology as well as training in social and family medicine and bio-ethics. Finally, clinical rotations deal with the part of the curricula where students do periodic assignments in hospitals under the supervision of a professor, practicing patient treatment in specialized areas of medicine such as cardiology, gynecology, and neurology. Special attention is given to the pathological causes of sickness. I also quantified the number of hours devoted to the three types of instruction methodology: theoretical, practical and clinical rotations. Theoretical instruction refers to lecture hours, while practical and clinical instruction refers to hands-on practice. Practical instruction usually takes place in labs and simulations while clinical instruction takes place during the clinical rotations. Most of the humanities and support courses are taught through theoretical instruction, while the basic courses in science and medicine are taught using a combination of practical and theoretical instruction and clinical rotations are composed almost entirely of clinical instruction. For a thorough description of the curricula for each school, see Appendix 4.

Figure 4.2 shows the percentage of teaching hours in the curriculum of each of the four medical schools that are devoted to theoretical, practical, and clinical aspects of medicine.

Figure 4.2

Percent of Hours Taught by Instruction Type

School	Theory	Practice	Clinical Rotations	TOTAL
Elite Private School	37%	25%	38%	7744
Rural Public School	43%	38%	20%	7408
Elite Public School	36%	30%	34%	7760
Low Income Private School	38%	29%	33%	8032

Type of Instruction
- Theory
- Practice
- Clinical Rotations
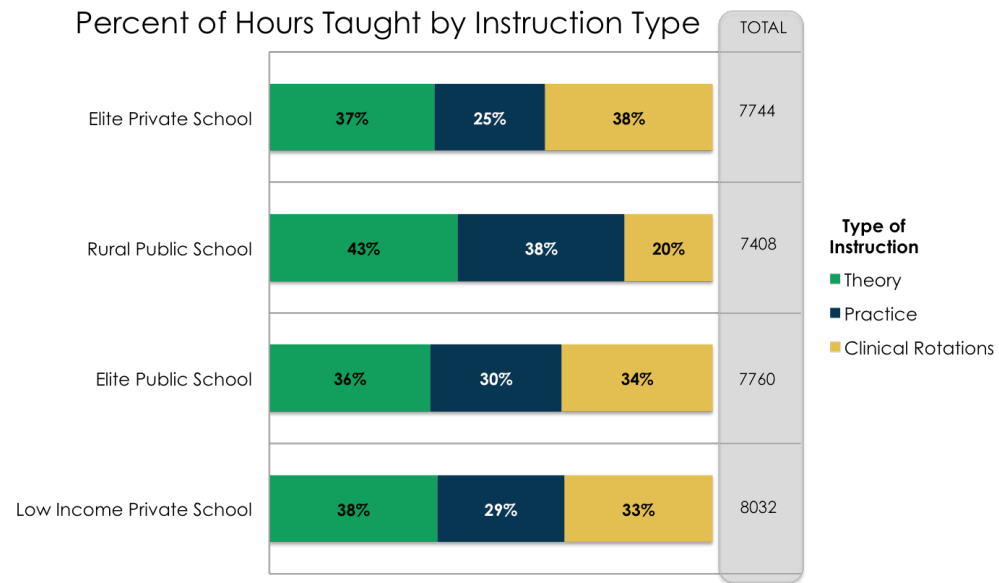
All schools split the hours of training between theory, practice, and clinical rotations. It is important to point out that all schools emphasize practice and developing skills, with the elite private and public schools devoting the largest percentage of hours to practice and clinical rotations. The elite private school devotes 38% of its instructional time to clinical rotation, which is 18 percentage points or 1,456 hours more than the rural public school, 5 percentage points or 240 hours more than the low-income private school, and 4 percentage points or 288 hours more than the elite public school.

As detailed in Appendix 4, total hours of instruction are clustered around 7,500 to 8,000 hours, with the school of medicine in the rural public school having the fewest instructional hours (7,408) and the low-income private school having the highest number of instructional hours (8,032).

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With regard to basic sciences, the rural public school of medicine devotes the most hours (1,712) to this component of medical training, almost twice the number of hours the elite public school devotes to this area (see Figure 4.3). This disparity likely reflects efforts to remediate incoming students from rural areas in basic science courses.

Figure 4.3

Hours of Basic Science Courses

School	Theory	Practice	Total
Elite Private School	432	608	1040
Rural Public School	656	1056	1712
Elite Public School	400	560	960
Low Income Private School	432	608	1040

Hours of Instruction
■ Theory
■ Practice

Figure 4.4

Hours of Support Courses

School	Theory	Practice	Total
Elite Private School	336	64	400
Rural Public School	528	224	752
Elite Public School	320	192	512
Low Income Private School	608	224	832

Hours of Instruction
■ Theory
■ Practice

As noted above, humanities and support courses are an important part of the curriculum. The rural and low-income private schools devote almost twice as many instructional hours to this type of coursework than the other two schools of medicine, as can be seen in Figure 4.4.

Figure 4.5 summarizes the number of curricular hours each school of medicine devotes to basic medicine

Figure 4.5

Hours of Basic Medicine Courses

	Theory	Practice	Total
Elite Private School	944	1264	2208
Rural Public School	912	1504	2416
Elite Public School	1008	1504	2512
Low Income Private School	960	1472	2432
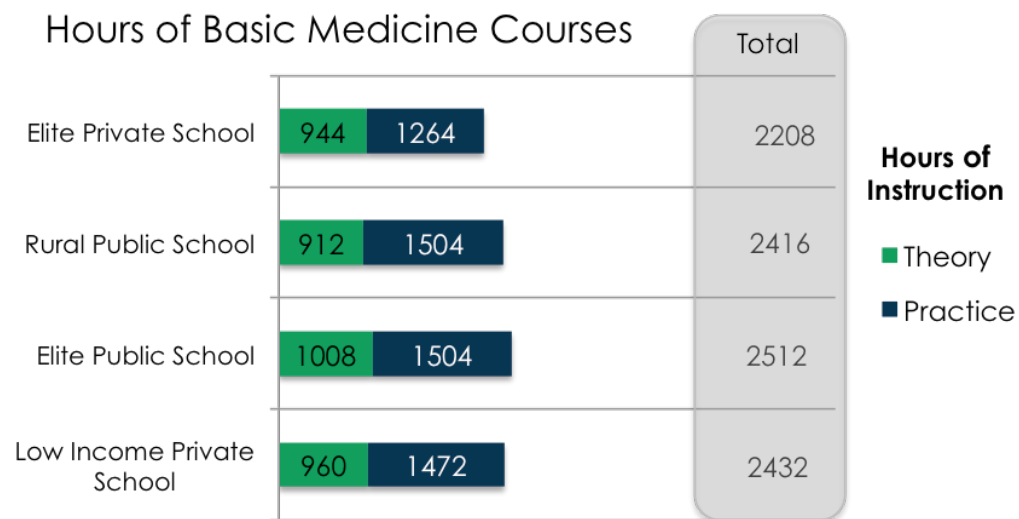
In basic medicine courses, the number of hours offered by the four medical schools were of the same order of magnitude, with the elite private school offering the fewest curricular hours in this area, almost 15% less than the other schools.

Figure 6 presents total hours allocated by each medical school to clinical rotations and clinical theory related to specialized functional areas such as gynecology and

cardiology. In reviewing clinical practice curricula, I found that the elite private school dedicates the most hours to clinical rotations, with the rural public school spending almost half as many hours in clinical practice than the elite private school which is relevant compared to the other three schools.

A major difference between schools is how early some schools initiate clinical rotations. At the elite private medical school, rotations start in the seventh semester, a full three semesters earlier than at the elite public school. A similar situation occurs in the rural public school, where clinical rotations start in the eighth semester. It should be noted that all four schools devote a very small number of primary care or clinical rotation hours to work in isolated communities. The only school with specific rotations in underserved communities is the rural public school, and even this experience involves few hours of student practice in isolated health centers due to limited resources and infrastructure.

Figure 4.6

Hours of Clinical Practice
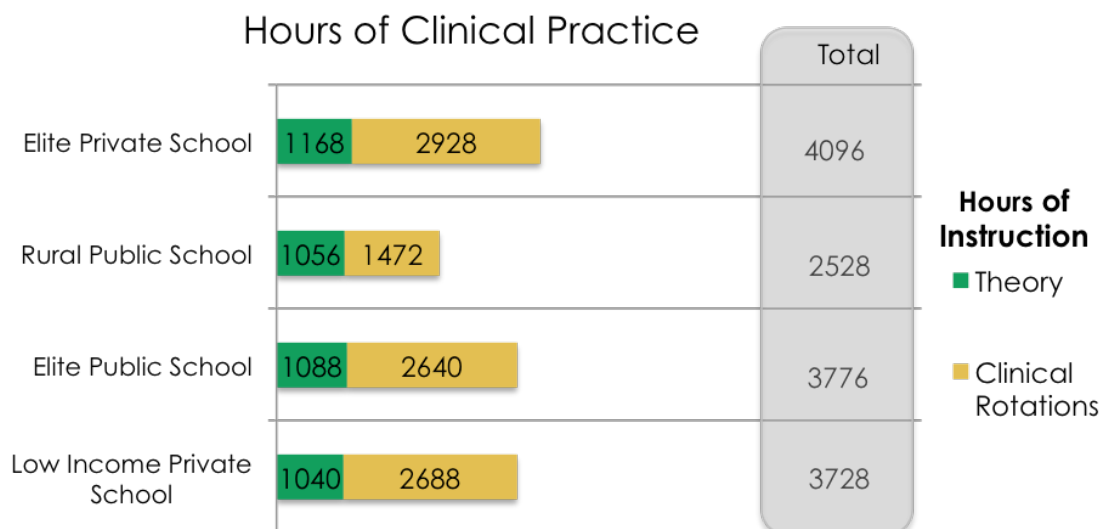
An important aspect of this study is to find out how many curricular hours medical schools devote to family and social medicine. To establish this, I reviewed the four curricula to identify all courses and clinical and laboratory rotations related to sociology, anthropology, primary care, social aspects of medicine, family medicine, and any specific course designed to teach the social context of medicine and primary care. I grouped all such courses under the category *social and family medicine.* I then analyzed the percentage participation of all the training related to this important element of physician development for primary care practice compared to the entire curriculum.

All schools devoted between 10% and 16% of their curricula to subjects in social and family medicine. As shown in Figure 4.7, the elite public school spent the largest percentage of instructional hours (16%) on social and family medicine. The elite private school devoted the smallest percentage (10%) of hours to the same topic.

Figure 4.7

Percent and Number of Hours Taught in Subjects Related to Family and Social Medicine

	Low Income Private School	Elite Public School	Rural Public School	Elite Private School
In Family and Social Medicine	880	1240	1000	736
Total Hours Taught	8032	7760	7408	7744
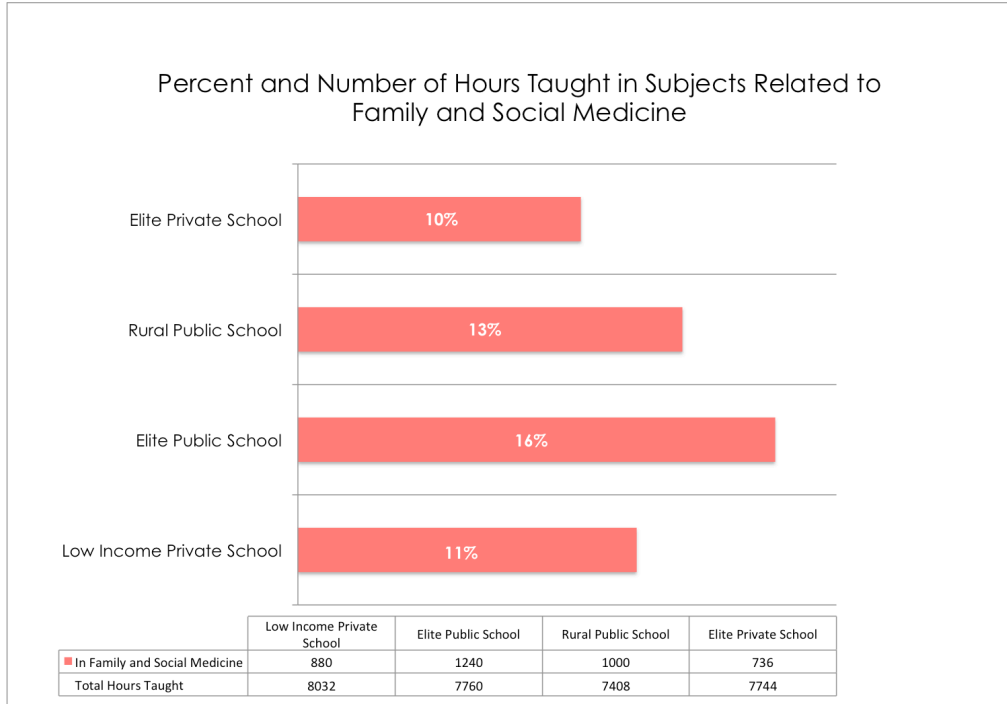
The elite public school has the highest number of hours of training in social and family medicine. On the other hand, the elite private school assigns 736 hours (out of 7,744 total curricular hours) to social and family medicine, which is the lowest of all four schools. As Figure 4.8 shows, in the low-income private school, of the 880 hours of training in social and family medicine, only 144 or 16% are clinical. In comparison, the elite public school devotes 440 clinical hours or 35% to social and family medicine.

Figure 4.8
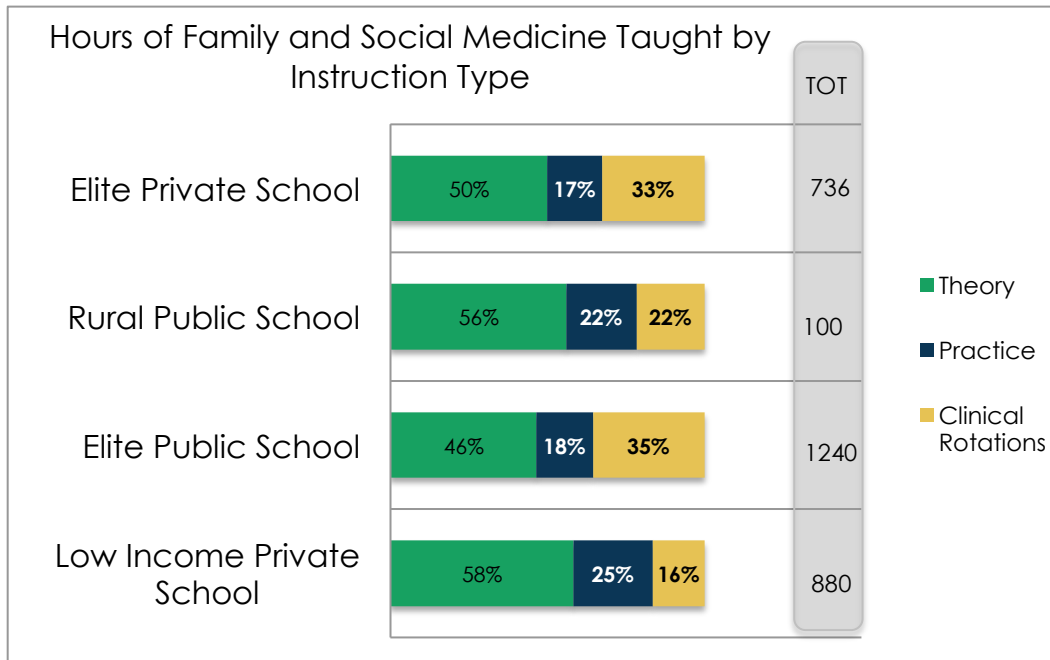
The other interesting finding is that the elite public and the elite private medical schools, despite having a difference of 504 hours devoted to family and social medicine, they allocate almost the same *percentage* of hours to clinical rotations in family and social medicine. The low-income private and the rural public medical schools, on the other hand, devote a lower percentage of social and family medicine curricular hours to clinical rotations.

Here is what the vice provost of the elite private medical school had to say about the role of clinical practice:

"The medical school curriculum should include clinical practice in "Centros de Salud" [Panamanian primary care centers for the poor]. There, students should be exposed to patients with undernutrition and other health deficiencies. The emotional impact of treating the poor and the underdog will be an important experience for the students. In addition, having to treat patients with equipment

and infrastructure limitations emphasizes the importance of focusing on patient care in general medical assessments and providing basic medicine service. A good doctor must be trained to work in all types of conditions, and this is important for primary care."

The dean of the low-income private medical school offered the following suggestion:

"Participation of the students in a series of medical tours and clinical rotations in primary care centers in isolated communities should partially fill the vacuum of primary care courses in the medical curriculum. For instance, the second year of clinical rotation should be carried out in the community primary care centers. These assignments balance the training students receive in the hospitals. Even more so, it may be a good requirement that any student looking for a vacancy to be trained as a specialist must practice one or two years in a primary care center before applying to become a specialist."

Academic Readiness

In Panama, students enroll in medical school once they finish high school and undertake a twelve-semester curriculum. With the exception of the state and private elite schools, the other schools of medicine have a universal access policy, but all require students to take a one- to six-month preparatory course in such basic sciences as biology, physics, chemistry, and mathematics. With regard to this factor, the dean of the elite state school of medicine made the following comments:

"There is a great inequality in the school system in Panama. On the one hand, private high schools have all the resources and prepare students to begin college studies at any university, even at the top 20 universities in the world. As you go farther into the rural areas, one will find high school students without the proper skill set and not ready to undertake university studies. It is pitiful because during my visits to the Indian reservations, I have found a significant group of students eager to study medicine but they lack financial resources and are likewise trapped within the region and the limited schooling they receive. There is a mismatch between their desire and their readiness to study medicine. It is possible to

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academically prepare and update those students in a six- to 12-month accelerated readiness program in biology, chemistry, and physics."

Student Support

Along with having proper financial support, participants from the different focus groups highlighted the value of different support mechanisms while in medical school.

Family support was evident in the focus group from the elite medical school. One participant said: "I am an example for all my family and even my community. My mother has had a difficult life and has always been trying to make ends meet. Because of this she has always motivated me to finish medical school."

Another participant agreed that "constant support from my mother was fundamental to my success."

All participants in the focus groups at the elite public medical school seemed to share the same sentiment. One said:

> "Family support is vital to survive medical school. My friend does not understand the sacrifices one needs to make to become a physician. In addition, I feel support from classmates and faculty is important. Most of the time, only those who are in medical school—students and faculty—understand all the situations one has to endure to be successful in medical school. On one occasion, I was facing financial difficulties and ran out of money and was ejected from the room I was renting. With no place to live, I decided to stay in the school premises until I could find a new place. The first night, one of my professors found me and asked me what happened. After I answered, with no questions attached, he gave me three hundred dollars and told me to get a place. That gesture was a turning point in my medical studies."

The academic officials from the four medical schools added some insight to the value of student support. The dean of the low-income medical school provided the following comments:

> "There is the need for better tracking of students to help them whenever they face difficulties. Having a professional that can "coach" the students, taking into consideration their individual academic and personal needs will definitely help to create a better medical student and eventually a physician."

In addition, developing workshops, on-line support, and virtual reality courses may help students develop their abilities and improve their skill set. The idea is that students may individually reinforce on a continuous basis, their progress through medical school. In our case, we have tried to develop a self-support system among the students, by developing a sense of community and a mentoring system. Students on their own have developed trivia games and study groups. In addition, students have identified specific academic areas where they would like to have more training and have thus requested it. Sometimes they have paid an outside instructor to get more academic training in a specific area. Sadly enough, faculty members are not connected with the medical school and much less with the students. This may be due to the fact that many of them are adjunct professors. Also, since it is a proprietary school, it is very difficult to request volunteers' time to help the students; hence there is a very "cold relation" between students and faculty. Furthermore, many of the professors have their private practice and may not be willing to sacrifice income to provide time to support their medical students.

The dean of the medical school from the elite private school offered the following point of view:

"Any mentoring system to help medical students is an excellent idea. The university needs to support the students, but not by being permissive and relaxing medical and academic requirements. The role of faculty is essential but is limited by the quality and diversity of faculty. Many of them are adjunct professors whose only job or interest is to lecture in class and not to provide help to the students outside of the classroom. Faculty should help create a proper environment and a community with the students. In this respect, they are not truly faculty members of the school of medicine."

Similar comments were made by the dean of the rural public school of medicine.

He said that:

"There should be better programs for teaching and mentoring students, even adding more preparatory courses before entering medical school. Proper tracking of the students on an individual basis is important to provide support in advance of difficulties. Another issue is the proliferation of private mentoring services that may not provide adequate support, while reducing the economic resources of the students."

The dean of the elite public school of medicine offered the following reflection:

"Low-income students in the elite state school of medicine usually face many personal problems that jeopardize their progress in medical school.

Lack of financial resources, adapting to an urban environment where the university is located or sharing responsibilities with the family they left behind are among the problems students from Indian reservations face after entering medical school. Last year, out of ten places for Indian students, only five were assigned, and those five students left medical schools after two semesters."

Another finding that emerged from the data was the difficulty of providing mentoring and tutoring in a country where there is no standardized system for determining academic gaps and the difficulties students face in their schooling. Consequently, such programs are almost nonexistent.

The following true story provided by the deputy minister of education and former dean of a school of medicine highlights the value of faculty in mentoring and tutoring:

"A youth from Ocu, an isolated community about 340 kilometers from the capital city, was enrolled in a school of medicine I used to head. He has failed twice the chemistry course. His father came to visit me and in an emotional way he said, I clearly want my son to become a doctor. And I answered him, "it is a good desire but first he needs to decide if he wants to become a doctor." The student confirmed his desire to become a physician. Then I asked him, what happened and he answered: "well in eleventh grade, my chemistry professor was appointed two months after school started, and in twelfth grade, a professor was appointed four months after with no knowledge of basic chemistry. Then I told the student's father: "Your son has to make up for these difficulties. I will get him a mentor and once this mentor confirms your son's readiness in chemistry, I will accept him back in medical school. The student finished medical school ten years ago and today is the head of a hospital in an isolated community in Panama."

Finally, with regard to student support, the former minister of health noted:

"Student support is a critical success factor in medical school. In the current system, all medical schools concentrate on academic performance. There is no formal student follow-up or mechanisms for early detection of students facing a problem. If we acknowledge that students from rural and low-income environments bring academic, financial and family shortcomings, it makes sense to develop formal support systems to help those students persist in medical school. It is very simple, high desertion rates of those students who usually receive relevant financial help implies an expensive cost in producing a doctor and a lower rate on investment for government and society. It is definitely more expensive, although not for the students. Hence, I advocate using new technologies to provide tutoring in a democratic way. This approach will facilitate faculty tutoring and support without urging faculty to go beyond their commitment to teach the assigned courses".

In addition, there should be counseling for personal and emotional problems of the students.

Clinical Rotations

Clinical rotations play an important role in developing students into physicians.

Students in the focus group all highlighted the value of clinical rotations. Participants from the rural public medical school mentioned that clinical rotations in

primary care centers helped them establish a connection with the community and a stronger sense of duty and willingness to help. One said:

> "Clinical rotation in Soloy [a very impoverished isolated Indian community in the Ngobe Bugle indian reservation] profoundly impressed me in my development as a doctor, because despite supposedly being a modern and advanced primary care center with laboratories and beds for patients, there was no light, water, or medicine. I had to participate in childbirths with flashlights and saw advanced pregnant women walking 4 hours before getting to the health center, some of them bringing their own hammocks because they were advised that there were no beds available for them."

In the case of the focus group in the elite public school of medicine, a participant shared different experiences. One said:

> "During clinical rotations, I realized I enjoy contact with patients and practicing medicine in a familiar way. I feel people go to the health centers, when they are sick and not to prevent illness. Once I finish, I intend to practice medicine in Chepo, an underserved community in the outskirts of Panama City."

Another participant from the same focus group highlighted the medical tours to Indian reservations as part of clinical rotations. He said:

> "I was impacted by what I saw in my clinical tours in isolated Indian communities. Many cases might be avoided with proper timely care. For instance, I witnessed the case of the death of a child who had been bitten by an animal, which could have been avoided with timely application of proper medicine. I felt that many communities are abandoned as far as basic health care is concerned."

This sentiment is reflected in another comment from a participant from the low-income medical school, who recalled:

> "I was profoundly impacted by the fact that even in a hospital within the metropolitan area, located in a low-to-middle income neighborhood, many patients were in bad medical health because of lack of appropriate medical care."

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Interestingly, all participants from the low-income private school focus group concluded that rotations have a much more profound impact than academic coursework in developing awareness with regard to helping the needy and the sick.

A participant from the focus group in the elite private school mentioned:

"My experience in rotating in primary care centers was positive and made me aware of my role as a primary care physician, especially in low-income communities. I believe it is important to continue with assignments in underserved communities, even if they are for short periods of time."

Another participant suggested that clinical rotations should be preceded by "stressing in some pre-clinical courses, how to treat patients and what is the proper role of the physician in the community they serve."

With regard to adjusting the medical curriculum to influence students' interest in primary care, the dean of the rural public medical school insisted that primary care should be the connecting axis of all subjects in the curriculum, stressing the benefits of primary care as an approach to preventing diseases. In addition, he mentioned that adding courses in social service and the impact of medicine in society should help reinforce the importance of primary care. The dean of the private medical school for low-income students went further, suggesting that:

"Students should have many opportunities to participate in workshops and short seminars during the first years of medical studies to expose them to the role of medicine in society. In addition, students should get basic capabilities to handle small medical emergencies. There is the need to modify the current curriculum so students face the social aspects of medicine in addition to techniques. The more the students are versed in the impact of medicine in society, the stronger will be their linkage with the communities once they graduate."

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Others deans mentioned the importance of early experiences of the students in primary care, starting during the second or third semester of the medical curriculum, to highlight the value of this practice within a physician's career. As one dean mentioned:

"Clinical rotations at primary care centers come after students have been exposed to specialists, and if the students have made up their minds toward a given specialization, it is very hard that they will show any interest in practicing primary care or in being a physician in isolated communities."

The dean of medicine at the elite private school suggested a more profound problem:

"There are major flaws in the main concepts and approaches toward curriculum development of medical training in Panama. There are not enough experts either in private or state universities capable of making profound changes in the curriculum to enhance the value of primary care as a major determinant of health planning and prevention in the country. Currently, medical training is based on the Flexner model where hospitals are the center of medical training, thereby lowering the importance of primary care centers. This model has created an enormous gap between medicine or health services and the community. In addition, the model has increased the role and value of the specialist, influencing patients to look for a specialist and hospital care as the first step when health services are required. Eventually, these movements of specialist and patients have pressed governments to invest in hospitals rather than primary care facilities. At the same time, the Flexner model has been widely used within the medical school curricula, increasing clinical training at hospitals."

Beyond that, specialist interest groups like medical societies, have conditioned patients and society in general, to forfeit the logical system where primary care physicians refer patients to specialists when needed, for a system where specialists interact immediately with patients even if a given health care condition does not require it. Thus major changes in health policymaking are needed.

In response to favoring primary care centers as the basis for clinical rotations during the last years of training in medical schools, the dean of the school of medicine at

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the elite public school noted that nutrition trends in the western world are heavily influenced by diets based on so-called "junk food" and the consumption of sugared drinks and heavy doses of carbohydrates. He argued that if these patterns do not change, the prevalence of chronic illnesses such as diabetes, heart problems, and liver-related diseases will continue and the need for specialized hospitals and specialists will remain in high demand. Hence, the training at medical schools will keep emphasizing clinical rotations at hospitals, despite the convenience and the long-term advantage of training in primary care centers.

Practice Tranche

The practice tranche concerns the choice of becoming a specialist or practicing primary care medicine. This is a crucial choice that affects existing disparities in physician density between urban and underserved communities and the inequalities of health services associated with these disparities. As the findings from the focus groups and the interviews reveal, many factors are associated with this fundamental choice.

Social and Financial Rewards

Many participants from different focus groups emphasized the status and recognition of being a physician. Many believe that being a physician is a great opportunity for upward mobility and improved economic conditions. In addition, some participants felt that physicians have an important role in the community where they practice and that they are admired and trusted by society. There is also a sense of pride

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among family members in having a physician or someone who has graduated from medical school in the family.

However, with respect to financial rewards, there were mixed feelings among students in the focus groups regarding the choice between becoming a specialist or working as a primary care physician in isolated communities. Many believe that becoming a specialist provides more economic rewards and reported that once they were in the second semester of medical school they felt pressure by peers and faculty alike to specialize. On the other hand, many believe that becoming a general practitioner implies not being ambitious enough to further study and specialize. Hence, some suggested a cultural change where primary care physicians are recognized and appreciated in the same way as any medical specialist.

One participant from the focus group in the rural public medical school spoke very explicitly about the choice between becoming a specialist in an urban area versus working in primary care in an isolated community:

"When one studies medicine, there is a lot of vocation within the person but also there is a strong desire to improve living conditions.

Hence it is very hard to work in a place with minimal working conditions and incentives. Currently, the government provides low incentives and improper housing. In addition, assignments in isolated communities are not short-timed and mainly, there is no time limitation, hindering the physician from considering further professional opportunities. In addition to economic incentives, government entities coordinating the physicians' assignments should award extra points or credit toward opportunities for the limited number of residencies to become a specialist. Once you go to an isolated community, you put yourself and your family in pause or at a standstill. Hence, even if you have the passion and desire to help, most of the time there are no resources to provide health care."

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Another participant from the same focus group suggested that incentives to work in isolated communities should be enough so the physician only has to worry about performing his or her professional duties. According to this student, physicians working in those communities should have their basic needs solved, in addition to having proper housing, good infrastructure for providing health care and adequate financial incentives.

Furthermore, with regard to financial incentives, participants from different focus groups, when asked about how high incentives to work in isolated communities should be, they proposed anywhere from 40% to 60% above the basic physician salary. One participant from the focus group in the private medical school for low-income students mentioned that there is a high opportunity cost in terms of professional improvement if someone decides to practice in rural and isolated areas.

Infrastructure and Resources

With regard to infrastructure and resources, the dean of the rural public school of medicine asserted:

> "There is no good health infrastructure in isolated communities, nor do the primary care centers have the medical resources and supplies to operate normally. In addition, appropriate housing for assigned physicians is nonexistent, forcing the physicians to live in other places. Since physicians do not live in the community, they do not develop a strong relationship with the population and eventually they want to leave and work somewhere else."

Along the same line of thought, the dean of the elite private medical school made the following comments:

"Working conditions in isolated communities are really bad. The lack of infrastructure and resources quickly frustrate assigned physicians, plus many are not willing to be exposed to legal responsibilities because of patient malpractice. If, in addition, you consider the poor quality of life of practicing physicians in these areas, you have perfect conditions for not attracting doctors to those areas. Medical students, when they do clinical rotations in those areas, become aware of this lack of infrastructure and supplies. Many times there is no running water or electricity. Hence, students, even if they feel capable, recognize the risks associated with these working conditions and around any assignment in those areas."

The vice provost of the elite private medical school agreed with those comments,

adding:

"Primary care physicians have the ability to analyze and understand patients and the environment where they live. They are also aware of the overall impact his practice may have in a vulnerable community. Nevertheless, because of lack of infrastructure and resources, they cannot perform adequately, losing little by little their main abilities to treat patients."

The dean of the elite private school voiced similar concerns about the problems in

infrastructure and limited resources in isolated communities, but said that these

conditions are not going to change drastically in the near future. Given the current state of

affairs, he suggested that:

"Providing good living conditions, adequate means of transportation to the communities, and having appropriate medical infrastructure is a must for primary care physicians to perform and have an impact in those communities. Nevertheless, with current conditions, in the short run, I believe there is a need towards more incentives for physicians to be motivated to work in these communities. I also believe that if students get medical training close to their communities and do frequent clinical rotations, there is a fair chance that once they graduate, they will be willing to go back, live and practice medicine in those communities. In addition, if government entities make a better distribution assignment of newly graduates, the gap of physicians between urban and rural areas can be improved. Finally, a point-reward system can be implemented whereby physicians who go to isolated communities get awarded more points toward obtaining a medical residency, the longer they stay and the more isolated the community wherein they work."

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Prestige and Recognition

Being a physician is a recognized profession in every culture and country of the world. This perception was universally recognized by all focus groups in different fashions. For instance, in the group from the rural public medical school, one participant noted that:

"Physicians are recognized and admired by every society and are always appreciated in the community where they work. Becoming a doctor in medicine offers us an opportunity to improve our economic and social status."

However, a participant from the same group pointed out the choice between becoming a specialist or staying as a primary care physician. He asserted:

"In general, people in a community believe that all physicians are specialists and do not understand the role of a primary care physician. Even more so, there is the need for a cultural change where the primary care doctor is appreciated and recognized as well as any specialist. There is also the need to change the perception that primary care doctors didn't choose to be so, but rather failed at becoming specialists."

Some similar reflections were shared by participants from the focus groups of the low-income medical school. One said:

"The choice between becoming a specialist or continuing as a primary care physician depends on many factors. In my case, ever since I was in my second semester in medical school, faculty members were asking me about my preference to specialize in a given field. Hence, it seems that there is a bias within medical schools toward specialization. This is coupled with the sense that any primary care physician is not apt to get a specialization or being a general medicine doctor is too monotonous. In fact, all my classmates find it more interesting to specialize rather than staying as a primary care physician. Maybe it has to do with society's perception that there is more value in being assisted by a specialist. Ultimately, only someone who has endured medical school really understands what it means to be a specialist or a primary care physician."

As a result of this group discussion, another dimension was added to the choice between becoming a specialist or a primary care physician. One of the participants was very specific about the value proposition of practicing primary care. She said:

"People tend to believe that once you become a doctor you will immediately improve your economic status. To be honest, there are other professions where becoming rich or making money is a lot easier. The fact is that studying medicine implies an important monetary investment from the government and families and many times one leaves medical school with the diploma and a heavy financial debt and even though there is this illusionary economic incentive to study medicine, that was not my main motivation to go through medical school. But faced with financial stress and knowing the difficulties in practicing medicine in isolated communities, I think it is a matter of opportunity cost and professional growth to decide to specialize."

The choice between becoming a specialist or remaining as a primary care physician was also discussed by the focus groups in the elite private medical school. All participants agreed that a physician is well respected and admired professionally in any community, with one person saying that "community members always trust a physician." However, with regard to remaining as a primary care doctor, all agreed that they would like to specialize. One of the participants shared the following reflection:

"There are many reasons why I want to specialize. Although I recognize the value of serving as a primary care physician and even try to reinforce the need to have good general medicine doctors, I honestly believe that the whole medical environment pushes the medical student toward specialization. Some of my classmates have even developed the notion that a primary care professional is not as good as a specialist and you only continue in primary care if you are not successful as a specialist. Also, specialists are going to earn more than a primary care physician, especially if you practice medicine in urban communities."

Similar feelings were shared in the focus groups from the elite public medical school. One participant from this group noted:

"There is nothing wrong with practicing as a primary care physician, but the perception is that once you become a primary care doctor you are less of a

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professional than a specialist. I think that in order to change this perception, one must recognize the role of the general medicine doctor as the first opportunity for any patient to obtain good health services and in this sense, medical schools and the communities have an important role to play to change this generalized perception."

The discussion of this important choice between primary care and specialized doctors was complemented by individual interviews with academic officials. The dean of the low-income medical school made a clear distinction in relation to this choice. He said:

"The main reason to become a specialist is social and economic recognition. There is a social presumption in any community that a specialist is better than a primary care doctor. Also, with the many problems faced by primary care physicians in vulnerable and isolated communities, the primary care doctor becomes a simple reference to the specialists, thereby repeating the main purpose of primary care. If to this you add the fact that the national public health system is specialist-oriented by having more specialist spots than primary care positions, it should not come as a surprise that more students prefer working toward a specialization once they finish medical school. Hence, it is necessary to provide better salaries for positions in underserved communities and make assignments in primary care centers a priority. In fact, I suggest that if a student wants to become a specialist, he should undergo a two-year clinical rotation in an underserved community before becoming a specialist. That is, the public health systems need to control supply and demand of primary care physicians."

Similar opinions were shared by other academic officials from the different medical schools, emphasizing the value perception of the specialist by society and the potential economic incentives for becoming a specialist. These income disparities between specialist and primary care physicians were mentioned as a major factor for encouraging medical students toward specialization. The vice-provost and dean of the elite private medical school asserted:

"Besides the low wage of primary care physicians which motivates young doctors to study toward a specialization, there is the competition among medical schools. If the elite state university is developing specialists, then private medical schools

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cannot focus in developing primary care doctors because they would lose competitive edge. If to this you add the community's misperception that a specialist is always better than a primary care physician, it is not surprising to have this general bias toward specialization. In addition to this, there is the fact that medical societies have conditioned patients and the community to look for specialists as the first gateway for health care services. Hence, there is a strong need to change the public health system."

<center>Personal Connection with the Community</center>

Participants from the focus groups in the isolated state medical school were widely expressive when talking about the role played by personal connections with the community they serve.

All participants suggested that they would be willing to provide services for free, being aware that in their communities many people cannot afford to pay for health services. As one student noted, "all doctors should have the vocation to help and contribute to the betterment of their communities." Another participant stated:

> "I would like to pursue a specialization, but on observing the poor treatment given to people in my community's basic primary center motivates me to stay and work in the center or the regional hospital, maybe splitting my professional time with the primary care center. This will also help develop trust in the primary care physician."

A student from the same focus group made the following reflection:

> "I am interested in family medicine, witnessing the shocking effects of children malnutrition and poverty in my community, and I would really like to work in a vulnerable community to help solve these problems; that is, work professionally not only to tackle health problems but trying to help eradicate those situations that allow a health condition to become epidemic. At the end, for any doctor, it is important to identify with the patients and the community where they live."

In the case of the participants from the elite public medical school, all agreed they will provide services to patients who cannot afford to pay. One participant stated:

"What motivates me as a physician is being able to help other people. I will develop non-profit associations to provide my medical services for free to those who cannot pay for those services. I want to contribute to society and to provide comfort to people."

Another student offered the following response:

"I know that my work as a physician can have the best impact in isolated communities, but I have seen that many times there are not enough resources. I would like to work in one of those communities for a given period as a primary care doctor, but eventually I plan to return to the city to specialize myself."

In general, there was a feeling that students are willing to help their neighborhood and to show that economic and health conditions can be improved in their communities.

In the elite private medical school, participants in the focus group shared their views in different ways. One suggested "every doctor should go back to their communities, showing empathy in their quest to help patients." Another student suggested that:

"In small communities, doctors are admired and well respected and everybody in the community trusts them. Thus it is important to identify with patients and have the willingness to help the community."

Another participant who comes from a small town more than 600 kilometers from the city asserted that:

"Maybe there are many doctors that see their career as a business. In my case, my desire to help the community comes from my heart. Therefore, I am planning in going back to my community because I know I can help. I feel there is a health service maldistribution in our country and I will help not only as a doctor but as a simple citizen."

The deputy minister of education discussed this factor using a different perspective. He stated that:

"Any doctor who is willing to work in an isolated or underserved community must have a profound interest in the community that he is to serve, otherwise he may not be willing to accept the sacrifices that this commitment implies. Hence, medical students should be linked to the community through different means other than a limited number of clinical rotations in underserved communities. The most effective way is to develop physicians close to the communities that are lacking medical services and are demanding it."

The dean of the rural public medical school asserted the following:

"If a student comes from an underserved community and enjoys primary care, he will probably go back to his community to serve as a physician. Therefore, I suggest to start visiting and doing clinical rotations in underserved areas, so students learn to work in those health centers that are under-resourced and understaffed to prepare the mindset correctly. In other words, the more the students have the opportunity to engage themselves in their own communities, the more they would be willing to stay and work in those underserved communities."

The dean of the low-income private medical school had a different view. He noted that:

"Theory says that if medical students are exposed to more social issues and subjects, they will feel more attached to the underserved communities and eventually many will decide to go back and work there. Nevertheless, reality shows that once a student has invested money and resources in graduating from medical school, he is not willing to go back and work in underserved communities. A potential solution is to improve access of students from underserved communities in larger numbers with the objective that many decide to go back to practice in their communities."

As these quotes reveal, there are many views regarding how personal connections influence whether medical school graduates go back to their community. The central theme seems to be developing closeness to the underserved region by promoting experiences and practices while students are in medical rotations, and taking advantage of those who are willing to serve in vulnerable communities.

Summary of Findings

In this study, I aimed to answer two primary research questions: What factors shape low-income students' commitments to become physicians? And how do policies and institutional practices influence rates at which low-income students become physicians? The findings described in this chapter reveal that there are many crucial factors, with complex relations among them, which enhance low-income students' motivation to undertake medical studies. The participants in the focus groups of the four participating medical schools revealed that early childhood experiences and role models during childhood and early schooling may be fundamental factors in the decision to become a physician. These elements, along with a desire to help and an affinity for science, pushed students to enroll in medical school, despite the lack of adequate financial resources and readiness to experience the academic demands of medical studies. These factors fall under what I describe as the influence tranche, which is the first stage toward developing a skillful physician.

Once students have met the entrance requirements for medical school, the data from this study reveal that other factors influence students' interests in and commitment to becoming doctors. Six factors emerged as fundamental in the transformation tranche, or the medical school journey of the students: the curriculum, academic preparation, financial support, development of life skills, clinical rotations, and student support. These factors in different ways helped students develop resilience against the consequences of adverse events and reinforced traits that are valuable when working as a physician. Findings indicate the existence of a significant vacuum in formal student support, a

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fundamental factor in whether low-income students and medical students coming from underserved communities persist in medical school. There is also an imbalance in the number of hours devoted to clinical training versus rotations focused in hospitals, and a need to understand primary care skills required to provide health care in underserved communities.

With regard to the practice tranche, I again found core factors that shape the graduates' decision to specialize in a field of medicine versus undertaking a primary care practice. Lack of proper infrastructure and resources, economic and emotional incentives, and the prestige and recognition that becoming a specialist implies, are all crucial elements that usually work against deciding to becoming a primary care physician in underserved areas. On the other hand, the more connected a student is to an underserved community or experiences clinical rotations in underserved areas, the more likely he or she will be willing to go back to the underserved community to practice medicine.

There seems to be a strong interaction among the influencing factors. For instance, deciding to practice medicine in an underserved community is an acceptance to work with poor infrastructure and limited resources. This may come from an underlying motivation of the physician, but there is little recognition or reward from authorities or patients. Eventually a physician may decide that the personal sacrifice is too high and that there is no possibility of advancing in his or her career without a specialization or working in a more urban setting. These findings also underscore the challenges of developing more primary care doctors in medical school.

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CHAPTER 5

SUMMARY, DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

Summary of the Study

In this dissertation, I have reviewed important factors that influence low-income Panamanian students in their decision to study medicine and become primary care doctors in underserved communities in the Republic of Panama.

I chose four schools of medicine that represent various options that students have in undertaking medical studies in the country. One school is an elite state school where potential students take admission tests to compete for 300 slots at the freshman level. Another school is an elite private school with 200 openings every year. Although students take an admissions test for this school, entering requirements are more relaxed than the elite state school. Most of the students come from wealthy families, but this school provides scholarships along with government support for low-income students with good high school academic performance. The third school, part of the study, is a private medical school for low-income students, located in the capital city with almost universal access, basic academic requirements, and space for 50 students. The fourth school of medicine included in this dissertation is a state school with universal access and free tuition. It is located in an isolated region 500 kilometers from the capital city and normally admits 150 students every year.

Each school selected five to six medical students from low-income backgrounds in their twelfth semester or ready to graduate, to be part of a focus group for this dissertation

research. The purpose of the focus groups was to explore the students' experiences in entering and finishing medical studies. Students in each school were chosen based on attributes I specified such as socioeconomic and neighborhood background and were subjected to a questionnaire to validate their willingness to participate. Altogether there were four focus groups—one drawn from each of the medical schools described above—with a total of 23 participants. In addition, I conducted 10 face-to-face semistructured interviews with medical school deans and directors from the four different schools and government officers who have experience in medical schools and public health policies.

In this chapter, I provide a brief summary of the study, research approach and methods, and major findings. The study interested me due to the limited scientific literature on the production of physicians who serve in isolated communities and who come from low-income background in emerging countries and, specifically, in Panama. Little is known about the topic, despite the fact that there is evidence (Walker, Dewitt, Pallant, & Cunningham, 2012) that such physicians may play an important role in remedying the deficit of physicians in underserved communities. I also discuss how some key findings from this study contrasts with the findings from the reviewed literature, and I highlight specific conclusions that emerged from the study that are related to the local context of Panama.

To carry out the study, I developed a set of specific questions to be used in the focus groups discussion. After finishing the interaction with the focus group, I developed an analytical framework that split the answers into three different tranches that capture a different stage in the development of a young person who decides to become a physician:

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influence, transformation, and career-decision stage. The influence stage refers to those factors that help students determine if they are willing to study medicine. In the transformation tranche, I included the elements that help develop a physician once a student starts medical school. Finally, the career-decision stage addresses the factors that help newly graduate decide between pursuing a specialty or having a primary care career. I reviewed transcripts and classified the students' comments and observations into the three tranches. From this initial exercise, key phrases were sorted out in major elements that resembled or echoed main inputs from the students in trying to identify major factors, and these were clustered in nodes to create a framework. University administrators provided information to understand major factors and as a result additional ones were added into the network framework.

Subsequently, within an emerging factor, original, textual descriptions from the participants were put together in trying to assemble a fair depiction of how students stressed a specific factor. This interactive process produced 14 thematic topics that capture student suggestions and main arguments regarding influencing factors that impact success in finishing medical school. These are (a) early life experiences; (b) role models; (c) affinity for science; (d) desire to help others; (e) academic readiness; (f) curriculum; (g) financial support; (h) clinical rotations; (i) life skills; (j) student support; (k) personal connections to community; (l) prestige and recognition; (m) infrastructure and resources; and (n) economic and emotional incentives.

With regard to the influence tranche, participants in the different focus groups described, sometimes with a high degree of emotion, experiences they or their relatives

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had with health deficiencies or critical healthcare needs that affected their view of the value of health and wellness have in a person's ability to carry out a successful life. In many cases, these experiences motivated participants to pursue medical careers. These important imprints in students' motivation to become health professionals was complemented in some instances by a parent, relative, or acquaintance who had a career in a healthcare-related field. Hence, the different focus groups stressed the fact that either early life experiences facing or witnessing health problems—even the death of a relative and being able to witness the performance of a relative as a health professional developed in some of them a strong desire to pursue a career where they could help others maintain or achieve wellness.

It is interesting to note that although many participants from the focus groups talked about how their affinity for science and, less frequently, their laboratory experiences and field study motivated them to further study science, this factor appeared to be taken for granted. Also with regard to an interest in science, in some cases, participants reported that their early life experiences with health problems and illness lead to an interest in furthering their scientific knowledge.

As the focus groups were composed, in the majority of cases by first-generation university students, the influence tranche was critical to their decision to undertake medical studies. Their early experiences with health care developed within them a strong professional aspiration to help people overcome sickness or maintain their health.

With regard to the transformation tranche, medical students from low-income backgrounds were influenced by a number of factors in their transformation from young

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people interested in health with a strong affinity for science into physicians. These factors, as described by the different focus groups, were main determinants of student accomplishment in and persistence through medical school. Below I review three factors—the medical school curriculum, financial challenges, and life-cycle skills.

One factor, the medical curriculum was analyzed for each of the four selected schools of medicine to help understand some of the assertions provided by the participants of the different focus groups. The findings show that, in general, all the schools provide a medical curriculum that is intended to achieve a very similar set of objectives—that is, to produce physicians with a solid knowledge of biomedical sciences with enough clinical training and fundamental skill set to provide health care services.

The curricula of all four medical schools have three components: a basic science core, a series of courses devoted to the functioning of the human body, and clinical rotations. As a starting point, the basic science core covers university physics, biology, chemistry, anatomy, physiology—all intended to provide a foundation for students' medical studies. These science basics are followed by the series of courses related to the functioning of the human body. For academic purposes, medical schools split the human body into specific functions, such as cardiology, gynecology, pediatrics, and urology. Finally, it is during the clinical rotations in hospitals that students are able to interact with doctors and patients and to witness and participate in the daily activities of providing medical care services. These three curricular components are structured in a rigorous curriculum design that is largely inflexible.

The blend of the three curricular components—along with long hours of study and practice—are intended to provide students with the knowledge they need to be successful physicians. All four schools seem to have the same general approach to student completion of knowledge and medical skills development, though there were a few differences—for instance, one of the schools put more emphasis on basic sciences. The schools required between 7,408 and 8,032 hours to complete the medical curriculum. As an example, the low-income school had the most curriculum hours due to additional clinical subjects.

The stark finding was that all schools conduct the clinical part of the curricula in hospitals almost exclusively, with only a few exceptions for clinical practice in isolated and vulnerable communities. This has the effect of emphasizing the critical care and illness components of medicine, as well medical services in urban settings. There was a noticeable lack of clinical hours in primary care services and family medicine. And I found no incentive within the curricula to motivate students to practice primary care in isolated communities after they graduate.

Focus group participants described the rigidity of the curricula and the strong emphasis on basic sciences during the early part of medical school as factors that negatively influenced their pursuit of a medical degree. Some participants suggested that specific subjects such as microbiology, chemistry, and physiology were designed to filter out students. In some cases, students said that the combination of assigned professors and difficult subjects made finishing the fifth and sixth semester of medical school quite a challenge. This situation created further anxiety and caused many students to quit

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medical school. It also highlighted high school deficiencies in preparing many low-income students in science subjects. Indeed, some students from the focus groups felt at a disadvantage when they compared themselves with students from private high schools or students coming from high-income families. In the case of the isolated medical school, the groups most affected by these academic barriers were students from Indian reservations. These traumatic conditions seemed to more adversely affect low-income students because of lack of additional resources to overcome failure in a subject or repeat courses and absorbing the consequences of delays. In some cases, failure of one or more courses forced some low-income students to take a break in schooling and work for one or two semesters before returning to finish medical school.

These academic challenges were exacerbated by financial factors. Students noted that they enter medical school with a basic financial aid packages that is a blend of government and school aid, scholarships, and family support, with no contingency funding for unforeseen conditions. Furthermore, student financial aid is limited to tuition costs, despite the fact that many low-income students reported having to move away from their families to attend medical school. Several participants mentioned the financial burden of room and board and other incidentals. The financial stress imposed upon low-income students was linked to some of these students taking a break in medical school to earn money. The effect of this factor is two-fold: as a constant stressor during medical studies and as an immediate delayer and barrier toward completion of medical school.

I also found that students are affected by the lack of what a couple of interviewed academic officers called "life-cycle skills." These are skills such as time management,

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discipline, a good work ethic, and the ability to sustain classmates competition that students need to succeed in medical school. In Panama, most students live with their parents even when going to college, the principal reason being than in Panama universities and colleges do not have campus dormitories. Medical students who have to move away from their family homes to attend medical school must abandon the family nucleus and quickly learn to cope with all responsibilities of daily life without any formal orientation. Not only must these students develop effective time management of their academic duties, but they also must figure out how to deal with the day-to-day realities of living on their own, likely for the first time in their lives. In addition, students from smaller cities and rural areas who move to medical school in Panama City may experience culture shock and even discrimination. Character development becomes a major challenge, especially if you take into account that students enter medical school directly from high school. Given all of these findings, it becomes clear that an important element of students' transformation into physicians resilience in the face of the many adverse conditions they encounter while undertaking medical school. Students also felt that there was a lack of faculty and school support in meeting the academic and clinical training challenges. Many believed that developing lifetime skills and behavioral traits required in the health professions was left to the students themselves. Other participants acknowledged that the curriculum didn't focus on developing empathy for the health and life conditions of the patients.

Finally, with regard to the career-decision tranche, I explored the different factors that influence low-income medical students in their decision to practice primary care in

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isolated communities. The focus groups' discussions produced a set of crucial factors that influence primary care specialty choice. These include prestige and recognition, personal connections to the community, infrastructure and resources, and economic and emotional incentives.

The findings of the study highlight the importance of performing clinical rotations and other academic experiences in isolated communities as well as having linkages to the community, such as having been born or grown up there or having friends and relatives who live there. A close association with a given underserved community and the desire to treat health problems of the underprivileged are influential factors in deciding on a primary care career in a vulnerable community. On the other hand, if the main interest of the newly graduated physician is prestige and recognition within the profession, then becoming a specialist is the preferred career decision. For instance, many students reported feeling that by choosing specialty careers, they will have more recognition in the professional medical community and more opportunities to learn innovative medical techniques or constantly improve upon their medical training. The same choice applies when considering economic and emotional incentives; that is, if students don't consider income to be a primary motivator, they preferred primary care careers. But if the prime motivator for the new graduate is income, most of the students opt for further study to become a specialist. This finding was confirmed by the deans and government officers I interviewed.

With regard to proper infrastructure and resources to perform as a physician, the study found that lack of them is a major deterrent in choosing primary care career in isolated

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communities. Again, policymakers whom I interviewed as part of this study acknowledged that not having proper facilities in depressed communities makes physicians avoid primary care careers.

I also confirmed that given the political conditions of the country and the bargaining power of professionals in the health sector, it is almost impossible to set up specific policies and legislation to attract doctors from other countries to practice primary care in the Republic of Panama. Thus, the option of relying on international medical graduates that has proven to be successful in the United Stated to mitigate the deficit of primary care physicians in isolated areas is not a viable option in Panama. By the same token, I found scant possibilities of establishing schools of osteopathic medicine in Panama, a trend that in the United States has increased the supply physicians in the last 3 decades and that has created the conditions to enact, as mentioned before, a single accreditation standards for all types of schools of medicine in the United States.

By reviewing these group of selected factors in a formal way by the use of student focus groups and face-to-face interviews of academic and government officials, I was able to recognize important elements in the complexities of producing doctors who are willing to work in isolated communities and who come from low-income families.

Discussion

General Analysis

In this section, I discuss the consistency of some of my findings with observations from previous research as evidenced in the literature review. I also explain some

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inconsistencies between my findings and publications cited in chapter two. Finally, I suggest how some of my findings provided extensions about the topic of this dissertation.

Health care scarcity, associated with physician shortages and their maldistribution in underserved communities, has been researched through different factors and cultural settings. Among the reasons for these shortages, familiarity with underserved communities has been shown to be an important factor in practicing medicine in underserved communities (Diamond, Viloski, & Gsyle, 2000; Jarman et al., 2004; Jiffe et al., 2010; Rabinowitz et al., 2000). In my study, this factor came up again and again in the focus groups of medical students in four different schools of medicine in Panama as well as in the open semi-structured interviews with academic deans and government officers. Their comments and observations provide important insights into this factor in the Panamanian context. First, it is clear that the more connected the student is to the community, either by background or by experiencing field studies or specific assignments in underserved communities, the higher his or her motivation is to do primary care practice in those communities as a career.

As mentioned in the literature review, research going back to the 1980s has found that curricular experience in primary care settings such as underserved areas increases interest in practicing medicine in these communities (Pfarwaller et al., 2015). Despite these findings, experience and medical training rotations in underserved communities is almost completely absent from academic medical training in Panama (Brook et al., 2002; Brooks et al., 2003; Javernier et al., 2003). Again, as shown by Roman et al., (2007), the principal reason for this limitation is that in the Republic of Panama, medical schools

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carry out medical training in laboratories and hospitals rather than in the field. Studies show that early experience by clinical rotations in community settings is a positive initiative toward making medical students more empathetic to others and aware of their role in society as physicians (Littlewood et al., 2005).

Furthermore, I found few faculty members who were primary care practitioners. This is contrary to findings in the literature that suggest that medical school should have a significant proportion of their faculty who are primary care practitioners when primary care is the focus for solving major health needs (Reinoso-Medrano et al., 2012).

These weaknesses in the Panamanian education system for training physicians is accompanied by other factors that limit making primary care the first choice among Panamanian medical graduates. Many previous studies (Ching et al., 2012; Jutzi et al., 2009; Schafer et al., 2000) found that remuneration is a basic element for recruiting and retaining physicians. In my study, this fact was corroborated in choosing between a specialization and a primary care career. An idea that generated enthusiasm among students was the potential of receiving priority seats for specializing or student loan forgiveness if medical school graduates work in underserved areas, along the lines of findings by Price et al. (2009). Furthermore, many participants from the different focus groups confirmed that economic incentives of between 60 percent and 80 percent of normal monthly income may be needed to convince new medical school graduates to practice medicine in underserved areas. Hence adequate economic incentives appear to be a fundamental differentiator for the Panamanian context, mirroring similar findings in other studies (Cheng, 2012; Jutzi et al., 2009).

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Students also confirmed that factors related to family lifestyles, educational opportunities for children, and advanced continuing education were important in choosing to practice medicine in underserved communities, mirroring findings by Dussault and Franceschini (2006) and Kiolbassa et al. (2011).

This situation of physician shortages in underserved areas is aggravated by the fact that many isolated communities in Panama have inadequate resources and infrastructure for providing primary care. As mentioned before, the method of training doctors based on the hospital model biases medical students toward considering specializing and entering private practice. This model of training emphasizes acute and critical illness, making primary care just a gateway for the patient to be referred to the specialist and undermining the value of preventative medicine. This approach is in contrast with the experience of those countries that Howe (2010) described, where a public health system starts with the assignment of a general practitioner or a family doctor to a family. The undervaluing of primary care practice in Panama makes it less a glamorous and prestigious career choice than being specialist. Many participants confirming this view of a primary care career as less prestigious, despite the fact that many of the participants in the study were enthusiastic about providing health care and serving others, especially those most in need.

Concerning the maldistribution of physicians among underserved communities, I found that medical school location and student body composition had no effect on maldistribution of doctors in the country. For instance, one of the medical schools is located close to a large Indian reservation, but it seemed to have little effect on students'

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interest in having a career as a physician on that reservation. The impact of a recently opened private school of medicine in a city close to underserved communities is yet to be seen, since this school has not had any graduating class yet and was not part of the study.

The study also found that specific factors could influence the decision by low-income students choose a career in medicine. This is important because it cannot be expected that a student from a wealthy family or with parents who practice medicine will decide to pursue a primary care career. The situation in Panamanian medical schools is that low-income students face adversity in many ways, including academic work, peer pressure from the competitive academic environment or recurrent financial limitations. This set of factors limits recruitment and retention of low-income students in medical schools, resulting in a low output of medical graduates with these backgrounds and thereby diminishing the chances of reducing the scarcity of physicians in underserved communities. Although diversity in Panama is a way of life and racial discrimination is not a widely recognized issue in Panamanian society, economic discrimination prevails, increasing the stress experienced by low-income students in medical school and creating and underrepresentation of physicians from low-income families. I also found a high proportion of female graduates in medical school, but a student's gender did not seem to be a factor in whether he or she chose a career in primary care.

Medical schools in Panama have followed the Flexnian approach to training physicians, an approach that has failed to produce enough primary care doctors to meet the country's needs. The graphs in Appendix 5 show how the maldistribution of physicians continues to be an outstanding problem in the country, where the density of

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doctors per 10,000 people is different between the capital province of Panama which is higher than what is currently needed and the rest of the country, where the density is lower than the actual requirements.

Unlike the United States, Panama does not have different sources of physician supply, such as osteopathic schools and international medical graduates. Therefore, as confirmed by government officers I interviewed, the main source of physician production continues to be the current allopathic schools. If no drastic changes are made in medical curricula, the maldistribution trend will likely be amplified.

Panamanian medical schools' responses to physician shortages

The four Panamanian medical schools that are part of this study share the same curricula philosophy as defined by the Flexner report in 1910 (Beck, 2004). In essence, medical curricula in Panama consist of teaching organ functioning, symptom and diagnostic approaches, with clinical training for providing patient health care. Curriculum and professional development that is likely to motivate new graduates to pursue medical careers in underserved areas is nonexistent. The single exception is the elite state medical school, where courses in family medicine and primary care have been frontloaded in the curriculum, according to the dean of medicine of this school. Although all deans acknowledge the need to increase rotations in isolated and underserved communities, this type of training is marginal in all schools under study. Furthermore, recommendations by WHO experts—such as mandatory placements, adequate work conditions, and community relationships to motivate physicians and other health workers to practice and live in underserved areas—have not been successful in diminishing physician scarcity in

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communities despite the fact that some of these actions are part of the current government´s health public policy (WHO, 2010).

The proper training of primary care physicians by Panamanian medical schools requires greater attention considering that there are not other academic means of closing the gap between supply and demand of physicians. Unlike in the United States, where more than 20 percent of medical students go to osteopathic schools of medicine (Lakha & Laird, 2009), there are no osteopathic schools in Panama. Policy makers do not foresee this type of training being allowed in the near future because of strong opposition by Panamanian health workers unions and professional associations.

The only other innovation by any of the Panamanian schools of medicine is the installation of a rural campus by the elite private medical school in Santiago, a city located 425 kilometers away from the capital city. Early results show that upcoming first graduating class in 2018 has a majority of students willing to stay in that sector of the country and practice medicine in rural and underserved communities.

Admissions efforts can also play an important role in achieving a higher production of physicians for underserved areas. Results from the focus groups show that there are factors in the early years of future physicians that enhance their motivation to enter medical school.

As noted above, witnessing or experiencing illness makes potential doctors more aware of the benefits of health care. In addition, the existence of a health care role model and an individual´s desire to help others are also influential factors in student motivation

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to undertake medical studies. Traditional admissions policies allow any student willing to undertake medical studies to apply and comply with mostly academic and past-performance requirements, along with entrance examinations as predictors of student success in medical schools. DeVries and Reid (2003) have found that early detection in the admission process of preference and acquaintance with health care needs in underserved areas can be used in predicting students with a preference to become primary care doctors. If admissions policies at Panamanian medical school were to take into account these student experiences, they might succeed in producing more primary care physicians from low-income backgrounds who are willing to serve in isolated or underserved communities.

A Practical approach to increasing physician production

From the discussion of findings from my study in addition to other relevant research, two observations can be made concerning the production of physicians in Panama. First, the gap between supply and demand of doctors in underserved areas continues to increase, as can be seen in the simple regression model shown in Appendix 6. And second, current measures to increase production of physicians will not be enough to close this gap. Hence, it is imperative that new initiatives be taken to complement the future production of physician in underserved areas.

The graphs in Appendix 7 were produced using data provided by three of the four medical schools discussed throughout the dissertation. The graphs show the actual number of students obtaining a medical degree within the standard degree length (red

curve) and a theoretical number of students that would obtain a degree if some objectives are achieved (blue line).

The shift from the actual to the theoretical occurs due to two changes that have been discussed throughout this dissertation. The first involves increasing the number of students that enroll in medical school, for the illustrative purpose of this graph the number was doubled. The second change involves reducing the average desertion rate, in this case by 5 percent. The reduction in the desertion rate would require the implementation of the mechanisms of support, curricula, and student engagement that have been discussed throughout this study. These two actions can drastically increase physician production. These initiatives, together with an emphasis on primary care choice, can help mitigate the risk of operating medical schools without minimizing physician shortage.

As for innovative schools, one of the medical schools that was a focus of this study was specially designed for low-income students, with many of them obtaining financial support from the governments. This school has shown that with proper support, low-income students can go on to become physicians, some of whom are willing to work in underserved areas.

But again, Panamanian medical schools are hesitant to introduce major changes like those that have proven effective elsewhere, such as the innovations adopted by Jefferson Medical College in the United States, as described by Rabinowitz et al. (2008).

With a limited opportunity to make major changes in the fundamental approach to medical curricula, I suggest creating a complementary curriculum that incorporates factors that appear to support the success of medical students, especially those from low-income backgrounds. The focus of this complementary curriculum would be to improve students' life-cycle skills, emphasize the humanistic aspects of the profession, provide more balance between clinical and primary care rotations, and develop resilience in future physicians.

As noted by some participants in the student focus groups and academic deans in the interviews, there is an opportunity to enhance students' abilities in time management, supporting stress, work ethics, and being physically prepared for the extended hours required by medical studies and the profession. The initiative to develop and refine these skills must be included as a concurrent set of activities that begin as soon as students are accepted in medical schools and continue throughout their medical school education. Brief, recurring workshops and seminars focused on the immediate best use of learned skills in the academic load should be encouraged and monitored.

The next factor I describe is humanization of the profession. All four schools of medicine under study follow the Hopkins approach to teaching medicine that emphasizes learning and interpreting basic sciences and applying them into a clinical setting. But I found that students had limited opportunities to actually treat patients. The "mechanistic organ-based and symptoms-centered" approach to teaching clinical medicine misses the opportunity to develop those personal qualities in doctors that will help them be more

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empathetic and patient-oriented and, therefore, to go beyond the application of a drug therapy or the performance of surgery (Kumar, 2014, p. 96). In the four schools of medicine, the emphasis continues to be learning to diagnose based on symptoms and laboratory reports and then applying a drug in accordance to what is normally prescribed for a given treatment. Research suggests that improving communication skills and clinical behavior skills so as to develop a better patient–physician relationship can be imparted to medical students (Singh & Talwar, 2013).

This powerful concept of "humanization of medical education" is based on the idea that beyond the technical and scientific elements of health care, lies the rights of patients to create a better relationship with physicians (Almeida & Chaves, 2007). In taking this approach to teaching medical education and producing doctors, even within the existing curriculum, Panamanian schools of medicine can make an important change in how students learn and apply medical knowledge. The patient becomes the center of the health care process, shifting medical practice from the specialty to primary care, and making patient treatment an integral effort where the biological, psychological, social, and personal aspects of patients' conditions are taken into consideration for healing and treatment. This is probably the biggest challenge current Panamanian medical education faces today.

Research studies suggest many approaches to move toward a more "human education" emphasizes ethics, bioethics, collective health, and homeopathy (Casate & Corrêa, 2012). Since current curricula include some of these subjects, the immediate largest opportunity is to integrate those courses with more clinical practice in primary care. This will not be

easy given that medical school faculty have been trained in the traditional approach to teaching and learning medicine.

"Humanizing" the profession produces a more balanced physician who understands patient suffering and applies empathy in patient care and treatment. This is a trait that is important for working in underserved areas and reducing inequality (Silveira, Araújo, Silva, & Félix, 2004). The humanizing approach to physician production requires adequate training and the involvement of medical faculty (Gomes & Germano, 2008) in integrating humanistic courses into the medical curriculum. Doing so might involve using innovative techniques (Lima et al., 2014) to increase physician awareness of patients as human beings and not as a sequence of cases in critical health care.

Another major element in securing low-income students to progress in the transformation tranche is bolstering their ability to cope with adverse situations. From being able to surpass an unexpected financial difficulty or to cope with stress from the rigorous academic curriculum and the extended hours in clinical rotations, it is important to develop the capacity to keep moving forward despite adversity and to obtain strength from these experiences. This concept is described as resilience, and a broad definition of it is "the capacity to respond to stress in a healthy way such that goals are achieved at minimal psychological and physical cost" (Epstein & Krasner, 2013, p. 301). In the case of the focus groups under study, many participants felt that there were not sufficient resources to help them cope with adversity, and often students were left alone to face unexpected negative events. Under the premise that in health care, quality of care, costs, and well-being of the clinical workforce are three major issues (Epstein & Krasner,

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2013), it is of upmost importance to include in the basic skill set of the future physicians the development and promotion of resilience.

Studies have shown that promoting resilience has positive benefits for the overall medical education enterprise (Dunn, Iglewicz, & Moutier, 2008). Other authors have found that developing academic resilience among students helps predict outcomes such as enjoyment of school, class participation, and general self-esteem (Martin & Marsh, 2006). Within the focus groups of this study, it was felt that burn-out from the medical academic experience had an impact on academic and clinical performance, with the potential of embedding this negative trait in the future physician practice and eventually developing a professional who is not able to handle the stress of being a physician.

Jackson, Firtko, and Edenborough (2007) have found that physician resilience can be a learned behavior with the use of positive and effective strategies such as "building positive relationship, achieving balance in life, being reflective and strengthening emotional self being" (p. 1).

As resilience is directly related to the well-being of health professionals, some predictors of resilience can be enhanced and learned within medical education as long as medical students get the opportunity to develop coping, capacity, and strengths and to learn leadership for change (McAllister & McKinnon, 2009).

The final component of my proposed complementary curriculum is the balancing of clinical rotations. Research studies show that early acquaintance with health care requirements in underserved areas increases the probability of future doctors choosing a

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primary care career (Kassebaum, Szenas, & Schuchert, 1996). Hence, I suggest increasing the numbers of hours and rotations in isolated, economically depressed and rural areas throughout medical school, and balancing these experiences with the traditional rotations in hospital and clinics. Furthermore, performing programmed medical tours of these communities as part of required social service hours of the students, under the guidance of experienced doctors, can also enrich students' experience and awareness of health care needs in underserved areas. For example, general vaccination programs and preventative medical tours in vulnerable areas should help lower the risk of epidemics and chronic health conditions in isolated areas, allowing the emergence of more primary care centers and making a primary care career a popular choice among medical graduates.

As discussed, although revamping the existing Flexnian curriculum is likely not possible in the short term, there is an opportunity to take immediate actions to strengthen the development of a physician in such a way that career choice between a specialty and primary care is less biased. Specific new attitudes that characterize professionalism in medicine have been described by Swick (2000). These include high ethical and moral standards as well as development of humanistic values such as empathy, compassion, care, altruism, respect for others, and loyalty.

Conclusions

There are many conclusions I can draw from this study, as the focus groups and interviews provided deep insights into the complex issues related to the main objective of this dissertation. As the first major conclusion, I highlight specific traits in those students

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who want to pursue medical studies. Enrolling low-income students who have demonstrated a desire to serve and help others, and who may also have experienced the challenges of sickness, improves the odds of developing a good physician. This focused approach needs to be complemented with selecting students who have an affinity for science either in an academic setting or a curiosity for the laws of nature. Once students are attracted to medical school, retaining and supporting them as they progress through school is paramount.

The second conclusion lies in the importance of the curriculum. A flexible, rigorous, hospital-centered curriculum may help develop physicians who specialize, but it may need to be modified in order to produce more doctors with a primary care career in mind. There is also a need to humanize the curriculum. A physician who is highly professional but who has also developed empathy and compassion for his or her patients may help improve health care, especially for those who live in isolated communities where there is a deficit of health services and doctors. This element is as important as developing resilience among medical students as a lifetime habit. Being able to cope with the rigorous academic workload, long laboratory hours, peer competition, stressful clinical rotations, responsibility for patients' well-being and life, along with the financial burden of medical school, makes developing resilience fundamental to producing physicians.

In addition, increasing clinical rotations in vulnerable communities may help balance the bias toward rotations in hospitals, thus improving the possibilities of newly graduated physicians deciding to practice primary care in isolated communities. Clinical

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rotations make a difference not only in developing the fundamental skills of a being physician but also in the types of careers they pursue.

Also, as discussed in the findings, academic officials and public health senior advisors all agreed on the difficulty of recruiting international medical graduates to work in vulnerable communities because of resistance by Panamanian medical unions and professional associations, which defend the current policy of reserving all physician slots for Panamanian citizens and legally forbidding foreigners to practice medicine. This is an issue that forces Panamanian policy makers to look for innovative approaches in dealing with the scarcity of physician and its maldistribution in economic depressed communities.

This situation is aggravated by the nonexistence of osteopathic schools of medicine due to cultural barriers and lack of accreditation. Hence, there is the need to reorient the current allopathic schools in such a way that their curriculum provides ample opportunities for the graduate to choose between primary care and specializing and exercising their practice in isolated communities versus urban areas.

Another main conclusion lies in the fact that if working and quality-of-life conditions are not improved in isolated communities, the possibilities of increasing the full-time presence of physicians in those communities are very slim. This is the case even if primary care centers are well equipped and economic packages are offered to the physicians to develop a primary care career.

Finally, lack of mentoring and student support, along with few opportunities to develop fundamental lifetime skills as part of schooling, have not helped the much-needed physical and mental attributes in students to face the rigors of medical school and the stress produced of constantly engaging in finding health care for acute and critical conditions in a patient-centered profession.

Implications for practice

The findings of this dissertation may provide specific, practical recommendations for the stakeholders involved in the production of physicians for economically depressed communities in Panama.

Deans and professors

The study highlights the role of deans and professors in contributing to an increase in the production of physicians from low-income families. In the first place, there is the importance of providing support to students in danger of abandoning medical studies because they are not able to cope with the stress and rigors of the medical curriculum and clinical rotations. Formal mentoring of students and early detection of warning signs of students in trouble should immediately lead to individualized help for those students. Psychological help is a must, and extracurricular discussion of specific adverse issues should be part of the development of the students as physicians.

Working together with admissions office, deans of medicine should lead the effort to properly recruit students with favorable traits as early as possible. Enactment of compensatory courses and workshops should help prepare those students for medical

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school. Even more, I suggest working together with high schools in isolated communities and urban economically depressed areas to install readiness programs for medical schools as early as 10th grade, an initiative that can help attract students to undertake medical studies. This focused recruitment effort must be part of a government effort to help talented and motivated students to study medicine and, upon graduation, provide incentives to motivate them to go back to their communities to exercise their careers.

Even with a Flexnian-like curriculum, deans and professors can lead the effort to move from an illness-focused approach to a prevention-based approach in medicine, and from a focus on acute-critical care to primary care. Balancing hospital-centered clinical rotations with primary-care rotations in vulnerable communities will likely encourage more new medical graduates to practice medicine in isolated communities. Of course, this focus should be accompanied by specific policies to make practicing medicine in vulnerable communities an attractive option.

Deans and professors can help eliminate "barrier courses" and the teaching of functions of the human body and instead develop an approach that emphasizes the integration of the human body and the interrelationships of good health and nutrition habits as a way to maintain wellness.

Another practical implication of this study is the need for Panamanian schools of medicine to collaboratively develop creative ways to produce more physicians in primary care for vulnerable communities. For example, arranging for periodic interventions on Indian reservations should help generate students' awareness of the need for primary care services in those communities. It is also important to monitor the effectiveness of the two

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schools of medicine located in isolated communities, the state school in Chiriquí and the private medical school in Santiago, in achieving the production of physicians that practice in their isolated communities once they graduate.

I also suggest trying group learning as early as possible in medical school, taking advantage of the fact that students eventually work in groups in medical rotations. Learning of basic medical science in groups allows students to discuss potential answers and benefit from the exchange of ideas of the group. This approach should help mitigate some of the stress factors imposed by academic responsibilities and pressure from peer competition.

<u>Students</u>

As findings focused on the transformation tranche of this study make clear, the making of a physician goes beyond the teaching and learning process of specific subjects and should be student-centered. I recommend building an ecosystem where medical education is student-centered and where academic activities are only one of many important factors in the making of a physician.

Students should request information and research on the scope and practice of primary care, especially in underserved areas. It is also important for students to be more open about their preferences and what would satisfy them as individuals practicing medicine in underserved areas. Through student associations, students may request support from the government, medical schools, and their communities to expand their

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experiences in vulnerable communities and enhance personal values such as empathy and compassion for people in need of quality health care.

As students undergo the transformation stage in their quest to become physicians, improving life-cycle skills and learning behaviors like resilience and a more human approach to medicine can become differentiators when practicing medicine. Learning and mastering time management is fundamental to the complex tasks of interviewing, diagnosing, and treating patient and managing their recovery. Furthermore, as the number of patients grows, time becomes a scarce factor in practicing medicine.

Students should learn to be more resilient in facing adversity, stress, and coping with the responsibility of being a physician. Jackson and others (2008) have found that physician resilience can be a learned behavior if using positive and effective strategies such as "building positive relationship, achieving balance in life, being reflective and strengthening emotional self being" (p. 6). As resilience is directly related to the well-being of health professionals, some predictors of resilience can be enhanced and learned within medical education as long as medical students get the opportunity to develop coping, capacity, and strengths, and to learn leadership for change (McAllister & Mckinnon, 2008).

Students should also develop good communication skills to deal with the responsibility of sharing diagnosis with patients, giving care and comfort in treating illness, and making a positive influence in people´s lives.

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Finally, students should participate in overseas programs, especially in European medical schools or countries like England that emphasize primary care physician production. An academic experience like this can help obtain proper practice in primary care in communities as well as benchmark Panamanian ways of practicing medicine.

Policy makers

Because primary care improves health care equality, there is a need to develop policies focused on the person and the communities to guarantee this objective and secure proper health coverage. There are several initiatives that policy makers can take to achieve this goal.

Panama, like the rest of the western world, is experiencing a prevalence of chronic diseases such as cardiovascular problems, diabetes, and obesity. To address these medical problems, policy makers can develop policies to slowly migrate the emphasis on medical education from critical health care, hospitals, and specialists to health promotion and wellness. In an effort like this, primary care physicians are important, as vaccination, nutrition, sickness prevention, and sexual education programs can be offered in any primary care community center. It is economically more effective to produce primary care physicians to support this shift from acute and critical care to health prevention.

To facilitate the recruitment of students from low-income backgrounds, policy makers can develop legislation to allow for more scholarships geared toward these students and contingency funds can be established to allow students to finish medical

school should they face unexpected financial crisis, as described by several participants in the focus groups of the four medical schools.

In the past, the Panamanian government funded yearly group that used to study at the Escuela de Medicina de America Latina in Havana, Cuba. This school has produced 300 Panamanian physicians during a 5-year period to work in underserved areas, but as of last year the program was suspended due to the low number of Panamanian physicians who graduated from that school and were able to pass the board examination in Panama.

Policy makers can help speed up an effort by Panamanian health authorities to reach an agreement with the four private schools of medicine in Panama to jointly fund scholarships to allow 200 students from underserved areas study medicine at those schools each year.

With regard to recruiting international medical graduates to serve as primary care physicians in isolated and underserved communities, this option is forbidden by law. Only in specific circumstances have a limited number of foreign physicians been allowed to practice medicine in the country on a temporary basis, and then only for specific specialties.

Such a limited set of options to increase physician presence have pressed government health officers to evaluate preliminary plans to create multidisciplinary groups—composed of nurses, medical technologists, and doctors of pharmacy, under the leadership of a physician—to provide health services in underserved areas with the use of

telemedicine. This option was not studied in this dissertation since planning is at an early stage.

But funds can be allocated to develop this type of professional, technology-based health teams as another approach to improve health services in economically depressed areas. Also, with proper incentives or priorities in assigning residencies, policy makers can help increase the number of physicians willing to do primary care in underserved communities.

Policy makers can promote innovations in technology and patient treatment, especially telemedicine, to expand the scope of work of specialists in isolated areas via social networks. This should also involve developing proper digital medical records for safeguarding patient confidentiality and facilitating electronic transfer of records between health care units and hospitals. Innovations in medical curricula to make primary care a priority should also be incentivized to encourage medical schools to participate.

Also there is the opportunity to open "immigration windows" to allow a small number of international medical graduates to be assigned to specific underserved communities while the output of producing Panamanian doctors increases.

For policy makers, it is also important to establish a national information system to keep track of the improvements in primary care in the country, especially in underserved areas, and the consequences of these initiatives in overall health of the community.

All these efforts require community education and massive communication campaigns. Policy makers can develop creative ways to provide resources to engage

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medical students in helping to promote health and well-being awareness and in improving the supply chain of proper medication and vaccination. Such programs would have the benefit of helping medical students financially and connecting them with the communities to improve the possibilities of more medical graduates deciding for a primary care career.

Implications for Further Research

There are many opportunities to perform further research related to the findings of this study. This study provides snapshot of the issues related to the production of physicians for economically depressed areas of Panama, but the nation would also benefit from a series of longitudinal studies to assess the impact of different initiatives and policies. For instance, such studies could measure the success of early recruiting of highly motivated low-income students who possess some of the critical factors found in this study. The same type of study can examine the effects of the suggested readiness programs in the latter years of high school. As another example, a longitudinal study can be carried out to analyze the long-term consequences of enacting a policy of improved economic incentives for the settlement of physicians in economically depressed areas.

Another area for further research that may help solving some of the issues raised in this study lies in the use of technology to improve the capabilities of professionals to provide health care, especially given the geographic dispersion of the population and the shortage of physicians. Much progress in this area has been made in other countries, but

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the value of further research lies in the opportunity to learn about potential adaptations for the local context and benchmarking with other countries experiences.

Another potential study is researching the impact of front-loading family and primary care courses within the medical curriculum and expanding the clinical rotations in isolated and economically depressed areas in the production of physicians who are willing to devote their career to communities lacking proper health services. Furthermore, this study raises the possibility of trying different short-term assignments for every doctor in the country in economically depressed areas. Further research on this initiative may include the legal framework to enact such policies, the corresponding economic incentives, and the logistics of programming 2- or 3-week assignments, as well as clearly identifying the objectives to be achieved.

Other research could focus on ways to make current medical curricula patient-centered, moving away from the current emphasis of developing fundamental skills in functional areas of the human body and confronting illness through drug-based therapies. This area of research is seemingly limitless, as there is a gap between providing health care as a fundamental way of living instead of an approach that emphasizes illness and critical care. In addition, if the focus is on the well-being of patients, we need research on how to develop professionals with a humanitarian approach to medicine. Physicians not only have to be experts in diagnosing illness, performing surgery, or allocating a drug treatment but also should consider the overall health of their patients to be a primary responsibility.

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Finally, there is an opportunity to do further research into the economics of this complex issue. The costs associated with executing focused recruiting of talented, motivated, low-income students and preparing them to enter medical school, plus the costs associated with financial aid, mentoring, life skills development, clinical rotations in isolated communities, and economic incentives can be calculated and compared to the savings expected in providing acute and critical care. This can serve as a preliminary cost-benefit analysis of producing more physicians for economic depressed areas in Panama. Needless to say, there are intangible benefits that can also be taken into account, such as the impact over time of having a healthier, more educated generation into the productivity of the country.

Closing

Working as a physician in Panamanian economically depressed areas is not easy. Lack of infrastructure, appropriate medical equipment, and resources limit health care services in those areas. In addition, there seem to be inadequate incentives for physicians to sacrifice their quality of life and that of their families. The traditional allopathic schools of medicine in Panama develop physicians through a rigid curriculum that is hospital-based and with an approach focused on treating chronic illness. Medical education of this nature works against increasing physicians' presence and practice in economically depressed areas.

I have found that low-income medical students do have some traits and attitudes that may help increase the number of physicians willing to provide health services in economically depressed areas; that is, there are factors that motivate these students to

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study medicine. These students should be recruited early in their high school studies to make them ready to enter medical school. Once they undertake medical studies, there is the need to develop effective life-cycle skills such as discipline, time management, and empathy along with strengthening factors that help student become resilient in medical school. Proper peer and faculty mentoring, contingency financing, and resilience development should be a fundamental part of the transformation tranche of producing doctors. Becoming resilient in their profession will help them perform better once they are exposed to the stressful life of a physician that can lead to burnout, including daily exposure to patients' misfortunes.

Along with the personal transformation of the medical students, I have found the need to modify the medical curriculum. Early courses in primary care, family medicine, and treatment of patients should be scheduled, with more clinical rotations in economically depressed health centers. Early medical school experiences in depressed communities enhance awareness and make students more empathic toward their patients.

Furthermore, from the side of policy making, I have found that government should try innovative ways to attract doctors to underserved areas. Making rotations in these areas mandatory, providing more economic incentives for working in them, and using technology for providing continuing education to physicians who work in these areas might help attract physicians to such areas. As a way to lessen the burden of primary care physicians, telemedicine can be used in conjunction with other professionals, servicing the patient under the guidance of a doctor living outside the community and virtually connected.

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I have found that bringing international medical graduates or establishing osteopathic schools is not an option, in the short term, for Panama to help fill the physician demand in vulnerable communities.

Panama, as any other emerging country, is lagging in fulfilling The Millennial Objectives of the World Health Organization, including the goal of producing enough doctors and properly allocating them. The consequences of this deficit impact development of a healthy, well-educated, and productive Panamanian population. And some of these negative effects last for several generations. But there is an ample opportunity to develop doctors, especially from low-income family groups who are willing to work in depressed areas. I have highlighted some factors from childhood, through medical school, and before entering medical practice that may help improve the production of physicians and decrease the gap in physician scarcity and geographic maldistribution. I propose that any agenda for change should include focused recruitment, ample and sustained student support though medical school, integration of basic biomedical school courses with a balanced clinical training, and promoting public health policy that makes primary care practice a highly desirable and personally fulfilling choice career. The challenge is complex but feasible, and the rewards are limitless.

This dissertation started with the stories of Pedro Marín and Juan del Cid, two young Panamanian children who were born the same day in different socioeconomic contexts in Panama. Throughout the study, I highlighted major findings regarding physician shortage and maldistribution in underserved areas of the Republic of Panama. My research concentrated in how medical schools in Panama can contribute to increase the production

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of doctors for these underserved areas and what actions can be taken to improve health care presence and service in these areas to mitigate the risks of having more children like Juan and Pedro experience such dramatically different upbringings and destinies. Access to health care should not amplify inequalities among human beings.

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APPENDIX A

LIST OF PARTICIPANTING INSTITUTIONS FOR FOCUS GROUPS

Universidad Latina de Panamá (ULATINA)

http://www.ulatina.ac.pa/es/index.php

"Elite Private School"

Universidad Nacional de Panamá

http://www.up.ac.pa/PortalUp/index.aspx

"Elite Public School"

Universidad Autónoma de Chiriquí (UNACHI)

http://www.unachi.ac.pa/

"Rural Public School"

Universidad Americana (UAM)

http://www.uam.ac.pa/

"Low-income Private School"

APPENDIX B

LIST OF DEANS AND PUBLIC OFICIALS FOR FACE-TO FACE INTERVIEWS

- Dr. Jorge Medrano

Universidad Latina de Panamá

Vice Provost

- Dr. Daniel Purcallas

Universidad Latina de Panamá

Dean, School of Medicine

- Dr. Luis Coronado

Universidad Latina de Panamá

Coordinator, Clinical Practice and Medical Programs

- Dr. Enrique Mendoza

Universidad de Panamá

Dean, School of Medicine

- Dr. Rigoberto Centeno

Universidad Americana

Dean, School of Medicine and Health Science

- Dr. Carlos Camilo Caballero Arauz

Universidad Autónoma de Chiriquí

Dean, School of Medicine

- Sra Etelvina Medianero de Bonagas

Universidad Autónoma de Chiriquí

Provost

- Dr. Javier Terrientes

Former Ministed of Health, Republic of Panama

- Dr. Carlos Staff

Deputy Minister of Education

- Dr Temistocles Diaz

Senior Advisor for Heath Policy to the President of the Republic of Panamá

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Title of the Research Study: Factors related to medical school retention and practice choice among low-income medical students in Panamá.

Protocol Number:

Principal Investigator: (name, address, phone and email) Eric J. Kaplan, Grad Sch. Of Education 3700 Walnut St. Philadelphia PA 19104, 215-573-8146, ejk@upenn.edu
Co-investigator: (name, address, phone and email): Jose Barrios, BMW Plaza, 11th Floor Calle 50 & Via Porras, Panamá City, Republic of Panamá, +507 270-2511, jbarrios@abco.com.pa

You are being asked to take part in a research study. Your participation is voluntary which means you can choose whether on not to participate. If you decide to participate or not to participate there will be no loss of benefits to which you are otherwise entitled. Before you make a decision you will need to know the purpose of the study, the possible risks and benefits of being in the study and what you will have to do if decide to participate. The research team is going to talk with you about the study and give you this consent document to read. You do not have to make a decision now; you can take the consent document home and share it with friends, and family.

If you do not understand what you are reading, do not sign it. Please ask the researcher to explain anything you do not understand, including any language contained in this form. If you decide to participate, you will be asked to sign this form and a copy will be given to you. Keep this form, in it you will find contact information and answers to questions about the study. You may ask to have this form read to you.

What is the purpose of the study?

The purpose of the study is to determine the factors related to retention of low-income medical students and the factors the influence students' choice of practice location upon graduation.

This study is being conducted to fulfill in part the requirements of a doctoral dissertation.

Why was I asked to participate in the study?

You are being asked to join this study because you are a successful medical student in your last year of school and your university has indicated that you come from a family whose income is considered to be below the national average in Panamá.

How long will I be in the study?

The study will take place over a period of 3 months. However your participation will only be required once during this period. We will need you to attend a focus group that will last approximately 1.5 hours.

Where will the study take place?

We will meet at your university.

What will I be asked to do?

You will participate in a focus group with 4 of your peers. During the focus group the moderator will guide you through a series of discussion topics related to the challenges that you might have faced in medical school and factors that might influence you might like to practice once you graduate.

These interactions will be audio recorded with your consent. If you choose not to be recorded you can end your participation in the study without any penalty.

What are the risks?

The risk of attending the focus group is minimal and all information collected will be anonymous and confidential. However considering the nature of focus groups it is impossible to guarantee 100% confidentiality. With this in mind we will remind all participants at the beginning of the sessions that they should not disclose any information shared in the group.

How will I benefit from the study?

There is no benefit to you. However, your participation could help us understand why low-income students drop-out of medical school and why so many choose to practice in the city instead of in underserved areas, which can benefit you indirectly. In the future, this may help universities and the government to enact better policy and launch programs aimed at reducing the shortage of physicians in underserved communities and improve the support systems and opportunities for low-income students.

What other choices do I have?

Your alternative to being in the study is to not be in the study.

What happens if I do not choose to join the research study?

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You may choose to join the study or you may choose not to join the study. Your participation is voluntary.

There is no penalty if you choose not to join the research study. You will loose no benefits or advantages that are now coming to you, or would come to you in the future. The university will not be upset with your decision.

When is the study over? Can I leave the study before it ends?

The study is expected to end after all focus groups have been conducted and all the information has been collected. The focus group may be stopped without your consent for the following reasons:

- o You have not followed the study instructions
- o The PI or the Office of Regulatory Affairs at the University of Pennsylvania can stop the study anytime

You have the right to step out of the focus groups at anytime during your participation. There is no penalty or loss of benefits to which you are otherwise entitled if you decide to do so.

How will confidentiality be maintained and my privacy be protected?

We will do our best to make sure that the personal information obtained during the course of this research study will be kept private. However, we cannot guarantee total privacy. Your personal information may be given out if required by law. If information from this study is published or presented at scientific meetings, your name and other personal information will not be used.

During the focus group you will be assigned a number and your name will never be used. Any data collected from you and your comments will only be associated to the number you were assigned. All physical recordings, notes and transcripts will be kept in a secured place and all digital copies will be password encrypted in protected disks. Besides the investigators only a transcriptions will have access to the raw data and this person will sign a non-disclosure agreement.

All data collected will then be analyzed, aggregated and summarized which means that any identifiers will be removed.

Will I have to pay for anything?

No, you won't have to pay for anything.

Will I be paid for being in this study?

No, you won't be paid to participate in this study.

Have any of the investigators conducting this study declared a conflict of interest?

The person running this study is a majority shareholder in two of the universities involved in the study. Nonetheless, the activities of this study have no direct impact on the universities' finances nor will the Principal Investigator gain or lose money in any direct way. If you would like more information, please ask the researchers or the study coordinator.

Who can I call with questions, complaints or if I'm concerned about my rights as a research subject?

If you have questions, concerns or complaints regarding your participation in this research study or if you have any questions about your rights as a research subject, you should speak with the Principal Investigator listed on page one of this form. If a member of the research team cannot be reached or you want to talk to someone other than those working on the study, you may contact the Office of Regulatory Affairs with any question, concerns or complaints at the University of Pennsylvania by calling (215) 898-2614.

When you sign this document, you are agreeing to take part in this research study. If you have any questions or there is something you do not understand, please ask. You will receive a copy of this consent document.

Signature of Subject

Print Name of Subject

Date

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Focus Group Guide

Factors related to context, personal background and experience

1. Can you recall a particular experience that might have led you to be interested in medicine?
2. Anyone in your family works or has worked in health care? Has this person served as a role model?
3. In which ways have your personal circumstance affected your development as a physician?
4. What is your biggest hope as a physician?

Factors related to support and community affinity

5. What type of supports have you received from your family or friends during you medical studies?
6. What type of support have you received from your colleagues and professors during your studies?
7. How do you perceive your role in the community?
8. Do you believe physicians have different responsibilities and obligations towards their communities?
9. Describe your ideal practice location in terms of patients, and resources.
10. In what type of community do you think you would have the greatest impact as a physician?
11. Do you believe that access to health care is a universal right and would you be willing to see patients that are unable to pay for your services?
12. During your medical training have you had the opportunity to practice in rural areas or underserved communities?
13. Of your medical rotations which one has left the most lasting impression on you?
14. What was your biggest challenge while in medical school?

Factors related to social perception

15. Do you think that in Panamá physicians are recognized and admired by society?
16. Do you plan to specialize?
17. Would you consider becoming a general physician or family doctor?
18. What is your perception of general medicine?
19. Have you been enrolled in any classes that address the moral role of physicians in society?
20. Do you think medicine is a lucrative and prestigious career?
21. What aspects of being a physician do you find the most attractive?

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22. What are the costs (professional, monetary, personal) that you believe are associated with working in underserved communities?
23. What are the benefits of working in underserved communities?

Factors related to policy

24. What sort of incentives do you think would be effective enough to attract physicians to underserved communities?
25. Do you think the government should implement policies that make it mandatory for physicians to work during a period of time in underserved communities?
26. What do you think would help reduce the shortage of physicians in underserved communities?

Interview Guide

1. What are the main causes associated with low-income students dropping out of medical school?
2. What is the mayor challenge low-income students face while in school? What sort of supports could be offered to help them overcome said challenges?
3. How much talent do you think is lost because students cannot afford a career in medicine?
4. What type of academic challenges do low-income students face?
5. How should the curriculum be improved to encourage more students to study and practice primary care and family medicine?
6. What type of support systems should be offered to low-income students that are trying to persist in medical school?
7. What impact do mentoring programs have on low-income student?
8. What role does faculty play in facilitating the academic progress of low-income students?
9. What actions should the government take to augment the number of low-income students in medical school?
10. How significant is the physician shortage in underserved communities in Panama?
11. What do you think are the main factors leading to this shortage?
12. Why do you think so few students decide to become family doctors?
13. What do you think are the most important factors preventing physicians from working in underserved communities?
14. What do you think are the most important factors influencing practice choice among physicians?
15. What changes do you think would have the greatest impact on practice choice among medical students?
16. Do you think having medical students rotate and practice in underserve communities increase the probability that students will choose to return to these communities?
17. Do you think the government should have mandatory service in underserved communities as part of a certification program?

Medical Curriculum

Universidad de Panamá - "Elite Public School"

School of Medicine - Curriculum 2016

Semester I	Theory	Practice	Lab	Total
Introduction to Health Sciences	32	0	0	32
Molecular and Cellular Biology	32	0	48	80
General Chemistry	48	0	48	96
Language and Communication	16	32	0	48
Mathematics	16	32	0	48
History of Panama in the Global World	32	0	0	32
History of Medicine	16	0	0	16
Theory of Science	32	0	0	32
TOTAL	224	64	96	384

Semester II	Theory	Practice	Lab	Total
Geography of Panama	32	0	0	32
Organic Chemistry	48	0	48	96
Biophysics	48	0	48	96
Psychology in Health Sciences	16	48	0	64
Research Methods	16	32	0	48
Society, Environment, and Sustainable Dev	32	0	0	32
Computing and Learning Networks	16	32	0	48
Molecular and Cellular Biology II	32	0	48	80
TOTAL	240	112	144	496

Semester III	Theory	Practice	Lab	Total

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	Theory	Practice	Lab	Total
Human Anatomy	64	0	192	256
Human Biochemistry	64	0	192	256
Human Embryology	32	0	48	80
Elective 1	16	32	0	48
TOTAL	176	32	432	640
Semester IV	**Theory**	**Practice**	**Lab**	**Total**
Human Neuroanatomy	32	0	48	80
Human Histology	64	0	192	256
Medical Microbiology	48	0	96	144
Medical Immunology	16	0	48	64
English	16	32	0	48
TOTAL	176	32	384	592

Semester V	**Theory**	**Practice**	**Lab**	**Total**
Medical Parasitology	64	0	192	256
Human Physiology	64	0	192	256
Preventive and Social Medicine I	32	64	0	96
Medical Psychology	32	0	0	32
Anthropology	32	0	0	32
Medical Genetics	32	0	0	32
TOTAL	256	64	384	704

Semester VI	**Theory**	**Practice**	**Lab**	**Total**
Medical Pharmacology	64	0	192	256
Human Pathology	64	0	96	160
Primary Healthcare I	32	64	0	96

	16	32	0	48
Elective 2	16	32	0	48
Preventive and Social Medicine II	32	0	48	80
TOTAL	208	96	336	640

Semester VII	**Theory**	**Clinical**	**Lab**	**Total**
Clinical Propaedeutics and Physiopathology	128	320	0	448
Psychopathology	32	0	0	32
Human Nutrition	32	0	0	32
Primary Healthcare II	32	0	0	32
Preventive and Social Medicine III	48	0	0	48
TOTAL	272	320	0	592

Semester VIII	**Theory**	**Clinical**	**Lab**	**Total**
Internal Medicine I	112	240	48	400
Pediatrics I	64	240	0	304
Diagnostic Imagenology	32	0	0	32
Deontology and Medical Ethics	32	0	0	32
TOTAL	240	480	48	768

Semester IX	**Theory**	**Clinical**	**Lab**	**Total**
Obstetrics	64	160	0	224
Pediatrics II	48	80	0	128
Internal Medicine II	80	160	0	240
Preventive and Social Medicine IV	32	80	0	112
TOTAL	224	480	0	704

Semester X	**Theory**	**Clinical**	**Lab**	**Total**

Gynecology	48	80	0	128
Internal Medicine III	48	240	0	288
Surgery I	64	160	0	224
Forensic Medicine	32	0	0	32
Primary Healthcare III	64	0	0	64
TOTAL	256	480	0	736

Semester XI	Theory	Clinical	Lab	Total
Psychiatry	64	160	0	224
Internal Medicine IV	64	160	0	224
Surgery II	64	80	0	144
Orthopedics and Traumatology	48	80	0	128
Bioethics	16	0	0	16
TOTAL	256	480	0	736

Semester XII	Theory	Clinical	Lab	Total
Emergency Medicine	48	80	0	128
Family and Community Medicine	48	160	0	208
Correlative Radiology	48	0	0	48
Surgery III	64	160	0	224
Preventive and Social Medicine V	32	80	0	112
Therapeutics	48	0	0	48
TOTAL	288	480	0	768

Total Hours of Theory	2816
Total Hours of Practice/Clinical Rotation	3120
Total Hours of Lab	1824

Total Hours of Instruction	7760

*120 additional hours community service

Universidad Americana - "Low-income Private School"

School of Medicine - Curriculum 2016

Semester I	Theory	Practice	Lab	Clinical	Total
General and Inorganic Chemistry	48	0	48	0	96
Cellular and Molecular Biology	48	0	96	0	144
Biophysics	48	0	96	0	144
Spanish	48	0	0	0	48
Biostatistics	48	32	0	0	80
English I	32	32	0	0	64
History of Medicine	48	0	0	0	48
Microcomputer Applications	0	96	0	0	96
TOTAL	320	160	240	0	720

Semester II	Theory	Practice	Lab	Clinical	Total
Medical Terminology	32	0	0	0	32
Geography of Panama	48	0	0	0	48
Ecology and Environment	48	0	0	0	48
Anthropology	48	0	0	0	48
Demographics	32	0	0	0	32
English II	32	32	0	0	64
Research Methods	48	32	0	0	80
Organic Chemistry	48	0	48	0	96

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TOTAL	336	64	48	0	448

Semester III	Theory	Practice	Lab	Clinical	Total
Medical Biochemistry I	64	0	96	0	160
Human Anatomy I	48	0	96	0	144
Human Embryology	32	0	48	0	80
Medical Histology I	64	0	96	0	160
English III	32	32	0	0	64
History of Panama	48	0	0	0	48
Medical Sociology	48	0	0	0	48
TOTAL	336	32	336	0	704

Semester IV	Theory	Practice	Lab	Clinical	Total
Medical Biochemistry II	48	0	96	0	144
Human Anatomy II	48	0	96	0	144
Medical Histology II	48	0	96	0	144
Medical Microbiology	32	0	96	0	128
Human Neuroanatomy	32	0	48	0	80
Human Diversity and Critical Thinking	48	0	0	0	48
Introduction to Physiology	48	0	96	0	144
TOTAL	304	0	528	0	832

Semester V	Theory	Practice	Lab	Clinical	Total
General Parasitology	32	0	96	0	128
Medical Physiology	48	0	96	0	144
Introduction to Pharmacology	48	0	96	0	144

Human Nutrition	32	0	0	0	32
Epidemiology	32	96	0	0	128
Medical Psychology	32	0	0	0	32
TOTAL	224	96	288	0	608

Semester VI	Theory	Practice	Lab	Clinical	Total
Medical Pharmacology	48	0	96	0	144
Psychopathology	32	0	0	0	32
Medical Immunology	32	0	48	0	80
General Physiopathology	32	96	0	0	128
Epidemiology II	32	32	0	0	64
Management	32	0	0	0	32
General Pathology	64	0	96	0	160
TOTAL	272	128	240	0	640

Semester VII	Theory	Practice	Lab	Clinical	Total
Medical Propaedeutics	32	0	0	144	176
Forensic Medicine	16	0	0	0	16
Psychiatry	80	0	0	144	224
Principles of Imagenology	16	0	0	48	64
Public Health I	32	64	0	0	96
Ethics and Deontology	32	0	0	0	32
TOTAL	208	64	0	336	608

Semester VIII	Theory	Practice	Lab	Clinical	Total
Clinical Hematology	32	0	48	0	80

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Internal Medicine I	80	0	0	144	224
Pulmonology	32	0	0	48	80
Dermatology	32	0	0	48	80
Public Health II	48	0	0	48	96
Lecture	32	32	0		64
TOTAL	256	32	48	288	624

Semester IX	Theory	Practice	Lab	Clinical	Total
Cardiology	48	0	0	48	96
Obstetrics	80	0	0	144	224
General Surgery	80	0	0	144	224
Pediatrics I	80	0	0	96	176
TOTAL	288	0	0	432	720

Semester X	Theory	Practice	Lab	Clinical	Total
Gynecology	48	0	0	96	144
Orthopedics and Traumatology	48	0	0	48	96
Otorhinolaryngology	32	0	0	48	80
Internal Medicine II	64	0	0	96	160
Pediatrics II	48	0	0	144	192
TOTAL	240	0	0	432	672

Semester XI	Theory	Practice	Lab	Clinical	Total
Correlative Imaging	16	0	0	48	64
Therapeutics	32	0	0	0	32
Ophthalmology	16	0	0	48	64
Urology	32	0	0	48	80

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Neurology and Neurosurgery	48	0	0	96	144
Urgencies Medicine	32	0	0	96	128
Family and Community Medicine	48	0	0	96	144
TOTAL	224	0	0	432	656

Semester XII	Theory	Practice	Lab	Clinical	Total
Hospital Practice (Internship)	0	0	0	768	768
Professional Exam Preparation	0	0	0	0	0
Medical Literature in English	32	0	0	0	32
TOTAL	32	0	0	768	800

Total Hours of Theory	3040
Total Hours of Practice	576
Total Hours of Clinical Rotation	2688
Total Hours of Lab	1728
Total Hours of Instruction	**8032**

Universidad Autónoma de Chiriquí - "Rural Public School"

School of Medicine - Curriculum 2016

Semester I	Theory	Lab	Total
Chemistry I	48	48	96
Biology I	48	96	144
Mathematics and Physics	64	96	160
Oral and Written Expression I	32	32	64
Scientific English I	48	0	48
Medical Computing I	48	48	96
Physical Education I	48	0	48
TOTAL	**336**	**320**	**656**

Semester II	Theory	Lab	Total
Chemistry II	48	48	96
Biology II	48	96	144
Mathematics and Physics	64	96	160
Oral and Written Expression II	32	32	64
Scientific English II	48	0	48
Medical Computing II	48	48	96
Physical Education II	0	32	32
TOTAL	**288**	**352**	**640**

Semester III	Theory	Lab	Total
Research Methods	32	0	32
Introduction to Statistics	32	96	128
Anthropology	48	0	48
History of Panama	48	0	48

	Theory	Lab	Total
Geography of Panama	48	0	48
Social Medicine	48	0	48
TOTAL	**256**	**96**	**352**

Semester IV	**Theory**	**Lab**	**Total**
Chemistry III	80	48	128
Chemical Physics	48	48	96
Biostatistics	32	96	128
Demography	16	32	48
Medical Ethics	16	0	16
Ecology	32	0	32
TOTAL	**224**	**224**	**448**

Semester V	**Theory**	**Lab**	**Total**
Human Biochemistry	64	192	256
Human Anatomy	64	192	256
Human Embryology	32	48	80
Medical Parasitology	32	96	128
Human Histology	64	192	256
Medical Nutrition	32	0	32
TOTAL	**288**	**720**	**1008**

Semester VI	**Theory**	**Lab**	**Total**
Neuroanatomy	32	48	80
Human Physiology	64	192	256
Microbiology	48	96	144
Medical Psychology	32	0	32

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	Theory	Lab	Total
Epidemiology I	32	0	32
Diagnostic Radiology	32	0	32
TOTAL	**240**	**336**	**576**

Semester VII	**Theory**	**Lab**	**Total**
Medical Pharmacology I	64	192	256
Human Pathology	64	128	192
Psychopathology	32	0	32
Medical Immunology	32	0	32
History of Medicine	16	0	16
Clinical Propaedeutics & Physiopathology	64	128	192
TOTAL	**272**	**448**	**720**

Semester VIII	**Theory**	**Clinical**	**Total**
Pediatrics I	64	128	192
Psychiatry I	48	64	112
Medical Hematology	32	48	80
Medical Pharmacology II	64	192	256
Epidemiology II	32	48	80
Pneumology	32	48	80
Cardiology	32	48	80
Endocrinology	32	48	80
TOTAL	**336**	**624**	**960**

Semester IX	**Theory**	**Clinical**	**Total**
Dermatology	32	64	96
Gastroenterology	32	64	96

	Theory	Clinical	Total
Neurology	32	64	96
Emergency Medicine	32	48	80
Surgery	64	64	128
Obstetrics	64	64	128
Pediatrics II	64	128	192
Orthopedics and Traumatology	32	48	80
TOTAL	**352**	**544**	**896**

Semester X	**Theory**	**Clinical**	**Total**
Gynecology	32	64	96
Neurosurgery	32	48	80
Preventive Medicine I	32	64	96
Family and Community Medicine	48	64	112
Otorhinolaryngology	32	48	80
TOTAL	**176**	**288**	**464**

Semester XI	**Theory**	**Clinical**	**Total**
Oncology	32	0	32
Ophthalmology	32	96	128
Urology	48	0	48
Forensic Medicine	48	0	48
Nephrology	48	0	48
Rheumatology	48	0	48
TOTAL	**256**	**96**	**352**

Semester XII	**Theory**	**Clinical**	**Total**
Preventive Medicine II	32	64	96

183

First Aid	32	64	96
Correlative Radiology	16	32	48
Geriatrics	32	48	80
Therapeutics	16	0	16
TOTAL	**128**	**208**	**336**

Total Hours of Theory	3152
Total Hours of Practice, Lab and Clinical Rotation	4256
Total Hours of Instruction	7408

Universidad Latina - "Elite Private School"

School of Medicine - Curriculum 2016

Semester I	Theory	Practice	Lab	Clinical	Total
Inorganic Chemistry	48	48	0	0	96
Cellular and Molecular Biology	48	96	0	0	144
Biophysics	48	96	0	0	144
Biostatistics	48	0	32	0	80
Spanish	32	0	0	0	32
History of Panama	32	0	0	0	32
English	32	0	0	0	32
TOTAL	288	240	32	0	560

Semester II	Theory	Practice	Lab	Clinical	Total
Socio-anthropology	48	0	32	0	80
Scientific and Research Methods	48	0	32	0	80
Organic Chemistry	48	48	0	0	96
History of Medicine	32	0	0	0	32
Geography	32	0	0	0	32
Ecology and Health	32	0	0	0	32
English II	32	0	0	0	32
TOTAL	272	48	64	0	384

Semester III	Theory	Practice	Lab	Clinical	Total
Human Biochemistry I	48	96	0	0	144
Human Anatomy I	64	96	0	0	160
Human Embryology	32	48	0	0	80

Medical Histology I	64	96	0	0	160
Human Neuroanatomy	48	48	0	0	96
TOTAL	256	384	0	0	640

Semester IV	Theory	Practice	Lab	Clinical	Total
Human Biochemistry II	64	96	0	0	160
Human Anatomy II	64	96	0	0	160
Medical Histology II	64	96	0	0	160
Medical Microbiology	48	96	0	0	144
Epidemiology I	32	0	64	0	96
TOTAL	272	384	64	0	720

Semester V	Theory	Practice	Lab	Clinical	Total
Medical Parasitology	48	96	0	0	144
Human Physiology I	64	96	0	0	160
Medical Pharmacology I	48	96	0	0	144
Human Pathology	64	96	0	0	160
TOTAL	224	384	0	0	608

Semester VI	Theory	Practice	Lab	Clinical	Total
Human Physiology II	64	96	0	0	160
Medical Pharmacology II	48	96	0	0	144
Psychology & Psychopathology	48	0	0	0	48
Medical Nutrition	32	0	0	0	32
Medical Immunology	32	48	0	0	80
Physiopathology	48	96	0	0	144
TOTAL	272	336	0	0	608

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Semester VII	Theory	Practice	Lab	Clinical	Total
Clinical Propaedeutics	48	0	0	144	192
Ethics and Forensic Medicine	48	0	0	0	48
Psychiatry	80	0	0	144	224
Imaging	32	0	0	48	80
Epidemiology II	32	0	0	48	80
TOTAL	240	0	0	384	624

Semester VIII	Theory	Practice	Lab	Clinical	Total
Hematology	32	0	0	48	80
Internal Medicine I	80	0	0	144	224
Pediatrics I	80	0	0	144	224
Public Health	48	0	0	96	144
Dermatology	32	0	0	48	80
TOTAL	272	0	0	480	752

Semester IX	Theory	Practice	Lab	Clinical	Total
Pulmonology	32	0	0	48	80
Cardiology	48	0	0	48	96
Obstetrics	80	0	0	144	224
General Surgery	80	0	0	144	224
Orthopedics & Traumatology	48	0	0	96	144
TOTAL	288	0	0	480	768

Semester X	Theory	Practice	Lab	Clinical	Total
Gynecology	48	0	0	96	144

Internal Medicine II	48	0	0	96	144
Pediatrics II	48	0	0	96	144
Ophthalmology	32	0	0	48	80
Health Management	48	0	0	0	48
Otorhinolaryngology	16	0	0	48	64
TOTAL	240	0	0	384	624

Semester XI	Theory	Practice	Lab	Clinical	Total
Correlative Imaging	32	0	0	48	80
Therapeutics	32	0	0	0	32
Urology	32	0	0	48	80
Neurology and Neurosciences	48	0	0	48	96
Urgencies Medicine	64	0	0	96	160
Family & Community Medicine	48	0	0	96	144
TOTAL	256	0	0	336	592

Semester XII	Theory	Practice	Lab	Clinical	Total
Hospital Practice (Internship)	0	0	0	864	864
TOTAL	0	0	0	864	864

Total Hours of Theory	2880
Total Hours of Practice	1776
Total Hours of Lab	160
Total Hours of Clinical Rotation	2928
Total Hours of Instruction	**7744**

Number of doctors and nurses per 10,000 people in Panamá

DOCTORS AND NURSES PER 10,000 PEOPLE NATIONWIDE

— Available doctors and nurses   — Needed

DOCTORS AND NURSES PER 10,000 PEOPLE OUTSIDE OF PANAMA CITY

— Available doctors and nurses   — Needed

Source: Instituto Nacional de Estadictica y Censo de Panamá

189
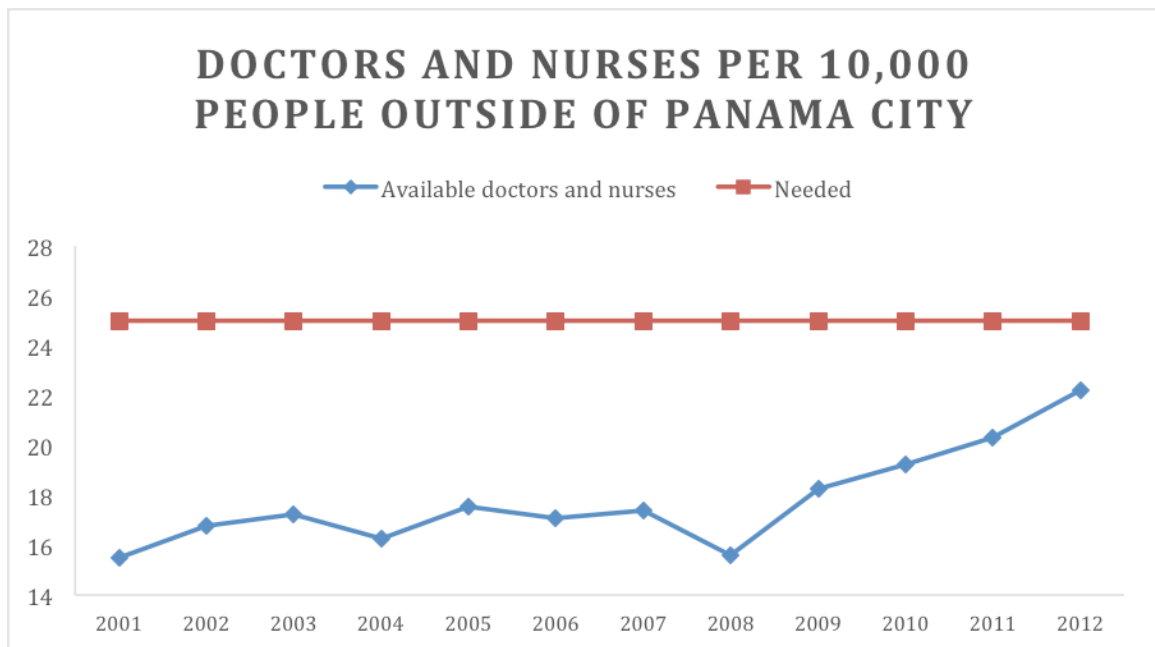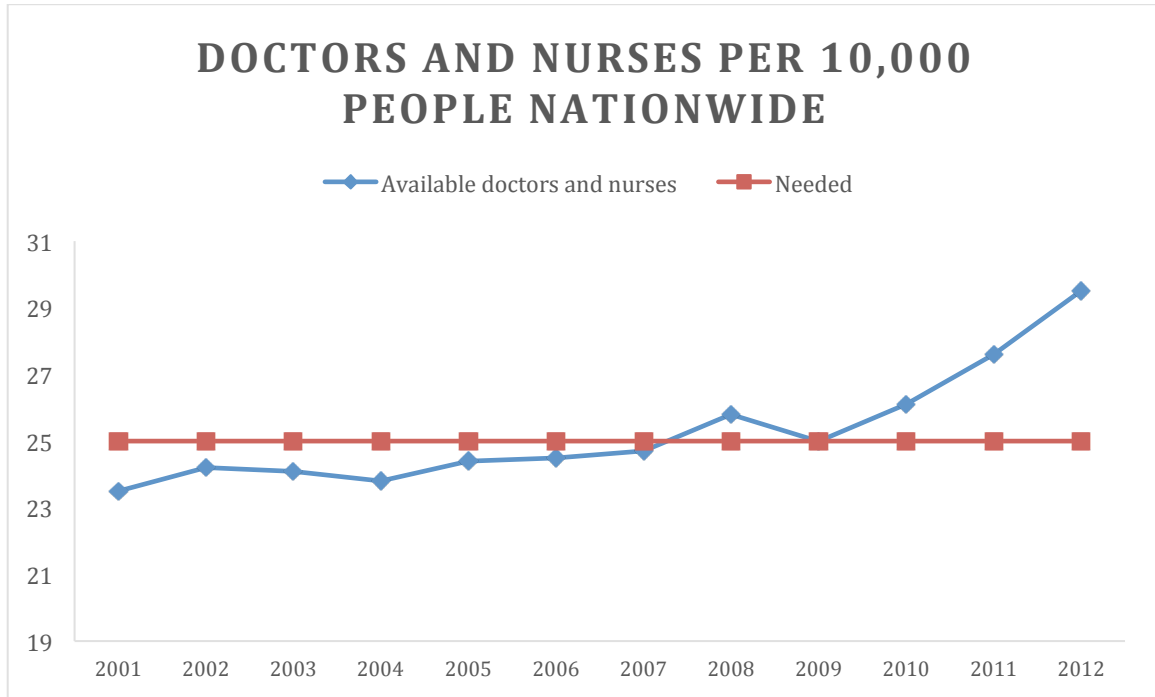
APPENDIX H

Demand versus supply of doctors in Panamá

Outside Panama City

In Panama City

Number of doctors

Doctors

Doctors

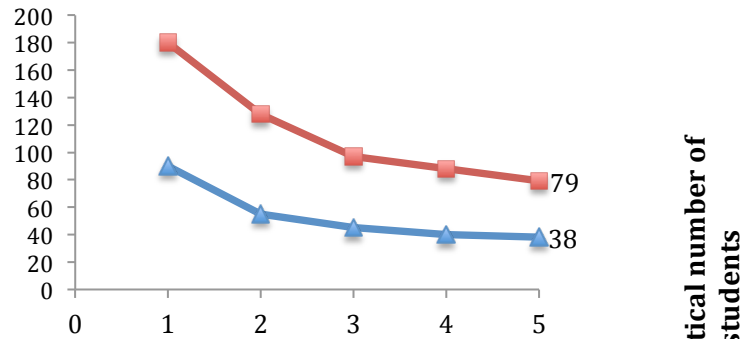* Based on 1.5 doctors per 1,000

In the Republic of Panama
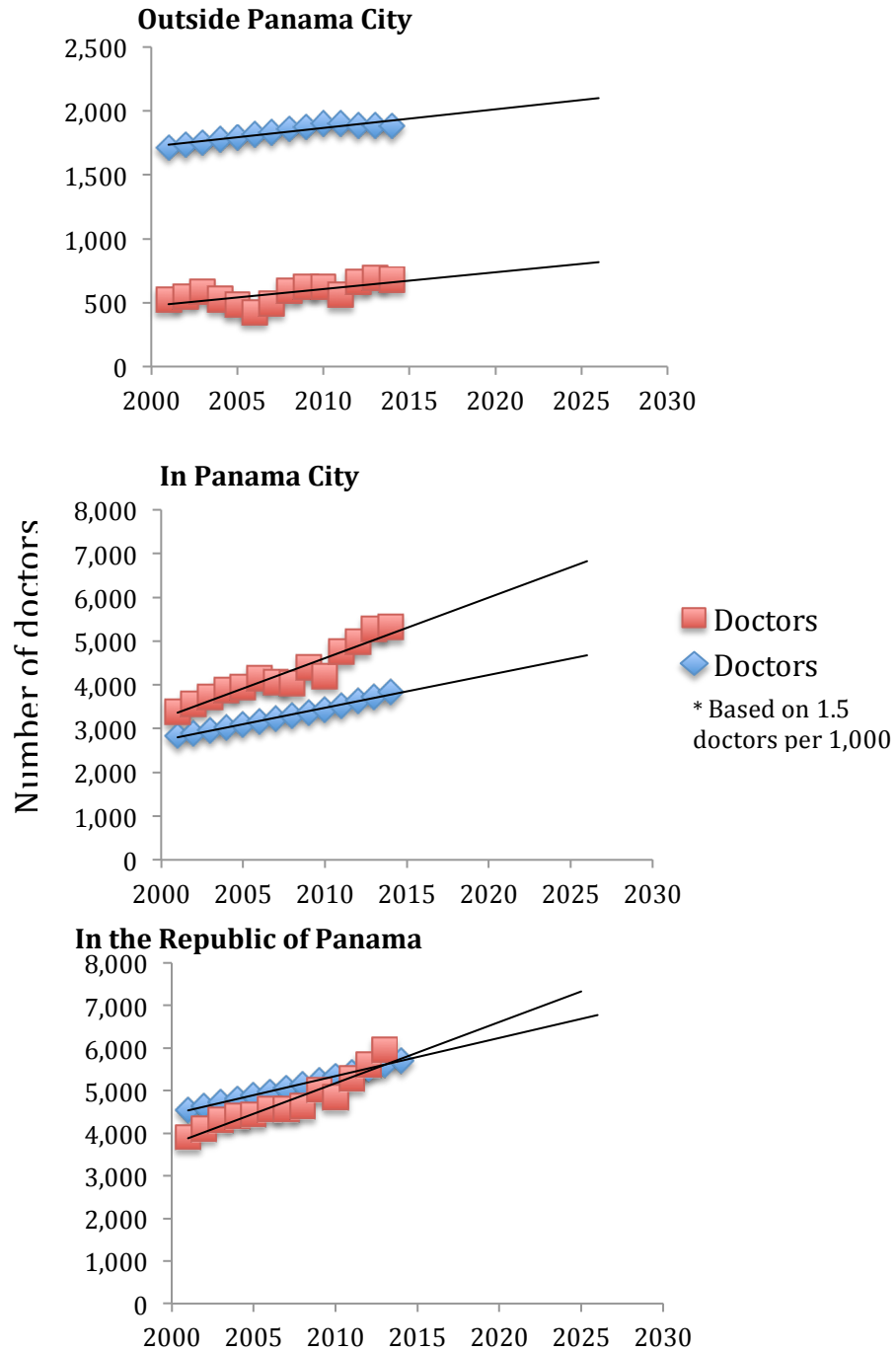
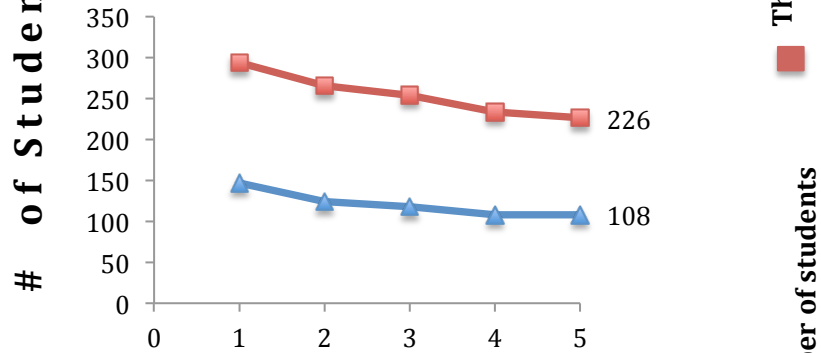**Source: Instituto Nacional de Estadictica y Censo de Panama**

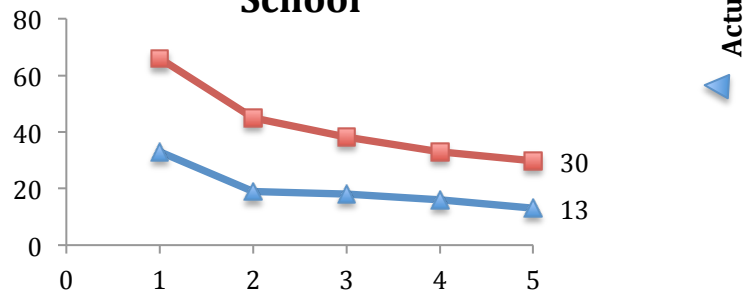**Number of medical students graduating within standard program length**

Elite Public School

Elite Private School

Low-income Private School

Academic year

# of Students

Theoretical number of students

Actual number of students

Source: Instituto Nacional de Estadictica y Censo de Panamá; Universidad Latina and Universidad Americana