FACTORS THAT INFLUENCE A CAREER CHOICE IN PRIMARY CARE: A MIXED-METHODS STUDY AMONG MEDICAL STUDENTS STARTING THE SOCIAL SERVICE PROGRAM IN HONDURAS

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A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Public Health in the Department of Health Policy and Management in the Gillings School of Global Public Health.

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**ABSTRACT**

Eduardo Benjamín Puertas: Factors that Influence a Career Choice in Primary Care: a Mixed-methods Study among Medical Students Starting the Social Service Program in Honduras
(Under the direction of Suzanne Babich)

Medical students are not choosing primary care careers. This project was a mixed-method study aimed to identify factors that influence the decisions of Honduran medical students to choose a career in primary care.

The study included a survey questionnaire applied to 234 last-year medical students and semi structured interviews to eight key informants. Career choice favors medical specialties. PC careers were the preferred career choice for 8.1% of students. Relationships between "sex" and "location where student lived" by specialty categories were statistically significant ($P$= 0.011 and 0.042). There were more male respondents preferring PC (8.8%); students who preferred PC came mainly from urban backgrounds (62.6%). The perceived monthly salary of specialties other than primary care was significantly higher than those of GPs, FPs and Pediatricians (p<0.001). Participants considered "making a difference", income, teaching, prestige, and challenging work as the most important factors that influence career choice.  Practice in ambulatory settings was significantly associated with a preference for primary care specialties (P=<0.05). Factor "patient-based care" was statistically significant (P=0.006) for selecting PC.

Rationales behind the preference of a specialty appear to be based on a combination of ambition and prestige on one hand, and on personal and altruistic considerations on the other. There are several factors distinctive to medical students in Honduras: future work option, availability of specialties, and

social factors including violence. A facilitator for PC selection in Honduras is the type of resources needed to practice a specialty.

Social service participants from urban background who prefer primary care are mostly influenced by rural work and practice in ambulatory settings, while respondents with a rural background who prefer specialties are influenced by the possibility of making a positive difference in people´s lives.

The study is a component of a strategy to strengthen primary care in the country that includes a public policy for strengthening PC workforce in Honduras. The results will be shared with Secretary of Health national authorities, including the Direction for Development of Human Resources, the National Council of Human Resources for Health, and academic authorities from UNAH. Policy advocacy is part of the plan for change.

To Tamy, for your love and comprehension during all these years. To my parents, who gave me the best inheritance, education. To my sisters and family for their encouragement. To John and Dorothy Swartz for their love and continuous support for most part of my life.
I dedicate this work to my father, who passed away few months before it was completed.

*The path is the end, and the end lies in the path*

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## LIST OF ABBREVIATIONS

CDC                 Centers for Disease Control

CONARHUS            National Council of Human Resources for Health

COPC                Community oriented primary care

DDHR                Direction of Development of Human Resources (DDHR)

ELAM                Latin American School of Medicine)

FM                  Family medicine

FONADES             National Forum for the Right to Health

FP                  Family practice

GP                  General Practitioner

HRH                 Human Resources for Health

IHSS                Institute of Social Security of Honduras

IOM                 Institute of Medicine

IRB                 Institutional Review Board

KMO                 Kaiser-Meyer-Olkin measure of sampling adequacy

PCO                 Principal Component Analysis

PC                  Primary care

PHC                 Primary health care

PH                  Public Health

PAHO                Pan American Health Organization

PI                  Principal investigator

SoH                 Secretary of Health

UCH                 Universidad Católica de Honduras

UNAH                Universidad Nacional Autónomo de Honduras

WHO          World Health Organization

# CHAPTER 1: INTRODUCTION

## Statement of the Issue

Health staff shortages, migration and unequal distribution of health personnel are current problems in some regions of the world. The proportion of Canadian medical school graduates who made family medicine (FM) their first option dropped from 40% in 1982 to only 28% in 2005, [2] and only one-third of medical students were interested in entering a family medicine program. [1] In 2011, 34% of medical school graduates made family medicine their first choice for residencies and in 2012 it was 35% (Canadian Resident Matching Service, 2012 Annual Report). However, this slight increase is not enough to fulfill the current needs of the Canadian population. Some studies show that this attitude was different at the beginning of the medical training, when medical students considered family medicine as a career choice, but as early as in the second year, the numbers dropped significantly. [3] There are several barriers that explain this phenomenon, including primary care (PC) low income relative to specialties, [4-12] low prestige given to primary care careers, [6,11-13] and some aspects of medical school training: primary care poorly reflected in the curricula, lack of exposure to family practitioners, negative perception of family doctors, and the prevailing negative culture towards PC. [9,14,15]

There is an ongoing debate whether the United States is experiencing a shortage of primary care physicians. The supply of primary care physicians did not change significantly between 2002 and 2012 (46.7 and 46.1 per 100,000 population, respectively), and the ratio of PC physicians to specialists has remained stable; it was 0.70 in 2012. [16] According to the U.S. Department of Health and Human Services, Health Resources and Services Administration, there was a shortage of 7 500 primary care physicians in 2010, and the projected shortage of PC practitioners will be of 20 400 physicians in 2020 [17].

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The Association of American Medical Colleges projected shortfalls between 12 500 and 31 100 primary care physicians by 2025.[18] The supply of adult primary care practitioners was expected to grow by only 2% to 7% from 2005 to 2025, while workload of adult primary care practitioners could increase by 29% due to population growth and aging.[19] According to these projections, the shortage of adult primary care physicians could reach an estimated 35 000 to 44 000 by 2025.[20] Petterson[21] also found that more than 44 000 primary care physicians would be needed by 2035. Even by adding primary care physicians, nurse practitioners, and physician assistants together, "…the ratio of primary care practitioners to population in the US is expected to fall 9% from 2005 to 2020"[20], although the projected shortage of 20 400 physicians in 2020 could be reduced to 6 400 with increased deployment of nurse practitioners and physician assistants[17]. Green et al.[22] also estimated that there is a primary care physician shortage in the U.S. (although the forecast might be overestimated) that could be eliminated by implementing partial pooling of patients and diverting 20 percent of patient demand to non-physician professionals or using electronic health record–enabled electronic communication, or both. On the other hand, Gaetan Lafortune of the OECD Health Division considers that "shortage" has not been well defined; sometimes it is simply defined as "…the gap between the current physician-to-population ratio or nurse-to-population ratio and some benchmark (or target)",[23] making it hard to identify a proper benchmark. Other countries carry out surveys, or determine the existence of a shortage using "vacancy rates" for jobs and residencies. The 2014 NRMP Match reported that family medicine residency programs filled 72 more positions in 2014, compared to 2013, which indicates a small and steady increase in medical students choosing primary care careers for several years in a row. Approximately 8.4% allopathic medical school graduates of the 17 478 graduates (July 2010 to June 2011) were first-year family medicine residents in 2011, compared with 8.0% in 2010 and 7.5% in 2009[24]. It is still controversial if this increase will meet the needs of the country. Medical students still prefer hospital-related specialties and subspecialties, and the gap of family practitioners is expected to grow. The existing number of

primary care physicians could not be meeting the demands of an increasing population, a growing proportion of patients report that they have long waiting times and cannot schedule timely appointments with their doctor [25] .

In England the expected shortage of physicians by 2020 could be around 25 000, especially general practitioners, while the demand for GPs could increase from 26 000 in 2002 to 55 000 in 2020 [26] . In Australia, 2006 projections estimated the general practice workforce to fall from 133 full-time general practitioners per 100 000 persons in the baseline year (2001), to 129 per 100 000 persons in 2003, and then remain at this level through to 2012, while the specialists workforce was projected to show steady growth from 162 in 2001 to 206 per 100 000 persons in 2012 [27] . In France, general practice was chosen by only 20% of the medical students [28] . Approximately 15 600 GPs have to be replaced in Germany due to retirement, while fewer students are deciding to work in general practice [29] .

The proportion of general practitioners to specialists in Chile declined from 8 GPs out of 10 specialists in 1996 to 6 out 10 in 2004 [30] . When considering only the public sector, there were 1.5 GPs out of 10 specialists, showing a lower proportion of general practitioners as the main providers of health care services in Chile. In 2007 there were 31 188 physicians working in the Brazilian national family health program, but only 604 were family practitioners; the rest were physicians with no further training than medical school, a fact that challenges the physicians' levels of preparation to work in primary care [31] . In fact, the main problem in Mexico and some Latin American countries could be related to the low quality of care provided by university trained physicians, rather than the lack of physicians. [32] Ecuador, primary care physicians (GPs and family practitioners) represented only 20% of the total number of physicians in the country in 2011. The Ministry of Health of Peru opened 332 positions for residency in family medicine in 2013 (Figure 1), but there were only 179 applicants (54%), although there were just 65 certified family physicians in the country by 2012 and a shortage of 606 family practitioners.

**Figure 1: Positions for family medicine and applicants. Peru 2009-2013**



**Residency in Family Medicine-Peru**
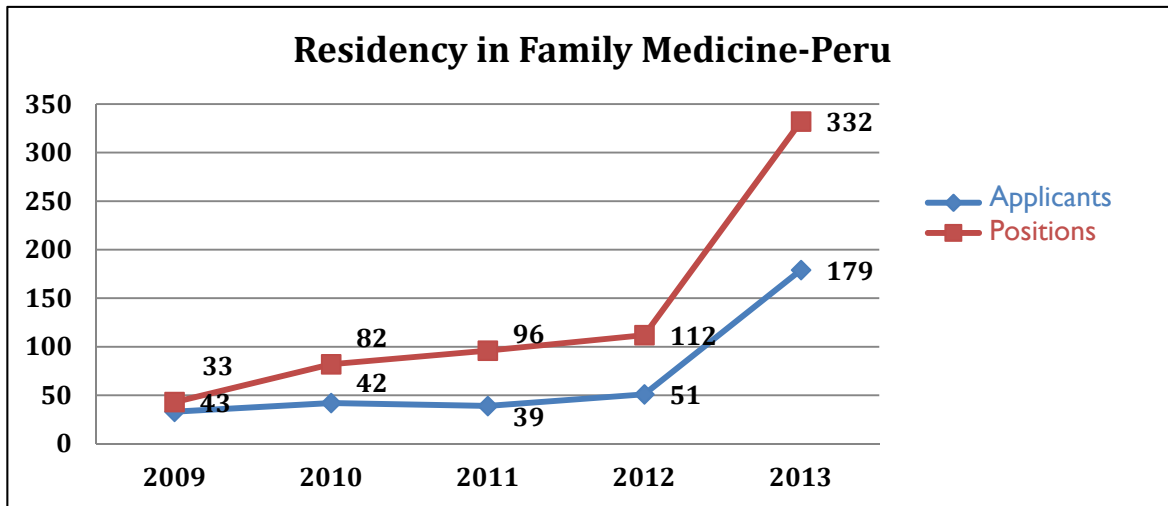
Source: Ministry of Health of Peru. 2013.

Planning and projecting physician workforce needs in the Latin American region is still limited. The shortage of primary care physicians must be quantified and projected into the future to understand its impact and implications. Causes for this gap must be identified and analyzed in order to minimize its impact in the health system. However, more research on the primary care workforce is needed to determine the factors that influence positively or negatively on career choice among medical students from this part of the world.

**Background**

Primary health care (PHC) and/or primary care (PC) are important components of any health system. Often they are confused as being identical, but in general terms, PC refers to the first level of health care, while PHC is a comprehensive strategy that is not limited to the health service, but recognizes social and biological determinants of health. The Declaration of Alma Ata in 1978 defined primary health care as:

"…[E]ssential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individual and families in the community through

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their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process" [33] .

Primary health care programs have contributed to improving health conditions around the world, especially among underserved populations from middle- and low-income countries. Broader coverage of PHC is significantly associated with longer life expectancy, and diminishing trends in infant mortality and under-5 mortality [34] .

Countries that have improved health outcomes using a primary health care approach have "…accountable leadership, coverage, community and family empowerment, district-level focus and equity priority" [35] . The Pan American Health Organization PAHO/WHO emphasized the importance of strengthening national health systems based in primary health care, as the "…best approach for producing sustained and equitable improvement in health" [36] .

Primary care is defined as:

"…[T]he provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community." (Institute of Medicine-IOM 1978)

or

Level of a health system "that provides entry to the system for all new needs and conditions, with a person-centered rather than a disease-centered approach, over time. It provides care for all conditions, except those that are uncommon or rare, and coordinates or integrates provision of care in other locations or by others." [37]

Bertrand Dawson first described "primary care centres" in 1920 D. Madison and as part of the social health movement to address health disparities and the increasing complexities. Compared to PHC, primary care is more clinically focused and can be considered a subcomponent of a broader primary health care system [38] . Starfield considered that PC is intimately interrelated to PHC, "primary care

connotes conventional primary medical care striving to achieve the goals of primary health care," [39] and

identifies four pillars of primary care practice: (a) first-contact care; (b) continuity of care over time; (c)

comprehensiveness; and (d) coordination with other parts of the health system [40] .

Primary care (PC) is a fundamental component of a health care system and plays an important role

in defining the quality, cost and outcomes of health care. For example, adequate access to primary care

contributed to better health outcomes of the population in Korea [41] and "…offers the potential to reduce

disparities in care, increasing citizens' opportunities to live healthy, productive lives", according to a

survey on PC experiences in Australia, Canada, New Zealand, the United Kingdom, and the United States

[42] . Health service networks based in PC ameliorate the effects of fragmentation and segmentation,

contributing to the integration of national health systems [43] .

**Primary Care, Primary Health Care and Public Health**

Frenk [44] believed that Alma Ata did not completely clarify the relationships between primary care

and prevention or between secondary care and curative medicine. This confusion led many to identify

primary health care with first level of care, a limited view of a broader concept as described in previous

paragraphs, allowing the focus on curative medicine. Perhaps the problem originated by adding

"primary" to the title, an element brought from the educational area, leading to "a false sense of

simplicity around primary health care." [45] Additionally, "primary" has been related to first contact, first

level and first causes, which is not necessarily true since the first contact with the health system could

happen in an emergency service of a hospital (secondary level), and not for a first cause. There is no

certainty that the use of other terminology, instead of "primary", could have reduced the confusion

around a strategy that is so broad in its reach. In some way, the "primary = basic" approach is quite

convenient to the medical establishment, which is reluctant to involve in an effort to expand its

involvement beyond the familiar setting of a hospital or health center, where curative medicine is

supreme and where medical doctors and other health care professionals are the unchallenged rulers.

The medical paradigm reduces PHC to what it can better understand: a bit of prevention, perhaps some epidemiology. Anything broader, or comprehensive in nature, creates fear within health care professionals that see any expansion to other domains as a threat to their own one. Health promotion is already out of the framework, and the social determinants of health move way beyond the limits imposed by the curative paradigm.

Another term introduced in the 1970s, community oriented primary care (COPC), brings a different focus to this confusing scenery. Often related to any primary health care-related program, COPC refers to a "…distinct approach to primary health care that links community epidemiology and associated pro-active responses to the priorities revealed, with primary medical care". [46]

Primary health care, primary care, and community-oriented primary care have a common goal: to improve the health of the public. Primary care focuses on "…providing medical services to individual patients with immediate health needs", while public health focuses on offering "…a broader array of ser-vices across communities and populations that collectively will help people to be healthy" (IOM 2012). The broader perspective of public health makes easier to differentiate it from primary care, although it is no so obvious when comparing public health and primary health care. Table 1 lists the essential components of PHC and COPC, and the essential public health functions (PAHO) and essential public health services (CDC).

**Table 1: Essential components, functions and services of PHC, COPC and public health**

| PHC Essential Components (Alma Ata) | 'Essential' and 'highly desirable' features of COPC* | Essential Public Health Functions (PAHO) | Essential Public Health Services (CDC) |
|---|---|---|---|
| 1. Education concerning prevailing health problems and the methods of preventing and controlling them<br>2. Promotion of food supply and proper nutrition;<br>3. An adequate supply of safe water and basic sanitation;<br>4. Maternal and child health care, including family planning;<br>5. Immunization against the major infectious diseases;<br>6. Prevention and control of locally endemic diseases;<br>7. Appropriate treatment of common diseases and injuries;<br>8. Provision of essential drugs | *Essential features:*<br>1. Complementary use of epidemiolog. and clinical skills;<br>2. A defined population for which the service is responsible;<br>3. Defined programs to address community health problems;<br>4. Community involvement in promoting its health;<br>5. Health service accessibility: geographic, fiscal, social and cultural.<br><br>*Highly desirable features:*<br>1. Integration or at least coordination of curative, rehabilit., prevent.& promotive care;<br>2. A comprehensive approach extending to behavioral, social and environmental determinants;<br>3. Multidisciplinary team;<br>4. Mobility, including 'outreach' capability, of the health team;<br>5. Extension of community health programs into broader programs of community development. | 1. Monitoring, evaluation, and analysis of health status<br>2. Surveillance, research, and control of the risks and threats to public health<br>3. Health promotion<br>4. Social participation in health<br>5. Development of policies and institutional capacity for public health planning and management<br>6. Strengthening of public health regulation and enforcement capacity<br>7. Evaluation and promotion of equitable access to necessary health services<br>8. Human resources development and training in public health<br>9. Quality assurance in personal and population-based health services<br>10. Research in public health<br>11. Reduction of the impact of emergencies and disasters on health | 1. Monitor health status to identify and solve community health problems.<br>2. Diagnose and investigate health problems and health hazards<br>3. Inform, educate, and empower people about health issues.<br>4. Mobilize community partnerships and action to identify/ solve health prob.<br>5. Develop policies and plans that support individual and community health efforts.<br>6. Enforce laws and regulations that protect health & ensure safety.<br>7. Link people to needed personal health services and assure provision of health care when unavailable.<br>8. Assure competent public and personal health care workforce.<br>9. Evaluate effectiveness, accessibility, and quality of personal and population-based health serv.<br>Research for new insights and innovative solutions |

*Community Oriented Primary Care

According to a PC definition, it provides care for all conditions, except those that are uncommon or rare, and coordinates or integrates provision of care in other locations or by others." [37] Primary care is closely related with PHC essential components associated with provision of maternal and child health

care, treatment of common diseases and provision of essential drugs (PHC components 4, 7 and 8); also with the first highly desirable COPC feature on integration or coordination of comprehensive health care and CDC essential PH function related to linking people to health services (Table 1).

The four pillars [40] also demonstrate how PC is closely associated to PHC and PH: (a) *first-contact care* and PHC essential functions related to maternal and child health care, prevention, immunization, treatment of common diseases and provision of essential drugs; (b) *continuity of care over time* is associated with CDC essential PH function related to linking people to health services; (c) *comprehensiveness* is similar to a COPC highly desirable feature, a comprehensive approach extending to behavioral, social and environmental determinants; and (d) *coordination with other parts of the health system* is similar to COPC feature of integration or coordination of comprehensive health care.

A hallmark of high-quality primary care is an emphasis on preventive care, health promotion, counseling, and awareness of patients' health concerns. [42] Prevention and health promotion are also PHC essential components (prevention, control and immunization), while health promotion is considered an essential COPC component (community involvement in promoting its health), and one of PAHO´s essential public health functions.

CDC essential public health services include the assurance of competent public and personal health care workforce, and PAHO included among the essential functions of public health the development and training of human resources in public health.

An effective way to reduce mortality and improve health among the population is through interventions on the social determinants of health. The strengthening of primary care workforce, including PC physicians, is another mechanism to improve public health conditions. It does not aim to "medicalize" health care more than it is already. As stated by Frenk in the 90s, "The aim is to produce a type of physician who would combine medical and public health skills with an emphasis on social and

population sciences." [44]

**Primary Care and PC personnel**

A fundamental component of health systems based in primary care is the supply of health care personnel. Some authors have found that countries or states with higher ratios of primary care physicians to populations had better health outcomes, including lower rates of all causes of mortality, [40] although in the United States the relationships were not consistent across the nation, since there were regions where the association physician-mortality varied from stronger, weaker to non-existent. [47] Thus, a greater supply of primary care physicians per capita was associated with lower mortality in the Midwest, and with higher mortality in South Florida. An analysis of national survey data in the U.S. found that patients identifying PC physicians as their usual sources of care had lower five-year mortality rates than patients identifying specialist physicians. [48] A study of 99 health authorities in England found that each additional general practitioner per 10 000 population was associated with about a 5 percent decrease in mortality [49]. The supply of primary care doctors had a larger positive impact in reducing infant mortality in areas with high social inequality in Mexico, where some aspects of primary care delivery had an important independent effect on reducing child mortality in socially deprived areas. [32] A study of 23 health areas of low socioeconomic level in Barcelona, Spain, showed a clear association between the process of reform that strengthened the role of primary care and the decrease in general mortality. [50] Populations of countries with higher degrees of primary care orientation benefit of better health outcomes and incur in lower health care costs than the populations of countries with lower PC orientation. [48]

There is evidence about how access to a PC practitioner increases preventive care utilization. Patients that visited the same doctor on regular basis were more likely to receive preventive services, [51,52] had greater satisfaction with their overall health care and lower rates of emergency department

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use for non-urgent conditions.[53] Other author considered that conclusions about physician supply and individual health outcomes are mixed and diverse.[54] A study in six New York counties found that a larger local supply of primary care physicians per capita increased availability and accessibility, and that having a primary care physician "exerts a powerful effect on each one of the utilization of preventive health measures".[54]

There is a widening shortage of primary care personnel, especially in remote areas where the lack of physicians and nurses is threatening the delivery of health care to vulnerable populations. In the United States there was a controversy about the existence of a shortage of PC practitioners. A study reported that even though 56% of visits to physicians' offices were for primary care, only 37% of medical doctors practiced primary care medicine, and a large percentage of the population was living in primary care shortage areas in the United States, according to a system of classification used to allocate federal resources[20] . Some authors considered that the Affordable Care Act could worsen the shortage of primary care physicians over the next ten years, as the nation's population grows and ages and as insurance coverage expands.[55-57]

The lack of family practitioners affects access to health care in urban settings, but worse damage occurs in rural areas in developing countries[58] . The density of doctors per 10 000 population was 7.7 in Lima, Peru and less than 2.0 in some rural departments in the Andean and Amazon regions. Moreover, physicians were concentrated in the richest areas (11.5 per 10 000 population) compared to poorest areas of Peru (1.9 per 10 000 population)[59] . In Bangladesh, four metropolitan districts have 35% of all doctors, but only 14.5% of the country's population[58] . In the United States, the ratio of primary care physicians to population in urban areas was 100 per 100 000 population in 2007, while in rural areas it was 46 per 100 000[20] , although other study determined that the number of primary care physicians within a geographic area did not mean that the population were having greater or lesser access or

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receiving more primary care services. [54] Ricketts et al. described a small net urban-to-rural diffusion of physicians, concluding that one third of urban and rural medical doctors will remain in their practice location for most of their professional careers [60] .

In middle- and low-income countries, the situation was even more critical, since the shortage of trained health personnel was exacerbated by the migration of doctors and nurses to high-income countries to fill the gap in primary care services. International medical graduates represented between 23 and 28 percent of physicians in the United States, United Kingdom, Canada and Australia, and 9 out of the 20 countries with the highest immigration factors were in sub-Saharan Africa or the Caribbean. [61] In Serbia, the prevalence of emigration intentions of medical undergraduates was 80.6%. [62] Due to migration, Peru lost 3 284 physicians between 1994-2008, Bolivia lost 363 doctors in the same period and Ecuador lost 226 between 1995-2010 [63] , and the trend continues.

The career intentions of medical students from developing countries are not aligned with the needs of the national health systems. In many parts of Africa, medical students were choosing specialties that did not relate to the continent's health care needs [64] , and curricula in some medical schools in sub-Sahara Africa were seen as "…unfocused and unmatched to realities in communities" [65] . Less than 5% of medical students from six Sub-Saharan African countries were interested in family medicine and only 4.8% intended to practice in rural areas [64] . In Chile, 69% of general physicians remained in general practice for less than three years before moving into a specialty [30] . In Turkey, among those physicians who chose to specialize, only 5% to 10% showed preference for family medicine, a new specialty in the country at the time of the study [66] .

**Significance of the Issue**

PAHO's Resolution CD44.R6, 1 of September 2003, invited Member States to adopt a series of recommendations to strengthen PHC [36] . In July 2005, representatives from 30 countries of the Americas

prepared a regional declaration on PHC that was ratified by PAHO's 46th Directing Council [67] .

Countries of the Latin American region are implementing strategies to strengthen primary care-based health systems. Since 1994, primary health care in Brazil has been redirected by means of the Family Health Strategy with the challenge of developing actions of comprehensive individual and collective care for families, "…responding to the principles and guidelines of the *Sistema Único de Saúde*" (National Health System - SUS) [68] **.** Andean and Central American countries have included primary health care as a priority in their legal framework, and have developed policies to implement a PHC approach. El Salvador approved an Eight Key Points Health Care Reform that included community based health teams, increasing human and capital resources in primary care by 25% by 2009. [69]  An essential component to achieve this goal is the workforce. In 2013, Andean countries defined a regional policy of human resources for health (HRH) that included a component for the strengthening of health systems based in primary health care [70] , and most of them have national HRH policies. However, the number of physicians and medical students interested in primary care careers (family medicine or general practice) continues to decrease or in the best cases remains low. Additionally, some countries in the region are experiencing a high rate of migration of qualified health professionals. Some countries are strengthening and/or increasing the number of family physician training programs, but they are not including strategies to motivate medical students to move into this field.

**Study Setting**

Honduras is a country in Central America with a population of 8.1 million inhabitants, 55% living in rural areas and 7% of indigenous origin (WHO, 2013). In 2015 there were three universities with a school of medicine in Honduras:

1. Universidad Nacional Autónoma de Honduras (UNAH-FCM):

    a. UNAH – Campus Tegucigalpa

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        b.   UNAH – Campus Valle de Sula

   2.   Universidad Católica de Honduras

        a.   UCH – Campus Tegucigalpa

        b.   UCH – Campus San Pedro Sula

   3.   UNITEC (no graduates yet)

In 2012, Universidad Nacional Autónoma de Honduras (UNAH) had a total of 11 499 medical students in its two campuses [74] . In 2013 the number decreased to 8 100 due to assigned quotas and the introduction of an admission test.

Undergraduate medical education in Honduras encompasses eight (8) years. The first and second years are introductory to basic sciences (Anatomy, Physiology, etc.) and some liberal arts courses (history, philosophy, mathematics, etc.); third and fourth years are preclinical in nature and consist of organ-system blocks, patient-centered health, and public health. During fifth year students complete the core areas: internal medicine, surgery, pediatrics, and obstetrics and gynecology. Sixth year is for specialties and seventh year is the hospital internship. The eight-year is the Medical Social Service, a mandatory requirement before the student can graduate. Graduates from international medical schools must complete the social service before they can practice in the country. Graduates from the Latin American School of Medicine (ELAM) must complete two years of social service: the first year in a hospital setting, the second year in a primary care setting.

Training of physicians has little emphasis in primary care, and there is no family medicine program in the country. The curriculum includes PC in the training of medical students, but it is limited to few courses that are not perceived by the students as important or relevant for their careers. In 2014, UNAH initiated a curricula reform and by June 2015, the School of Medicine was completing a first draft of the

new study plan, which included a PHC cross-cutting dimension. An average of 70 Honduran physicians

graduate each year from the Latin American School of Medicine (ELAM) in Cuba, which offers a medical

program based in primary health care. Those physicians are joining the primary care national program to

fulfill the social service requirement. In 2013 there were 160 Cuban doctors in Honduras, most of them

assigned to primary care posts.

According to the Pan American Health Organization, [71] Honduras is among the five countries with

the lowest density of human resources in health in the region. In 2008 there were 6 792 physicians in

Honduras (8.8 per 10 000 population), and only 5 family practitioners (0.073% of total workforce) [72]

trained abroad since there is no family medicine program in the nation. According to Universidad

Nacional Autónoma de Honduras (UNAH), in 2008 there were 4 528 general practitioners (66.7%), most

of them inadequately trained in primary care and with little interest on this area. In 2012 the Secretary

of Health reported a GP - specialist's ratio of 1:0.8. This trend could change if the current specialist

annual growth of 4.5% continues, compared to 2.9% for GPs [73] .

**Figure 2: Numbers of General practitioner versus Specialists in Honduras. 2008-2012**
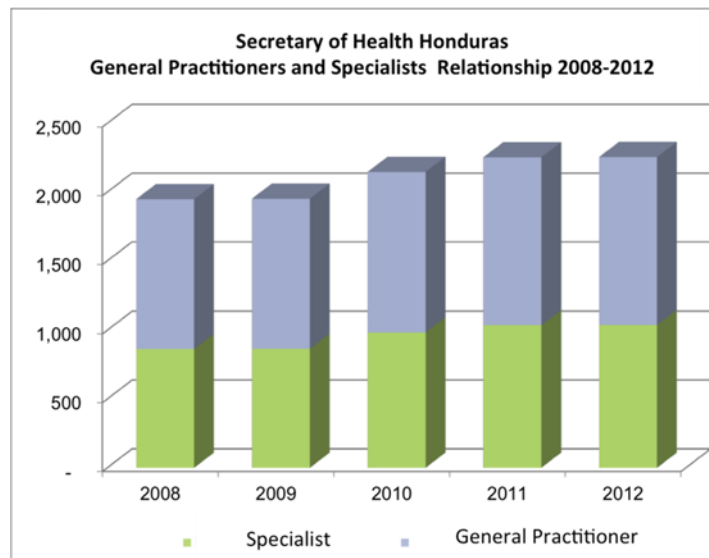


Source: Secretary of Health, Tegucigalpa-Honduras, 2013.

In Honduras general practitioners (GPs) and family doctors are considered primary care physicians. GPs do not have a medical specialty and their training is hospital-based, with little emphasis in primary care settings. Family physicians complete a residency program that lasts from three to four years, but there are few of them since the country does not offer a family medicine program. In 2014 the salary of employed physicians was USD 1 304 for general practitioners and USD 1 544 for specialists (Secretary of Labor, December 2014). There was only a USD 240 difference in favor of the specialists.

In May 2013, Honduras approved the National Healthcare Model and soon after a Presidential decree directed the strengthening of a national health system based on primary healthcare. By May 2015, a total of 330 primary care health teams were organized to deliver healthcare to nearly one million people from urban and rural areas of Honduras, with difficulties accessing healthcare services. The teams were composed of physicians and nurses in their social service year, nurse´s aides, health promoters or environmental health technicians (in Honduras, upon completion of medical school, medical and nursing students must complete a year of social service before they obtain their degree.) As the model consolidates, the Secretary of Health is responsible to incorporate regular staff to the health units to strengthen the delivery of primary care and to ensure the continuity of the model. The model implementation will be carried out progressively in 17 departments of the country and progressively the basic health units will articulate with ambulatory centers and hospitals in integrated health services delivery networks in order to achieve the continuity of care.

Little is known about factors that influence medical students in Honduras to choose primary care careers. The identification of facilitators and barriers that influence medical students when choosing a career in primary care will allow the Secretary of Health and the academia to implement strategies to promote training of PC specialties and support a broader policy shift toward the National Healthcare Model.

**Research Purpose and Specific Aims**

The purpose of this study is to more fully understand the factors that influence medical students in Honduras when deciding on their future specialty. The study is limited to 8th year medical students who are beginning the social service program, since they are close to making definite career choices. The questions being addressed by this study are:

What are the specialties that medical students in Honduras are selecting?

What are the factors that influence career choice in primary care among medical students in Honduras?

The specific research aims are:

1.   Describe patterns of specialty choice

2.   Investigate relationships between career selection and selected demographic indicators among 8th year med students

3.   Identify salary perception of primary care careers, and medical and surgical specialties

4.   Identify factors that influence career choice in PC among 8th year medical students in Honduras

5.   Identify factors influencing desired location of future medical practice

6.   Recommend a plan for change that includes specific actions and products to support the Government of Honduras and academic institutions to establish strategies and policies for strengthening the PC workforce.

**CHAPTER 2: LITERATURE REVIEW**

Understanding the factors that influence career choice among medical students can improve the development of strategies to motivate students in the election of primary care specialties, and reduce the gap of PC practitioners.

This chapter reviews the literature on two areas of inquiry related to this issue:

1) Intrinsic and extrinsic factors that influence the decision of medical students to choose a career in PC, and

2) Differences and similarities in factors that influence medical students from high-, middle- and low-income countries.

**Methods**

A systematic review of scientific literature that studies characteristics of medical students who choose a career in primary care was conducted to identify factors that influence their decision.

**Definitions for use in this study:**

*Primary Care*: "The provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community." (Institute of Medicine-IOM 1978) (Donaldson et al. 1996; IOM 1978)

*Medical Student*: Individual attending an accredited medical school as a registered undergraduate

student.

*Career choice*: a profession or occupation chosen as one's life's work.

*Primary care physicians*: Physician´s specialties that adhere to the principles of primary care characteristics in their practices. In the US, primary care physicians include family and general practitioners, general internists, and general pediatricians. (Weiner and Starfield 1983).

*Family Medicine*: A specialty that provides comprehensive, continuing care to patients and their families. Family physicians apply and integrate medical knowledge, clinical skills and professional attitudes in their provision of care, in the context of patients, families and their communities (College of Family Physicians of Canada).

*Extrinsic Factor*: originating or acting from outside (the environment); external. Salary or economic incentives are extrinsic motivators.

*Intrinsic Factor*: relating to the essential nature of a thing; inherent. A positive social attitude toward underserved population is an example of an intrinsic factor.

**Eligibility Criteria**

The selected studies included at least one factor that influences career choice among medical students. The types of studies considered were descriptive and analytical, with qualitative and quantitative data. The papers were published between 2003 and 2013, since important efforts to improve the situation of human resources in health have taken place during this time: Toronto Call to Action (Canada, 2005), First Global Forum in Human Resources for Health (Uganda, 2008), Second Global Forum in Human Resources for Health (Thailand, 2011). The languages of publication were English, Spanish, French and Portuguese, considered the PAHO official languages. The selected studies were reviewed articles, indexed journal articles and systematic reviews.

*Inclusion criteria*

- Studies that addressed at least one factor (barrier or facilitator) that influence career choice among medical students

- Published between 2003 and 2013

- Descriptive and analytical

- Quantitative and qualitative

- In English, Spanish, French and Portuguese

- Investigation articles, systematic reviews

*Exclusion criteria*

- Studies that addressed career choice among students from other health professions

- Articles published in non-indexed journals

- Article published in other than PAHO official languages

- Unofficial reports

- Published before 2003

**Data Sources and Search Strategy**

The review included several searches of literature indexed in *PubMed*, *Google Scholar* and *BVS* (*Biblioteca Virtual de Salud* – Virtual Library of Health) using a broad set of terms to maximize sensitivity. The search strategy included a combination of key words and search terms (Table 2). The reviewer followed links to find other related articles and also contacted one of the authors to request further information about additional studies and other relevant authors on human resources in health in Latin America (a snowballing sampling technique).

**Table 2: Search Strategy**

| Search Date | Databases | Key Words and Search Terms |
|---|---|---|
| 08/04/2013 | PubMed | Medical career choice |
| | PubMed | Career choice AND medical student |
| | PubMed | Career choice AND medical student |
| | PubMed | Career choice AND medical student AND (family practice OR family medicine OR primary care) |
| | PubMed | Career choice AND medical student AND (family practice OR family medicine OR primary care) AND (barriers OR factors OR incentives OR facilitators) |
| 01/04/2013 | BVS | "Medical career choice" |
| | BVS | "Career choice" AND "medical student" |
| | BVS | "Career choice" AND "medical student" AND "family practice" |
| | BVS | "Career choice" AND "medical student" AND "family practice" AND "factors" |
| 01/04/2013 | Google Scholar | Medical career choice |
| | Google Scholar | "Career choice" AND "medical student" |
| | Google Scholar | "Career choice" AND "medical student" AND "family practice" |
| | Google Scholar | "Career choice" AND "medical student" AND "family practice" AND "factors" |
| | Google Scholar | "Career choice" AND "medical student" AND "family practice" AND "factors" AND "incentives" |
| | Google Scholar | "Career choice" AND "medical student" AND "family practice" AND "factors" AND "incentives" AND "barriers" |

**Study Selection**

The reviewer selected the following types of articles: investigations and systematic reviews. An initial search was carried out using a general approach ("Medical Career Choices" and "Career choice AND medical students"), followed by a more refined search (see Search Strategy). The studies were screened by title and abstract and some records were excluded because they did not meet the inclusion criteria or they were duplicates. Full-text articles were assessed for eligibility; some were excluded because they did not meet inclusion criteria to end with a total of 55 studies included in the systematic review.

**Data Collection Process**

The reviewer appraised and extracted details of relevant articles using a standardized abstraction form that included information about the author, journal and year of publication, location, purpose of the study, study design, major findings, limitations and observations.

The reviewer used narrative synthesis methods to integrate findings into descriptive summaries, using a four-element process (Popay et al, 2006):

- Developing a theory about what are the main factors that influence medical students to follow a career in primary healthcare, why and how;

- Developing a preliminary synthesis;

- Exploring relationships within and between studies;

- Assessing the robustness of the synthesis.

**Quality Assessment of Selected Studies**

The reviewer used the *Quality Assessment Tool for Quantitative Studies,* [75] which rates articles on the following criteria: selection bias, study design, confounders, blinding, data collection method and withdrawals and dropouts. Each criterion was assessed using the *Quality Assessment Tool for Quantitative Studies Dictionary* [76] a tool used to assist reviewers in scoring study quality by rating each section of a study as strong, moderate, or weak. A study was categorized as "strong" if it had no weak ratings, "moderate" if it had 1 weak rating, and "weak" if it had 2 or more weak ratings.

For the qualitative studies, the *Critical Appraisal Skills Program* (CASP) tool [77] was used, which includes criteria such as reliability, validity, and objectivity. The tool includes 10 questions on aims, methodology, research design, recruitment strategy, and data analysis. A selected study was categorized as "strong" if it had 8 – 10 positive responses, "moderate" for 5 – 7, and "weak" for less than 5.

**Synthesis of Results**

The reviewer defined intrinsic and extrinsic factors that influence career choice of medical students, and grouped together factors that were shared by medical students from high-, middle-, and low-income countries. For those factors that were different, the reviewer grouped low- and middle-income countries as a single unit of analysis, and compared them with influential factors among medical students from high-income countries.

**Results**

**Study Design**

The initial search identified a total of 5 083 related records from three different databases (PubMed, Google Scholar and BVS). A refined search identified 600 records, 255 studies were screened by title and abstract and 181 records were excluded because they did not meet the inclusion criteria (169) or they were duplicates (12). Seventy-four full-text articles were assessed for eligibility, 19 were excluded because they did not meet inclusion criteria upon further review. The final review included 55 studies (Figure 3). The majority of the articles (32) were cross-sectional studies (58.1%). We also found 4 systematic literature reviews (7.2%), 6 cohort prospective (10.9%), 6 qualitative interviews and focus groups (10.9%), 2 analytical (3.6%), and 5 longitudinal studies (9.1%). The selected studies were mainly in the English language. There was one article in Spanish and another in Portuguese among the eligible studies, the rest were in English. All of the articles were from 2003-2013.

**Figure 3: Flow diagram of study selection**
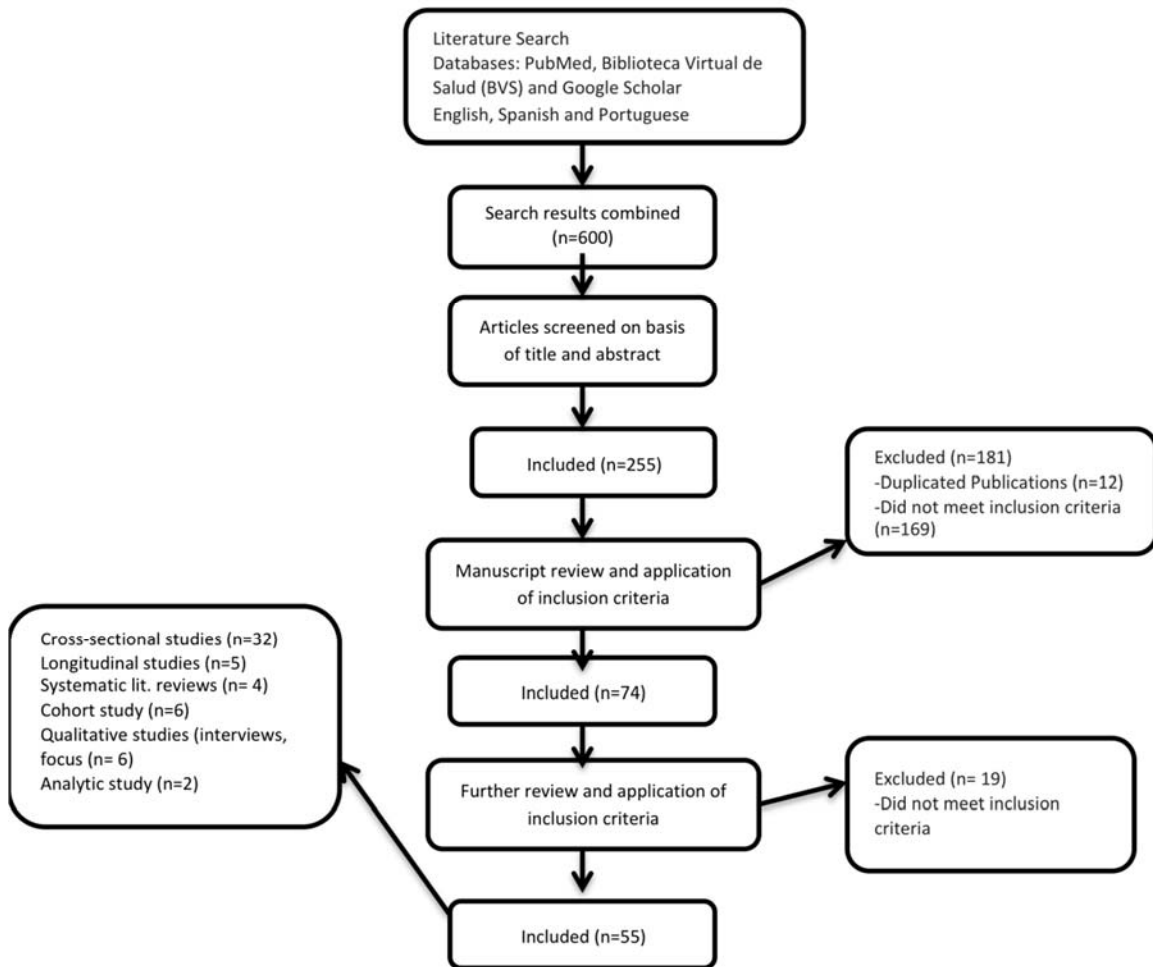


The selected articles discussed studies that were carried out in 7 high-income countries (Australia, Canada, Germany, Japan, New Zealand, United Kingdom, United States), and 13 middle-and low-income countries (Greece, Iraq, Jordan, Lebanon, Malaysia, Pakistan, Saudi Arabia, Turkey, Brazil, Chile, Trinidad, Ghana and Kenya). The systematic review included studies from 20 countries from Africa, the Americas, Asia, Europe, Middle East and Oceania (Table 3). One article was written in Spanish and other in Portuguese, the rest were written in English.

**Table 3: Countries and selected studies included in systematic review**

| High-income countries | | Middle-and low-income countries | |
|---|---|---|---|
| **Countries** | **No. studies** | **Countries** | **No. studies** |
| *Americas:* | | *Africa:* | |
| Canada | 9 | Ghana | 1 |
| United States | 21 | Kenya | 1 |
| | | | |
| *Asia:* | | *Americas:* | |
| Japan | 1 | Brazil | 1 |
| | | Chile | 1 |
| | | Trinidad | 1 |
| *Europe:* | | | |
| Germany | 2 | | |
| United Kingdom | 1 | *Europe:* | |
| | | Greece | 1 |
| *Oceania:* | | | |
| Australia | 6 | *Middle East and Asia:* | |
| New Zealand | 2 | Iraq | 1 |
| | | Jordan | 1 |
| | | Lebanon | 1 |
| | | Malaysia | 1 |
| | | Pakistan | 1 |
| | | Saudi Arabia | 1 |
| | | Turkey | 1 |
| *Total* | *42* | *Total* | *13* |

Ten articles from high-income countries (23.8%) were considered "strong" in terms of quality, 28 were "moderate" (66.7%) and 4 were "weak" (9.5%). There were no "strong" quality articles among the selected studies from middle- and low-income countries, and 30.8% were categorized as "weak".

**Key Facilitators and Barriers For Career Choice in Primary Care**

*Factors that influenced career choice among medical students from high-income countries*

The systematic review identified a variety of factors that influenced medical students from high-income countries to follow a career in primary health care (Table 4).

Canada and the United States share many of the demographic characteristics that influence medical students to follow a PC career: being female, married, engaged or living with a partner. [1,6,10,13,78-86] Rural background or previous exposures to non-urban/rural environments were also associated with a primary care career choice in developed societies. [1,78,79,85,87,88] Students with urban backgrounds had different reasons to follow a family practice career choice, including "…the opportunity to deal with a variety of medical problems; current debt load; and family, friends, or community". [78] Gill et al. identified four factors significantly associated with students preferring family medicine: emphasis on continuity of care, length of residency, influence of family, friends, or community, and preference for working in a rural community. Other authors also considered an important factor for career decision the influence of family, friends and community. [78,79,89-91]

Additionally, Scott et al. identified other characteristics among medical students who chose family practice, including not having parents with postgraduate university education, nor having family or close friends practicing medicine, having volunteered to work in a developing country, desire for a broader scope of medical practice, an orientation toward society, a lower interest in research, desire for short postgraduate training, and "lower preference for medical versus social problems" [81] . Having family physician mentors was an important factor that influenced the decision to choose a family practice career in most of the high-income countries analyzed. [92]

Positive attitudes regarding professional responsibility toward underserved populations was a factor associated with primary care residency. A societal orientation ("working with the poor", "altruistic personal values", "underserved populations", "dealing with people") was a predictor for choosing a family PC career in Canada, [81,86] and in the USA. [7,9,83,93-95] Wayne did not find this association in a later cohort. [93]

In two studies, most of the participants who were considering a career in primary care or a rural practice came from public medical schools. [12,83] Rabinowitz found that planning to become family physicians or to work rurally was related to a career choice in primary care. [87] Less interest in research was a common trait among students who were interested in pursuing a career in primary care. [81,83,96] The short length of a family medicine residency program was also considered a facilitator for medical students, [1,78,81,97] as well as an early exposure to general practice (in quality and quantity). [91,98] The varied scope of practice in primary care careers was a predictor of moving into that professional direction. [81,86,95,99] Financial incentive was a factor that positively influenced career choice. [100] Flexibility of work (working conditions) was an important factor to opt for PC careers in two studies, [11] as well as being less hospital-oriented. [86,101]

There were several intrinsic factors that were associated with a PC career choice, including having a social/extroverted personality type, [79,84] being a patient-oriented student, [82] and having volunteered in a developing nation. [81,85]

Among French medical students, the main motivating factor to pursue a general practice career included the possibility to deal with interesting diseases, opportunities for private practice and patient contact. The participants in the French National Practice Examination considered that "poor quality of life, an exclusively hospital-based career and loss of patient contact" were some of the reasons why they would choose a general practice career. [28] German medical students considered factors such as gender (female), age (older), patient orientation, "the possibility to work with a broad spectrum of patients and diseases on a long-term care basis", and "good compatibility of work and family life", as the main reasons to pursue a family practice career. [82,102] Scottish medical students that were planning to enter a PC career rated their academic abilities lower, were disillusioned with hospital medicine or had already decided to become general practitioners. [101]

Among the barriers to following a PC career path, low income and/or debt were identified as major factors by several authors. [4-12] Interest in research was a negative factor among students, [6,103] as well as the low prestige given to primary care careers. [6,11-13] Aspects of medical school training were identified as barriers to influencing medical students to become family physicians: family medicine poorly reflected in the curricula, lack of exposure to family practitioners and negative perception of family doctors were the main determinants. [9,14] The breadth of knowledge needed in family medicine was a barrier for students in two reviewed studies. [11,12]

**Table 4: Summary of findings in selected studies from high-income countries**

| Author/ Year | Sample size/ Country | Factors influencing career choice | Study Design | Study Quality* |
|---|---|---|---|---|
| | | **AMERICAS** | | |
| Bennett KL, 2010 | 200 articles USA | FACILITATORS: -Female gender, attendance at a publicly funded medical school, rural background or plan for a rural career, and lower expected income, older and/or married students, -Less interest in prestige or research, -Altruistic personal values and a commitment to service. | Systematic literature review incorporating a secondary data analysis | Moderate |
| Bazargan M, 2006 | Fourth year medical students (668) USA | FACILITATORS: -Being interested in serving the undeserved. -Strong student's social compassion attitudes and values. BARRIERS: -Personal practice-oriented considerations -Financial considerations -Medical training experiences | Cross-sectional survey | Moderate |
| Borges NJ, 2009 | Fourth-year medical students (356) USA | FACILITATORS: (positive influences) -By personal physician, by school faculty, and by medical school activities; GENERAL INFLUENCES: -Parents, faculty, coursework, income, and lifestyle. | Cross-sectional survey | Moderate |
| Colegrove DJ, 2009 | 161 (1386 total) osteopathic med students USA | FACILITATORS: Aged 34 years or over, being raised in a rural area BARRIERS: (practice of rural medicine) Overall interest in rural practice decreased in years 2 to 4 | Cross-sectional study | Moderate |
| Compton MT, 2008 | Med students 942/2080 USA | FACILITATORS: Female. BARRIERS: Career prestige | Cohort study | Moderate |
| DeZee KJ, 2011 | 4th-year med students in DoD obligation (447 of 797) USA | FACILITATORS: -Age was a factor for choosing PHC -Financial incentives before and after residency. | Cross-sectional quantitative and qualitative survey | Moderate |
| Dyrbye LN, 2012 | 858/1321 med students attending five schools. USA | BARRIERS: -Being a fourth-year student -Being female | Prospective, multi-center study | Strong |
| Grayson MS, 2012 | Medical students: 2674 (1ST), 2307 (4th) 81% response USA | BARRIERS: -Low income and debt | Longitudinal. | Strong |
| Hojat M, 2008 | Medical students (1,076) USA | FACILITATORS: -Women -Personality: sociability (not confirmed) | Cross-sectional | Moderate |
| Knox KE, 2008 | All Wisconsin medical students | FACILITATORS: -Interest in underserved populations, relationships with patients, scope of | Cross-sectional survey | Moderate |

| | (304/1480)<br>USA | practice, and role models<br>- PC students responded that salary and competitiveness were "not at all" important. | | |
|---|---|---|---|---|
| Lawson SR, 2004 | Medical students (555)<br>USA | FACILITATORS:<br>-Variables predictive of primary care residency choice were: gender; student ratings of psychiatry, surgery, and internal medicine clerkships; not having participated in a research project in medical school; attitudes toward "the changing health care system on physicians" and "access to medical care"; and planned practice in a medically underserved area. | Secondary analysis and a questionnaire, | Moderate |
| Manuel RS, 2009 | 349 students<br>(55% response)<br>USA | FACILITATORS:<br>-Early preference for person-oriented specialties | Cross-sectional survey | Weak |
| Newton DA, 2005 | Fourth year medical students (1,334)<br>USA | GENERAL FACTORS:<br>-Lifestyle, income.<br>(Family practice and internal medicine were considered as "lifestyle intermediate") | Cross-sectional | Moderate |
| Newton DA, 2010 | 4th year medical students<br>(337 students planning pediatric careers)<br>USA | FACILITATORS: (general pediatric careers)<br>-Married<br>-Anticipated lower incomes<br>-Rated lifestyle, comprehensive patient care, and working with the poor as more important<br>BARRIERS:<br>Prestige, income, and research opportunities. | Longitudinal survey | Moderate |
| Phillips JP, 2010 | All medical students<br>(983 of 1533)<br>USA | BARRIERS:<br>Students from middle-income families anticipating more debt were less likely to plan primary care careers. | Cross-sectional survey | Moderate |
| Rabinowitz HK, 2012 | 1,111 Medical students / graduates<br>USA | FACILITATORS:<br>-Growing up in a rural area,<br>-Entering med school with plans to practice in a rural area,<br>-Entering medical school with plans to be a family physician. | Longitudinal study | Strong |
| Rosenblatt RA, 2005 | Medical students<br>(14,240)<br>USA | FACILITATORS:<br>-Female students were much more interested in primary care—and especially pediatrics.<br>BARRIERS:<br>-Higher levels of debt (inverse relationship between the level of total educational debt and the intention to enter primary care). | Secondary data analysis | Strong |
| Royston PJ, 2012 | 141/225 med students from an osteopathic medical school<br>USA | FACILITATORS (Rural Practice):<br>-Being raised in a rural area for more than half of one's life<br>-Having a spouse or significant other who had lived in a rural area.<br>-Extroverted | Cross-sectional survey data | Moderate |
| Senf JH, 2003 | 36 articles<br>USA | FACILITATORS/PREDICTORS:<br>-Rural background, low income expectations, and do not plan a research career.<br>-Public med school | -Reassessment and literature review | Strong |

| | | | | |
|---|---|---|---|---|
| | | -Required family medicine time in clinical years<br>-Students planning on a career in a disadvantaged or rural area.<br>BARRIERS:<br>-Parents' socioeconomic status<br>-Prestige, low income, and breadth of knowledge required. | | |
| Teitelbaum HS, 2009 | Fourth-year osteopathic med students<br>1,882 of 2,345<br>USA | FACILITATORS:<br>-Dealing with people, women showed a slightly greater preference for a PCS<br>-Those who anticipated practicing in cities of fewer than 100,000 citizens.<br>BARRIERS<br>Income and debt | Cross-sectional survey | Strong |
| Wayne S, 2010 | 826 medical students.<br>USA | FACILITATORS:<br>-Strong professional responsibility toward underserved populations (early cohort)<br>This association was not found in the more recent group. | Prospective cohort survey:<br>Cohorts: 1993–1999 and 2000-2005 | Moderate |
| Feldman K, 2008 | First-year medical students (1907)<br>CANADA | FACILITATORS:  rural family medicine<br>-Have grown up rurally, graduated from a rural high school and have family in a rural location than others.<br>-They were more likely to be older, in a relationship, to have volunteered in a developing nation and less likely to have university-educated parents than those interested in a specialty. | -Cross-sectional design: questionnaire | Strong |
| Gill Harbir, et al, 2012 | Medical students:<br>1st year: 118<br>2nd Year: 120<br>3rd year: 107<br>82% response<br>CANADA | FACILITATORS<br>-Emphasis on continuity of care (87.3%)<br>-Length of residency (73.4%)<br>-Influence of family friends or community (67.1%)<br>-Preference for working in a rural community (41.8%)<br>-Older than 25 year (69.6%)<br>-Previously lived in rural location (46.8%)<br>-Gender: 69.6% were women | Cross sectional questionnaire survey | Moderate |
| Jordan J, 2003 | Medical students (11)<br>CANADA | FACILITATORS:<br>-Family physician mentors<br>-Contact with family practice models<br>-Opportunities to observe the diversity of family practitioner's work. | -Qualitative study using semi-structured interviews. | Moderate |
| Jutzi L, 2009 | All 525 medical students in U.Western Ontario<br>CANADA | FACILITATORS: (rural career)<br>Lifestyle considerations<br>GENERAL INFLUENCES:<br>-Family, professional development opportunities, partners, long-term earning potential. | Cross-sectional. Survey | Weak |
| Morra DJ, 2009 | Medical students<br>560/781<br>CANADA | BARRIERS:<br>- Payment as a factor in career decision-making increased with higher debt and with advancing training. | Cross-sectional<br>Focus group and survey | Moderate |
| Scott I, 2007 | Medical students (33)<br>CANADA | *Pre–medical school*:<br>Role models (positive and negative)<br>*Medical school:*<br>Little representation of family medicine in the curriculum; lack of exposure with family doctors and negative representations of family physicians. | -Qualitative study conducted along with a parallel quantitative study<br>-Focus groups and | Moderate |

| | | | interviews | |
|---|---|---|---|---|
| Scott I, 2011 | 1st year students (1542 of 1941) 8 medical schools<br><br>CANADA | FACILITATORS:<br>Being older, being engaged or in a long-term relationship, not having parents with postgraduate university education, nor having family or close friends practicing medicine, having undertaken voluntary work in a developing nation, not volunteering with elderly people, desire for varied scope of practice, a societal orientation, a lower interest in research, desire for short postgraduate training, and lower preference for medical versus social problems. | Cohort Prospective follow-up | Strong |
| Vanasse A, 2011 | Clinical (n=1109) and preclinical (n=829) med student<br><br>CANADA | FACILITATORS:<br>-Female, slightly older, married or living with partners, born in Canada, previous exposure to non-urban environments, a short residency program<br>BARRIERS:<br>-Debt related to medical studies.<br>-Interest in research | Descriptive study.<br>A cross- sectional, self-reported online survey. | Moderate |
| Wright B, 2004 | Medical students (519)<br>CANADA | FACILITATORS:<br>-Tended to be older, to be concerned about medical lifestyle and to have lived in smaller communities at the time of completing high school; they were also less likely to be hospital oriented.<br>-Demonstrate a societal orientation and a desire for a varied scope of practice. | Cross-sectional survey | Moderate |
| **OCEANIA** | | | | |
| Henry JA 2009 | 17 interns<br>AUSTRALIA | FACILITATORS:<br>-Rurality as a factor in student selection; -Rural experience during medical course. -Community connectedness<br>BARRIERS:<br>-A partner who was not committed to rural life. | Literature review and interviews. | Moderate |
| Jones M, 2009 | 6292 med students<br>AUSTRALIA | FACILITATORS (rural practice intention):<br>-Generalist intentions, length of rural residence and holding a scholarship (but not a bonded arrangement).<br>BARRIERS: (rural practice intention):<br>-Intentions towards specialist practice or the status of being supported by parents | Cross-sectional survey | Moderate |
| Roberts C et al, 2012 | Medical students (10), clinical supervisors and teachers (15), community health staff (3), AUSTRALIA | FACILITATOR:<br>-Prior rural exposure<br>-Personal attitudes: making a difference to the rural community<br>-Informal curriculum<br>BARRIERS: (rural practice)<br>-Geographical isolation<br>-Workload<br>-Perceived risks to education | -Qualitative study using semi-structured interviews and focus group | Moderate |
| Stagg P, 2009 | Med students / graduates<br>49 of 86<br>AUSTRALIA | FACILITATORS: (rural career)<br>Having a spouse/partner with a rural background; clinical teachers and mentors; the extended rural based undergraduate learning experience; and a specialty preference for general practice. | Retrospective survey | Weak |

| | | | | |
|---|---|---|---|---|
| Thistlethwaite J, 2008 | 13 medical students<br><br>AUSTRALIA | FACILITATORS:<br>-Role models encountered during medical school.<br>-Quality exposure to general practice<br>-Early exposure to general practice.<br>-Continuity of care, range of patients and conditions, stimulating patient-doctor interactions, skill mix, ability to practice holistic care, lifestyle, and autonomy.<br>-Flexible working hours and career path | Semi structured interviews | Moderate |
| Tolhurst H, 2005 | First and final year medical students (82)<br>AUSTRALIA | FACILITATORS:<br>The nature of the work (including its diversity), continuity of care, community context, and working conditions (including flexibility of training and work, availability of part time work and portability of qualifications).<br>BARRIERS:<br>Breadth of knowledge needed, boring work (in urban general practice), having to run a business, and working conditions (including relatively poor remuneration, overwork in rural general practice, and poor status of general practitioners). | Qualitative study: Focus groups | Moderate |
| Pasley T, 2009 | Graduating med students 186 of 262<br>NEW ZEALAND | FACILITATORS:<br>Regional/rural students were more likely to have strong interests in general practice than students intending to work in the city. | Longitudinal study | Moderate |
| Poole P, 2009 | Med students<br>Entry cohorts n=216 / Exit cohort n=115<br>NEW ZEALAND | GENERAL INFLUENCES:<br>-Positive experience in a clinical rotation, positive role models and flexibility in training | Cohort study Questionnaires | Moderate |
| **EUROPE** | | | | |
| Gibis B, 2012 | 12,518 med students, 15.7% of all medical students GERMANY | FACILITATORS:<br>Good compatibility of work and family life was important<br>Female<br>BARRIERS<br>-Expectation for working in clinical areas<br>-Attraction to larger town and cities | Cross-sectional study | Strong |
| Kiolbassa K, 2011 | Med students (114 of 1299)<br><br>GERMANY | FACILITATORS:<br>-Female, older, patient orientation<br>BARRIERS:<br>-Job-related ambition<br>GENERAL PREDICTORS<br>Individual aspects ('Personal ambition', 'Future perspective', 'Work-life balance') | Cross-sectional survey. | Weak/ Moderate |
| Sinclair HK, 2006 | All entrants into the medical school<br>United Kingdom | FACILITATORS:<br>-Being female, have their family home in Scotland, rate their academic abilities lower and their nonacademic abilities as average, and have decided on their future career earlier.<br>-General practice intention increased as students advanced in their studies.<br>-Reasons for general practice included: working in and being part of a community; continuity of patient contact; variety of illnesses and people encountered; undergraduate teaching experiences; dislike of or disillusionment with hospital medicine; and an increasing awareness of part-time opportunities. | -Longitudinal study, questionnaire and five annual follow-ups. | Strong |

| ASIA | | | | |
|---|---|---|---|---|
| Saigal P, 2007 | Medical students (25) Japan | GENERAL FACTORS:<br>- Illness in self or close others, respect for family member in the profession, preclinical experiences in the curriculum such as labs and dissection, and aspects of patient care such as the clinical atmosphere, charismatic role models, and doctor-patient communication. | Qualitative: semi-structured interviews | Moderate |

*Quality Assessment Tool for Quantitative Studies (*Effective Public Health Practice Project*)

***Factors that influenced career choice among medical students from middle- and low-income countries.***

Among the demographic characteristics, being a female was a common attribute for students who were considering primary care in Lebanon [104] and among those who intended to apply for pediatrics in Kenya and Pakistan. [105,106] On the other hand, in Ghana, male medical students predominated among those who chose a PC career or a rural practice. [107] while in Saudi Arabia gender was not an important factor. [108]

Rural origin and having lived in a rural area were attributes of medical students from Ghana who were considering a career in primary care. According to a study in Kenya, financial reward was perceived as a facilitator to following a career in primary care [105] while in Greece, the guarantee of employment upon completion of a residency program was a main factor for medical students to consider a general practice career. [109]

Primary care became more popular as Saudi Arabian students advanced in their careers. [108] A role model could be a positive or negative influence, but the evidence demonstrated that it is an important factor to consider when deciding about a career. [30,105,110] Participant students from Lebanon and Trinidad considered "intellectual challenge" as an influential factor when deciding for a primary care career. [104,111] "Benefits for the patient" was a determinant of career choice in Malaysia, Turkey and Trinidad [66,110,111] while "social responsibility" was a determinant for career choice only in Lebanon. [104] Lifestyle was a facilitator only among students from Trinidad. [111]

Low income was an important barrier among medical students interested in a primary care program from Brazil, Turkey, Jordan and Trinidad. [31,66,111,112] Debt was a barrier only for Brazilian medical students. [31]

Other negative influences were research opportunities in Kenya [105] and the emphasis given to specialized medicine in Chile. [30] Some students in Chile and Brazil considered the medical school

environment as a barrier for the following reasons: little emphasis in PHC, family medicine is not

reflected in the curricula, hospital-centered practices. [30,31] The low prestige of family medicine was a

barrier among students from Jordan, Trinidad, and Brazil [31,111,112] (Table 5).

**Table 5: Summary of findings in selected studies from middle-and low-income countries**

| AUTHOR | SAMPLE SIZE / COUNTRY | FACTORS INFLUENCING CAREER CHOICE | STUDY DESIGN | STUDY QUALITY* |
|---|---|---|---|---|
| **AFRICA** | | | | |
| Kotha SR, 2012 | All 4th year med students. 307 (99%) surveyed. 228 Ghanaian GHANA | FACILITATORS: (rural career) Male gender, having lived in a rural area but never lived abroad, and low parental professional and educational status. | Cross sectional questionnaire survey | Moderate |
| Maseghe Mwachaka P, 2010 | 450 med students KENYA | FACILITATORS: Female students were more interested in pediatrics. GENERAL FACTORS: Role model in specialty, job opportunities and financial rewards, intellectual challenge in the specialty, and research opportunities. | Cross-sectional self administered questionnaires | Moderate |
| **AMERICAS** | | | | |
| Baboolal NS, 2007 | First year medical students (170) TRINIDAD | GENERAL FACTORS: -Ability to help patients, intellectual ability, interesting and challenging work, lifestyle factors, financial reward and prestige. | -Cross-sectional survey/ questionnaire | Weak |
| Breinbauer K H, 2009 | 822 first to seventh year medical students CHILE | BARRIERS: -Emphasis given to specialized medicine in the teaching environment. GENERAL FACTORS: Medical school environment: curricula organized by specialty; little emphasis in PHC, family medicine in curricula; professors are specialists; internship and practices within a hospital setting and organized by specialties. Residents are considered role models. | Descriptive survey (cross-sectional) | Moderate |
| Cavalcante Neto, Pedro Gomes; 2008 | 27 articles BRAZIL | BARRIERS: Low prestige, low pay, limited contact with primary care during undergraduate medical training, and heavy student indebtedness. | Literature review | Moderate |
| **EUROPE** | | | | |
| Mariolis A, 2007 | Final year medical students (1237) GREECE | FACILITATORS: - Guaranteed employment on completion of the residency. | -Cross-sectional self-reported questionnaire | Moderate |
| **MIDDLE EAST AND ASIA** | | | | |
| Al-Mendalawi MD. 2010 | Final-year medical students (108 of 118) IRAQ | GENERAL FACTORS: - Most influencing factors: Personal interest, anticipated higher income. -Ranked at lower rates: prestige, anticipated future mastering of skills and development, charismatic role models, and family or spousal influence. -No statistical gender differences were noted. | Cross-sectional survey | Weak |
| Chew YW, 2011 | 4th, 5th medical students (425) MALAYSIA | GENERAL FACTORS: **Personal factors** 1. Influence of teaching faculty 2. Advice from parents/siblings/relatives 3. Advice from friends/ seniors 4. Possession of competency needed for this specialty 5. Financial rewards 6. Less work pressure | Cross-sectional questionnaire survey | Moderate |

| | | | | |
|---|---|---|---|---|
| | | and better quality of life⬛7. Less working hours/ability to spend time with family 8. Personal experience pertaining to the field.<br>**Professional factors** 1. Inspiration during clinical posting⬛2. Advice from practicing doctors⬛3. Lack of experts in the field in Malaysia 4. Continuous care for patients⬛5. No night calls⬛6. Preference for community-based settings 7. Suitability of specialty to own personality 8. Challenging nature of the field | | |
| Dikici MF, 2008 | First-year medical students (770)<br><br>TURKEY | GENERAL FACTORS:<br>- Better financial opportunities and prestige.<br>-Personal development<br>-More benefits for the patient.<br>-Wish to work in an urban area. | -Cross-sectional | Moderate |
| Huda N, 2006 | Final year MBBS students (232)<br>PAKISTAN | FACILITATOR:<br>Gender (women chose pediatrics as their second choice)<br>GENERAL FACTORS:<br>- Personal interest (most influential factor)<br>-Men as compared to women influenced by intellectual challenge, professional independence, content specialty and policies/missions of the college. | Cross-sectional questionnaire | Weak |
| Khader Y, 2008 | Second, fourth and sixth year medical students (440)<br><br>JORDAN | GENERAL FACTORS:<br>-Most influential: intellectual content of the specialty, individual's competencies.<br>-Other influential factors: reputation of the specialty, anticipated income, and focus on urgent care. | -A cross-sectional study: questionnaire-based survey | Moderate |
| Khater-Menassa B, 2005 | Graduating medical students (127)<br><br>LEBANON | FACILITATORS:<br>Being female<br>-Most important factors: intellectual opportunities, match of personal interest and skills and helping and social responsibilities.<br>-Diversity in diagnosis and treatment, and emphasis on patient education and prevention. | Cross-sectional survey | Weak |
| Mehmood SI, 2013 | Medical Students (590)<br>SAUDI ARABIA | Gender was not a factor to choose PC<br>PC specialties became more popular as students advance in their careers | Cross sectional study | Moderate |

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**Discussion**

This systematic review identified common and specific factors that influenced career choice in primary care among medical students from low-, middle- and high-income countries. Being female was a common intrinsic factor, while previous exposure to a rural location, having a rural background, influence of role models and working conditions were extrinsic factors that acted as facilitators (Figure 4). There were also some barriers that were common to low-, middle- and high-income countries. Limited research opportunities, low income, lack of prestige in primary care specialties, and a medical school environment biased towards hospital-based care were common extrinsic factors that acted as barriers.

**Figure 4: Facilitators and barriers that influence career path among medical students: underlying extrinsic and intrinsic factors in high-, middle- and low-income countries**
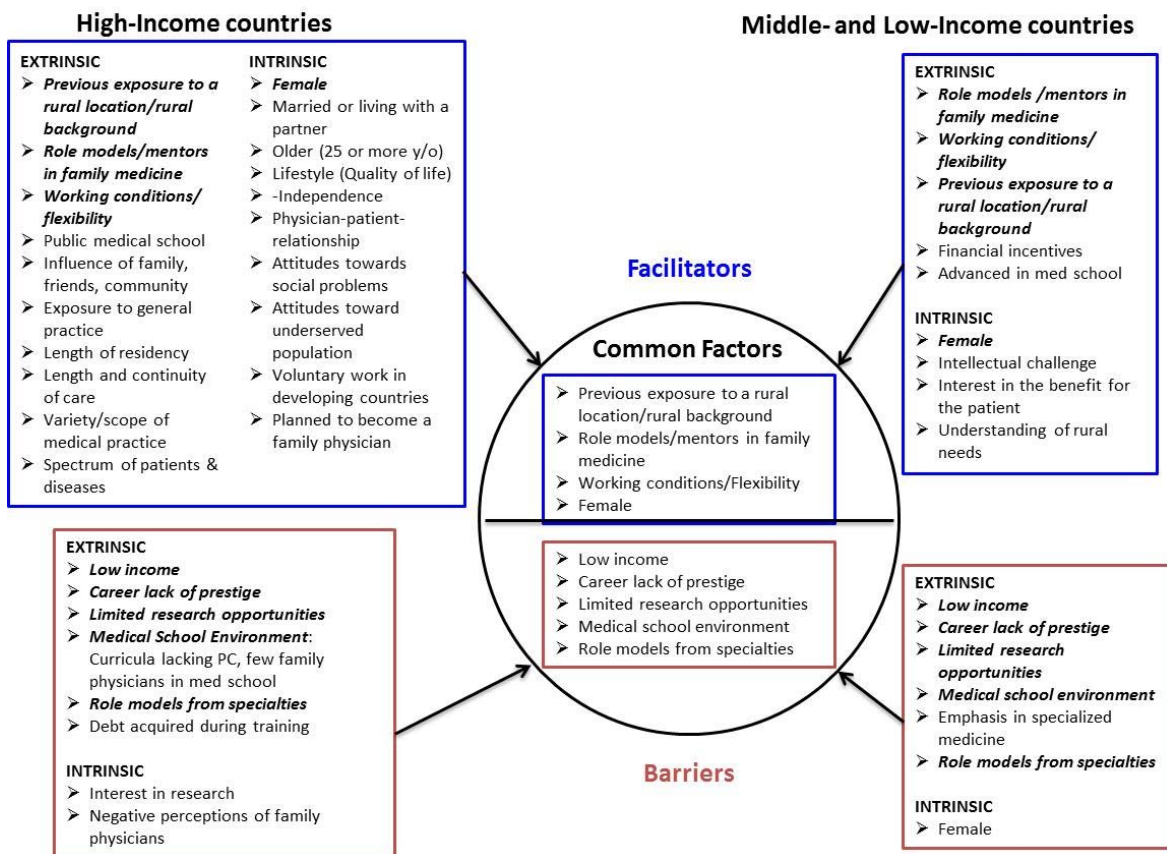
The review identified extrinsic factors that influence medical students to follow a primary care career, which were specific to high-income countries: exposure to general practice, length of residency, length and continuity of care, variety and scope of medical practice, spectrum of patients and diseases, work flexibility and having studied in a public medical school. The factors identified mostly related to the type of practice in primary care and its advantages compared to a hospital-based specialty. Debt acquired during training was a specific barrier to following a PC career among medical students in high-income countries, a factor closely related to lower income expectations.

Most of the positive intrinsic factors were specific to high- or middle- and low-income countries, and they were mostly related to demographics (being married, older), or to positive social attitudes toward underserved populations. "Interest in research" and "negative perceptions of family practice" were barriers perceived by medical students who considered choosing a PC career.

Extrinsic factors that influenced medical students from middle- and low-income countries to choose a PC career included financial incentives (Kenya) and being advanced in medical school (Saudi Arabia). The intrinsic factors cited were intellectual challenge, interest in the benefit of patient and understanding of rural needs. Specific extrinsic barriers included emphasis in specialized medicine and lack of research opportunities; the extrinsic barriers were "interest in research" and "negative perceptions of family physicians".

Since low income was one of the major barriers perceived by medical students to enter a PC career, financial rewards were considered motivators, especially in middle- and low-income countries, although more evidence is necessary.

The studies from high-income countries represented 76% of the total selected articles included in the review (studies from the USA represented 38% of the total and 50% of the high-income countries). Search results yielded a significant difference in the amount of studies on the present topic between

high-income countries, compared to middle-and low-income countries, despite an inverse relationship to the actual health needs of the population.

Factors relating to social altruism were more common among medical students from high-income countries than from the other groups. We expected students from middle- and low-income countries to be more sensitive to the social needs of the population, but the selected studies did not show that correlation. Only Turkish medical students included "benefits for the patient" as a factor that influenced their career intention. [66]

### Strengths and Weaknesses

#### Strengths

The systematic review included studies from countries located in five continents of the world. The use of three different databases diversified the search, and the inclusion of studies in Spanish, Portuguese and French allowed the addition of articles written in those languages. Many of the selected studies had large population samples and included several universities and medical colleges. The review included articles with a variety of study designs: cross-sectional, cohort, longitudinal, systematic reviews, analytic, and qualitative studies.

#### Weaknesses

Some of the studies from low- and middle-income countries did not meet the quality standards as much as those from high-income countries. The sample sizes were smaller and in most of the cases, from a single institution.

There is the possibility that some published studies that met the inclusion criteria did not appear in the three databases. Snowball sampling may have partially corrected this limitation. Additionally, unpublished studies from low- and middle-income countries were not represented, which may

represent a publication bias. The exclusion of articles published before 2003 may have omitted

literature that could have provided valuable information on the research topic as well.

Although the selected studies came from a total of twenty countries from all of the continents

(except Antarctica), they cannot be considered a representative sample of the world´s countries. As

stated earlier, there is an evident lack of research in the subject among low-and middle-income

countries.

### *Implications*

There are key factors within a medical school environment that influenced career intention among

medical students. Beginning with the selection process, medical school plays an important role in

identifying students who are interested in following a primary care path (i.e. by promoting applications

from students with a rural background). Curricula design, participation of family physicians as faculty,

early involvement of students in community activities, and development of a positive attitude towards

primary and rural care are some of the elements where the medical school can play an important role.

Public and private medical schools have a social responsibility toward the community they serve,

and they must adjust to local or regional needs. The evidence emphasized the importance of

strengthening rural practice programs where medical students have an early involvement with

community health problems. Collaboration between academic institutions and health providers can be

promoted with or without government participation to identify common objectives.

There were a number of factors (mostly intrinsic) that influenced career intention in PC before

admission into medical school, while other factors (mainly extrinsic) influenced medical students during

the training process (Figure 5). The present study did not analyze those factors that influence career

choice among physicians, but the researcher believes that the main efforts to promote primary care

careers among medical students should be placed in the admission process and during the medical

training.

**Figure 5: Factors determining a career choice in PC: a temporal approach**
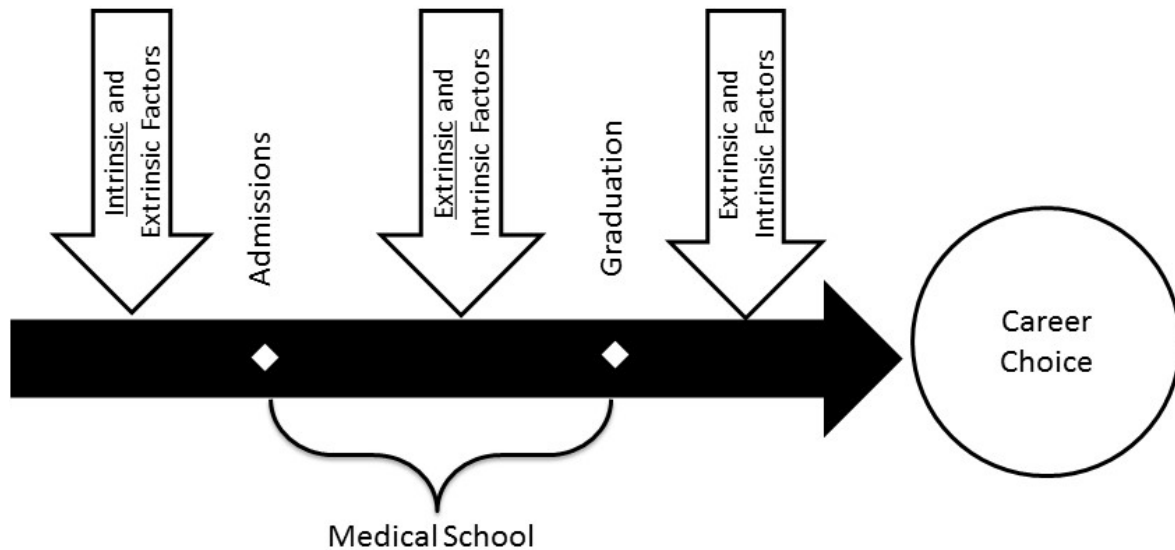


**Future Research**

This review demonstrated the need for more descriptive and analytical studies on the subject in low- and middle-income countries. Interventions directed to increase the number of medical students who choose primary care must be documented and their effectiveness and impact must be evaluated. On a macro level, it is necessary to evaluate the impact that national health systems and healthcare models have on career choice among medical students, especially from middle- and low-income countries.

**Gaps in the Literature and Conclusion**

The limited research on the topic in middle- and low-income countries could be related to a lack of interest on this particular area, or to an overall culturally related deficit in research in developing nations (or to both). The problem is not limited to a region of the world, since fewer medical students are choosing careers related to primary care. There is a need to expand research on these areas, including

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evaluating the interventions to increase the number of PC professionals, and assessing the impact on national health systems.

This review demonstrated that there is an important effort to identify factors that influence career choice among medical students; some of the factors are common across countries, and others are specific to high-, middle-and low-income countries.

Early intervention with medical students could improve the chances that they will follow a primary care career, as well as taking into consideration intrinsic factors that influence career choice, such as sex, age or rural origin. However, the environment will continue acting as a barrier: as described earlier, medical schools from everywhere continue offering hospital-centered medical training, governments continue paying low salaries to PC physicians, and society as a whole grants less prestige to primary care practitioners.

## CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

**Conceptual Model**

Career choice in primary care depends on a variety of elements. Socio-economic development influences the national health system in terms of access to healthcare services, modeling of supply and demand, financing and allocation of resources to the health sector. The health system defines the healthcare model: a hospital-centered approach or a primary health care approach. This environment influences health personnel, including medical students in training, but there are other elements, intrinsic and extrinsic, which affect their career choice. Figure 6 illustrates the relationship between those factors at the macro level.

The micro-level conceptual model (Figure 7) depicts the variables that influence medical students for career choice. There will be some medical students who are committed to PC and will choose a primary care career, others who feel positive about PC and will consider it; there are undecided med students, and those who are not committed to primary care. When finally choosing a career, there will be those who stick to their initial idea, but some will end up changing their career choice.

The present study focused on the intrinsic and extrinsic factors that influence medical students in choosing a primary care career in Honduras.

**Figure 6: Conceptual model: macro level**
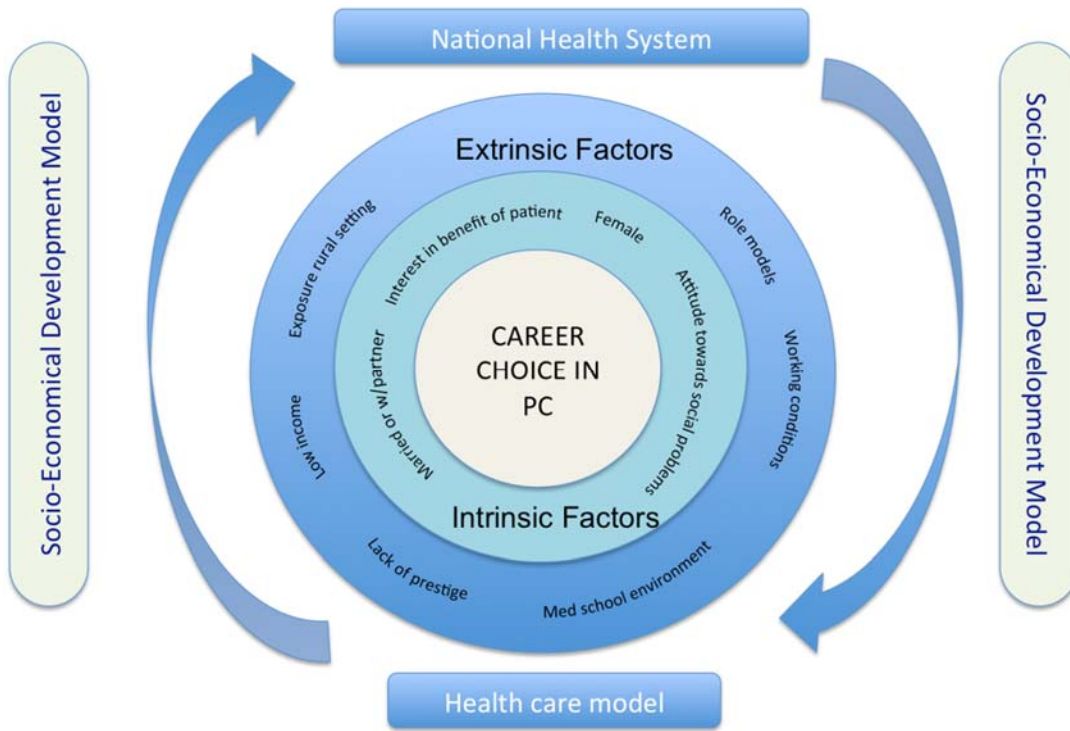


**Figure 7: Conceptual model: micro level**
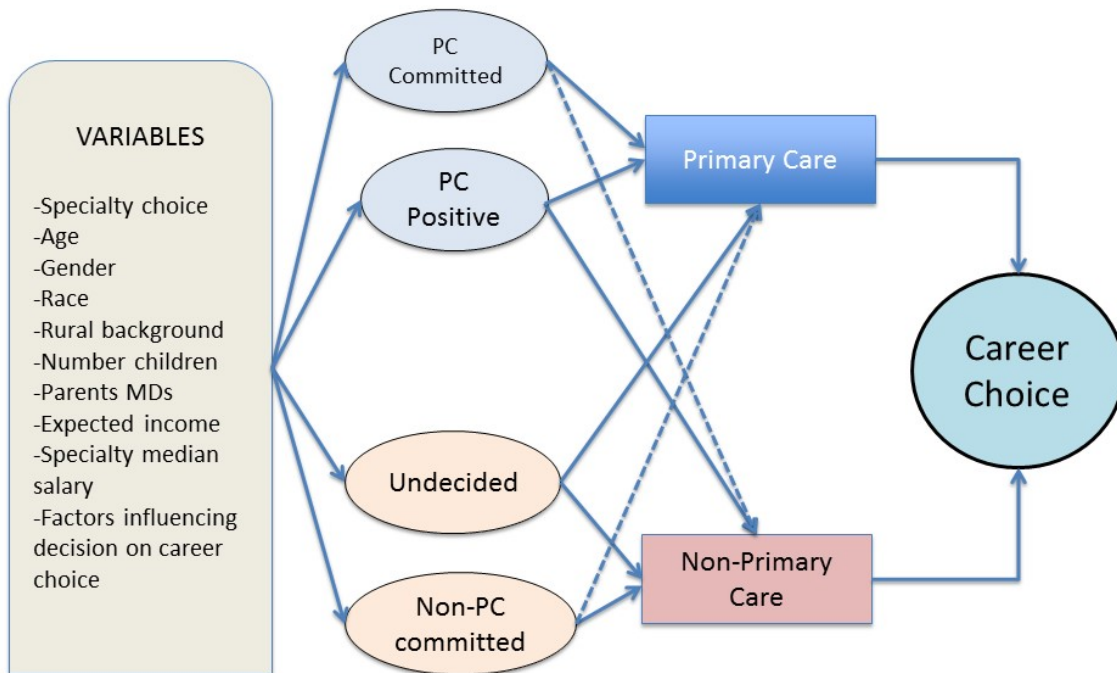
**Study Design**

The study used a mixed methods approach that included a cross sectional study aimed at exploring

and describing the factors that influence Honduran medical students in choosing a career in primary

care. The qualitative component is intended to provide richer insight into the contextual and

experiential factors associated with career choice in primary care from the perspectives of those who

are medical student leaders, primary care physicians, and faculty from Universidad Nacional Autónoma

de Honduras (UNAH).

**Quantitative component: Survey**

A cross sectional study using a survey questionnaire was administered to a cohort of 249 last-year

medical students from the two universities with schools of medicine in Honduras, plus students from

Escuela Latinoamericana de Medicina (ELAM) who are applying to the social service program in that

country:

- Universidad Nacional Autónoma de Honduras (UNAH)

- Universidad Católica de Honduras (UCH)

- Escuela Latinoamericana de Medicina, Cuba (ELAM)

**Sample**

After completing the seventh-year of study, medical students must engage in a one-year social

service program before they can practice medicine. Each time, a cohort of approximately 250 students

participates in a Secretary of Health lottery that randomly assigns individuals to health posts located

throughout the country. In this study, 249 out of 277 medical students from UNAH, UCH and ELAM who

registered for the Social Service program completed a survey questionnaire during their pre-service

training. The training is a three-day orientation designed for social service participants prior to their field

assignments. Of the 249 students who completed the survey, a total of 234 surveys fulfilled the inclusion criteria (see below) and had responses to at least 95% of the survey questions. These completed surveys were included in the study.

The selection of last-year medical students was purposeful, since their career intentions could closely reflect their actual eventual choices. Since most students just completed medical training and were about to start their social service year in primary care settings, this allowed the researcher to better understand the facilitators and barriers that determine a career choice in primary care, before the experience in a PC setting could influence them. Subjects were identified during the training prior to the beginning of the social service program. The cohort met at the auditorium of the School of Medicine of Universidad Nacional Autónoma de Honduras where the survey questionnaire was administered. Inclusion and exclusion criteria are listed below:

*Inclusion Criteria*

- Medical students from any Honduran accredited university about to start the Social Service program.

- National MD graduates from medical schools in other countries who returned to Honduras.

- Graduates from Escuela Latinoamericana de Medicina (ELAM) who need to complete the primary care component (their social service also includes one year of hospital work).

- International MD graduates from medical schools in other countries who are planning to practice in Honduras.

*Exclusion Criteria*

- Medical specialists

- 1st to 7th year medical students

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**The Instrument**

The survey *Factors Influencing Medical Students' Career Choice in Honduras* was adapted from a survey developed by the University of Alberta in Edmonton, Canada, and translated into Spanish by a team of professionals from the Human Resources for Health program at the Pan American Health Organization in Lima, Peru (Appendix 1). The questionnaire addressed four main areas:

1.    Demographic information

2.    Preferred medical specialties

3.    Salary Perception

4.    Factors influencing preferred specialty choice

Demographic characteristics included: sex, age, year of medical school, marital status, ethnicity, and whether a parent was a physician. Students rated how important they perceived each of 26 factors that may influence career choice using a modified Likert scale ranging from 1 (very unimportant) to 5 (very important). The list of medical career choices was adapted from the list used by the Canadian Resident Matching Service (CaRMS), the US Physicians Foundation Projection Model [113] and from the summary of specialties published by the Honduras College of Physicians (July 2014).

The survey instrument was piloted by a group of thirty-nine (39) 5th year medical students from Universidad Nacional Autónoma de Honduras (UNAH), 23 females (59%) and 16 males (41%). Most of the participants (72%) were 25 years old or younger. Prior to survey implementation, the principal investigator (PI) read the informed consent and asked the participants to sign the form. The mean time for survey completion was 15 minutes. When all students completed the survey, the PI asked questions regarding language, comprehension and pertinence of the questions. Notes were taken and suggested changes were taken into consideration. The pilot allowed the principal investigator to adapt the

language of the survey to a local context, using words and expressions commonly used in Honduras.

The principal investigator obtained written approval from the local UNAH-IRB to carry out the study, and a written authorization from the Vice-Chancellor to conduct the survey. The School of Medicine assigned a representative among the faculty to coordinate with the PI those activities related to the survey. The principal investigator and the faculty delegate met on two occasions to review the survey and organize the logistics of the activity.

**Data Collection**

The survey was conducted in the auditorium of the School of Medicine at UNAH on September 19th 2014, during the week of Social Service induction. On the day of the survey, an academic authority explained the study´s main objectives and requested the students´ participation. The principal investigator provided a brief description of the study using a Power Point presentation in Spanish. The PI explained the instrument and answered questions about the investigation. Then, the researcher read the informed consent and the assistants distributed the forms to be read and signed. The assistants distributed the survey guide and questionnaires that were completed by the participants. To ensure confidentiality, completed questionnaires were collected and placed in a box. All questionnaires were anonymous, and no personally identifiable information was collected.

**Qualitative Component: Interviews**

The researcher complemented survey data with data collected from semi-structured key informant interviews conducted in Honduras. Key informants were selected for their knowledge and experience on the subject, and for having insights that were useful for the study and that the PI did not have.

**Sample**

The sample was composed of eight (8) key informants, a HRH national authority, a dean of a medical school, a faculty member, two medical students (5th to 6th year), a family physician, a pediatrician and a

clinical specialist (psychiatrist). This sample was intended to provide a richer insight into the contextual and experiential factors associated with career choice in primary care from the perspectives of those who are students, faculty and physicians.

The selection of key informant leaders was purposeful, highlighting not only their clinical training as physicians and current practice, but also their academic view, their on-going training (medical students) and their positional authority through which they can influence and drive the adoption of policies (i.e. a new admission policy, a PC strengthening policy), or new training programs. The purposeful sampling of key informants with extensive knowledge of their specialty, academic experience and a broader view of the national health system, allowed for cross-validation or corroboration with survey data, and for in-depth study and understanding of the research questions. None of the potential key informants had a direct reporting relationship to the principal investigator.

**Data Collection**

The principal investigator conducted the semi-structured interviews. The topics explored included: (a) patterns of specialty choice, (b) factors that influence career choice, and, (c) location of future medical practice. The questionnaire includes ten open-ended questions distributed as follows: (3) opening questions; (1) introduction question; (3) questions on specialty choice; (2) questions on location of future medical practice; and, (1) end question, plus probes.

Subjects were contacted in person, by phone or by email to request their participation, at which time a brief description of the study was shared using a standardized script in Spanish. Phone calls were used when there was no response one week after the email contact. When participants agreed to be interviewed, an appointment was scheduled at a time convenient to them. The meeting was conducted face to face in a private room. All sessions were recorded with participant permission. Interviews lasted approximately 20-25 minutes.

The principal investigator obtained written consent from the participants at the time of the face-to-face interviews. The principal investigator reviewed the consent form orally and invited the participant to ask detailed questions about the study. Study participants were consented and interviewed in Spanish. Interviews were audiotaped and transcribed verbatim in Spanish. Later, interviews were converted into English using an online translation service. The PI reviewed and fixed parts of the translation.

For this mixed methods study, the researcher used a concurrent triangulation strategy, collecting quantitative and qualitative data concurrently and then comparing the two databases to confirm, disconfirm, cross-validate or corroborate the information. [114]

**IRB Approval and Confidentiality Issues**

Approval for the proposed study was obtained through the Institutional Review Board (IRB) at the University of North Carolina at Chapel Hill, and through the local IRB at Universidad Nacional Autónoma de Honduras.

The principal investigator obtained written consent from the medical students who agreed to participate in the survey, and from key informants at the time of the face-to-face interview. The principal investigator reviewed the consent form orally and the participants were invited to ask detailed questions about the study. Study participants consented, surveyed and interviewed in Spanish. All study procedures were described in detail such that the participant were fully informed of their requirements while in the study. During this consent process, medical students and key informants were reminded they are free to choose to take part in the research study or not, and that their decision will not affect their academic status or employment at the healthcare system. The principal investigator emphasized that participation was voluntary, that there was no negative consequence and no expected appropriate answer to the questions. Those who consent to participate in the study were enrolled.

During the consent process, all participants were informed that information they provide through interviews was confidential (i.e., not shared with anyone outside of the research team) and voluntary (i.e., they are not obligated to answer any question). Interviewees were told that they were free to take breaks and/or terminate the survey or the interview at any time.

Privacy risks and confidentiality were addressed as follows:

- The survey was conducted in a classroom with separate desks for each student.

- All interviews were conducted in private locations of the interviewees choosing.

- Identification numbers, rather than names, were used on research materials to identify participants.

- Hard copies of data and collateral materials such as consent forms were stored separately in a locked cabinet in the office of the principal investigator. All survey and interview data were stored in password-protected files on a computer at in the principal investigator's office.

Once the data were analyzed and the study completed, all questionnaires and recordings were destroyed to ensure that no responses would be linked to an individual. The results were presented in the aggregate and the names of the individuals kept confidential. Descriptors of key informants were included, but in order to maintain confidentiality of the respondent, these participants' names were not included.

**Confidentiality**

To maintain confidentiality, each questionnaire/subject was given a numeric identifier so their specific responses/comments could not be linked to the data. After the survey, the questionnaire data were entered into a digital database and saved on a password-protected computer in the principal investigator's office. Immediately after each interview, the digitally recorded files were uploaded and saved on a password-protected computer in the principal investigator's office. The interview files were

sent electronically to an individual on the research team for transcription. Interviews were transcribed

verbatim and verified against the audio recording to ensure that all thoughts and opinions were

included in the analysis. Once verification of the transcripts was complete, the investigator conducted a

content analysis, which involved identifying themes and categories prior to coding the data. In addition

to the principal investigator, an individual not involved in the interview but on the research team

independently reviewed half (50%) of the transcripts to ascertain themes and categories. As a result, a

set of codes and code definitions were developed.

A variety of themes and patterns emerged through this coding process. Following the coding of all

interviews, coding reports were generated for each of the codes in order to systematically analyze and

report on the information received during the key informant interviews.

Once the data was analyzed and the study completed, all questionnaires and recordings were

destroyed to ensure that no responses would be linked to an individual. The results were presented in

the aggregate and the names of the individuals kept confidential. Descriptors of key informants were

included, but in order to maintain confidentiality of the respondent, the participants' names were not

included. Hard copies of data and collateral materials such as consent forms were stored separately in a

locked cabinet in the office of the principle investigator. All interview data were stored in password-

protected files at the principal investigator´s office.

**CHAPTER 4: RESULTS**

As discussed in Chapter Three, a survey was applied to a total of 238 social service participants and a semi-structured interview was conducted to eight key informants. This section details the results of the survey and key informant interviews. Results responded to the following research aims:

1.     Describe patterns of specialty choice among 8th year medical students

2.     Investigate relationships between career selection and selected demographic indicators

3.     Identify salary perception of primary care careers, and medical and surgical specialties

4.     Identify factors that influence career choice in PC among 8$^{th}$ year medical students in

       Honduras

5.     Identify factors influencing desired location of future medical practice

The survey was structured to respond to the research questions in Aims 1, 2, 3 and 4. Interviews responded to the research questions in Aims 1, 4 and 5.

**Quantitative Component: Survey**

**Type of variables and analysis**

The analysis of data obtained during the survey included descriptive methods. Frequency distributions and percentages were calculated; the statistical analysis included a Chi-square test to assess relationships between two categorical variables belonging to a nominal or ordinal scale. A **α** level of .05 was used to determine statistical significance. Because many of these characteristics are

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correlated, the investigator conducted factor analysis to aggregate the effects into domains (or

"factors") influence career choice ("factor analysis"). Statistical analysis was performed using SPSS v.19®,

and significance was established as p< .05.

The independent variable for the study was the intended specialty choice. The independent

variables were demographic characteristics (age, gender, racial background, marital status, rural

background), expected income, and other intrinsic and extrinsic factors that influence career choice.

**Table 6: Types of variables and coding**

| Variables | CODE | Types of Variables | |
|---|---|---|---|
| Intended specialty choice | SPECIALTY | Nominal | Dependent |
| Age of medical students (<25 or >25) | AGE | Nominal | Independent |
| Gender of medical students | SEX | Nominal | Independent |
| Racial background | RACE | Nominal | Independent |
| Marital status | MARITALSTAT | Nominal | Independent |
| Geographic Setting | SETTING | Nominal | Independent |
| Number of children | CHILDREN | Nominal | Independent |
| Plans for children in the future | FUTCHILD | Nominal | Independent |
| Parents physicians | MDPARENT | Nominal | Independent |
| Feeling that this will be the final specialty choice | FINALCHOICE | Nominal | Independent |
| Second specialty choice | CHOICETWO | Nominal | Independent |
| Annual expected income | INCOME | Continuous | Independent |
| Estimated median salary of some specialties | SALARY | Nominal | Independent |
| Estimated median salary of first choice specialty | SALARYSPEC | Nominal | Independent |
| Factors influencing decision on career choice | FACTORa - FACTORaa | Nominal | Independent |

**Reclassification of Variables**

Some of the options got few responses or did not get any at all, thus the researcher reclassified

"Settings" into two variables: *urban* (inner city, urban/suburban, two or more setting) and *rural* (small

town, rural). Specialties were classified in four main groups: *primary care*, *emergency medicine*, *surgical*

*specialty* or *medical specialty*, as described in Table 7.

**Table 7: Specialties reclassified in four main groups**

| *Primary Care Specialties* | *Emergency Medicine Specialties* | *Surgical Specialties* | *Medical Specialties* |
|---|---|---|---|
| 1. Family Medicine<br>2. General Practice<br>3. Pediatrics<br>4. Public Health | 1. Emergency medicine<br>2. Intensive care | 1. Thoracic Surgery<br>2. Surgery<br>3. Neurological Surgery<br>4. Pediatric Surgical Specialties<br>5. Plastic Surgery<br>6. Ophthalmology<br>7. Otorhinolaryngology<br>8. Traumatology and Orthopedics<br>9. Urology | 1. Anesthesiology<br>2. Cardiology<br>3. Dermatology<br>4. Endocrinology<br>5. Tropical and Infectious Diseases<br>6. Pediatric Non Surgical Specialties<br>7. Gastroenterology<br>8. Geriatrics<br>9. Gynecology / Obstetrics<br>10. Allergy / Immunology<br>11. Physical Medicine and Rehabilitation<br>12. Internal Medicine<br>13. Nephrology<br>14. Pulmonology<br>15. Neurology<br>16. Oncology<br>17. Pathology<br>18. Psychiatry<br>19. Radiology<br>20. Rheumatology |

Prior to applying factor analysis, the rating scale was grouped into: *Important* (somewhat important

and very important) or, *Not important* (very unimportant, somewhat unimportant, and neither

unimportant nor important).

**The Respondents**

There were 277 medical students in their 8th year who registered for Social Service in the last trimester of 2014. Almost half of them (47.7%) came from Universidad Nacional Autónoma de Honduras (UNAH).

**Figure 8: Applicants to Social Service program by university, September 2014**
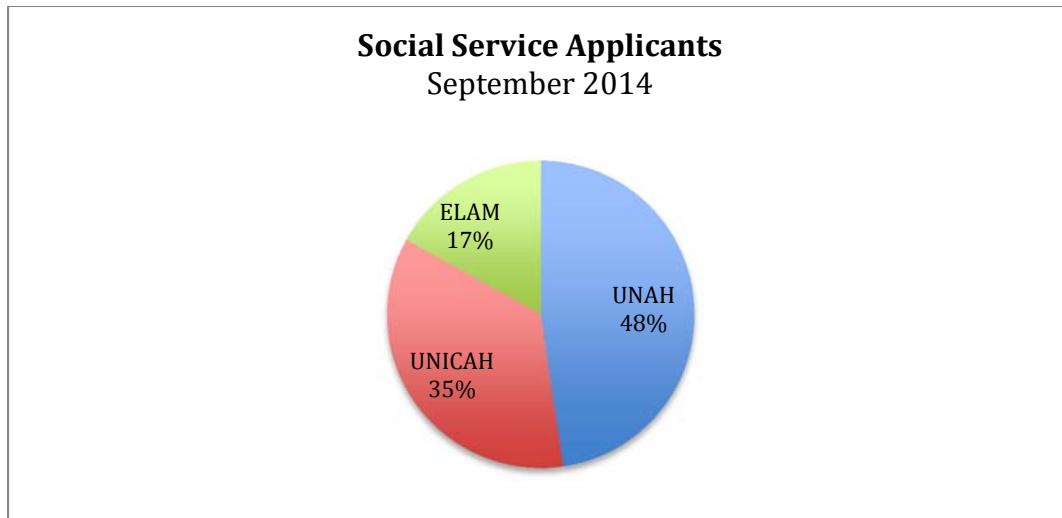


The day of the placement lottery, there were 249 Social Service applicants present at the moment the researcher carried out the survey. The overall completion rate was 100.0% (249 of 249), calculated as the total number of completed surveys divided by the total number of distributed surveys. Eight surveys were eliminated because the participants were already specialists who needed to complete the Social Service program in order to practice in the country. Seven additional surveys were eliminated because they were incomplete (more than 5% empty responses). The total number of completed surveys was 234, which represented 84.5% of the total number of applicants to social service for that period, and 93.9% of the social service applicants present at the moment of the survey (response rate).

Most of the students (92.3%) who participated in the survey were in their 8th year of medical school, beginning the social service program. There were 13 participants (5.6%) who responded "other",

probably graduates from medical schools out of Honduras.

**Demographic Characteristics**

More than half of the participants were older than 25 years (59.4%). The number of female

participants (N=148) was almost twice that of male participants (N=80). Most of the respondents

considered themselves of mestizo origin (N=205, 87.6%); there were 25 students who categorized

themselves as white (10.7%), and only two Afro descendant (0.9%).

**Figure 9: Age of the respondents**
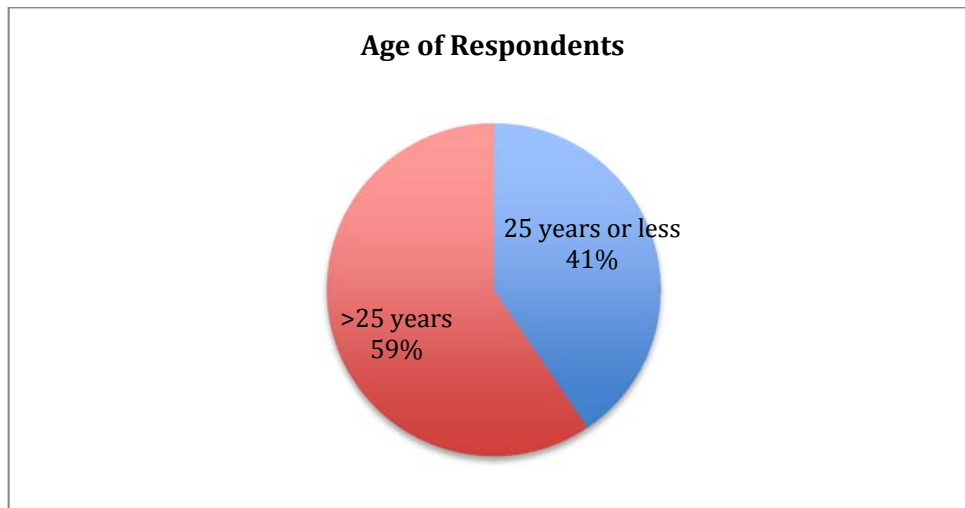


**Table 8: Sex of respondents**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Male | 80 | 34.2 | 35.1 | 35.1 |
| | Female | 148 | 63.2 | 64.9 | 100.0 |
| | Total | 228 | 97.4 | 100.0 | |
| Missing | No Answer | 6 | 2.6 | | |
| Total | | 234 | 100.0 | | |

Racial background was similar between male and female, with a predominance of mestizo population in both cases.

Most of the students were single (81.2%), 41 (17.5%) declared they were married or living with a partner. Most of the participants (84%) did not have any children at the moment of the survey; however, 171 respondents (87.2%) were planning to have children in the future.

The majority of participants came from an urban setting (88%), 3 came from inner city (1.3%) and only 15 (6.4%) came from a rural setting. Since there were few responses in some of the options, the researcher re-categorized "Setting background" into two variables: *urban* (inner city, urban/suburban, two or more setting) and *rural* (small town, rural). Under this categorization, 92% of the participants came from urban areas prior to admission to the university.

**Figure 10: Area where participants lived prior to university admission**
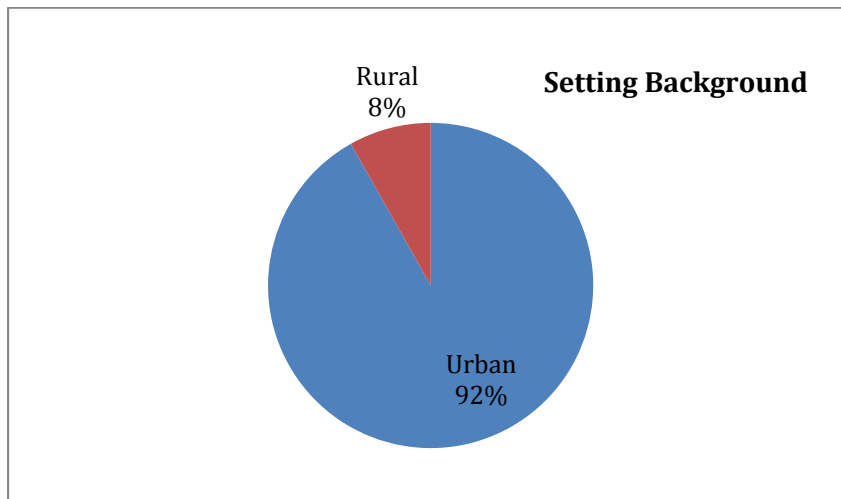


Fifteen percent of the respondents had a parent who was a medical doctor, in most of the cases (74.3%) the father. Three students (8.6%) had parents who were both medical doctors.

**Aim 1: Describe patterns of specialty choice among 8th year medical students**

**Preferred Medical Specialties**

The most likely medical specialties identified by participants were: Gynecology/Obstetrics (9.8%), Surgery (9%), Psychiatry (8.5%) and Internal Medicine (8.1%). Pediatrics was the first choice for 16 respondents (6.8%). There were two participants (0.9%) who selected Family Medicine as their most likely specialty, one chose Public Health (0.4%), and one chose Tropical and Infectious Diseases (0.4%). There were no social service candidates who selected General Practice as their preferred choice (Table 9). Only 20.5% students considered that it was their final career choice; most of the participants (71.8%) responded that it was a probability.

**Table 9: Most likely specialty selected by respondents**

| Specialty | Frequency | Percent |
|---|---|---|
| Gynecology/Obstetrics | 23 | 9.8 |
| Surgery | 21 | 9.0 |
| Psychiatry | 20 | 8.5 |
| Internal Medicine | 19 | 8.1 |
| Pediatrics | 16 | 6.8 |
| Cardiology | 11 | 4.7 |
| Dermatology | 11 | 4.7 |
| Urology | 10 | 4.3 |
| Pediatric Non Surgical Speciaties | 9 | 3.8 |
| Radiology | 9 | 3.8 |
| Traumatology and Orthopedics | 9 | 3.8 |
| Gastroenterology | 8 | 3.4 |
| Other | 8 | 3.4 |
| Anesthesiology | 7 | 3.0 |
| Pediatric Surgical Specialties | 7 | 3.0 |
| Plastic Surgery | 6 | 2.6 |
| Physical Medicine and Rehabilitation | 6 | 2.6 |
| Otorhinolaryngology | 6 | 2.6 |
| Geriatrics | 4 | 1.7 |

| | | Frequency | Percent |
|---|---|---:|---:|
| | Endocrinology | 3 | 1.3 |
| | Pulmonology | 3 | 1.3 |
| | Thoracic Surgery | 2 | .9 |
| | Neurological Surgery | 2 | .9 |
| | Emergency Medicine | 2 | .9 |
| | Family Medicine | 2 | .9 |
| | Neurology | 2 | .9 |
| | Ophthalmology | 2 | .9 |
| | Oncology | 2 | .9 |
| | Tropical and Infectious Diseases | 1 | .4 |
| | Allergy/Immunology | 1 | .4 |
| | Pathology | 1 | .4 |
| | Public Health | 1 | .4 |
| Total | | 234 | 100.0 |

The most frequent second choice of specialty identified by respondents included: Surgery (8.7%), Dermatology (8.2%) and Internal Medicine (8.2%), Traumatology and Orthopedics (7.1%), Pediatrics (6.6%), and Plastic Surgery (6.0%). There were four participants (2.2%) who selected Family Medicine as their second choice of specialty, two chose Public Health (1.1%), one chose Tropical and Infectious Diseases (0.5%), and one respondent selected General Practice (0.5%) (Table 10).

**Table 10: Second preferred choice of specialty**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---:|---:|---:|---:|
| Surgery | 16 | 6.8 | 8.7 | 8.7 |
| Dermatology | 15 | 6.4 | 8.2 | 16.9 |
| Internal Medicine | 15 | 6.4 | 8.2 | 25.1 |
| Traumatology and Orthopedics | 13 | 5.6 | 7.1 | 32.2 |
| Pediatrics | 12 | 5.1 | 6.6 | 38.8 |
| Plastic Surgery | 11 | 4.7 | 6.0 | 44.8 |
| Gynecology/Obstetrics | 10 | 4.3 | 5.5 | 50.3 |
| Physical Medicine and Rehabilitation | 10 | 4.3 | 5.5 | 55.7 |

| | | | | |
|---|---|---:|---:|---:|---:|
| | Urology | 9 | 3.8 | 4.9 | 60.7 |
| | Gastroenterology | 7 | 3.0 | 3.8 | 64.5 |
| | Neurology | 5 | 2.1 | 2.7 | 67.2 |
| | Otorhinolaryngology | 5 | 2.1 | 2.7 | 69.9 |
| | Radiology | 5 | 2.1 | 2.7 | 72.7 |
| | Anesthesiology | 4 | 1.7 | 2.2 | 74.9 |
| | Pediatric Surgical Specialties | 4 | 1.7 | 2.2 | 77.0 |
| | Family Medicine | 4 | 1.7 | 2.2 | 79.2 |
| | Ophthalmology | 4 | 1.7 | 2.2 | 81.4 |
| | Oncology | 4 | 1.7 | 2.2 | 83.6 |
| | Cardiology | 3 | 1.3 | 1.6 | 85.2 |
| | Pediatric Non Surgical Specialties | 3 | 1.3 | 1.6 | 86.9 |
| | Allergy/Immunology | 3 | 1.3 | 1.6 | 88.5 |
| | Thoracic Surgery | 2 | .9 | 1.1 | 89.6 |
| | Neurological Surgery | 2 | .9 | 1.1 | 90.7 |
| | Intensive Care | 2 | .9 | 1.1 | 91.8 |
| | Geriatrics | 2 | .9 | 1.1 | 92.9 |
| | Emergency Medicine | 2 | .9 | 1.1 | 94.0 |
| | Psychiatry | 2 | .9 | 1.1 | 95.1 |
| | Public Health | 2 | .9 | 1.1 | 96.2 |
| | Endocrinology | 1 | .4 | .5 | 96.7 |
| | Tropical and Infectious Diseases | 1 | .4 | .5 | 97.3 |
| | General Practice | 1 | .4 | .5 | 97.8 |
| | Nephrology | 1 | .4 | .5 | 98.4 |
| | Pulmonology | 1 | .4 | .5 | 98.9 |
| | Pathology | 1 | .4 | .5 | 99.5 |
| | Other | 1 | .4 | .5 | 100.0 |
| | Total | 183 | 78.2 | 100.0 | |
| Missing | System | 51 | 21.8 | | |
| Total | | 234 | 100.0 | | |

**Preferred and Second Career Choice by Specialty Categories**

Specialties were recoded into four main categories: primary care, emergency medicine, surgical and

medical specialties.

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Of the 234 respondents who selected from a list of 35 medical career options, 19 (8.1%) selected primary care specialties, 144 (61.5%) selected medical specialties, 69 (29.5%) selected surgical specialties, and 2 (0.9%) selected emergency medicine specialties, as their preferred career choice.

**Table 11: Preferred career choice by specialty category**

|  | Frequency | Percent | Cumulative Percent |
|---|---|---|---|
| 1.  Primary Care Specialties | 19 | 8.1 | 8.1 |
| 2.  Emergency Medicine Specialties | 2 | .9 | 9.0 |
| 3.  Surgical Specialties | 69 | 29.5 | 38.5 |
| 4.  Medical Specialties | 144 | 61.5 | 100.0 |
| Total | 234 | 100.0 | |

Most survey respondents selected medical specialties as their second choice (51.1%), followed by surgical (38.3%), primary care (10.4%), and emergency medicine specialties (2.2%) (Figure 11).

**Figure 11: Second career choice by specialty category**
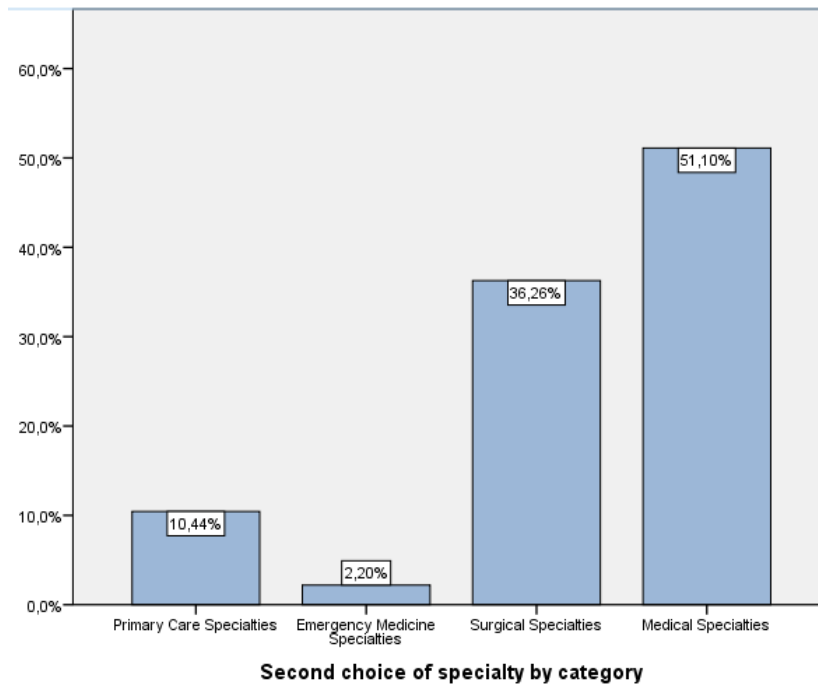
**Aim 2: Investigate relationships between career selection and selected demographic indicators**

**Preferred Specialty Categories and Demographic Characteristics**

The researcher applied Chi-square to test for homogeneity and independence of variables in Table N° 6:

$$H_0: Variable\ Independence$$

$$H_1: Variable\ Homogeneity$$

The investigator applied Chi-square to test for association between "Sex of the respondents" and "Specialty Categories", resulting in $\chi^2$=11.048 (Table 12). Therefore, the relationship between sex and specialty categories was statistically significant (*P*= 0.011). When Emergency Medicine was excluded from the analysis, $\chi^2$=9.918 and p=0.007.

**Table 12: Sex of respondents by Specialty categories**

| | | | Specialties Categories | | | | |
|---|---|---|---|---|---|---|---|
| | | | Primary Care Specialties | Emergency Medicine | Surgical Specialties | Medical Specialties | Total |
| Sex | Male | Count | 7 | 0 | 34 | 39 | 80 |
| | | % row | 8.8% | 0.0% | 42.5% | 48.8% | 100.0% |
| | Female | Count | 11 | 2 | 34 | 101 | 148 |
| | | % row | 7.4% | 1.4% | 23.0% | 68.2% | 100.0% |
| | Total | Count | 18 | 2 | 68 | 140 | 228 |
| | | % row | 7.9% | 0.9% | 29.8% | 61.4% | 100.0% |

Chi square = 11.048 (p=0.011)

Men showed more preference for surgical (42.5%) and PC specialties (8.8%) than females (23% and 7.4% respectively). There were more female respondents who chose medical specialties (68.2%), compared to male respondents (48.8%). Just two respondents preferred emergency medicine, all of them female.

**Figure 12: Sex of respondents by Specialty categories**
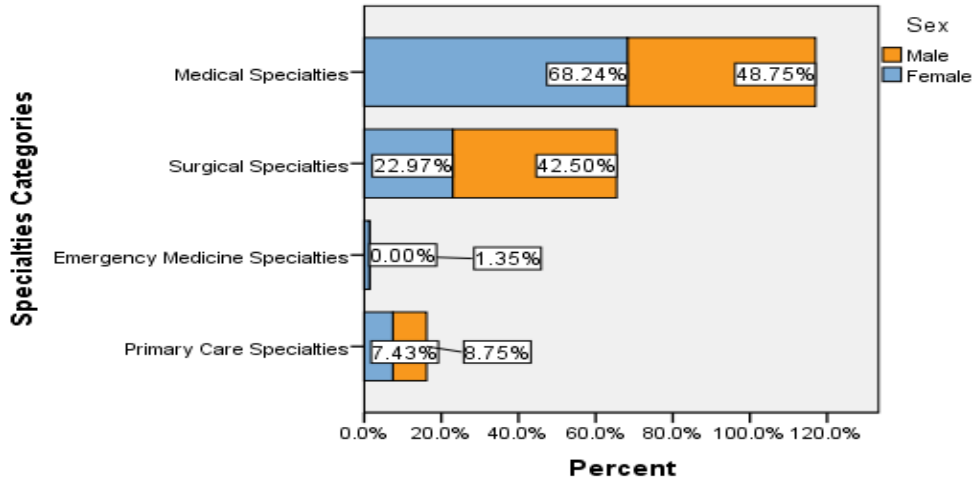


The researcher applied Chi-square to test for association between "location where student lived prior to university admission" (setting background) and "Specialty Categories", resulting in $\chi^2$=13.075 (Table 13). Therefore, the relationship between setting background and specialty categories was statistically significant (*P*= 0.042). When Emergency Medicine was excluded from the analysis, $\chi^2$=12.777 and p=0.012.

**Table 13: Location where student lived by Specialty categories**

| | | | Specialties Categories | | | | |
|---|---|---|---|---|---|---|---|
| | | | Primary Care Specialties | Emergency Medicine | Surgical Specialties | Medical Specialties | Total |
| Location where student lived prior to University | Urban | Count | 17 | 2 | 61 | 134 | 214 |
| | | % row | 7.9% | 0.9% | 28.5% | 62.6% | 100.0% |
| | Rural | Count | 1 | 0 | 8 | 10 | 19 |
| | | % row | 5.3% | 0.0% | 42.1% | 52.6% | 100.0% |
| | No answer | Count | 1 | 0 | 0 | 0 | 1 |
| | | % row | 100.0% | 0.0% | 0.0% | 0.0% | 100.0% |
| | Total | Count | 19 | 2 | 69 | 144 | 234 |
| | | % row | 8.1% | 0.9% | 29.5% | 61.5% | 100.0% |

Chi square = 13.075 (p=0.042)

More respondents from urban backgrounds preferred medical (62.6%) and primary care specialties (7.9%) compared to those who preferred rural backgrounds (52.6% and 5.3%, respectively). More social service participants from rural background preferred surgical specialties (42.1%) compared to participants from urban background (28.5%).

**Figure 13: Location where student lived by Specialty categories**
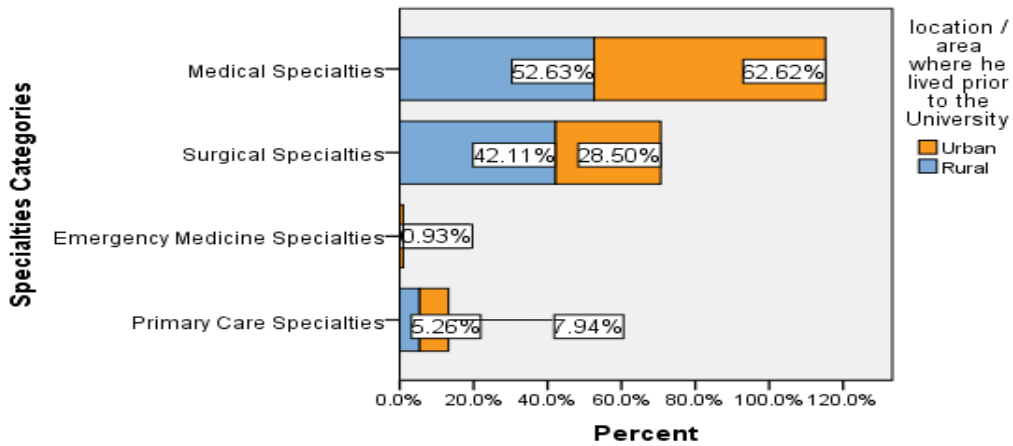


Table 14 describes the overall results of the analysis of demographic characteristics by specialty categories. There were several cells with expected frequencies of less than 5.

**Table 14: Characteristics of respondents by preferred specialty categories**

| Demographic Characteristics | Specialty Categories | | | | |
| --- | --- | --- | --- | --- | --- |
| | Primary Care Specialties N (%) (N = 19) | Emergency Medicine Specialties N (%) (N = 2) | Surgical Specialties N (%) (N = 69) | Medical Specialties N (%) (N = 144) | Total N (%) (N = 234) |
| **Current year MD program (*)** | | | | | |
| • 8th Year | 15 (6.9) | 2 (0.9) | 65 (30.1) | 134 (62.0) | 216 (100.0) |
| • Other | 1 (7.7) | 0 (0.0) | 3 (23.1) | 9 (69.2) | 13 (100.0) |
| • No Answer | 3 (60.0) | 0 (0.0) | 1 (20.0) | 1 (20.0) | 5 (100.0) |
| • Total | 19(8.1) | 2(0.9) | 69(29.5) | 144(61.5) | 234(100.0) |
| **Age** | | | | | |
| • 25 years or less | 7 (7.4) | 1 (1.1) | 29 (30.5) | 58 (61.5) | 95 (100.0) |
| • >25 years | 12 (8.6) | 1 (0.7) | 40 (28.8) | 86 (61.9) | 139 (100.0) |
| • Total | 19(8.1) | 2(0.9) | 69(29.5) | 144(61.5) | 234(100.0) |
| **Sex (*)** | | | | | |
| • Male | 7 (8.8) | 0 (0.0) | 34 (42.5) | 39 (48.8) | 80 (100.0) |
| • Female | 11 (7.4) | 2 (1.4) | 34 (23.0) | 101 (68.2) | 148 (100.0) |
| • No Answer | 1 (16.7) | 0 (0.0) | 1 (16.7) | 4 (66.7) | 6 (100.0) |
| • Total | 19(8.1) | 2(0.9) | 69(29.5) | 144(61.5) | 234(100.0) |
| **Race** | | | | | |
| • White | 2 (8.0) | 0 (0.0) | 6 (24.0) | 17 (68.0) | 25 (100.0) |
| • Mestizo | 16 (7.8) | 2 (1.0) | 62 (30.2) | 125 (61.0) | 205 (100.0) |
| • Afro-descendant | 1 (50.0) | 0 (0.0) | 0 (0.0) | 1 (50.0) | 2 (100.0) |
| • Original groups | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (100.0) |
| • Other | 0 (0.0) | 0 (0.0) | 1 (50.0) | 1 (50.0) | 2 (100.0) |
| • Total | 19(8.1) | 2(0.9) | 69(29.5) | 144(61.5) | 234(100.0) |
| **Marital Status** | | | | | |
| • Single | 17 (8.9) | 2 (1.1) | 55 (28.9) | 116 (61.1) | 190 (100.0) |
| • Married/CommonLaw | 2 (4.9) | 0 (0.0) | 13 (31.7) | 26 (63.4) | 41 (100.0) |
| • Separated/divorced/ Widowed | 0 (0.0) | 0 (0.0) | 1 (33.3) | 2 (66.7) | 3 (100.0) |
| • Total | 19(8.1) | 2(0.9) | 69(29.5) | 144(61.5) | 234 (100.0) |
| **Location/area where student lived prior to University (*)** | | | | | |
| • Urban | 17 (7.9) | 2 (0.9) | 61 (28.5) | 134 (62.6) | 214 (100.0) |
| • Rural | 1 (5.3) | 0 (0.0) | 8 (42.1) | 10 (52.6) | 19 (100.0) |
| • No answer | 1 (100.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (100.0) |
| • Total | 19(8.1) | 2(0.9) | 69(29.5) | 144(61.5) | 234 (100.0) |
| **Parent works as MD** | | | | | |
| • yes | 2 (5.7) | 0 (0.0) | 10 (28.6) | 23 (65.7) | 35 (100.0) |
| • no | 17 (8.5) | 2 (1.0) | 59 (29.6) | 121 (60.8) | 199 (100.0) |
| • Total | 19(8.1) | 2(0.9) | 69(29.5) | 144(61.5) | 234(100.0) |

(*) $P<0.05$

As mentioned before, the relationship between the variables "sex of the respondents" (female) and "location where student lived prior to university admission" (urban) compared to the variable "specialty categories" was statistically significant ($P<0.05$). Sixty-six percent of participants who chose medical specialties (N=23) have parents who were physicians, compared to 28.6% of respondents who selected surgical specialties, and 5.7% of those who selected primary care specialties (Figure 14).

**Figure 14: Specialty categories by parent working as MD**
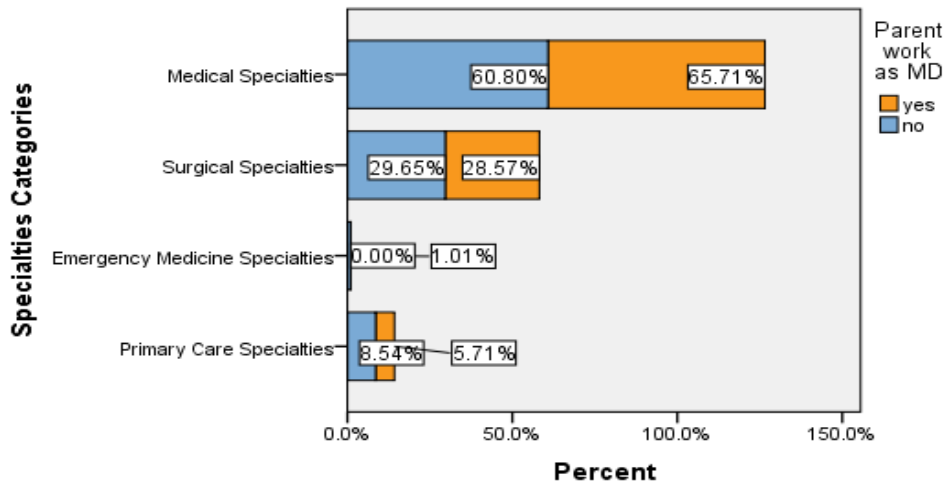


**Preferred Specialty Categories and Certainty of Career Choice**

Only 1.3% of respondents who chose primary care specialties were completely sure of their choice, compared to 19.2% of participants who selected other specialties. Most of the respondents considered that they would probably choose a non-PC career (65%).

**Figure 15: Perception of being the final choice by specialty categories**
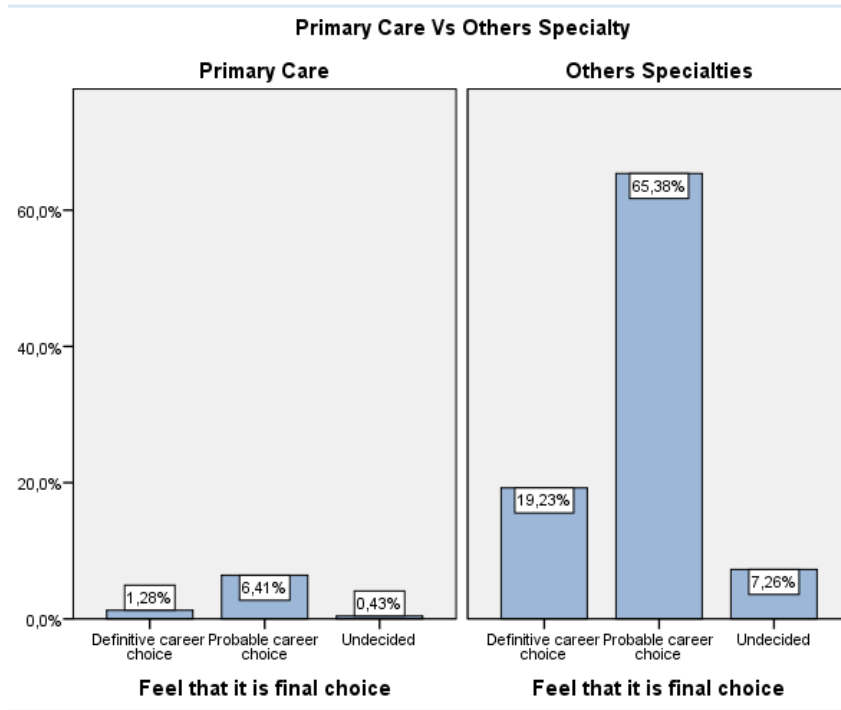


**Aim 3: Identify salary perception of primary care, medical and surgical specialties**

**General Salary Perception**

The mean monthly-expected income among survey participants was USD 2 904.79 (61 727.27 Lempiras), which represents an annual income of USD 34 857. The median was USD 2 823.50 per month or USD 33 882 per year.

**Salary Perception of PC and non-PC careers**

The median monthly-expected income of primary care specialties (USD 2 353) was almost 17% lower than the median monthly-expected income of other specialties (USD 2 824).

**Figure 16: Median monthly-expected income of primary care specialties**
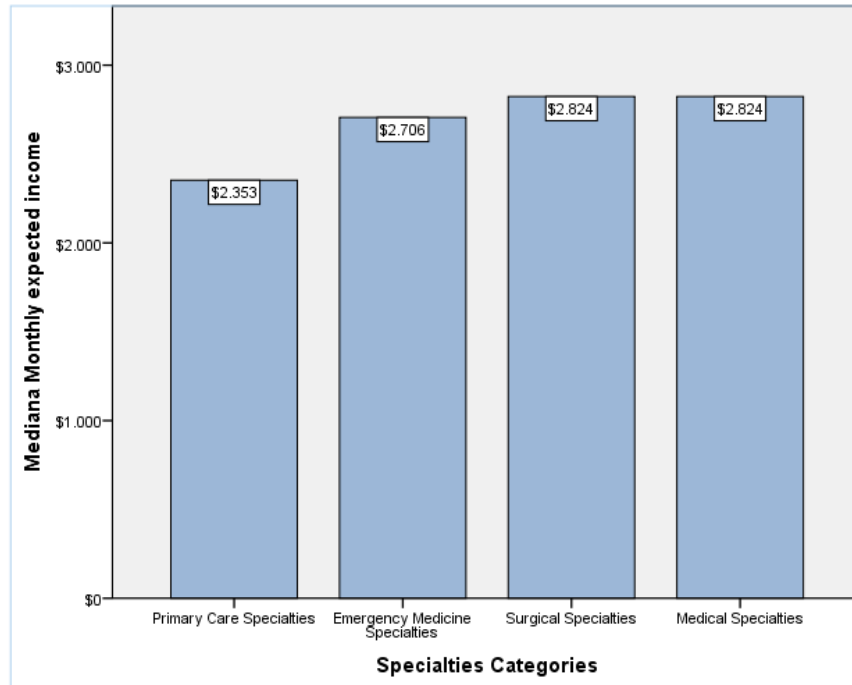


Nearly 60% of the respondents believed that the salary of general practitioners was less than USD 1 400, compared to 30% in the case of family physicians and 3% in the case of pediatricians. Most of the participants (62.3%) believed that the salary of pediatricians was between USD 1 400 to 2 820, and 55.9% of the respondents chose the same amount for family physicians. Almost half of the participants (46.6%) believed that the monthly salary of other specialists was over USD 4 000.

**Table 15: Monthly salary perception: GP, pediatrics, family medicine and Other Specialists**

| Perceived Salary | General Practitioner N (%) (N = 226) | Pediatrician N (%) (N = 220) | Family Practitioner N (%)(N = 220) | Other Specialists N (%) (N = 210) |
|---|---|---|---|---|
| Less than USD 1 400 (Less than 30 000 L)* | 135 (59.7) | 7 (3.2) | 64 (29.1) | 4 (1.9) |
| USD 1 400 to 2 820 | 79 (35.0) | 137 (62.3) | 123 (55.9) | 108 (51,4) |
| USD 2 820 to 4 000 | 10 (4.4) | 67 (30.5) | 32 (14.5) | 70 (33.3) |
| USD 4 000 or more | 2 (.9) | 9 (4.1) | 1 (.5) | 28 (13.3) |
| *Exchange rate September 19, 2014: 1 USD = 21.2502 Lempiras | | | | |

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The perceived monthly salary of specialties other than primary care was significantly higher than those of GPs, FPs and Pediatricians (p<0.001).

**Table 16: Monthly salary perception for PC specialties and other specialties (in USD)**

| Intended Specialty | Primary Care N (%) (N = 19) | Others Specialties N (%) (N = 215) | Total N (%) (N = 234) |
|---|---|---|---|
| **_Salary General Practitioner_** | | | |
| Less than USD 1 400 | 10 (52.6) | 125 (58.1) | 135 (57.7) |
| USD 1 400 to 2 820 | 9 (47.4) | 70 (32.6) | 79 (33.8) |
| USD 2 820 to 4 000 | 0 (0.0) | 10 (4.7) | 10 (4.3) |
| USD 4 000 or more | 0 (0.0) | 2 (0.9) | 2 (0.9) |
| No Answer | 0 (0.0) | 8 (3.7) | 8 (3.4) |
| **_Salary Pediatrics_** | | | |
| Less than USD 1 400 | 0 (0.0) | 7 (3.3) | 7 (3.0) |
| USD 1 400 to 2 820 | 13 (68.4) | 124 (57.7) | 137 (58.5) |
| USD 2 820 to 4 000 | 5 (26.3) | 62 (28.8) | 67 (28.6) |
| USD 4 000 or more | 1 (5.3) | 8 (3.7) | 9 (3.8) |
| No Answer | 0 (0.0) | 14 (6.5) | 14 (6.0) |
| **_Salary Family Medicine_** | | | |
| Less than USD 1 400 | 4 (21.1) | 60 (27.9) | 64 (27.4) |
| USD 1 400 to 2 820 | 13 (68.4) | 110 (51.2) | 123 (52.6) |
| USD 2 820 to 4 000 | 2 (10.5) | 30 (14.0) | 32 (13.7) |
| USD 4 000 or more | 0 (0.0) | 1 (0.5) | 1 (0.4) |
| No Answer | 0 (0.0) | 14 (6.5) | 14 (6.0) |
| **Salary if not GP. Ped or FM\*** | | | |
| Less than USD 1 400 | 0 (0.0) | 4 (1.9) | 4 (1.7) |
| USD 1 400 to 2 820 | 1 (5.3) | 103 (47.9) | 104 (44.4) |
| USD 2 820 to 4 000 | 0 (0.0) | 69 (32.1) | 69 (29.5) |
| USD 4 000 or more | 0 (0.0) | 28 (13.0) | 28 (12.0) |
| Not applicable | 18 (94.7) | 11 (5.1) | 29 (12.4) |
| No Answer | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| **\*P<0.001** | | | |

**Salary Perception of PC and non-PC careers and Sex of Respondents**

Perceived salaries among female respondents was higher than males. Forty percent (40%) of female respondents considered that the salary of a general practitioner was less than USD 1 400, compared to 19.5% of male respondents. Most female participants placed pediatricians and family practitioners´

salary between USD 1 400 to 2 820 (38.8% and 34.6%, respectively). More respondents expected a

higher salary (USD 4 000 or more) in specialties *other* than PC (8% of female and 5.5% of male

participants), compared to PC specialties (Table 17).

**Table 17: Expected salary for GP, pediatrician and family practitioner, and other specialists by sex**

**of respondents**

| | | Sex | | | |
|---|---|---|---|---|---|
| | | Male | | Female | |
| | | Count | Table Valid N % | Count | Table Valid N % |
| **Salary General Practitioner** | Less than USD 1 400 | 43 | 19.5% | 88 | 40.0% |
| | USD 1 400 to 2 820 | 32 | 14.5% | 45 | 20.5% |
| | USD 2 820 to 4 000 | 4 | 1.8% | 6 | 2.7% |
| | USD 4 000 or more | 0 | 0.0% | 2 | 0.9% |
| **Salary Pediatrics** | Less than USD 1 400 | 4 | 1.9% | 3 | 1.4% |
| | USD 1 400 to 2 820 | 50 | 23.4% | 83 | 38.8% |
| | USD 2 820 to 4 000 | 21 | 9.8% | 44 | 20.6% |
| | USD 4 000 or more | 2 | 0.9% | 7 | 3.3% |
| **Salary Family Medicine** | Less than USD 1 400 | 25 | 11.7% | 38 | 17.8% |
| | USD 1 400 to 2 820 | 45 | 21.0% | 74 | 34.6% |
| | USD 2 820 to 4 000 | 6 | 2.8% | 25 | 11.7% |
| | USD 4 000 or more | 1 | 0.5% | 0 | 0.0% |
| **Salary if not GP. Ped or FM** | Less than USD 1 400 | 1 | 0.5% | 3 | 1.5% |
| | USD 1 400 to 2 820 | 40 | 20.0% | 61 | 30.5% |
| | USD 2 820 to 4 000 | 22 | 11.0% | 46 | 23.0% |
| | USD 4 000 or more | 11 | 5.5% | 16 | 8.0% |

**Aim 4: Identify factors that influence career choice in PC among 8th year medical students**

**Most Influential Factors in Career Choice**

The participants considered "making a positive difference in people´s lives" (23.5%), income

potential (13.1%), opportunity to teach (6.6%), perceived prestige (5.5%), and opportunity to work on

highly challenging cases (5.5%) as the first most important factors that influence career choice.

Making a positive difference in people´s lives was also the second most important factor (15.8%),

followed by income potential (9.3%), opportunity to work on highly challenging cases (8.7%), and more

opportunities to practice with professional independence (8.7%). Income potential and opportunity to

enjoy life outside of work shared first place as third most important factor (Table 18).

**Table 18: Most important factors that influence career choice**

|  | N | (%) |
|---|---|---|
| **1st most important factor** | | |
| -Makes a positive difference in people's lives | 43 | 23.5% |
| -Income potential | 24 | 13.1% |
| -Opportunity to teach | 12 | 6.6% |
| -Perceived prestige | 10 | 5.5% |
| -Opportunity to work on highly challenging cases | 10 | 5.5% |
| **2nd most important factor** | | |
| -Makes a positive difference in people's lives | 29 | 15.8% |
| -Income potential | 17 | 9.3% |
| -Opportunity to work on highly challenging cases | 16 | 8.7% |
| -More opportunities to practice with professional independence | 16 | 8.7% |
| -Opportunity to teach | 13 | 7.1% |
| -Perceived prestige | 12 | 6.6% |
| -Opportunity to deal with a variety of medical problems | 10 | 5.5% |
| -Opportunity for research | 10 | 5.5% |
| **3rd most important factor** | | |
| -Income potential | 18 | 9.9% |
| -Provides an opportunity to enjoy life outside of work | 18 | 9.9% |
| -Makes a positive difference in people's lives | 14 | 7.7% |
| -Ability to use a wide range of skills & knowledge in patient care | 12 | 6.6% |
| -Perceived prestige | 11 | 6.0% |
| -Opportunity to teach | 11 | 6.0% |
| -More opportunities to practice with professional independence | 11 | 6.0% |
| -Emphasis on continuity of care of patients | 10 | 5.5% |

Respondents included other factors that influence career choice, which included: teaching, quality

of life, enjoy working in specialty, cover family financial needs, time with family, opportunity to travel

abroad.

**Factors Influencing Preferred Career Choice by Specialty Categories**

One factor was significantly associated with a preference for primary care specialties compared to the other specialties combined: practice in ambulatory settings (88.9% vs. 63.3%, P=<0.05). When all categories were compared, preference for working in a rural community (52.6%, P=0.008), opportunity for research (89.5%, P=0.016), ability to master a small set of skills and be the "expert" (84.2%, P=0.046), emphasizes practice in ambulatory settings (88.9%, P=0.044), and development of long-term relationships with patients (94.7%, P=0.05) were significantly associated with the decision to go into a primary care specialties (Table 19). The variable "predictable work hours" (72.2%, P=0.026) was significantly associated with medical specialties.

**Table 19: Factors influencing preferred specialty choice by specialty categories**

| Factors Influencing Medical Student's Preferred Specialty Choice | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Primary Care Specialties N (%) (N = 19) | Emergency Medicine Specialties N (%) (N = 2) | Surgical Specialties N (%) (N = 69) | Medical Specialties N (%) (N = 144) | All Specialties Combined N (%) (N = 215) | Specialties Categories P Values | Primary Care vs. All others P Values |
| Income potential | 14 (73.7) | 2 (100.0) | 51 (73.9) | 103 (71.5) | 156 (72.6) | .823 | .916 |
| Perceived prestige | 14 (73.7) | 1 (50.0) | 55 (79.7) | 103 (71.5) | 159 (74.0) | .528 | .980 |
| Opportunity to teach | 16 (84.2) | 1 (50.0) | 51 (73.9) | 116 (80.6) | 168 (78.1) | .465 | .536 |
| Preference for working in a rural community | 10 (52.6) | 1 (50.0) | 13 (18.8) | 56 (38.9) | 70 (32.6) | **.008 *** | .077 |
| Preference for working in an urban center | 12 (63.2) | 1 (50.0) | 46 (67.6) | 102 (70.8) | 149 (69.6) | .819 | .559 |
| Preference/influence of family, friends or community | 9 (47.4) | 0 (0.0) | 22 (31.9) | 59 (41.5) | 81 (38.0) | .296 | .423 |
| Makes a positive difference in people's lives | 17 (89.5) | 2 (100.0) | 61 (88.4) | 136 (95.1) | 199 (93.0) | .314 | .572 |
| Perceived intellectual content of discipline | 17 (89.5) | 1 (50.0) | 63 (91.3) | 133 (92.4) | 197 (91.6) | .200 | .747 |
| Opportunity for research | 17 (89.5) | 0 (0.0) | 55 (79.7) | 120 (83.3) | 175 (81.4) | **.016 *** | .379 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Opportunity to work on highly challenging cases | 18 (94.7) | 2 (100.0) | 62 (89.9) | 131 (91.6) | 195 (91.1) | .879 | .590 |
| Opportunity to work on acute medical problems | 18 (94.7) | 2 (100.0) | 59 (85.5) | 132 (91.7) | 193 (89.8) | .437 | .486 |
| Emphasis on continuity of care of patients | 17 (89.5) | 2 (100.0) | 61 (88.4) | 135 (94.4) | 198 (92.5) | .434 | .633 |
| Opportunity to deal with a variety of medical problems | 17 (89.5) | 1 (50.0) | 61 (88.4) | 131 (91.0) | 193 (89.8) | .283 | .968 |
| Early exposure to the discipline | 15 (78.9) | 1 (50.0) | 56 (82.4) | 117 (81.3) | 174 (81.3) | .707 | .801 |
| Opportunity to work with people with limited access to hlt care | 15 (83.3) | 1 (50.0) | 50 (72.5) | 124 (86.1) | 175 (81.4) | .068 | .839 |
| Length of residency | 11 (57.9) | 1 (50.0) | 41 (60.3) | 82 (57.3) | 124 (58.2) | .974 | .978 |
| Ability to use a wide range of skills & knowledge in patient care | 19 (100.0) | 2 (100.0) | 68 (98.6) | 127 (89.4) | 197 (92.5) | .052 | .216 |
| Ability to master a small set of skills and be the "expert" | 16 (84.2) | 0 (0.0) | 51 (73.9) | 94 (65.7) | 145 (67.8) | .046 * | .137 |
| A positive interaction with a clinician/teacher of this specialty | 17 (89.5) | 1 (50.0) | 57 (83.8) | 116 (81.1) | 174 (81.7) | .503 | .394 |
| Current debt load to study Medicine | 9 (47.4) | 1 (50.0) | 17 (25.0) | 51 (35.4) | 69 (32.2) | .228 | .181 |
| More leisure time | 5 (26.3) | 0 (0.0) | 10 (14.5) | 21 (14.6) | 31 (14.4) | .528 | .168 |
| Opportunities to practice with professional independence | 17 (89.5) | 1 (50.0) | 60 (87.0) | 123 (85.4) | 184 (85.6) | .490 | .640 |
| Emphasizes practice in ambulatory settings | 16 (88.9) | 1 (50.0) | 38 (55.1) | 97 (67.4) | 136 (63.3) | .044 * | .028 * |
| Predictable work hours | 12 (63.2) | 0 (0.0) | 39 (56.5) | 104 (72.2) | 143 (66.5) | .026 * | .767 |
| Provides an opportunity to enjoy life outside of work | 10 (52.6) | 1 (50.0) | 45 (66.2) | 110 (76.4) | 156 (72.9) | .095 | .061 |
| Development of long-term relationships with patients | 18 (94.7) | 1 (50.0) | 50 (72.5) | 121 (84.0) | 172 (80.0) | .05 * | .115 |
| *P<0.05 | | | | | | | |

**Factors Influencing Preferred Career Choice and Demographic Characteristics**

Analysis within each category of student background revealed that the preference for primary care versus other specialties was influenced by rural work (P =0.025), and practice in ambulatory settings (P = 0.05) among students with urban backgrounds. "Family, friends or community" statistically influenced rural background students who chose primary care (P= 0.047), while "making a positive difference in people´s lives" influenced those who chose other specialties (P=0.003).

Sixty seven participants (76.1%) in the 25 years or less category that chose specialties other than primary care considered important the opportunity to enjoy life outside of work (P=0.007); 33.3% of those over 25 years who chose primary care specialties considered important more leisure time (P=0.005).

**Factor Analysis**

To verify if it was possible to carry out a factor analysis with the current data, the researcher applied the KMO test[1], resulting in an overall total of 0.8188, with a KMO over 0.7 in all the variables, which showed that a factor analysis was feasible. Additionally, the investigator performed the Bartlett's test to verify the significance of correlation between variables. P value was significant ($p < 0.05$), which means that the study variables (characteristics that influence career choice) were inter-correlated and a factor analysis was feasible.

The researcher used Principal Component Analysis (PCA) as an extraction method to convert a set of correlations among variables into a set of values of linearly uncorrelated variables (principal components). The scree plot in Figure 17 visualizes and identifies the optimal number of factors that can be extracted.

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[1] Kaiser-Meyer-Olkin measure of sampling adequacy.

**Figure 17: Scree plot of Eigenvalues**
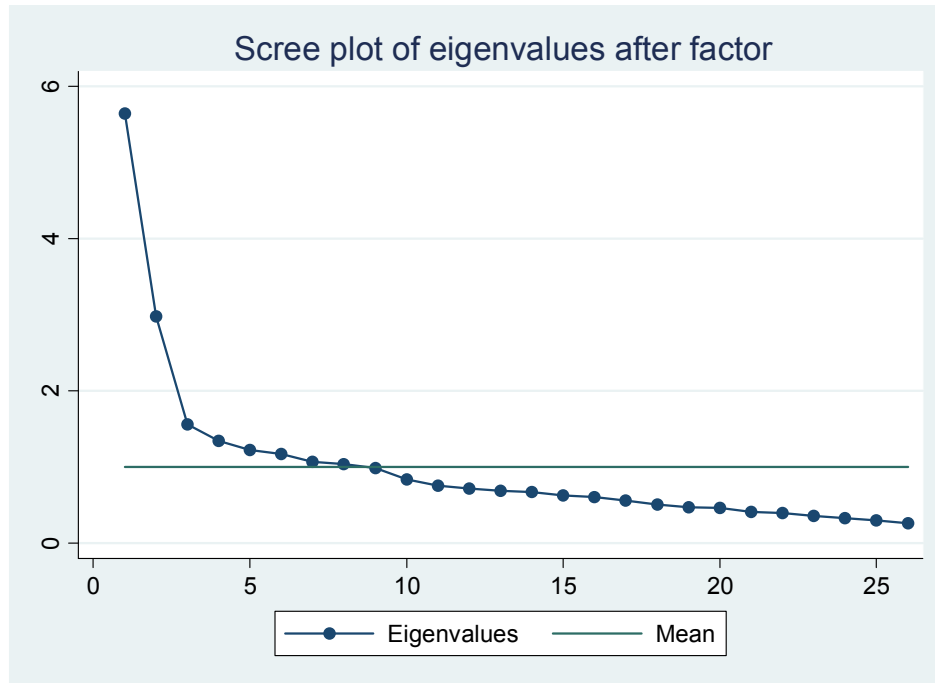


The investigator applied factor analysis using the principal component method, and analyzed the variances and co variances matrix containing the four factors that were used for the bivariate logistic regression analysis. The 4 factors explained 44% of data variability.

The PI rotated the four factors using the orthogonal varimax method to facilitate factors loading interpretation. This rotation minimized the number of variables with high loadings in each factor. The characteristics associated with the first factor (skills & knowledge application) appeared grouped together, meaning that they are related to each other (Figure 18). There was a marked separation between factor 1 and factor 2 (income and prestige), indicating that they relate to a different set of characteristics.

**Figure 18: Factor loadings (rotated)**
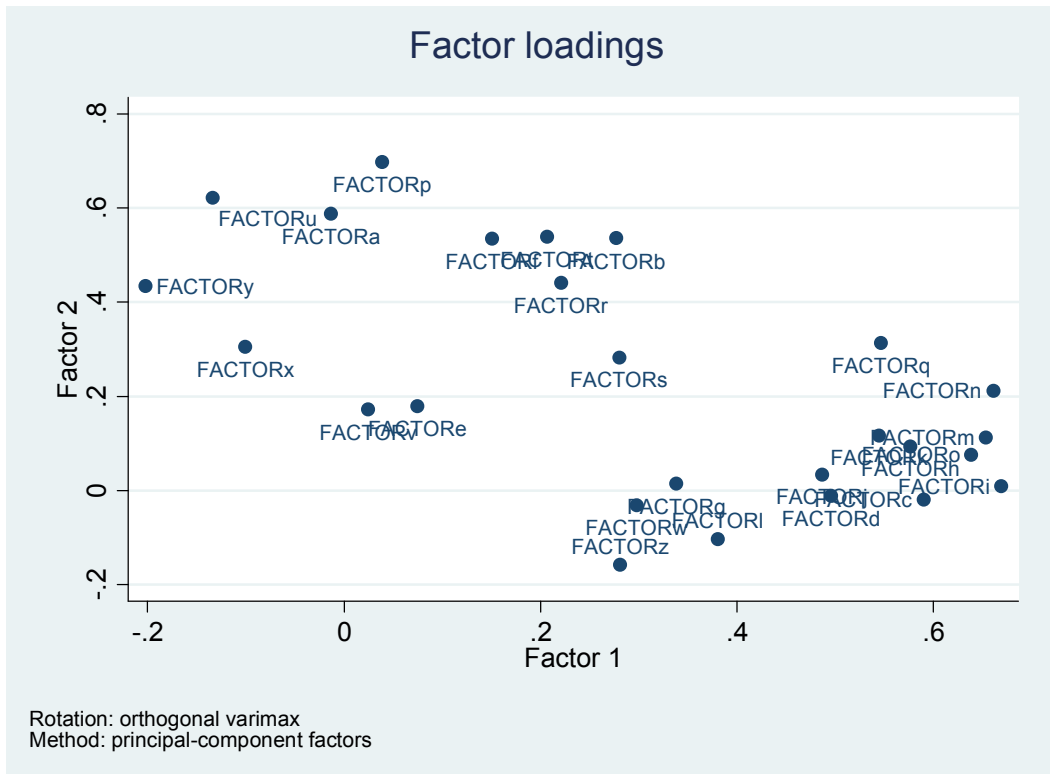


Table 20 shows the variables that relate with each of the four factors. The investigator identified each factor with a name linked to the characteristics of the correlated variables:

1. Factors related to skills & knowledge application

2. Factors related to income and prestige (social status)

3. Factors related to type (autonomy) of practice

4. Factors related to patient-based care (building lasting relationships)

**Table 20: Factors identified and correlated variables**

| Factor | Correlated (internal correlation) |
|---|---|
| 1. Factors related to skills & knowledge application | a. Intellectual content<br>b. Research<br>c. Challenging work<br>d. Work on acute med problems<br>e. Teaching<br>f. Rural work<br>g. Variety of med problems<br>h. Early exposure<br>i. Work with people limited health access<br>j. Wide range of skills & knowledge |
| 2. Factors related to income and prestige (social status) | a. Income potential<br>b. Prestige<br>c. Family, friends influence<br>d. Length of residency<br>e. Set of skills and be the "expert"<br>f. Current debt load<br>g. Leisure time |
| 3. Factors related to type (autonomy) of practice | a. Professional independence<br>b. Practice in ambulatory settings<br>c. Predictable hours<br>d. Enjoy life<br>e. Patients long relation |
| 4. Factors related to patient-based care (building lasting relationships) | a. Making a difference in people´s lives<br>b. Urban work<br>c. Continuity of care |

The PI applied logistic bivariate regression analysis. The dependent variable was Primary Care vs. Other Specialty, and the independent variables were the four factors identified in the factor analysis: (1) Factors related to skills & knowledge application, (2) Factors related to income and prestige (social status), (3) Factors related to type (autonomy) of practice, and (4) Factors related to patient-based care (building lasting relationships).

Factor 4 (patient-based care) was statistically significant (P=0.006). The odds ratio was 1.88, which means that for each additional unit in this factor, the probability of selecting PC increases 88% compared to other specialties.

**Table 21: Logistic regression of factors for PC specialties vs. Other specialties**

```
. logistic  PCare_OtherSpecialty  skillsKnowledge Incomeprestige Typeofpractice Patientbasedcare

Logistic regression                              Number of obs  =        213
                                                 LR chi2(4)     =      10.69
                                                 Prob > chi2    =     0.0303
Log likelihood = -56.348646                      Pseudo R2      =     0.0866


─────────────┬───────────────────────────────────────────────────────────────
PCare_Othe~y │  Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
─────────────┼───────────────────────────────────────────────────────────────
skillsKnow~e │    .5978083    .1792092   -1.72   0.086     .3321935    1.075803
Incomepres~e │    1.200458    .2914739    0.75   0.452     .7458872     1.93206
Typeofprac~e │    .8449886    .2269283   -0.63   0.531     .4991764    1.430368
Patientbas~e │    1.879541    .4334861    2.74   0.006     1.196013     2.95371
```

**Key Informant Interview Results**

The interviews were structured to respond to the research questions in Aims 1, 4 and 5 by collecting opinions and ideas about patterns of specialty choice,    factors that influence career choice among medical students, the location of future medical practice, and promotion of primary care practice. The information shared in these interviews reflects the knowledge and opinions of the informants about the current state of specialty choice and medical training in Honduras.

**Informants**

A total of 8 individuals were interviewed, reflecting a diverse group of national and academic authorities, faculty members, medical students, primary care physicians and clinical specialists. The participants represented a purposeful combination of experience and interests that included the type of practice, the academic perspective, and the political view of decision makers.

**Analysis**

The interview data were typed into word documents, cleaned, and uploaded into Atlas.ti 1.0.5 (71) program for Mac®. During the first analysis, 30 different codes were used to classify the data. During the second review, several codes were associated with each other and five major themes emerged from key informant interviews. These themes facilitated the interpretation and understanding of the data

regarding factors that influence career choice, location of future medical practice and patterns of specialty choice. The number of statements per theme gives a sense as to where the informants focused their thoughts and responses during the interview. The themes, subthemes and number of statements made within those areas are described in Table 22.

**Table 22: Key informant themes and number of statements coded per theme**

| THEMES | SUBTHEMES | # Statements |
|---|---|---|
| *Aim 4: Identify factors that influence career choice in PC among 8th year medical students in Honduras* | | |
| 1. Career choice influenced by extrinsic and intrinsic factors | *EXTRINSIC* | *52* |
| | Medical training | 9 |
| | Economic factor | 7 |
| | Work options | 7 |
| | Experience during training | 6 |
| | Specialty availability | 4 |
| | Violence | 4 |
| | Resources needed for a specialty | 4 |
| | Exposure to specialty | 2 |
| | Mentoring | 2 |
| | Role models | 2 |
| | Geographical factor | 2 |
| | Case variety | 2 |
| | Debt | 1 |
| | *INTRINSIC* | *16* |
| | Prestige | 6 |
| | Vocation & personal preferences | 5 |
| | Career orientation | 4 |
| | Health status | 1 |
| 2. Promoting PC Practice | Family Medicine program | 14 |
| | Primary care training | 9 |

| | Incentives | 7 |
|---|---|---|
| **Aim 5: Identify factors influencing desired location of future medical practice** | | |
| 3.  Future Practice location | Urban Setting | 27 |
| | Hospital setting | 29 |
| **Aim 1: Describe patterns of specialty choice among medical students** | | |
| 4.  Perception of specialties the country needs | Family Medicine | 7 |
| | Pediatrics | 4 |
| | Gynecology/Obstetrics | 4 |
| | Internal Medicine | 3 |
| | Public Health | 2 |
| | Surgery | 1 |
| | Other | 8 |
| 5.  Specialties MD Students are prone to choose | Pediatrics | 8 |
| | Internal Medicine | 8 |
| | Gynecology/Obstetrics | 7 |
| | Surgery | 6 |
| | Public Health | 2 |
| | Others | 4 |

The statements made by informants most commonly reflected factors that influence career choice and patterns of specialty choice among medical students. Comments in the *Career choice influenced by extrinsic and intrinsic factors* category focused on specific factors that affect specialty choice among medical students in Honduras. These comments were useful in explaining some of the consistencies or inconsistencies discovered during the survey. They also helped form a better picture of the most influential factors for specialty choice in Honduras. There were some informants who considered the importance of establishing a family medicine program in Honduras, as well as the strengthening of primary care training, along with incentives. These suggestions were captured in the *Promoting Primary Care Practice* category. Items coded under *Future practice location* category included comments about

preferences for future geographical or institutional practice. Statements included in the *Perception of specialties the country needs* theme provided specific information about the specialties that the informants considered essential for Honduras, while the *Specialties medical students are prone to choose* category captured informants' perception on specialties that medical students currently choose. This information was particularly useful to confirm, disconfirm, cross-validate or corroborate the information obtained during the survey.

**Aim 1: Describe patterns of specialty choice among medical students**

**Perception of specialties the country needs**

The interviewer asked key informants about their perception on the specialties that Honduras needs. Most of the informants considered that the country needed primary care physicians, including family practitioners (Table 23). One participant placed a priority in PC specialties and related technical careers. Another informant prioritized PC specialties and public health, as well as areas related to clinical specialties and research.

> First we need primary care, particularly family medicine. But I think that it is not only family medicine that we must strengthen. It is also the area of public health in strict sense, the master of public health, and the different levels that lead to research in public health or to a PhD. Our country also needs to improve clinical specialties. Even if we now have 20 programs, there is still a deficit of gynecologists, obstetricians and pediatricians. Also there is gap of training in non-communicable diseases areas such as endocrinology and cardiology. (Informant A-2).

A physician maintained that pediatrics was the most important specialty that Honduras required, considering that the country had a large population less than 18 years of age. Pediatrics was followed by gynecology/obstetrics, internal medicine, and surgery. The same informant added urology. Most key informants mentioned more than one specialty as the most needed, using a combination of primary care, clinical and surgical specialties, plus public health at the master level, basic sciences and research. For the medical students interviewed, family medicine was not a priority or it appeared after other

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specialties.

**Table 23: Perception of most needed specialties in Honduras vs. specialties students choose**

| Key Informant | Specialties the country needs | Specialties students are prone to choose |
|---|---|---|
| A-1 | -Primary care technicians, family practitioners, and community health physicians. | -Internal medicine, pediatrics, gynecology/obstetrics and surgery. |
| A-2 | -Primary care, particularly family medicine. Master of public health.<br>-Gyn/Obs and pediatricians.<br>-Endocrinology and cardiology. | -Internal medicine, pediatrics, surgery.<br>-Psychiatry, neurology, neurosurgery<br>-Public health or epidemiology (at a lesser degree) |
| A-3 | -Family medicine.<br>-Specialties already established in the country | -Internal medicine, pediatrics, gynecology/obstetrics and surgery. |
| A-4 | -Pediatrics, gynecology/obstetrics, internal medicine, surgery, urology | -Pediatrics, Gynecology/obstetrics, Internal medicine, and surgery |
| A-5 | -Family medicine. | -Gynecology/obstetrics, pediatrics, Internal medicine |
| A-6 | -Public health, psychiatry, and internal medicine. | -Pediatrics, cardiology, gynecology, general surgery and internal medicine |
| A-7 | -Neurology, otorhinolaryngology, dermatology.<br>-Pediatrics, gynecology/obstetrics and internal medicine (covered but with deficits).<br>-Medical genetics, pharmacology, pathology.<br>-Epidemiology and family medicine. | -Internal medicine, pediatrics, gynecologist and surgery |
| A-8 | -Pediatrics and gynecology/obstetrics, with a family medicine orientation | -Gynecology/Obstetrics, Pediatrics and Internal Medicine. |

Informants emphasized the importance of a family medicine program in Honduras, as an essential requisite to promote primary care. One faculty member was strong about it: "Honduras is ready for a program in family medicine, it needs it". The interviewees acknowledged the lack of PC physicians, including family practitioners. The academic authority was adamant when declaring:

Our country suffers from an enormous weakness in areas of primary care and of specialists who could promote a comprehensive care in several levels, including lifestyles. (Informant A-2).

From the perspective of medical students, one of them acknowledged the deficit of PC physicians, emphasizing that most of his classmates did not aspire to become general practitioners.

Although there is a deficit of general practitioners, people were not interested in becoming GPs.

Some interviewees acknowledged the role of the National University in training most of the specialists in Honduras, although the informants also considered that there was not only a deficit of PC physicians, but also of "medical specialists" and surgeons.

> Although the School of Medical Sciences offers over 40% of the medical specialties in the country, we still have a gap of medical specialists. (Informant A-2).

However, one key informant thought that there were some specialties that should be controlled before they become saturated.

**Specialties students are prone to choose**

When asked about the specialties that medical students were inclined to choose, all key informants mentioned the basic four or at least three of them: pediatrics, gynecology/ obstetrics, internal medicine, and surgery (Table 2). One informant assured that most of the applications were for pediatrics, and provided some reasons:

> My conclusion is based on several facts: (1) the Pediatrics Department historically has been the best organized in our medical school, also the one with the largest number of specialists trained abroad with an academic and health care vision, and with a training orientation. (2) The perception of the department as the most organized, ahead than the rest of departments; (3) The perception of pediatrics as a national priority, students perceive that the specialty will give them an opportunity even in the most remote areas of the country. (Informant A-4).

Another informant from the academia added psychiatry, neurology and neurosurgery, and included public health and epidemiology, but "at a lesser degree".

**Aim 4: Identify factors that influence career choice in PC among medical students**

Interviews revealed a number of factors that affect specialty choice among medical students in Honduras, most of them extrinsic in nature.

**Extrinsic Factors**

A factor repeatedly mentioned by most key informants was <u>medical training</u>. There was a generalized perception that medical training prioritizes hospital care, and that students have a larger exposure to hospital settings, compared to primary care centers.

> I see that pre-graduate medical studies are focused on curative medicine, and not on preventive medicine. That is the reason why students and physicians do not choose family medicine or primary health care. Instead they choose a clinical specialty, because it is what is taught at medical school. (Informant A-5)

The focus of training was perceived to be on curative medicine, not on prevention or primary health care. The interviewees considered that a hospital-based training encourage students to choose clinical or surgical specialties. One informant associated the problem to "the curricula, the faculty and the health care provider orientation, all of them promoting a curative approach".

> We need to work a lot to change the curative approach of [medical] training into a preventive approach. We should orient on the importance of family medicine, and of course to have a family medicine program, because not all the students have the means to study abroad, and currently you must leave the country to study family medicine. (Informant A-5)

Participants emphasized the importance of primary care training to promote PC practice in the country. One informant from the academia mentioned that UNAH medical school was working in a curriculum where primary health care was a crosscutting track. Half of the informants believed that Honduras needed a family medicine program, three of them as a specialty, the other one did not consider that FM should be a specialty; instead, curricula should incorporate a family medicine orientation throughout medical training at the pre-graduate and graduate level.

To me, family medicine in our country should not be a specialty by itself, but a cross cutting area in all levels of medical training, pre-graduate and graduate level. That is why the project to start a family medicine program has not succeeded. We should all be trained as family doctors… Medical schools should include a family medicine orientation in the general practitioner curricula. (Informant A-4).

Another informant (family practitioner) considered it important to have both, a family medicine orientation during medical training and a FM specialty for those who decide to choose this career:

We need to promote a training oriented to primary care and family medicine among students, so when they finish medical school, they will be more motivated to choose the family medicine specialty. (Informant A-5).

Most of the interviewees considered that there was an economic factor involved in specialty choice. They pointed out that clinical and surgical specialists had a higher income than PC physicians, public health professionals or epidemiologists. One participant specifically mentioned some surgical specialties as high-income careers, including cardiothoracic surgery, plastic and reconstructive surgery.

Some informants noted that there is a materialistic approach when making a career decision. Interviewees considered that the majority of students enter medical school "to improve their social status or their economic position", noting that the economic factor not only influenced specialty choice, but also choosing medicine as a career. Later, when faced with specialty choice, students consider the time invested and the future return:

Students ask themselves "in which [specialty] I will invest less time and will receive more benefits?" (Informant A-4).

One informant attributed medical training for inducing students to select specialties associated with higher income.

This fact reveals the ineffectiveness of our training system that pushes the individual to prefer the specialties that provide greater economic benefits. (Informant A-6).

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There was one informant who did not consider salary as an important factor when selecting a specialty. This participant explained that salaries for employed physicians in Honduras were established by norms and regulations, and the difference in income between employed PC physicians and clinical and surgical specialists was minimal.

Informants also considered work option a factor. Students were prone to choose the specialty that offers more options to get a job in the future:

> I think that the priority in specialty choice is the work field, what the probabilities are to find a job, mainly with the two major employers in the country: Secretary of Health and Social Security Institute. (Informant A-8).

One informant pointed out the problem of unemployment among physicians in Honduras, and how it affected career decision, since graduates were mostly interested in finding a job, in being able to finding a job in the labor market.

> Medical students choose to go where there is work; it does not matter if it is in an urban or in a rural setting. (Informant A-3).

Another factor related to medical training was the type of experiences medical students went through during their training. Since most of it occurs within a hospital setting, the experiences were mostly related to hospital care, and students were inclined to choose clinical or surgical specialties. One interviewee considered this factor as one of the main reasons why medical schools should incorporate a community approach as part of medical training, avoiding "a 100% hospital-based training". Medical students interviewed agreed with a practical linkage, and not only "the traditional unidirectional classroom training". This training could be in a rural setting, as another informant pointed out:

> Students in training should have a personal experience in rural areas… The experience of students exposed to field research in public health and community intervention have proved that public health can have a greater impact in a community compared to what can be achieved in a hospital setting, and, that primary health care tools are cost-effective and much useful for the population. Moreover, it is an enlightening experience for them. (Informant A-2).

In the same train of thought, some informants considered that having an early exposure to a specialty influenced career decision. One informant noted that exposure to primary care, public health or epidemiology could contribute to motivate students to select these areas, but the lack of exposure was definitely a barrier. One medical student confirmed the lack of contact with family practitioners during his training, pointing out that there were no PC physicians working as faculty at the school of medicine. Additionally, one informant included mentoring as a factor that could facilitate career choice:

> Mentoring and promotion of a [PC] career should be carried out from the academia to motivate students. (Informant A-5).

The lack of primary care physicians among the faculty limited the possibilities of exposure to primary care. For some informants, there were no PC role models in health care units or in medical schools. Thus, students find role models among those available, usually professors of internal medicine, pediatrics or surgery.

For some interviewees, specialty availability was considered a factor that influenced career choice. As noted by an informant, each year there is an assigned quota for most specialties offered in Honduras, and students must apply for a position. Some specialties offered 15 to 30 openings each year: gynecology/obstetrics, pediatrics, internal medicine and surgery. Other residency programs offered only 2 to 5 positions each year, like psychiatry. Some key informants believed that students choose a career depending on the availability of positions, even if the specialty was not their first choice.

> At this moment, the most influential factor in Honduras is the availability of openings for certain specialties. Students go and get what is there, or what they can find. It should not be like that… (Informant A-8).

One informant added a geographical factor that could influence specialty choice. This interviewee perceived that there was a pattern of specialty choice among students who come from urban areas, and a different one if students come from a rural setting.

Students that come from urban areas always choose the basic specialties, which are better known at the community, because they come from a family of physicians with the same specialty, or because they have an office. Those [students] who come from communities catch what is left. (Informant A-3).

Two interviewees considered violence to be a factor when deciding on a specialty and future practice location. Students were afraid to practice in certain locations, urban or rural, for fear of violence. The HRH authority pointed out that violence was a barrier when choosing a specialty that implied community-related work:

Violence is a factor that affects not only the security of individuals and the economy of the country. It is a barrier when deciding on the specialty. We have seen this among social service physicians. There are places where you cannot go, no matter how much health care is needed. Some of these "hot" areas are within urban centers. We cannot guarantee the personal security of health professionals in these areas... (Informant A-1).

A PC doctor interviewed (the pediatrician) considered that the resources needed for a specialty could be an influential factor, since there were specialties that require sophisticated equipment and complex facilities, such as neurosurgery or cardiovascular surgery, while other specialties could be practiced anywhere with some basic equipment and facilities, such as pediatrics.

The pediatrician just needs an office, a desk and a chair, a small examination bed, and some tools to practice 90% of the specialty. That is not the case with other more complex specialties such as neurosurgery, cardiovascular surgery, and other surgical areas where you need sophisticated equipment. These are specialties of concentration. Unlike pediatrics, internal medicine or obstetrics, they need a lot of physical infrastructure, equipment and auxiliary human resources. (Informant A-4).

Only one key informant included debt as a factor that influenced specialty choice in Honduras. The interviewee affirmed that some medical students required a loan to cover the expenses of a specialty, even if they were granted a scholarship.

The price to obtain a loan for a medical specialty is high, very expensive. There are colleagues who have spent 30 to 40 years paying the debt. Even with a scholarship, it is not enough to cover the expenses of a medical specialty. (Informant A-3).

One interviewee considered the variety of clinical cases as a factor that influenced career choice, attributing this characteristic to hospitals in urban locations, since there was a higher number and a

richer variety of cases in teaching hospitals, compared to rural settings.

**Intrinsic Factors**

Some informants considered professional <u>vocation and personal preferences</u> as factors that influenced specialty choice. <u>Career orientation</u> was also an important factor for one informant, although the interviewee noted that current orientation was biased towards clinical specialties:

> Students should be oriented early in their careers through conferences, written material, and most important by example. However, medical training orients students towards clinical specialties and subspecialties. (Informant A-4).

The same informant added that career choice was a conscious election that needed adequate and opportune information on the selected career, as well as social and family orientation. Another informant pointed out the inadequacy and untimeliness of the induction process at the national medical school, while another noted that there was no vocational orientation during admission.

An interviewee stated that the perception of a physician`s contribution to the improvement of the <u>health status</u> of a population could be a factor that influenced career choice.

Most of the informants considered the <u>prestige</u> of a specialty as an important factor among medical students when deciding on a career. The two medical students interviewed for the study shared this perception. According to them, primary care specialties were not valued among medical students or even among some health authorities. Medical students considered a demotion to practice primary care; it was like "…being downgraded as health professionals". Two informants told the interviewer that some authorities saw PC specialists as general practitioners, and job openings went according to that perception; therefore, the country was losing the experience of PC specialists and the advantage of their international training.

> Prestige is important for the students. They believe that becoming a cardiologist, pediatrician, or medical internist, will allow them to climb in the social scale, higher than what they could achieve with other careers such as public health or family medicine that have a higher impact at

the community level, but are considered too easy, with few [economic] benefits. (Informant A-6).

**Aim 5: Identify factors influencing desired location of future medical practice**

Interviewees were unanimous in their criteria that medical students in Honduras preferred urban settings for future practice location, specifically in larger cities such as Tegucigalpa and San Pedro Sula. According to one informant, the newly introduced admission process at the largest medical school in the country will exacerbate this phenomenon, since "90% of the selected students come from private schools in the metropolitan areas of Tegucigalpa and San Pedro Sula", and they will probably stay in urban areas upon graduation. By contrast, there was one key informant who considered that physicians go where there is work, "it does not matter if it is in an urban or rural setting".

When asked why they think medical students preferred urban areas as their future practice location, half of the interviewees mentioned better access to basic services including health care, opportunities to grow, better education for their children and comfort. Other informant mentioned cultural activities. Some key informants cited the economic benefit as a factor that motivated students to stay in urban areas.

> Students choose urban settings because of living conditions and the convenience that gives the capital, better hospitals, future work possibilities, professional development and better economic benefits. (Informant A-6).

Some key informants referred as a barrier the lack of incentives to practice in remote areas, including the fact that physicians earned the same no matter if they practiced in rural or urban settings:

> There are no incentives to go to remote areas, since the physician makes the same money as in an urban setting, where there are all the benefits and comforts of the city. (Informant A-1).

Interviewees agreed that there should be "…special economic incentives to those professionals who want to practice primary health care in rural areas".

One primary care physician considered the existence of several <u>factors of social nature</u> that

influenced the decision on future practice location.

> Due to the current situation in Honduras, the decision about where to practice depends on the
> social condition [of the population], violence levels, and the internal political situation in the
> country. (Informant A-4).

Some interviewees mentioned hospitals as future practice locations, since they were located in

urban centers, and physicians had the support of other colleagues. They also suggested that medical

students choose hospitals because there was a "greater demand of health care services and physicians

can achieve a <u>better specialty training</u> in this type of health services". One informant mentioned <u>access</u>

<u>to basic services</u> such as water and electricity, as a factor that motivated the decision:

> Now, most of the social-service physicians prefer to go to hospitals, because there they have the
> comforts of a city, they have basic services such as electricity, permanent potable water, they
> have the support of other health care resources, they are not alone. (Informant A-4).

A key informant stated that some doctors would choose a health center instead of a hospital for a

convenience reason, such as to avoid night shifts.

> Some would like to work in a health center, but not because they like family medicine or the
> primary heath care approach, but because they can avoid night shifts. (Informant A-5).

**CHAPTER 5: DISCUSSION**

The data from each research component were studied separately to look at trends, gaps of specialties and factors affecting career choice. The information from all data sources was also studied as a whole to fully answer the research questions. Data gaps and inconsistencies seen in the survey were partially explained by data collected from key informants.

This chapter will begin by summarizing the results of the study. Next it will discuss those results by each aim of the study, explaining whether the results proved or disproved the study hypothesis: (a) Medical students in Honduras do not prefer primary care careers; (b) there are intrinsic and extrinsic factors that influence career choice in primary care among medical students in Honduras.

Finally, this chapter will present the limitations of the study, the opportunities for improvement at the local and national level from both a pro and con perspective, and will suggest directions for future research.

**Key Findings**

The study found that medical students in social service (8th year) do not prefer primary care careers. Influences on the career choices of medical students come from a multifactorial set of intrinsic and extrinsic determinants that are complex and dynamic. Most of the factors that influence PC career choice among Honduran medical students are similar to those found in the literature: practice in ambulatory settings, preference for working in a rural community, and development of long-term relationships with patients. Opportunity for research, ability to master a small set of skills and be the expert are also facilitators of PC choice, although they are considered barriers in other studies. [1,6,96,115]

Barriers are also similar to evidence found elsewhere: income potential, opportunity to work on highly challenging cases, perceived prestige, opportunity for research, medical training and debt. Students who prefer medical specialties are influenced to a greater degree by predictable work hours.

There are several factors distinctive to medical students in Honduras, most of them barriers to PC choice: future work option, availability of positions for a residency program, and social factors including violence. A facilitator for PC selection in Honduras is the need of fewer resources to practice a specialty (i.e. pediatrics).

Participants consider the most important factors that influence career choice to be making a difference in people´s lives, income potential, teaching, perceived prestige, and challenging work.

The qualitative analysis confirmed most of the determinants documented in the survey, identifying additional factors that influence career choice in Honduras: work options, specialty availability and resources needed for a specialty.

**Key Findings**

1. Medical students in social service in Honduras do not prefer primary care careers, although key informants agree that the country needs PC practitioners.

2. There are more men preferring surgical and PC specialties. Women prefer medical specialties.

3. Most medical students in social service come from an urban background and prefer medical and primary care specialties. Medical students from rural background prefer surgical specialties.

4. Expected annual salary among social service respondents is almost twice of what a GP or a specialist makes early in his/her career. Salary perception among female respondents is higher in the upper categories.

5. Perceived monthly salary of specialties other than primary care was significantly higher than those

of GPs, FPs and pediatricians.

6. Medical students prefer urban settings for future practice location, mainly large cities such as Tegucigalpa and San Pedro Sula.

7. Factor associated with a preference for primary care careers:

- Emphasizes practice in ambulatory settings

- Preference for working in a rural community

- Opportunity for research

- Ability to master a small set of skills and be the "expert"

- Development of long-term relationships with patients

8. Factors associated as barriers for PC choice:

- Future work option

- Availability of positions for a residency program

- Resources needed for a specialty

- Social factors including violence

The main findings are discussed by each aim of the study in the following section. Limitations of the research, conclusions and recommendations are presented at the end of the chapter.

**Aim 1: Describe patterns of specialty choice**

**Preferred Medical Specialties**

The top-ten list of preferred medical specialties presents some particularities. The most likely specialties identified by social service participants and by key informants are Gynecology/Obstetrics,

Surgery, Internal Medicine and Pediatrics. However, there are some careers considered first choice by medical students that are not associated with the main health priorities in Honduras. Psychiatry is the third most preferred specialty among social service participants. There are some reasons that could explain this occurrence: Honduras is the most violent country in the world, and violence affects almost every aspect of social life. A study found a 20.5% prevalence of anxiety and a 13.1% of psychosis in a region of the country. [117] The choice of psychiatry could reflect a genuine concern among medical students to improve mental health in the country; additionally, students could be responding to a shortage of psychiatrists and work possibilities within the health system; or perhaps, interest in psychiatry could be a personal response to a situation that touches them or their family. Psychiatry was the second most common choice among Italian medical students; choosing psychiatry was predicted by "having volunteered for further clinical or research activities in psychiatry, believing that the problems presented by psychiatric patients are interesting and challenging, and by accounts of personal/family experience with physical illness". [118] Consistent with this study, Chilean 7th year medical students identified psychiatry as their third preferred specialty choice. [30] The increasing prevalence of non-communicable diseases, such as hypertension and cardiovascular diseases, plus the perceived prestige of the specialty could be the reason why cardiology is among the top-ten preferred specialties.

Dermatology and urology are also among the top of the list, although they do not necessarily correspond to the epidemiological profile of Honduras, where communicable diseases (bacterial sepsis and pneumonia) and non-communicable diseases (acute myocardial infarction, stroke) are the major causes of mortality. [119] Dermatology is a choice that could reflect a higher demand for this specialty due to an increasing prevalence of skin cancer and other dermatologic conditions, although it could also represent an increasing public willingness to pay for aesthetic procedures, also reflected in the increasing interest in plastic surgery among social service participants, higher than the preference for any PC career. On the other hand, the absence of night shifts and long hospital hours during

dermatology training could be a factor that attracts students, especially female and married students with children.

Family medicine (0.9%), public health (0.4%), tropical and infectious diseases (0.4%) and general practice (0%) do not attract the attention of most survey respondents as their first choice of specialty. Faculty, academic and national health authorities that participated in the qualitative component agree on the importance of primary care and family medicine in the improvement of a national health system, however medical students prefer medical and surgical specialties. This lack of interest in primary care and family medicine is consistent with results of studies in Chile, Malaysia, Turkey, Jordan, USA, Canada and Greece. [1,7,30,66,109,110,112]

Survey respondents selected similar careers as their second choice of specialty. Plastic surgery appears as one of the top ten preferred second choices (sixth), while there is just one participant who selected general practice.

**Preferred Career Choice by Specialty Categories**

In general terms, career choice among social service participants favors medical specialties, followed by surgical, primary care, and emergency medicine careers, as first and second choices. These results are consistent with other studies, in particular with Breinbauers` in Chile, where specialty preferred choices included internal medicine, surgery, pediatrics and psychiatry. [30] Sub-Saharan medical students favored surgery, internal medicine and pediatrics. [64] Interest in primary care careers among Honduran medical students in their social service (8.1%) is lower than figures reported in studies from Canada, Chile, Germany, France, Iraq and USA. [28,30,102,115,120,121] Final choice of a PC specialty could be even lower, since only 1.3% of respondents are completely sure of a PC career, compared to students who chose other specialties (19.2%).

The lack of interest for emergency medicine is important to consider in a country where violence, trauma and vehicle-related injuries are a major cause of mortality. The number of fatalities caused by traffic accidents reached 14.7 per 100 000 in 2010 [119] and the rate of homicides in the country reached 85.5 per 100 000 in 2012 (WHO Global Status on Violence Prevention 2014). National health authorities are aware of this situation and in 2014, the Minister of Health officially requested scholarships to train abroad family physicians and emergency room doctors.

**Preferred Specialty Categories and Certainty of Career Choice**

The majority of social service respondents is not sure of their specialty choice or is still undecided about it. This uncertainty leaves room for some actions to be taken by Secretary of Health (SoH) and UNAH during community service, in order to motivate these professionals towards primary care careers. However, a one-year period is insufficient and social service conditions probably do exactly the opposite: social service physicians experience the lack of resources to perform their job, they are underpaid and the stipend is usually two or three months late, they have insufficient support from the regional health department, and their training to perform at a primary care level is inadequate. In most cases, health care professionals complete social service demotivated and eager to go back to a hospital setting in an urban environment. There is some discussion at the SoH about the need to incorporate general practitioners to work in primary care centers and PC teams, instead of social service graduates. By hiring physicians, SoH expects to reduce the rotation of social service graduates whose program is limited to one year, thus improving the continuity and quality of care at the community level. However, it would represent a huge investment for the State, since physicians in social service only cost USD 4.5 million annually (1.5% of the SoH total expenses in human resources for health) compared to USD 18.5 million if they hire GPs.

**Aim 2: Investigate relationships between career selection and selected demographic indicators**

The social service applicants for 2014-second annual lottery comprise an unusual cohort. Previous cohorts had an overwhelming predominance of UNAH students, but 2014 survey respondents come from three different universities, more than half from Catholic University and ELAM.

Female respondents represent almost half of total participants, a fact that supports the feminization of health professions in the country, and in particular in medicine. The cohort is representative of the Honduran population in terms of racial group, mostly of mestizo origin. Survey participants are mostly single and have no children. There is a slight majority of respondents in the >25 age group. Except for the age, these results are not indicative of participants selecting primary care careers, since evidence found that students who are married or engaged, older and with children were more likely to pursue PC careers. [6,78,81,82,85,86]

The fact that the majority of participants come from urban settings reflects a trend in Honduras and most countries of the Central American region. Evidence indicates that practitioners with an urban background are less motivated to move to rural or remote locations, compared to those who come from rural areas, [79] while growing up in a rural area was a predictor for rural practice. [87] The introduction of the admission test at UNAH in 2012 could decrease even more the number of students from rural areas being admitted into medical school, exacerbating the shortage of physicians working in remote and rural areas of the country.

There are more men who prefer surgical and primary care specialties compared to women. Female prefer medical specialties. Surgical specialties are still a bastion of male predominance in medicine in Honduras. Tradition and remnants of machismo could be reasons why female do not yet dominate surgical specialties, as well as long hospital hours and night shifts. Although the study found that men preferred PC, most reviewed evidence found a female predominance in PC careers as preferred choice.

[1,10,13,83,84,101,102,106] Other studies [78,80] found a female predominance only in family medicine as a preferred career choice. Kielbasa's study on career choices among German medical students [82] found a female predominance in general practice, gynecology and obstetrics, pediatrics, and surgery; males were predominant only in internal medicine as preferred specialty. There are some studies where male were predominant in PC careers as preferred choice. [107,108] In the United States there were more males in family practice in 2014 (55 702) than females (33 941), although the difference is consistently diminishing since previous years. [122]

The intended specialty choice shows a trend of feminization of medical specialties in Honduras, (68%). There are no studies on factors that influence work decisions among Honduran female physicians. Female practitioners are more interested in flexible working hours [123] and provide fewer hours of work compared to the male and younger counterparts. [124]

Medical students from urban background prefer medical and PC specialties. Participants from rural background prefer surgical specialties. An interviewee pointed out that students from urban areas choose the basic specialties (internal medicine, pediatrics, gyn/obstetrics, surgery), and those who come from communities "catch what is left" (Informant A-3).

Over 89% percent of respondents who chose primary care specialties do not have a parent who was a physician. These results are consistent with other findings, where not having family or close friends practicing medicine was one of the variables that predicted whether a student named family medicine as his or her top residency choice. [81] More evidence indicates that having parents who are physicians influences specialty choice, [116] while not having parents or relatives who are physicians is a facilitator for a career choice in primary care. [115] Since only 8% chose primary care careers, there are other factors that probably have greater influence in career decision in Honduras, which are analyzed in the following sections.

**Aim 3: Identify salary perception of PC careers, and medical and surgical specialties**

Annual salary perception among social service respondents is USD 33 900 (median), almost twice of what a general practitioner or even a specialist makes early in his/her career in Honduras (USD 16 128 and USD 19 100, respectively). Perhaps, this perception is based on the additional benefits contemplated in the Statute for Employed Physicians Act[2] that employed physicians receive, such as bonuses for practicing in rural or remote areas, night shifts and annual salary increments. These findings are consistent with interview data, which suggest that students aspire to become physicians to obtain economic benefits and to climb in the social scale.

Most of the respondents believe that non-PC doctors earn more than PC physicians. These results are supported by the opinions of key informants, who consider that clinical and surgical specialists have a higher income than PC physicians, public health professionals and epidemiologists. Evidence in the literature corroborates these findings. [4,6,8,100,125]

Qualitative results indicate that income difference between GPs and specialists is minimal in Honduras. In fact, the difference in favor of employed specialists is only USD 248 per month compared to GPs, almost half the difference perceived by survey respondents (USD 471). This is a unique case in the Latin America region, where salaries for specialists are usually much higher and ministries of health struggle to reduce the gap. However, it does not make a difference in career choice if medical students have higher salary perceptions for medical and surgical specialties, compared to PC careers; they will continue favoring those specialties no matter if earnings are about the same.

Salary perception among female respondents is higher in the upper categories (USD 2 800 and plus) compared to male´s perception. Another study also found that female physicians were influenced in their career choice by a sizeable income and a short residency. [82] Perhaps women are more concerned

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[2] Presidencia de la República de Honduras. Reglamento de la Ley del Estatuto del Médico Empleado. 1986.

with the costs of raising a family in Honduras, and they aspire to a higher salary. However, this perception could lead to a lesser degree of satisfaction in professional career associated to a lower, more realistic monthly income.

Knox[95] points out that salary may have been overemphasized in understanding career choice. In Honduras, current social and economic conditions place income as a significant determinant in career and specialty choice.

**Aim 4: Identify factors that influence career choice in PC among 8th year medical students**

**Most Influential Factors in Career Choice**

Participants consider making a difference in people´s lives, income potential, teaching, perceived prestige, and challenging work as the most important factors that influence career choice. These results coincide with findings in the qualitative component. Rationales behind the choice of medical specialty appear to be based on a combination of ambition and prestige on one hand, and on personal and altruistic considerations on the other. These results are similar to Aasland´s findings. [126]

Survey respondents consider it very important to make a difference in people´s lives, although it is a factor that influences a choice of medical specialties instead of PC careers, as evidence supports. [66,83,93,104,127] Results of the logistic regression analysis were somewhat closer to the literature review, since patient-based care factors such as making a difference in people lives and continuity of care were related to PC preferred career choice. Few respondents (15%) consider very important the income potential of a specialty, although social service participants have a salary perception almost twice the real income of a physician working in a public institution. Moreover, qualitative data suggest that students enter medical school to advance in social status or to improve their economic position, noting that income potential not only influences specialty choice, but also choosing medicine as a career. Perceived prestige of a specialty is an influential factor for medical students who consider a demotion to

practice primary care, and a reason not to choose PC careers. This is consistent with evidence found elsewhere. [6,12,13,31,66,83,111] This determinant could be even more significant in an unequal society such as the Honduran, where name, social position and prestige play an important role in every aspect of life.

**Factors Influencing Preferred Specialty Choice**

The study reaffirms many known trends governing student career choice in primary care such as practice in ambulatory settings, preference for working in a rural community, and development of long-term relationships with patients. It also contradicts other trends such as opportunity for research, and ability to master a small set of skills and be the expert, which are considered factors more related to medical and surgical specialties. [12,83,96] Social service participants who prefer primary care careers tend to place greater importance on the practice in ambulatory settings, a factor that is not among the most important determinants that influence career choice in this cohort.

Students who prefer medical specialties are influenced to a greater degree by predictable work hours. Honduras has a policy of a six-hour schedule for physicians employed by public institutions. This schedule allows the time for a lucrative private practice for specialists working in public hospitals, as well as physicians accepting positions as faculty, or both. This practice has increased the waiting lists for programmed surgeries and the length of stay in hospitals, since residents and interns, except for those few specialists who are on-call, run hospitals after mi-day, and they have a maximum of 72 hours per month of on-call duty.

The study provides some insight into how decision factors are weighted differently in Honduras for those who choose primary care careers versus other specialties, and between students with rural and urban backgrounds. Social service participants from urban background who prefer primary care are mostly influenced by rural work and by practice in ambulatory settings, while respondents with a rural background who prefer specialties are influenced by the possibility of making a positive difference in

people´s lives. Exposure to rural work and ambulatory settings is important considering that most students come from urban background. The social service program provides an opportunity to obtain such an exposure, and it could motivate social service graduates to select PC careers; but as it is currently designed, it does the opposite. Medical schools in Honduras need to incorporate a primary care approach in their curricula, and to provide opportunities for rotations in primary care units and health brigades in community settings as part of medical training early in the career.

Older students who choose primary care specialties consider more leisure time to be important. This is consistent with other studies. [78,81-83,85,86,100,128] Younger participants who prefer specialties other than PC are influenced by the opportunity to enjoy life outside of work. This is not consistent with other studies, where lifestyle is a factor that influences non-PC career choice. [86,91,94,98,110,111]

Survey respondents consider very important the opportunity to deal with a variety of medical problems, but they relate it to urban hospitals where there is a higher number and a richer variety of cases, compared to rural health centers. Therefore, it is a factor that influences non-PC career choice in social service respondents.

Qualitative data suggest that medical training is as an influential determinant of specialty choice. In Honduras, medical training prioritizes hospital care, and students have a larger exposure to hospital settings than to primary care centers, encouraging them to choose clinical or surgical specialties instead of PC careers. Interview data also indicates that training in primary care during medical school can have an impact in specialty choice, motivating students to select PC careers. These findings are consistent with the literature. [9,30,129-131] After a long and complicated process, UNAH School of Medicine is completing a redesign of its curricula, with the inclusion of primary care as a cross-sectional component. The implementation of the new curricula will be another challenge, but faculty is more aware of the importance of a comprehensive approach towards medical education. However, there are other

components that must accompany curricula reform: hiring PC faculty, incentives to capture students with rural background, mentorship and internship programs in primary care, and scholarships for PC careers.

Debt is not an influential factor for specialty choice in Honduras, as it is in other countries, since applicants accepted in a residency program receive a state scholarship, and as previously described, the salary gap between GPs and specialists is not significant. However, those who come from rural or remote areas could require a loan to cover living expenses and other costs.

**Additional Factors**

Key informants mentioned some additional factors that influence career choice among medical students. The type of experiences during medical training is a factor that influences students to choose medical or surgical specialties, mostly because training favors hospital settings and provides an early exposure to specialists from these areas. On the other hand, medical students have little or no experience practicing in community health centers, and exposure to PC practitioners is minimal during their training.

Most survey respondents consider important a positive interaction with a clinician or professor of a specialty when choosing a career. The absence of primary care role models is a barrier in Honduras, since family practitioners or other PC physicians are rare as part of faculty in medical schools. Students find role models among those available, usually clinicians or surgeons. These barriers could become facilitators, if medical schools integrate primary health care in their curricula, include a community approach and incorporate primary care physicians as faculty.

Future work option is considered a factor, since students in Honduras are prone to choose the specialty that offers more possibilities to get a job, no matter if it is in an urban or in a rural setting. In 2012, approximately 45% of physicians were unemployed or sub employed in Honduras, and the public

sector was the main employer of medical doctors in the country (45% were working in public institutions in the same year). The Secretary of Health could use its recruiting power to influence the physician´s profile and type of training at the pre graduate and graduate level (including specialties) according to the needs of the country.

The availability of positions for residency programs influences students to choose specific specialties, even if the specialty is not their first choice. The small number of openings for residency programs in most specialties limits the possibilities of being accepted in the selected program; so medical students choose a career depending on the number and availability of positions. This is a barrier for selecting PC careers since Honduras does not offer a family medicine specialty, and positions for other PC specialties are limited.

In addition to other factors already described, violence could be a barrier when deciding on a primary care career. Honduras has one of the highest rates of violence in the world. According to the WHO Global Status on Violence Prevention 2014, the rate of homicides in the country reached 85.5 per 100 000 in 2012. Medical students are aware about the risks involved in working in certain communities or neighborhoods. When they apply for the social service program, those who are appointed to areas known to be violent prefer to wait for another cohort, instead of completing social service in that year. Practicing in a hospital is safer where there are guards or some type of control at entry points, hospitals are located in urban areas, and physicians are not alone as is often the case in a rural health post.

For students in a poor country such as Honduras, the resources needed to practice a specialty could be a facilitator to select PC careers, since primary care does not require sophisticated equipment or complex facilities, such as neurosurgery or cardiovascular surgery. However, this "simplicity" could discourage students who wish to pursue more technology dependent work in medicine.

Professional vocation and personal preferences could also facilitate career choice in Honduras, as

shown in similar studies. [106,120] However, the role of career orientation as a factor is not clear. The main

university in the country with the largest medical school (UNAH) does not have a vocational orientation.

The university offers an induction program to new students, mostly related to administrative and

academic procedures. Once a year, the national university holds a Vocational Fair opened to high school

students and to pre-graduate students who are planning to change careers. Each department of every

professional school is represented during the fair, providing information on the career and its

specialized areas. There is some informal orientation throughout medical school, mostly on clinical and

surgical specialties, while evidence suggests that making career choices has been made difficult by

inadequate careers advice. [131] Career orientation is a barrier for PC choice among medical students,

since it is biased towards clinical and surgical specialties.


**Aim 5: Identify factors influencing desired location of future medical practice**

Medical students in Honduras prefer urban settings for future practice location, mainly large cities

such as Tegucigalpa and San Pedro Sula. In 2011, Universidad Nacional Autónoma established an

admission test for all its careers, including medicine. In Honduras the best high school education is

provided by private schools, while public schools struggle with budget and academic quality. The

situation is even worse in rural and remote areas, where education does not fulfill quality standards. The

admission process at the largest medical school could exacerbate this phenomenon, since most of

admitted students come from private schools in the metropolitan areas of Tegucigalpa and San Pedro

Sula, and they will probably stay in urban areas upon graduation.

Medical students in Honduras prefer urban areas because of better access to basic services including

health care, opportunities to grow, better education for their children, comfort, access to cultural

activities and economic benefit. These findings are consistent with other studies. [66,102] The barriers to

practice in rural or remote areas are related to the lack of these basic elements. Additionally, the lack of

incentives and factors of social nature such as poverty, violence and the internal political situation influence the decision on future practice location. Urban hospitals are a desirable practice location, since they have basic services such as electricity and potable water, and physicians have the support of other health care professionals.

The Statute for Employed Physicians Act establishes that medical doctors have the right to receive a geographical bonus equivalent to 25% of the monthly salary, when required to work in rural or remote areas of the nation. Apparently, this economic incentive is not enough to motivate social participants and physicians to consider a future medical practice in rural or remote areas, or the bonus is not enough to persuade practitioners to move into these areas.

**Limitations of the Study**

The study´s limitations include the cross-sectional nature of the survey, which is a snapshot at a point in time, making it difficult to explain career choice in primary care at different stages of medical training. For logistical reasons, the study included 8th year students who were about to begin the Social Service Program, therefore the findings are not be generalizable to all undergraduate medical students. Some students could have noticed the Social Service Program focus towards primary care, and could have accommodated their responses in favor or against PC. Another limitation is that the questionnaire measured students' "preferred" choice of medical career, and not the "actual" choice.

The survey did not collect information on the participants' university; thus, it was not possible to cross-analyze the results and compare them by university of origin. The small number of respondents who preferred PC and emergency medicine specialties limited the possibility of further analysis, since some contingencies tables had cell counts less than 5.

The qualitative component of the study made no attempt to recruit a truly representative sample of interviewees, given that the purpose was to triangulate the findings of the cross-sectional study with the

views of a selection of stakeholders. Key informant interviews have the potential for respondent-induced bias because interview participants might have been selective of the information that they reported to the researcher, or because they knew the focus towards primary care of the study. This potential bias was mitigated by interviewing participants in a variety of organizational positions and with diverse perspectives (i.e., administration, faculty, physicians). Furthermore, the researcher corroborated key informant interview data with data from the literature review.

The interviews were recorded in the original language (Spanish) and later transcribed verbatim and translated into English. Some of the content could have lost some of its original meaning during the translation. Additionally, the investigator conducted all of the interviews and bias might have been introduced into the results of the key informant interviews. However, the nature of the questions, the relatively short length of the interviews, and the immediate transcription of the results, served to reduce bias. To further improve construct validity, the researcher requested that informants review drafts of their interview to ensure its accuracy.

**Opportunities for Improvement**

The School of Medicine at Universidad Nacional Autónoma, the largest in the country, is currently working on a profound curricula redesign that involves the incorporation of primary health care as one of the cross-cutting components. The School of Medicine has the opportunity to reorient the training of medical students, emphasizing generalism and addressing the hidden curriculum in undergraduate medical education. This can be achieved through a curricula reform that includes training of faculty, employing new faculty in PC areas, increasing students exposure to PC physicians, and increasing students exposure to community health work in both, the preclinical and clinical years. The proposed new curriculum includes public health modules, participation in health brigades, a community internship during the 7th year, and the social service program at the end of medical training. A primary care

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tutoring and mentoring program could also increase students exposure to PC physicians, rising PC

awareness among faculty and positioning the area among the schools of health sciences (Medicine,

Nursing, Odontology).

The Social Service Program needs to be reinforced in its PC approach. A one-week orientation course

is not sufficient to fulfill the training gaps in areas such as primary health care, community development

and public health. The introduction of PC as a cross-cutting component, plus an earlier students

exposure to population health (health brigades, community internship) could better prepare students

for social service. However, it is important that academic and national health authorities improve their

coordination to provide an adequate working and learning environment to 8th year medical students.

Regional health personnel and academic authorities must provide on-going training, supervision and

monitoring of activities to social service participants. Although they have completed medical training,

participants do not receive their medical degree until completion of the social service program. This fact

represents a source of conflict with legal repercussions, since social service participants provide medical

services that include diagnosis, treatment and drug prescription without being fully certified. UNAH

should consider the possibility of graduating students as medical doctors before they start social service.

Since 2014, the School of Medicine is negotiating an agreement with a US academic institution,

which includes cooperation to establish a family medicine program in Honduras. The Secretary of Health

is also interested in having family practitioners to strengthen its family health teams. A family medicine

program will provide the opportunity to Honduran medical students to obtain a specialty that is not yet

available in the country. It will also provide a cohort of much-needed mentors and tutors to the School

of Medicine, increasing the awareness and interest of students towards PC careers.

The admission test at UNAH can assist identifying the most qualified students to be accepted in

medical school. However, it might be excluding students from rural or remote areas, where high school

education lacks quality standards. UNAH should establish propaedeutic courses directed to medical school applicants from rural districts, and scholarships to those who pass the admission tests. Increasing the number of students from rural areas is important to reduce the gap of physicians in those districts.

UNAH is not only the largest university in the nation, but also it legally has the steering role for higher education in Honduras. Any improvement or change at the School of Medicine will influence others in the public and private sector. Additionally, UNAH has the authority to dictate norms and regulations to all universities or institutes of higher education. Under UNAH leadership, there are more possibilities of implementing a comprehensive approach to medical training that emphasizes generalism and primary care in other medical schools in Honduras.

In 2014 the Secretary of Health established a Direction of Development of Human Resources (DDHR). Together with the Direction of Integrated Health Service Networks (DIHSN), they have been working to strengthen primary care in Honduras. In 2014, the DDHR elaborated a draft policy to strengthen human resources in primary care that is being socialized with the main stakeholders, including the university. The DIHSN is establishing and integrated network of health care services and increasing the number of family health teams in rural and remote areas.

Government can assist medical schools by providing incentives and alternate payment models to encourage more family physicians to become involved in teaching and mentoring.

The Government should re-orient its national scholarship program, which currently covers mainly medical and surgical specialties. The program should offer more scholarships for primary care careers, including the family medicine specialty, focusing on candidates from ethnic minorities or from rural or remote districts. Additionally, the Secretary of Health should establish an innovative system of incentives to promote hiring or relocation of PC practitioners in rural areas. It should include not only economic benefits, but also possibilities of personal and professional development such as continuing

education, training, telemedicine, free Internet connection and access to virtual libraries.

The Secretary of Health is the major employer of health personnel in Honduras; thus, it has the capacity to influence physicians' supply according to the nation needs. As the leader of the health sector, the SoH can influence academic institutions to train health professionals that respond to the national priorities. It is expected that this steering role will prevail under a decentralized health care model, where non-governmental organizations will provide health care services through a management agreement, although in most cases these "providers" will utilize SoH infrastructure, human resources, and equipment. The SoH is currently identifying a package of health services that will be guaranteed for all the people. It includes primary care and primary health care services. If it is approved, external institutions and those that still remain under SoH management will deliver this guaranteed set of benefits to the population, including PC and PHC services. SoH will monitor the fulfillment of the management agreement.

Government and municipalities must work together to improve safety conditions in certain districts where violence drives out health workers. Some physicians could be motivated to work in rural districts, but access to basic services and lack of good education for their children dissuade them to accept positions in these areas. This is a major challenge that will require time, a strong investment and political commitment.

On May 7 2015, the National Congress approved the Social Protection Framework Law. The new law includes a chapter on health care where it is stated that the national health system prioritizes prevention and primary health care (Art. 16), and a real integration of a public health care services network, "from primary care to the higher complexity levels of care" (Art.19). This new legal framework supports the development of new or existing programs, plans or policies to strengthen primary health care and primary care, including human resources for health.

**Future Research**

UNAH should sponsor a follow up study of the same cohort of students who completed social service in September 2015. This new study could confirm those factors originally found to influence career choice, or it could identify different factors that act as facilitators or barriers for PC career choice. It could also determine if social service experience motivated more students to prefer primary care careers or other specialties.

The criteria for student admission requirements and the influence of traditional medical education on the career choices of students in Honduras require further research. Since this study was a cross-sectional picture of a cohort of medical students in its final year, it would be interesting to follow a prospective cohort over their entire medical training and measure changes from initial career preferences to the final selection of residency, identifying factors that influenced the decision throughout the training and its variations.

**Policy Implications**

There are a number of local and national policy implications that come out of the study results. In order to address the most important ones, decision-makers should raise the following questions:

Do health care providers take into consideration these factors when implementing health care models based in PHC?

Do national health authorities and health care providers take into consideration these factors when planning present and future health workforce needs?

Do faculties of medicine take into consideration these factors when recruiting students?

How can this knowledge contribute to integrate efforts from health care providers and medical faculties to train the professionals Honduras needs?

**Plan For Change**

The results of the study will be shared with Secretary of Health national authorities, including the Direction for Development of Human Resources, the National Council of Human Resources for Health, and with academic authorities from Universidad Nacional Autónoma de Honduras. As explained later, the study is a component of a strategy to strengthen the primary care workforce in the country.

The plan for change utilizes Kotter's eight steps for transforming an organization [132].

**Create Urgency**

As mentioned earlier, Honduras is among the five countries with the lowest density of human

resources for health in the Region and in 2012 there were only 5 family practitioners registered with the College of Physicians. In 2014 the Secretary of Health (SoH) announced the national model of health based in primary care to be a priority. On 7 May 2015, the National Congress approved the Social Protection Framework Law, containing a title on health that positions primary health care and primary care as a priority. The Law includes an article that mandates the Secretary of Health to prepare a proposal of a National Health System Act to be presented to the National Congress.

The National Health Plan established that SoH primary health care teams are expected to increase to 500 by 2018. In 2013 the School of Medicine at UNAH began a curriculum reform process that includes a crosscutting PHC component. UNAH is not only the largest University in the country, but also the national authority in higher education.

There are several elements that contribute to create a window of opportunity to strengthen the primary care workforce in the country: the new legal framework, the national health model based in PHC, a genuine interest of academic and national health authorities in PC and PHC, the curriculum reform at UNAH School of Medicine, and the creation of the Direction for the Development of Human Resources at the Secretary of Health. Identifying the factors that influence career choice decision among medical students provides the baseline information to be used in building policy and implementing curriculum reform at UNAH, and also for policy development and HRH planning at the Secretary of Health.

**A Primary Care Coalition**

The National Council of Human Resources for Health (CONARHUS)[3] is a political national entity of the health sector responsible to orient and provide leadership on policies, plans, programs and projects for the development of human resources for health. Among its functions it determines the relationship

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[3] Consejo Nacional de Recursos Humanos en Salud

between supply and demand of HRH; plans the training, capacity building and utilization of these resources; and, defines HRH educational and occupational profiles. Institutions represented include: Secretary of Health (chair), Secretary of Education, General Direction of Civil Service, Federation of Professional Colleges of Honduras, College of Professional Nurses, College of Physicians, Institute of Social Security, Universidad Nacional Autónoma de Honduras and Association of Private Universities. PAHO/WHO provides technical cooperation to the Council through its country office.

CONARHUS has been inactive for almost two years. For years, the HRH Department at SoH was understaffed, unrecognized as a key area of SoH, and with restricted access to decision-makers. The HRH Department was not able to maintain CONARHUS delegates interested and motivated in HRH development efforts. The creation of a Direction of Development of Human Resources changed the scenario, and now it has more staff, a director who is closer to decision-makers and the willingness to position itself at the SoH and within the health sector. PAHO/WHO has been supporting the SoH-DDHRH from the beginning, and suggested the Direction the re-activation of the National Council as a strategy to establish alliances with institutions committed to the development of HRH. On April 21 2015, CONARHUS had a first general meeting after several years of inactivity. During this meeting, the SoH presented a draft of a national policy to strengthen primary care workforce in Honduras prepared with PAHO support and UNAH participation. SoH requested comments and suggestions to CONARHUS delegates.

UNAH is one of the most influential institutions in the country, and an active member of CONARHUS. Moreover, the University vice-chancellor is a physician with a strong commitment towards public health, and with an excellent professional reputation. In 2013 this authority was re-elected for another four-year term. The vice-chancellor represents UNAH at CONARHUS and her commitment to strengthening primary health care could motivate other members of the group, as well as major stakeholders such as

UNAH Chancellor, and national health authorities into using the study results to adopt a comprehensive strategy that includes SoH, the academia and the physician's professional college.

An agreement between Secretary of Health and National Autonomous University of Honduras could form a powerful coalition to strengthen the primary care workforce in the nation. PAHO's participation as an agency of international health cooperation could create the bridge to bring together the main stakeholders. Additionally, PAHO has a network of HRH experts and collaborators at the national, sub-regional (Central America) and regional level (Americas) to provide support to HRH initiatives in member states.

**Vision for Change**

VISION: *Honduras will have a robust primary care workforce to strengthen the network of health care public services. Medical personnel will be trained adequately in PHC in academic institutions that will have reformed their curricula to incorporate a comprehensive approach; the country will have a national family medicine program that will prioritize primary care; medical training will meet the needs of the population so that the country achieves universal health coverage.*

**Key Findings and Plan for Change**

The results of this study will be presented as part of a strategy to increase and strengthen the primary workforce. Key findings could contribute to bring the attention of decision-makers on issues regarding the strengthening of primary care workforce. The following section will provide some strategies and tactics to implement the plan for change.

The results showed that medical students in social service do not prefer primary care careers, although Honduras needs PC practitioners. Curricula reform at the School of Medicine includes the incorporation of PC as a cross cutting component and the training of faculty. I will schedule presentations of key findings to the School of Medicine Academic Council and to UNAH Academic Vice-

chancellor office. As an advisor to the commission that is preparing the curricula proposal, I will provide evidence of international experiences of PC incorporation into the curricula of schools of medicine. UNAH should establish a tutoring and mentoring program in primary care and primary health care. Through the Pan American Health Organization I can offer the PAHO on-line PHC Training Program and motivate the participation of faculty from schools of health sciences. Advocacy to national health authorities is also important to approve and implement the policy for strengthening of PC workforce. The Social Service Program should prioritize a PC orientation, providing adequate training and resources to maximize the experience and motivate medical students during that period. I will advocate SoH Direction of HRH and the Dean of the School of Medicine for reassuming talks to complete and sign an agreement between UNAH and SoH, as well as advise SoH and UNAH stakeholders on strengthening the PC orientation of the Social Service Program.

Another finding showed that most medical students come from an urban background. A propaedeutic course at UNAH could improve chances of admission to the School of Medicine of applicants from rural and remote areas, including students from indigenous and afro-descendant groups. Since PAHO has channels of communication with representatives of indigenous and afro-descendant groups, as well as with UNAH authorities, I can facilitate the dialogue between these stakeholders.

The expected salary among social service respondents is almost twice of what a GP or a specialist makes early in his/her career. Additionally, the perceived monthly salary of specialties is significantly higher than those of GPs, FPs and pediatricians. Medical students and residents should be familiarized with the Statute for Employed Physicians Act, which includes the official monthly salaries and the geographical bonus for those working in rural and remote areas. I will advice academic coordinators and

faculty on including a revision of the Statute for Employed Physicians Act during social service orientation.

The results demonstrated that factors associated with preference for a PC career included practice in ambulatory settings and preference for working in a rural community. The SoH must continue expanding and strengthening the Family Health Teams (FHT), since it provides social service physicians the opportunity to practice in outpatient settings, and it should establish an innovative system of incentives to promote hiring or relocation of PC practitioners into rural areas. I can offer the PAHO on-line PHC Training Program or other courses, and motivate the participation of family health and regional teams. I will advice health authorities on establishing continuing education and telemedicine programs to promote professional development of PC practitioners in rural and remote areas. These efforts involve mobilizing resources via PAHO for funding the courses, and for providing communications and information technology. Sharing the Statute for Employed Physicians Act with medical students and social service physicians is another strategy to raise awareness about the geographical bonus.

Opportunity for research was a factor associated with PC preference. UNAH should open and promote lines of investigation on PC and PHC subjects at the pre and graduate level. I will advocate national health authorities, research committees, IRBs and authorities from the MPH program to support PC and PHC investigation, and to promote an annual award for best research on the field.

Future work option is a barrier for PC choice as well as the availability of positions for a residency program. The Secretary of Health should use its influence to modulate the supply of PC physicians. The Direction of Human Resources for Health at SoH should lead the efforts to promote policy development to strengthen PC workforce in the country. National Scholarship Program should expand the number of scholarships to train physician in PC careers, including family medicine. The establishment of a family

medicine program in Honduras will motivate students to join a PC career and the possibility of future

work. Advocacy to national health authorities, including HRH national director, coordinator of PC

department at SoH to continue the strengthening of FHT and advocacy to UNAH, Medical Federation,

Institute of Social Security and the National Council for HRH (CONARHUS), to approve and implement

the policy for strengthening of PC workforce, which includes a family medicine program. I will continue

advising on the strengthening of CONARHUS and its delegates. I will promote teleconferences with

representatives of US academic institution interested in supporting a FM program to accelerate the

completion of a formal agreement, and will provide evidence and facilitate virtual meetings with experts

from Latin America to share experiences of FM programs.

Medical students prefer urban settings for future practice location, mainly in large cities such as

Tegucigalpa and San Pedro Sula. SoH should establish an innovative system of incentives to promote

hiring or relocation of PC practitioners into rural areas. UNAH and other academic institutions that offer

the career of medicine must actively search/motivate applicants from rural and remote areas, including

students from indigenous and afro-descendant groups. I will advice health authorities on promoting

professional development of PC practitioners in rural and remote areas, offering PAHO on-line courses

and telemedicine (Virtual Clinic program), and mobilizing funds through PAHO to support these

initiatives. Since PAHO has channels of communication with representatives of indigenous and afro-

descendant groups, as well as with UNAH authorities, I can facilitate the dialogue between these

stakeholders.

**Communicate the Vision**

I will present the study´s results to authorities and faculty from schools of medicine in the country,

as well as to authorities from the Secretary of Health and CONARHUS delegates.  On April 21, 2015 the

investigator presented the study preliminary results during the first general meeting of the National

Council of Human Resources for Health. I am scheduled to present the results of the study to UNAH Superior Academic Council on May 2015. Final results will be presented during a workshop where major findings will be discussed. The participants (academic and SoH national authorities, CONARHUS delegates, professional colleges delegates and medical students' representatives) will identify common mechanisms to improve interest in PC careers among medical students. PAHO will compile and summarize the results of the workshop and will present a draft joint proposal to national health authorities and to deans of medical schools with mechanisms to improve training, recruiting and selection of PC practitioners in the country. Through its HRH unit, PAHO will follow up with universities future actions that could include changes in the admission process, curricula development, rural training, among others.

Under the leadership of the Direction for Development of Human Resources, the coalition formed by SoH, UNAH, National Council of Health and Education, Council of Higher Education and PAHO/WHO will advocate to National Congress for the funding of the policy for the strengthening of primary workforce in Honduras. Advocacy will include one-to-one meetings with legislators, letters to members of the Health Commission. A direct communication with the president of the Health Commission of the National Congress is a strategy that could yield positive results; telephone calls from the minister of health, from UNAH Chancellor and Vice-chancellor, and from PAHO Office Director could influence members of Congress. Hearings and meetings with the full health commission or with some members would increase the possibilities of positioning the policy. Documented evidence and fact sheets will add credibility to the arguments.

PAHO can organize a series of teleconferences with opinion leaders and experts from countries in the Region where similar experiences are yielding positive results.

The involvement of grassroots groups can add support to the initiative. The National Forum for the

Right to Health (FONADES) is a group of individuals and organizations from civil society who defend the right to heath care. The Forum has representatives from the academia, professional associations, users, diabetic clubs, patient associations, unions, etc. Although the Forum is still new, it can support lobbying efforts in Congress.

*Media Campaign*

The National Direction of Development of Human Resources (DDHR) will coordinate the efforts to involve the media, through calls to editors and editorialist of major newspapers and TV news programs to include articles about primary care and family medicine, fact sheets sent to the media, interviews with SoH and academic authorities (UNAH has its own TV channel), media coverage of related activities (seminars, workshops). The involvement of the communication departments from SoH, UNAH and PAHO could increase media coverage. User associations and representatives from indigenous and Afro communities can also advocate for the policy through a direct approach to legislators and media, using their own channels and contacts.

**Remove Obstacles**

*Proponents and Supporters*

The main supporters of the strategy are SoH through the Direction for Development of Human Resources, and Universidad Nacional Autónoma de Honduras, through the Vice-chancellor office and the School of Medicine. Tables 35 and 36 describe the main stakeholders and their position as proponents/supporters or opponents of the policy goal related to the establishment of a family medicine program.

**Table 24: Stakeholder analysis: primary proponents/supporters**

| Stakeholders | Type | Position/Interest | Arguments for a policy to create a FM program | Influence/ Power & Ways to Utilize |
|---|---|---|---|---|
| Minister of Health | Government | The Minister has defined health priorities that need trained primary care workforce for their fulfillment:<br>-A model of health care based in PHC.<br>-Increasing the number of primary care teams to 500 in the country.<br><br>The Minister is interested in a comprehensive plan for the development of human resources for health, which includes physicians and nurses trained in primary health care. | -Evidence demonstrates that infant and general mortality decreases in relation to the availability of primary care doctors (family practitioners).<br>-The National Model of Health Care is based in primary health care.<br>-Without PC physicians, there will not be a successful model.<br>-Family doctors are the specialists in primary care.<br>-There is no family medicine program in Honduras. | -Comments to key stakeholders and to the media.<br>-Hearings with the Congress Health Commission and direct approaches with legislators.<br>-Dialogues with other ministers during the Ministers Council, so they can also support the advocacy efforts to influence the Congress. |
| General Direction for the Development of Human Resources (DDHR) | Government | -The Direction is new and it is trying to consolidate its position.<br>-A policy to strengthen PC workforce will position the DDHR as a strategic unit to implement the national model of health care.<br>-The short-term policy goals could provide some results that respond to the needs of the political agenda, in a reasonable timeframe. | There is a shortage of PC physicians to work in the public network of health care services.<br><br>The existing gap between population health needs and the availability of HRH without the necessary skills. | -Influence in the National Council of Health and Education (CONCOSE), universities, health organizations.<br>-These organizations can get involved in the advocacy efforts to influence the Congress. |
| National Congress Health Commission | Public | -Most of he members are physicians from different specialties, including Ob/Gyn, pediatrics. They have publicly expressed their support to prevention and primary care.<br>-Legislators and commissions are evaluated by the number of proposals presented to the Congress. | -The few family practitioners were trained abroad.<br>-Honduras needs to have its own FM program. | -Since most of its members are health professionals, they can influence other legislators from different commissions. |
| Universidad Nacional Autónoma de Honduras (UNAH) | Academic (public) | -UNAH is the higher education national authority.<br>-Curricular reform becomes an opportunity (and a challenge) to align HRH training with national priorities.<br>-Opportunity to improve the collaboration with SoH | -Pioneering the training of family practitioners in Honduras.<br><br>-Transforming into action the repeated discourse on strengthening primary care. | -High influence and power to generate opinion.<br>-Positive experience implementing PHC projects in several municipalities of Honduras. |
| Council of Higher Education | Public, autonomous | Interested in improving graduate education governance in the nation. | -Enforcement of the Higher Education Law and its regulation.<br>-Supporting graduate programs that respond to the health needs of the country. | The Council conducts higher education in the country and could get involved in the advocacy efforts to create a FM program. |

| Stakeholders | Type | Position/Interest | Arguments for a policy to create a FM program | Influence/ Power & Ways to Utilize |
|---|---|---|---|---|
| International Agencies of health cooperation: PAHO/WHO | International | PAHO supports the strengthening of primary health care and its workforce. | -PAHO government bodies' resolutions.<br>-PAHO has positioned PHC as the strategy to achieve universal health coverage, and PC workforce as a priority to achieve it. | -PAHO is the technical referent in health for the National Congress (Health Commission)<br>-PAHO works closely with the Secretary of Health.<br>-It provides technical cooperation to the Direction of HRH. |
| National Forum for the Right to Health | Civil Society | Supports universal health coverage and systems based in primary health care. | -The Forum has representatives from indigenous and afro groups, as well as patient associations. These groups support the strengthening of primary care, especially among underserved population | -Letters to legislators and social pressure through press conferences.<br>- The Forum can get involved in the advocacy efforts to influence the Congress. |

**Table 25: Stakeholder analysis: primary opponents**

| Stakeholders | Type | Position/Interest | Possible arguments against the policy | Influence/ Power & Ways to Mitigate |
|---|---|---|---|---|
| College of Physicians and Medical Associations | Professional | The curative, hospital-based approach is strong among physicians.<br><br>CP could oppose the Cuban influence from family doctors trained in the Latin American School of Medicine in Cuba (ELAM) | Increasing mercantilism of the medical profession hinders the interest in PC and a family medicine training program, which is not perceived as economically attractive. | Counter arguments:<br>-Family practitioners go to places where specialists do not go.<br>-FP will be hired by the Government to work in primary care centers.<br>-Geographic bonus can make FP more attractive.<br>-There are no specialists in PC in the country.<br>-FM is a specialty that can add efficiency to health care services.<br><br>Key decision-makers (university chancellor or vice-chancellor, minister of health) can approach the President to obtain his support. |

| Stakeholders | Type | Position/Interest | Possible arguments against the policy | Influence/ Power & Ways to Mitigate |
|---|---|---|---|---|
| Association of Private Hospitals and Clinics | Private | Private providers in Honduras favor hospital, specialized medical care. | -Primary care and family medicine perceived as basic care.<br>-Too broad ("FPs know too little of too much").<br>-No tradition of family practitioners in the country. | Emphasize that FM is a specialty and that PC practitioners can add efficiency to health care services. |
| Pharmaceutical companies | Private | Pharmaceutical companies favor hospital, specialized medical care, with extensive use of expensive brand medicines. | They could perceive primary care and family medicine as: "basic care", too broad ("FPs know too little of too much").<br><br>PC and family practitioners perceived as "low prescribers" | Emphasize that family practitioners are also prescribers.<br><br>FPs could expand health care (and prescriptions) to underserved urban and rural areas. |

Some specialists could oppose a family medicine program, because they believe family practitioners (FP) will compete with other specialties for patients. It is important to approach Gyn/Obs, Pediatrics and Internal Medicine Associations to minimize the apprehension. The arguments to use include: FP specializes in primary care; most of FPs will be hired by the Secretary of Health to provide care in health centers and as part of the PC teams; their main area of influence includes urban (with low access to health care), rural and remote areas where specialists are not interested to expand their practice; although FP could start a private practice, most of them will work for SoH or IHSS, and will not compete with the specialist's private practice; FPs will mainly support  primary care, they could work in regional hospitals (secondary care), but tertiary care will continue as the realm of specialists.

A family medicine program with a three-prong strategy—clinical, teaching and research—would increase interest in primary care among medical students and physicians; the new cohorts of family practitioners would support SoH efforts to improve its PC network of health care services, it would allow the expansion of primary care teams, and would improve health care coverage in underserved urban, rural and remote areas of the nation. Family practitioners organize the delivery of health care (through reference), without limiting access to specialized care for those who really need it.

UNAH as the larger university and medical school in the country would be the one that hosts a family medicine program. UNAH Medical School authorities, including the dean, are specialists who were trained in hospital settings and had little or no experience with primary care practitioners. The interest in improving PC training, the subsidy from the Government to create the FM program, plus the influence of CONARHUS and SoH to train physicians with the profile the country needs could influence positively the dean and other authorities. The possibility of opening the first family medicine in the country could motivate the authorities to take the initiative. The support of the Vice-chancellor, a renowned physician with a public health background, and of the Chancellor would minimize opposition to the program.

Some academic authorities could question the program, since there are not enough FP faculty or practicing family physicians to start the training. There are newly trained FPs who are returning from the Latin American School of Medicine in Cuba and from other countries who could join the faculty. However, the program must be viewed as a national effort to train the family practitioners the country needs, with the influence of several programs, but tailored to meet the health needs of the Honduras population.

**Create Short-term Wins**

**Short-term Goals Description**

*Baseline study to identify the factors that influence career choice in primary care among medical students beginning their social service program*

The results will generate awareness on current career choices and will allow medical schools to adopt strategies to improve the interest in PC among students.

*Government scholarships to graduating medical students to obtain the family medicine specialty abroad*

A short-term policy goal is to establish government scholarships to finance the training in family medicine of graduating medical students who have completed the social service program. Each cohort would receive information about the scholarship early in the program, and those interested will submit an application. SoH and UNAH will define the variables to identify the best candidates. Special consideration will be given to applicants from rural areas, since the evidence shows that they are more likely to return and work in a rural setting [1,78,79] .

*Mentorship and internship programs in primary care for UNAH medical students*

Having family physician mentors has shown to be an important factor that influenced the decision to choose a family practice career. This is a short-term, relatively easy to implement policy goal, that will improve medical students interest in primary heath care, some of whom will choose family medicine as a specialty.

*A primary care training program to regional and primary health care teams*

A PC training program can improve certain skills in primary care that can be applies on the field. The training of regional teams improves the chance of sustainability, since they will train the new cohorts of social service physicians and nurses.

Additionally, there are other short-term goals that include the following: (1) introducing primary health care contents in the curriculum of medical schools in the country; (2) training in primary care to medical trainers; (3) identifying PHC competences among graduates from medical schools, and establishing basic requirements prior to admission to social service; (4) increasing the number of applicants to UNAH medical school from rural and underserved areas; and, (5) establishing a longitudinal study to follow cohorts of medical students and their interest in specialties, background, geographical location.

**Build on the Change**

CONARHUS commission must continue to function independently to assure the continuity of the process, even if SoH national authorities are removed from office. PAHO is key to support coordination efforts among the different stakeholders, and also, PAHO can act as a bridge among agencies that are not communicating adequately. The involvement of faculty from other universities, including private ones such as UNITECH or Catholic University will bring fresh ideas as new change agents and leaders join the effort. UNAH role is fundamental to maintain a momentum, since it is the largest academic institution in the country and the national authority in higher education.

Since the Direction for Development of Human Resources at SoH will continue preparing a national plan for the development of HRH each year, it is feasible to introduce new goals to support the on-going strengthening of the primary care workforce in the country.

**Anchor the Changes**

The inclusion of a chapter on human resources for health in the National Health System Act could position the subject as part of the legal framework of the country. By February 2015, the draft proposal of the Act included the strengthening of primary care workforce; it is expected that the main components of the draft version will not suffer major changes in its process to final approbation.

The development of public policy on human resources for health will contribute to anchor the major issues considered throughout this document.

**Leadership to achieve the plan for change**

*Secretary of Health Leadership*

The Secretary of Health has the challenge to strengthen its steering role within the sector under a scenario of decentralization of health care services, and a future launching of the Superintendence of Health. Policy development is one of the approaches to maintain SoH leadership within the national

health system. However, policy development and policy advocacy have not been SoH strengths, since

most of its efforts were directed to the provision of health care services. In 2014 the Secretary of Health

implemented a new organizational design, integrating programs under new and existing directions. The

Direction of Development of Human Resources (DDRH) is a result of this restructuration. DDRH

leadership faces several challenges: it is a new direction, it needs to position within and outside the SoH,

and DDHR has a limited budget. Aligning people around primary health care [133] and engaging others in

shared meaning [134] are leadership traits that can contribute to achieve transformation of HRH. DDHR

director previously worked for the PHC unit and she is a strong supporter of this strategy. However, is it

only the director´s vision and alignment that can achieve a transformation? Heifetz questions some

traditional views of leadership, "…the prevailing notion that leadership consists of having a vision and

aligning people with that vision is bankrupt because it continues to treat adaptive situations as if they

were technical: The authority figure is supposed to divine where the company is going, and people are

supposed to follow". [135] The leader's vision could be wrong, but his/her influence remains untouched

within the organization, until a new leadership emerges or until the crisis become so evident that a

major change takes place. But leadership takes place every day, not only during crisis or where a new

vision is required. Then, leaders should come from all levels of the organization, from above and from

below, as Heifetz point out. This democratization of leadership could be a way to ensure continuity of

processes when authorities change. Therefore, DDHR should involve more SoH permanent staff in

strategic processes that require time and sustainability, encouraging new leaderships to emerge,

delegating some decision-making, since political appointments last for such a short time in Honduras.

Perhaps, they all can assume a leadership position temporarily at some point of time, depending on the

circumstances, and then go back to the normality, to the routine. However, leaders are leaders all the

time? Or does leadership manifest itself only at certain moments, when there is a need to set a vision,

when there is a need to make tough decisions, when turbulence affects the organization and there is a

need for a leader to align people to achieve a goal. When things move smoothly, leaders step back and

managers take over until the next crisis develops. What leaders do then? Do they climb back to the

"balcony" and try to read the signs for new changes? Do they go back to envisioning the big picture and

prepare for the next tsunami? Probably, but as the health sector becomes a more dynamic field, as

training, planning and managing of human resources for health becomes more complex, as health care

markets become less predictable, as organizations search to become self-resilient systems, leaders will

be continuously requested to step down. However, adaptive challenges appear everyday, and the

solutions rest not only on ministers or national directors, but also in the "…collective intelligence of

employees at all levels". [135]  Leaders are not alone...

*PAHO/WHO Leadership*

The Pan American Health Organization is the oldest international health organization in the world,

and for years it has guided the health sector in Latin America. PAHO international advisors were

considered experts on their fields and leaded some of the most strategic programs in the Region. At the

present, there are less international advisors and they have to cover more programs with less funding,

some of them out of their fields of expertise. How to be a leader under those circumstances? The Health

Systems and Services (HSS) Unit at PAHO/WHO office in Honduras is the department that works

specifically for the development of human resources for health, among other fields, providing support to

the Direction of Development of Human Resources (DDHR), as well as to other national agencies. PAHO

has the recognition and respect of SoH, Universidad Nacional Autónoma de Honduras (UNAH), Honduras

Institute of Social Security (IHSS) and other agencies working in HRH, its leadership being recognized by

all. However, it is necessary to reassess this leadership, considering the type of work that international

staff from PAHO provides to ministries of health in Latin America. For decades, international consultants

applied the action logics of an expert, with certain characteristics of the achiever and the diplomat.

Nowadays, the role of the expert has diminished, since most governments have well trained personnel working for national agencies. From PAHO perspective, there is a need of leaders with a combination of strengths and skills that include the action logic of the diplomat, the achiever, but essentially of the strategist that generates "…organizational and personal change to achieve transformation over the short and long term" [136] . In order to provide technical cooperation in health, PAHO international consultants must be able to "…move back and forth between the action and the balcony", [135] which means supporting the ministries of health in their day-to-day activities, without missing the broader picture from "the balcony". Does it mean applying different styles of leadership? Probably yes, "different situations call for different types of leadership". [137] PAHO managers must learn to be leaders, they must identify their personal traits, discover their own crucibles, find meaning to what they do, reach Collins' Level 5 leadership style that involves a "…deep personal humility with intense professional will" [138] and combine types of leadership according to the situation: be an expert in your field, be a diplomat when dealing with national and international authorities, be a strategist and lead your organization through the path to become a self-learning organization, learn from the processes, develop emotional intelligence and always... always be humble.

*We need less reverence for the objects we create, and much more attention to the processes we use to create them*. [139]

We admire leaders for their work as an end, but we rarely stop to think about their journey to achieve that goal, the people that accompanied the path, the setbacks, and the doubts. *The path is the end, and the end lies in the path.* The journey itself becomes a goal. We would value more those leaders when we understand the path they had to walk to achieve an end, we would value more ourselves if we look into the journey as a goal, either if we succeed of fail in achieving our objective.

FACTORS INFLUENCING MEDICAL STUDENTS' CAREER CHOICE IN HONDURAS

Thank you so much for agreeing to participate in this research study. The purpose of this survey is to learn more about the deficit in primary care physicians in the country, and the factors that influence career choice in primary care among medical students in the country. Medical students in their last year of training and about to start their social service program will participate in the survey. The questionnaire should take no more than fifteen (15) minutes to fill it out.

For the purposes of this study, primary care is the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community. I am happy to answer any questions you have about the research study or the survey.

**Part A: Demographic Information**

1. What year of the MD program are you currently studying?   ☐ 8$^{th}$ year        ☐ Other (Specify)_____

2. In what year were you born?_____ How old are you?   ☐ 25 years or less ☐ >25 years

3. Sex:          ☐ Male          ☐ Female

4. Which of the following bests describes your racial background?
   ☐ White                    ☐ Mestizo                    ☐ Afro-descendant
   ☐ Original groups      ☐ Other (specify) _____

5. What is your marital status?
   ☐ Single                    ☐ Married/Common Law  ☐ Separated/Divorced/Widowed

6. Select one statement which best describes the setting in which you grew up prior to university
   ☐ Inner city    ☐ Urban/suburban        ☐ Small town
   ☐ Rural          ☐ Remote/isolated        ☐ Two or more settings

7. 7.1. How many children (age 18 or less) do you have, if any?
   ☐ One                          ☐ Two                              ☐ Three
   ☐ Four or more            ☐ None

   7.2. If none, do you plan to have children in the future?
   ☐ Yes                          ☐ No                                ☐ Unsure

8. Do any or both of your parents work as a physician?
   ☐ Yes              ☐ No        **If YES**, ☐ Mother      ☐ Father      ☐ Both

**Part B: Intended Specialty Choice**

1. What speciality are you currently most likely to choose as your future career?  (Check only one)

| | | |
|---|---|---|
| ☐ Allergy / Immunology | ☐ Neurological Surgery | ☐ Psychiatry |
| ☐ Anesthesiology | ☐ Neurology | ☐ Public Health |
| ☐ Cardiology | ☐ Oncology | ☐ Pulmonology |
| ☐ Dermatology | ☐ Ophthalmology | ☐ Radiology |
| ☐ Emergency Medicine | ☐ Otorhinolaryngology | ☐ Rheumatology |
| ☐ Endocrinology | ☐ Pathology | ☐ Surgery |
| ☐ Family Medicine | ☐ Pediatrics | ☐ Thoracic Surgery |
| ☐ Gastroenterology | ☐ Pediatric Non | ☐ Traumatology and |
| ☐ General Practice | Surgical Specialties | Orthopedics |
| ☐ Geriatrics | ☐ Pediatric Surgical | ☐ Tropical and Infectious |
| ☐ Gynecology / Obstetrics | Specialties | Diseases |
| ☐ Intensive Care | ☐ Physical Medicine and | ☐ Urology |
| ☐ Internal Medicine | Rehabilitation | ☐ Other *(specify)* |
| ☐ Nephrology | ☐ Plastic Surgery | _____ |

2. How strongly do you feel that this will be your final specialty choice?

☐ Definite career choice (skip to question 4)     ☐ Probable career choice     ☐ Undecided

3. If you feel your specialty choice is "probable" or "undecided" (Question 2), please list the specialty you are considering as your second choice from the above list of choices.

Second choice _____

4. Please estimate the amount in Lempiras (LPS) of your monthly-expected income (in current year Lempiras) five years after completion of residency training.

$_____.00

5. What do you believe is the median **monthly** salary nationwide in Honduras (in Lempiras-LPS) of the following specialties when practicing as an attending physician 2-3 years after residency training?

General Practice ☐ Less than LPS 30,000 ☐ 30,000 a 60,000 ☐ 60,000 to 85,000 ☐ 85,000 or more
Pediatrics          ☐ Less than LPS 30,000 ☐ 30,000 a 60,000 ☐ 60,000 to 85,000 ☐ 85,000 or more
Family Medicine ☐ Less than LPS 30,000 ☐ 30,000 a 60,000 ☐ 60,000 to 85,000 ☐ 85,000 or more

The specialty you applied for, if not General Practice, Pediatrics, or Family Medicine
          ☐ Less than LPS 30,000  ☐ 30,000 a 60,000 ☐ 60,000 to 85,000 ☐ 85,000 or more

6. How important are each of the following factors to you in deciding on your currently preferred specialty? (Mark with a circle the chosen option)

1=Very Unimportant;  2=Somewhat Unimportant;  3=Neither Important nor Unimportant;  4=Somewhat Important; 5=Very Important

| FACTOR | SCALE | | | | |
|---|---|---|---|---|---|
| a) Income potential | 1 | 2 | 3 | 4 | 5 |
| b) Perceived prestige | 1 | 2 | 3 | 4 | 5 |
| c) Opportunity to teach | 1 | 2 | 3 | 4 | 5 |
| d) Preference for working in a rural community | 1 | 2 | 3 | 4 | 5 |
| e) Preference for working in an urban centre | 1 | 2 | 3 | 4 | 5 |
| f) Preference/influence of family, friends or community | 1 | 2 | 3 | 4 | 5 |
| g) Makes a positive difference in people's lives | 1 | 2 | 3 | 4 | 5 |
| h) Perceived intellectual content of discipline | 1 | 2 | 3 | 4 | 5 |
| i) Opportunity for research | 1 | 2 | 3 | 4 | 5 |
| j) Opportunity to work on highly challenging cases | 1 | 2 | 3 | 4 | 5 |
| k) Opportunity to work on acute medical problems | 1 | 2 | 3 | 4 | 5 |
| l) Emphasis on continuity of care of patients | 1 | 2 | 3 | 4 | 5 |
| m) Opportunity to deal with a variety of medical problems | 1 | 2 | 3 | 4 | 5 |
| n) Early exposure to the discipline | 1 | 2 | 3 | 4 | 5 |
| o) Opportunity to work with people with limited access to health care | 1 | 2 | 3 | 4 | 5 |
| p) Length of residency | 1 | 2 | 3 | 4 | 5 |
| q) Ability to use a wide range of skills & knowledge in patient care | 1 | 2 | 3 | 4 | 5 |
| r) Ability to master a small set of skills and be the "expert" | 1 | 2 | 3 | 4 | 5 |
| s) A positive interaction with a clinician/teacher of this specialty | 1 | 2 | 3 | 4 | 5 |
| t) Current debt load to study Medicine | 1 | 2 | 3 | 4 | 5 |
| u) More leisure time | 1 | 2 | 3 | 4 | 5 |
| v) More opportunities to practice with professional independence | 1 | 2 | 3 | 4 | 5 |
| w) Emphasizes practice in ambulatory settings | 1 | 2 | 3 | 4 | 5 |
| x) Predictable work hours | 1 | 2 | 3 | 4 | 5 |
| y) Provides an opportunity to enjoy life outside of work | 1 | 2 | 3 | 4 | 5 |
| z) Development of long-term relationships with patients | 1 | 2 | 3 | 4 | 5 |
| aa) Other (specify): _____ | 1 | 2 | 3 | 4 | 5 |

**APPENDIX 2: INTERVIEW**

**KEY INFORMANT INTERVIEW QUESTIONNAIRE**

**FACTORS INFLUENCING MEDICAL STUDENTS' CAREER CHOICE IN PRIMARY CARE IN HONDURAS**

**Introduction:**

Thank you so much for agreeing to talk to me and participate in this research study. The purpose of this interview is to learn more about the deficit in primary care physicians in the country, and the factors that influence career choice in primary care among medical students in the country. Eight physician leaders, academic and national authorities will participate in the interviews. The interview should take no more than thirty (30) minutes.

For the purposes of this study, primary care is the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.

I am happy to answer any questions you have about the research study or the interview.

**QUESTIONS**

*Opening*
− What is your job title?
     or What year of the MD program are you currently studying?
− How long have you held this position?
     or For how long have you been studying Medicine?
− Do you have other responsibilities in addition to those related with human resources management or training of medical students?
     or Do you work or have other responsibilities in addition to those related with studying Medicine?

*Introduction*
− Please describe any experience you have had with primary care physicians?

*Topic: Specialty choice*
− Which specialties do you think the country mostly need?
     *Probe: Why do you think so?*
− What are the specialties that medical students are more prone to choose?
     *Probe: Why do you think medical students are choosing those specialties?*
− What do you think are the main factors that influence career choice among medical students?

*Topic: Location of future medical practice*
− Where do you think medical students will practice when they obtain a specialty?
     *Probe: Why do you think they will choose that location?*
−  What do you think it should be done to promote primary care practice?

*End Question*

– Is there anything else you would like to add about the factors that influence medical student's career choice?

**Conclusion:**

Thank you for your time today to discuss the factors that influence career choice in primary care. The information and insights you shared will be valuable to my study. If you are interested, I would be happy to share the results of my research when the final report has been approved and accepted by UNC.

**APPENDIX 3: CONSENT FORMS**

**SURVEY CONSENT FORM**

**Title of Study:** Factors that Influence a Career Choice in Primary Care: a Mixed-methods Study Among Medical Students Starting the Social Service Program in Honduras.

**Investigator:**

E. Benjamín Puertas, MD, MPH, DrPH (candidate) Department of Health Policy and Management, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

**Purpose:** The purpose of this study is to identify the intrinsic and extrinsic factors that influence career decision in primary care of last year medical students about to start the social service in Honduras.

**Potential Benefits:** You may benefit from participating in this study by discovering those factors that affect specialty choice that could influence your own career decision. The research is designed to benefit the greater healthcare system and population health by gaining new knowledge that will allow UNAH and the Secretary of Health to define public policy to strengthen the workforce in primary care in the nation. You may not benefit personally from being in this research study.

**Potential Risks:** There are no known or expected risks to participating in this study.

**Privacy Protection:** The researcher listed on the first page of this form is the only person who will have access to information that links individual participants to the responses from the survey. Participants will be asked for permission before being identified in any report or publication about this study. Additional information about privacy protection is available on the Study Fact Sheet.


**Consent**


I, _____, understand that I am being asked to participate in a University of North Carolina study to answer question relating to career preferences and factors that could influence the decision.

I understand that it is my voluntary choice to participate in this study, and I also understand that I may refuse to answer any question during the survey and/or withdraw from the study at any time without penalty.

A summary of the results of the survey will be made available to me upon completion of the study, should I request a copy. I understand what this study involves and I freely agree to take part. A copy of this written consent form will be provided to me upon request.

I understand that my verbal consent after having this form read to me shall constitute my consent as if I had signed this consent below.

_____     _____     _____

**Signature of participant            Name of participant            Date**


If you have any questions or concerns, either prior to or following your participation, please do not hesitate to contact me.

E. Benjamín Puertas at +504 9990-2151 or by email at puertas@live.unc.edu.

**INTERVIEW CONSENT FORM**

**Title of Study:** Factors that Influence a Career Choice in Primary Care: a Mixed-methods Study Among Medical Students Starting the Social Service Program in Honduras.

**Investigator:**

E. Benjamín Puertas, MD, MPH, DrPH (candidate) Department of Health Policy and Management, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

**Purpose:** The purpose of this study is to identify the intrinsic and extrinsic factors that influence career decision in primary care of last year medical students about to start the social service in Honduras.

**Potential Benefits:** You may benefit from participating in this study by discovering those factors that affect specialty choice among medical students and graduates The research is designed to benefit the greater healthcare system and population health by gaining new knowledge that will allow UNAH and the Secretary of Health to define public policy to strengthen the workforce in primary care on the nation. You may not benefit personally from being in this research study.

**Potential Risks:** There are no known or expected risks to participating in this study.

**Privacy Protection:** The researcher listed on the first page of this form is the only person who will have access to information that links individual participants to the responses from the interviews. Participants will be asked for permission before being identified in any report or publication about this study. Additional information about privacy protection is available on the Study Fact Sheet.

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_____    _____    _____

**Signature of participant**          **Name of participant**              **Date**

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# REFERENCES

1. Vanasse A. Attractiveness of family medicine for medical students influence of research and debt. *Canadian family physician*. 2011;57(6):e216.

2. Ko H, Lee T, Leung Y, Fleming B, Vikis E, Yoshida E. Factors influencing career choices made by medical students, residents, and practising physicians. *BC Medical Journal*. 2007;49(9):482-489.

3. Bethune C. Family medicine as a career option how students' attitudes changed during medical school. *Canadian family physician*. 2007;53(5):880.

4. Grayson MS, Newton DA, Thompson LF. Payback time: The associations of debt and income with medical student career choice. *Med Educ*. 2012;46(10):983-991. doi: 10.1111/j.1365-2923.2012.04340.x; 10.1111/j.1365-2923.2012.04340.x.

5. Phillips JP, Weismantel DP, Gold KJ, Schwenk TL. Medical student debt and primary care specialty intentions. *Fam Med*. 2010;42(9):616-622.

6. Newton DA, Grayson MS, Thompson LF. Money, lifestyle, or values? why medical students choose subspecialty versus general pediatric careers. *Clin Pediatr (Phila)*. 2010;49(2):116-122. doi: 10.1177/0009922809350216; 10.1177/0009922809350216.

7. Teitelbaum HS, Ehrlich N, Travis L. Factors affecting specialty choice among osteopathic medical students. *Acad Med*. 2009;84(6):718-723. doi: 10.1097/ACM.0b013e3181a43c60; 10.1097/ACM.0b013e3181a43c60.

8. Morra DJ, Regehr G, Ginsburg S. Medical students, money, and career selection: Students' perception of financial factors and remuneration in family medicine. *Fam Med*. 2009;41(2):105-110.

9. Bazargan M, Lindstrom RW, Dakak A, Ani C, Wolf KE, Edelstein RA. Impact of desire to work in underserved communities on selection of specialty among fourth-year medical students. *J Natl Med Assoc*. 2006;98(9):1460-1465.

10. Rosenblatt RA, Andrilla CH. The impact of U.S. medical students' debt on their choice of primary care careers: An analysis of data from the 2002 medical school graduation questionnaire. *Acad Med*. 2005;80(9):815-819.

11. Tolhurst H, Stewart M. Becoming a GP--a qualitative study of the career interests of medical students. *Aust Fam Physician*. 2005;34(3):204-206.

12. Senf JH, Campos-Outcalt D, Kutob R. Factors related to the choice of family medicine: A reassessment and literature review. *J Am Board Fam Pract*. 2003;16(6):502-512.

13. Compton MT, Frank E, Elon L, Carrera J. Changes in U.S. medical students' specialty interests over the course of medical school. *J Gen Intern Med*. 2008;23(7):1095-1100. doi: 10.1007/s11606-008-0579-z; 10.1007/s11606-008-0579-z.

14. Scott I, Wright B, Brenneis F, Brett-Maclean P, McCaffrey L. Why would I choose a career in family medicine?: Reflections of medical students at 3 universities. *Can Fam Physician*. 2007;53(11):1956-1957.

15. Erikson CE, Danish S, Jones KC, Sandberg SF, Carle AC. The role of medical school culture in primary care career choice. *Acad Med*. 2013;88(12):1919-1926. doi: 10.1097/ACM.0000000000000038 [doi].

16. Hing E, Hsiao CJ. State variability in supply of office-based primary care providers: United states, 2012. *NCHS Data Brief*. 2014;(151)(151):1-8.

17. U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis., ed. *Projecting the supply and demand for primary care practitioners through 2020.* Rockville, Maryland: U.S. Department of Health and Human Services; 2013.

18. IHS. The complexities of physician supply and demand: Projections from 2013 to 2025. . 2015.

19. Colwill JM, Cultice JM, Kruse RL. Will generalist physician supply meet demands of an increasing and aging population? *Health Aff (Millwood)*. 2008;27(3):w232-41. doi: 10.1377/hlthaff.27.3.w232; 10.1377/hlthaff.27.3.w232.

20. Bodenheimer T, Pham HH. Primary care: Current problems and proposed solutions. *Health Aff (Millwood)*. 2010;29(5):799-805. doi: 10.1377/hlthaff.2010.0026; 10.1377/hlthaff.2010.0026.

21. Petterson SM, Liaw WR, Tran C, Bazemore AW. Estimating the residency expansion required to avoid projected primary care physician shortages by 2035. *Ann Fam Med*. 2015;13(2):107-114. doi: 10.1370/afm.1760 [doi].

22. Green LV, Savin S, Lu Y. Primary care physician shortages could be eliminated through use of teams, nonphysicians, and electronic communication. *Health Aff (Millwood)*. 2013;32(1):11-19. doi: 10.1377/hlthaff.2012.1086 [doi].

23. Lafortune G. Overview of health workforce projection models in 18 OECD countries. . 2013.

24. Biggs WS, Bieck AD, Crosley PW, Kozakowski SM. Entry of US medical school graduates into family medicine residencies: 2011--2012. *Fam Med*. 2012;44(9):620-626.

25. Bodenheimer T. Primary care — will it survive? *N Engl J Med*. 2006;355(9):861; 861-864; 864.

26. Wanless D. Securing our future health: Taking a long-term view. . 2002.

27. Joyce CM, McNeil JJ, Stoelwinder JU. More doctors, but not enough: Australian medical workforce supply 2001-2012. *Med J Aust*. 2006;184(9):441-446.

28. Lefevre JH. Career choices of medical students: A national survey of 1780 students. *Med Educ*. 2010;44(6):603-612.

29. Natanzon I, Szecsenyi J, Ose D, Joos S. Future potential country doctor: The perspectives of german GPs. *Rural Remote Health*. 2010;10(2):1347. doi: 1347 [pii].

30. Breinbauer KH, Fromm RG, Fleck LD, Araya CL. Trends among medical students towards general practice or specialization. *Rev Med Chil*. 2009;137(7):865-872. doi: /S0034-98872009000700001; /S0034-98872009000700001.

31. Neto P. Interesse dos estudantes pela medicina de família: Estado da questão e agenda de pesquisa. *Revista brasileira de educação médica*. 2009;33(2):198.

32. Reyes H, Perez-Cuevas R, Salmeron J, Tome P, Guiscafre H, Gutierrez G. Infant mortality due to acute respiratory infections: The influence of primary care processes. *Health Policy Plan*. 1997;12(3):214-223.

33. World Health Organization. Declaration of alma-ata. international conference on primary health care, alma- ata, USSR. . 1978.

34. Hsieh VC, Wu JC, Wu TN, Chiang TL. Universal coverage for primary health care is a wise investment: Evidence from 102 low- and middle-income countries. *Asia Pac J Public Health*. 2013. doi: 10.1177/1010539513492562.

35. Rohde J, Cousens S, Chopra M, et al. 30 years after alma-ata: Has primary health care worked in countries? *Lancet*. 2008;372(9642):950-961. doi: 10.1016/S0140-6736(08)61405-1; 10.1016/S0140-6736(08)61405-1.

36. Pan American Health Organization. *Reniewing primary health care in the americas.* Washington, DC: ; 2007. http://www2.paho.org/hq/dmdocuments/2010/Renewing_Primary_Health_Care_Americas-PAHO.pdf.

37. Fortuna C, Mishina S, Matumoto S, Pereira M. Team work in a family health care program: The team process concept and operational teams . *Revista Latinoamericana de Enfermería*. 2005;13(2):262.

38. Stumberg J. Primary care. In: *The foundations of primary care: Daring to be different.* 1st ed. Oxon, UK: Radcliffe Publishing Ltd; 2007:183-188.

39. Starfield B, ed. *Primary care. concept, evaluation, and policy.* New York: Oxford University Press; 1992.

40. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Milbank Q*. 2005;83(3):457-502. doi: 10.1111/j.1468-0009.2005.00409.x.

41. Lee J, Park S, Choi K, Kwon SM. The association between the supply of primary care physicians and population health outcomes in korea. *Fam Med*. 2010;42(9):628-635.

42. Schoen C. Primary care and health system performance: Adults' experiences in five countries. *Health affairs (Millwood, Va.)*. 2004;23:283.

43. Pan American Health Organization, ed. *Integrated health service delivery networks: Concepts, policy options and a road map for implementation in the americas.* Washington, DC: PAHO/WHO; 2010.

44. Frenk J, Gonzalez-Block MA, Alvarez-Manilla JM. First contact, simplified technology, or risk anticipation? defining primary health care. *Acad Med*. 1990;65(11):676-681.

45. Frenk J. Reinventing primary health care: The need for systems integration. *Lancet*. 2009;374(9684):170-173. doi: 10.1016/S0140-6736(09)60693-0 [doi].

46. Tollman S. Community oriented primary care: Origins, evolution, applications. *Soc Sci Med*. 1991;32(6):633-642.

47. Ricketts TC, Holmes GM. Mortality and physician supply: Does region hold the key to the paradox? *Health Serv Res*. 2007;42(6 Pt 1):2233-51; discussion 2294-323. doi: HESR728 [pii].

48. Friedberg MW, Hussey PS, Schneider EC. Primary care: A critical review of the evidence on quality and costs of health care. *Health Aff (Millwood)*. 2010;29(5):766-772. doi: 10.1377/hlthaff.2010.0025 [doi].

49. Gulliford MC. Availability of primary care doctors and population health in england: Is there an association? *J Public Health Med*. 2002;24(4):252-254.

50. Villalbi JR, Guarga A, Pasarin MI, et al. An evaluation of the impact of primary care reform on health. *Aten Primaria*. 1999;24(8):468-474.

51. Xu KT. Usual source of care in preventive service use: A regular doctor versus a regular site. *Health Serv Res*. 2002;37(6):1509-1529.

52. Blewett LA, Johnson PJ, Lee B, Scal PB. When a usual source of care and usual provider matter: Adult prevention and screening services. *J Gen Intern Med*. 2008;23(9):1354-1360. doi: 10.1007/s11606-008-0659-0 [doi].

53. Saultz JW, Albedaiwi W. Interpersonal continuity of care and patient satisfaction: A critical review. *Ann Fam Med*. 2004;2(5):445-451.

54. Continelli T, McGinnis S, Holmes T. The effect of local primary care physician supply on the utilization of preventive health services in the united states. *Health Place*. 2010;16(5):942-951. doi: 10.1016/j.healthplace.2010.05.010 [doi].

55. Hofer AN, Abraham JM, Moscovice I. Expansion of coverage under the patient protection and affordable care act and primary care utilization. *Milbank Q*. 2011;89(1):69-89. doi: 10.1111/j.1468-0009.2011.00620.x [doi].

56. Steinwald AB. Primary care professionals: Recent supply trends, projections, and valuation of services. testimony before the committee on health, education, labor, and pensions, US senate. http://www.gao.gov/new.items/d08472t.pdf. Updated 2008.

57. Mitka M. Looming shortage of physicians raises concerns about access to care. *JAMA*. 2007;297(10):1045-1046. doi: 297/10/1045 [pii].

58. Lehmann U, Dieleman M, Martineau T. Staffing remote rural areas in middle- and low-income countries: A literature review of attraction and retention. *BMC Health Serv Res*. 2008;8:19-6963-8-19. doi: 10.1186/1472-6963-8-19; 10.1186/1472-6963-8-19.

59. Miranda JJ, Diez-Canseco F, Lema C, et al. Stated preferences of doctors for choosing a job in rural areas of peru: A discrete choice experiment. *PLoS One*. 2012;7(12):e50567. doi: 10.1371/journal.pone.0050567; 10.1371/journal.pone.0050567.

60. Ricketts TC, Randolph R. Urban-rural flows of physicians. *J Rural Health*. 2007;23(4):277-285. doi: JRH104 [pii].

61. Mullan F. The metrics of the physician brain drain. *N Engl J Med*. 2005;353(17):1810-1818. http://dx.doi.org.libproxy.lib.unc.edu/10.1056/NEJMsa050004. doi: 10.1056/NEJMsa050004.

62. Santric-Milicevic MM, Terzic-Supic ZJ, Matejic BR, Vasic V, Ricketts TC,3rd. First- and fifth-year medical students' intention for emigration and practice abroad: A case study of serbia. *Health Policy*. 2014;118(2):173-183. doi: 10.1016/j.healthpol.2014.09.018 [doi].

63. Organización Panamericana de la Salud, ed. *Migración calificada en salud, impacto financiero, reconocimiento de títulos: Retos y perspectivas en los países de la región andina.* 1a ed. Lima, Perú: Sinco Editores; 2013.

64. Burch VC, McKinley D, van Wyk J, et al. Career intentions of medical students trained in six sub-saharan african countries. *Educ Health (Abingdon)*. 2011;24(3):614.

65. Greysen SR, Dovlo D, Olapade-Olaopa EO, Jacobs M, Sewankambo N, Mullan F. Medical education in sub-saharan africa: A literature review. *Med Educ*. 2011;45(10):973-986. doi: 10.1111/j.1365-2923.2011.04039.x [doi].

66. Dikici MF, Yaris F, Topsever P, et al. Factors affecting choice of specialty among first-year medical students of four universities in different regions of turkey. *Croat Med J*. 2008;49(3):415-420.

67. Pan American Health Organization PAHO/WHO. Declaración regional sobre las nuevas orientaciones de la atención primaria en salud. . 2005;CD/46/13.

68. Ministerio da Saúde Brasil. Política nacional de atenção básica: Aprova a política nacional de atenção básica, estabelecendo a revisão de diretrizes e normas para a organização da atenção básica para o programa de saúde da família (PSF) e o programa de agentes comunitários de saúde (PACS). . 2011;Portaria MS/GM Nº 2.488.

69. Ventres W. Response: Re: The emergence of primary care in latin america: Reflections from the field. *J Am Board Fam Med*. 2013;26(5):612.

70. Organismo Andino de Salud. Polìtica andina de planificación y gestión de recursos humanos en salud. . 2013.

71. Pan American Health Organization PAHO/WHO.   Most countries in the americas have sufficient health personnel but face challenges in distribution, migration and training. http://www.paho.org/hq../index.php?option=com_content&view=article&id=9146%3Amost-countries-in-the-americas-have-sufficient-health-personnel-but-face-challenges-in-distribution-migration-and-training&catid=740%3Anews-press-releases&Itemid=1926&lang=en. Updated 2013. Accessed January 27, 2014.

72. Universidad Nacional Autónoma de Honduras. *Análisis de situación de recursos humanos en salud honduras.* Tegucigalpa: ; 2009.

73. Secretaría de Salud de Honduras. Diagnóstico de recursos humanos de la secretaría de salud. . 2013.

74. Universidad Nacional Autónoma de Honduras. Boletín informativo. facultad de ciencias médicas. . Enero 2013.

75. Effective Public Health Practice Project. Quality assessment tool for quantitative studies. hamilton, ON: Effective public health practice project. http://www.ephpp.ca/index.html - http://www.ephpp.ca/PDF/Quality%20Assessment%20Tool_2010_2.pdf. Updated 2010. Accessed August 23, 2013.

76. Effective Public Health Practice Project. Dictionary for the effective public health practice project quality assessment tool for quantitative studies. http://www.ephpp.ca/tools.html - http://www.ephpp.ca/PDF/QADictionary_dec2009.pdf. Updated 2009. Accessed August 23, 2013.

77. National Collaborating Centre for Methods and Tools. Critical appraisal tools to make sense of evidence. hamilton, ON: McMaster university. http://www.nccmt.ca/registry/view/eng/87.html. Updated 2011. Accessed August 23, 2013.

78. Gill H, McLeod S, Duerksen K, Szafran O. Factors influencing medical students' choice of family medicine: Effects of rural versus urban background. *Can Fam Physician*. 2012;58(11):e649-57.

79. Royston PJ, Mathieson K, Leafman J, Ojan-Sheehan O. Medical student characteristics predictive of intent for rural practice. *Rural Remote Health*. 2012;12:2107.

80. Dyrbye LN, Eacker AM, Harper W, et al. Distress and empathy do not drive changes in specialty preference among US medical students. *Med Teach*. 2012;34(2):e116-22. doi: 10.3109/0142159X.2012.644830; 10.3109/0142159X.2012.644830.

81. Scott II. Determinants of choosing a career in family medicine. *CMAJ.Canadian Medical Association journal*. 2011;183(1):E1-E8.

82. Kiolbassa K, Miksch A, Hermann K, et al. Becoming a general practitioner--which factors have most impact on career choice of medical students? *BMC Fam Pract*. 2011;12:25-2296-12-25. doi: 10.1186/1471-2296-12-25; 10.1186/1471-2296-12-25.

83. Bennett KL, Phillips JP. Finding, recruiting, and sustaining the future primary care physician workforce: A new theoretical model of specialty choice process. *Acad Med*. 2010;85(10 Suppl):S81-8. doi: 10.1097/ACM.0b013e3181ed4bae; 10.1097/ACM.0b013e3181ed4bae.

84. Hojat M, Zuckerman M. Personality and specialty interest in medical students. *Med Teach*. 2008;30(4):400-406. doi: 10.1080/01421590802043835; 10.1080/01421590802043835.

85. Feldman K, Woloschuk W, Gowans M, et al. The difference between medical students interested in rural family medicine versus urban family or specialty medicine. *Can J Rural Med*. 2008;13(2):73-79.

86. Wright B, Scott I, Woloschuk W, Brenneis F, Bradley J. Career choice of new medical students at three canadian universities: Family medicine versus specialty medicine. *CMAJ*. 2004;170(13):1920-1924.

87. Rabinowitz HK, Diamond JJ, Markham FW, Santana AJ. The relationship between entering medical students' backgrounds and career plans and their rural practice outcomes three decades later. *Acad Med*. 2012;87(4):493-497. doi: 10.1097/ACM.0b013e3182488c06; 10.1097/ACM.0b013e3182488c06.

88. Henry JA, Edwards BJ, Crotty B. Why do medical graduates choose rural careers? *Rural Remote Health*. 2009;9(1):1083.

89. Borges NJ, Manuel RS, Duffy RD, Fedyna D, Jones BJ. Influences on specialty choice for students entering person-oriented and technique-oriented specialties. *Med Teach*. 2009;31(12):1086-1088. doi: 10.3109/01421590903183787; 10.3109/01421590903183787.

90. Stagg P, Greenhill J, Worley PS. A new model to understand the career choice and practice location decisions of medical graduates. *Rural Remote Health*. 2009;9(4):1245.

91. Jutzi L, Vogt K, Drever E, Nisker J. Recruiting medical students to rural practice: Perspectives of medical students and rural recruiters. *Can Fam Physician*. 2009;55(1):72-3, 73.e1-4.

92. Jordan J. Choosing family medicine. what influences medical students? *Canadian family physician*. 2003;49(9):1131.

93. Wayne S, Timm C, Serna L, Solan B, Kalishman S. Medical students' attitudes toward underserved populations: Changing associations with choice of primary care versus non-primary care residency. *J Health Care Poor Underserved*. 2010;21(2):438-447. doi: 10.1353/hpu.0.0317; 10.1353/hpu.0.0317.

94. Newton DA, Grayson MS, Thompson LF. The variable influence of lifestyle and income on medical students' career specialty choices: Data from two U.S. medical schools, 1998-2004. *Acad Med*. 2005;80(9):809-814.

95. Knox KE, Getzin A, Bergum A, McBride P, Rieselbach R, Friedsam D. Short report: Factors that affect specialty choice and career plans of wisconsin's medical students. *WMJ*. 2008;107(8):369-373.

96. Lawson SR. Understanding primary care residency choices: A test of selected variables in the bland-meurer model. *Academic medicine*. 2004;79(10 suppl):S36; S36-9; 9.

97. Jones M, Humphreys J, Prideaux D. Predicting medical students' intentions to take up rural practice after graduation. *Med Educ*. 2009;43(10):1001-1009. doi: 10.1111/j.1365-2923.2009.03506.x; 10.1111/j.1365-2923.2009.03506.x.

98. Thistlethwaite J, Kidd MR, Leeder S, Shaw T, Corcoran K. Enhancing the choice of general practice as a career. *Aust Fam Physician*. 2008;37(11):964-968.

99. Jordan J, Brown JB, Russell G. Choosing family medicine. what influences medical students? *Can Fam Physician*. 2003;49:1131-1137.

100. DeZee KJ, Maurer D, Colt R, et al. Effect of financial remuneration on specialty choice of fourth-year U.S. medical students. *Acad Med*. 2011;86(2):187-193. doi: 10.1097/ACM.0b013e3182045ec9; 10.1097/ACM.0b013e3182045ec9.

101. Sinclair HK, Ritchie LD, Lee AJ. A future career in general practice? A longitudinal study of medical students and pre-registration house officers. *Eur J Gen Pract*. 2006;12(3):120-127. doi: 10.1080/13814780600780833.

102. Gibis B, Heinz A, Jacob R, Muller CH. The career expectations of medical students: Findings of a nationwide survey in germany. *Dtsch Arztebl Int*. 2012;109(18):327-332. doi: 10.3238/arztebl.2012.0327; 10.3238/arztebl.2012.0327.

103. Vanasse A, Orzanco MG, Courteau J, Scott S. Attractiveness of family medicine for medical students: Influence of research and debt. *Can Fam Physician*. 2011;57(6):e216-27.

104. Khater-Menassa B, Major S. Factors influencing the choice of specialty among medical students in lebanon. *J Med Liban*. 2005;53(1):16-20.

105. Maseghe Mwachaka P, Thuo Mbugua E. Specialty preferences among medical students in a kenyan university. *Pan Afr Med J*. 2010;5:18.

106. Huda N, Yousuf S. Career preference of final year medical students of ziauddin medical university. *Educ Health (Abingdon)*. 2006;19(3):345-353. doi: 10.1080/13576280600984087.

107. Kotha SR. Lifecourse factors and likelihood of rural practice and emigration: A survey of ghanaian medical students. *Rural and remote health*. 2012;12:1898.

108. Mehmood SI, Khan MA, Walsh KM, Borleffs JC. Personality types and specialist choices in medical students. *Med Teach*. 2013;35(1):63-68. doi: 10.3109/0142159X.2012.731104; 10.3109/0142159X.2012.731104.

109. Mariolis A, Mihas C, Alevizos A, et al. General practice as a career choice among undergraduate medical students in greece. *BMC Med Educ*. 2007;7:15. doi: 10.1186/1472-6920-7-15.

110. Chew YW, Rajakrishnan S, Low CA, Jayapalan PK, Sreeramareddy CT. Medical students' choice of specialty and factors determining their choice: A cross-sectional questionnaire survey in melaka-manipal medical college, malaysia. *Biosci Trends*. 2011;5(2):69-76.

111. Baboolal NS. Factors affecting future choice of specialty among first-year medical students of the university of the west indies, trinidad. *Med Educ*. 2007;41(1):50; 50-56; 6.

112. Khader Y, Al-Zoubi D, Amarin Z, et al. Factors affecting medical students in formulating their specialty preferences in jordan. *BMC Med Educ*. 2008;8:32-6920-8-32. doi: 10.1186/1472-6920-8-32; 10.1186/1472-6920-8-32.

113. UNC Cecil Sheps Center, The Physicians Foundation, NC Medical Society Foundation. Estimating the supply of physicians, use of healthcare services, and capacity of physician supply to meet the health care services use for the united states population, 2011-2030. https://www2.shepscenter.unc.edu/workforce. Updated 2014.

114. Creswell J. Mixed methods procedures. In: *Research design: Qualitative, quantitative, and mixed methods approaches.* Third Edit. ed. Los Angeles: SAGE; 2009:213-214.

115. Scott, Ian,MD, MSc, Gowans M, BSc, Wright B, MD, Brenneis F, MD, Banner S, Boone J. Determinants of choosing a career in family medicine. *Canadian Medical Association.Journal*. 2011;183(1):E1-8. http://search.proquest.com.libproxy.lib.unc.edu/docview/840339747?accountid=14244.

116. Saigal P, Takemura Y, Nishiue T, Fetters MD. Factors considered by medical students when formulating their specialty preferences in japan: Findings from a qualitative study. *BMC Med Educ*. 2007;7:31. doi: 10.1186/1472-6920-7-31.

117. Paz-Fonseca A, Moneada_Landa R, Mendoza C, Romero M, Murcia H, Reyes-Ticas A. Prevalencia de trastornos mentales en la comunidad de villa nueva, región metropolitana. *Rev Med Post UNAH*. 1999;4(1):75.

118. Ferrari S, Reggianini C, Mattei G, Rigatelli M, Pingani L, Bhugra D. International study of student career choice in psychiatry (ISoSCCiP): Results from modena, italy. *Int Rev Psychiatry*. 2013;25(4):450-459. doi: 10.3109/09540261.2013.804402 [doi].

119. Pan American Health Organization PAHO/WHO. Honduras. In: *Health in the americas, 2012 edition: Country volume.* 2012th ed. OPS/OMS; 2012:414.

120. Al-Mendalawi M. Specialty preferences of iraqi medical students. *Clinical Teacher*. 2010;7(3):175-179. https://auth.lib.unc.edu/ezproxy_auth.php?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=52927857&site=ehost-live&scope=site. doi: 10.1111/j.1743-498X.2010.00358.x.

121. Jeffe DB, Whelan AJ, Andriole DA. Primary care specialty choices of united states medical graduates, 1997-2006. *Acad Med*. 2010;85(6):947-958. doi: 10.1097/ACM.0b013e3181dbe77d [doi].

122. The Cecil G. Sheps Center, The Physicians Foundation. FutureDocs forecasting tool. https://www2.shepscenter.unc.edu/workforce/model.php. Updated 2015. Accessed June/17, 2015.

123. Puddester DG. Staying human in the medical family: The unique role of doctor-parents. *Med J Aust*. 2004;181(7):395-8. http://search.proquest.com.libproxy.lib.unc.edu/docview/235738588?accountid=14244.

124. Sarma S, Thind A, Chu M. Do new cohorts of family physicians work less compared to their older predecessors? the evidence from canada. *Soc Sci Med*. 2011;72(12):2049-2058. doi: http://dx.doi.org.libproxy.lib.unc.edu/10.1016/j.socscimed.2011.03.047.

125. Palmeri M, Pipas C, Wadsworth E, Zubkoff M. Economic impact of a primary care career: A harsh reality for medical students and the nation. *Acad Med*. 2010;85(11):1692-1697. doi: 10.1097/ACM.0b013e3181f5b754; 10.1097/ACM.0b013e3181f5b754.

126. Aasland OG, Rovik JO, Wiers-Jenssen J. Motives for choice of specialty during and after medical school. *Tidsskr Nor Laegeforen*. 2008;128(16):1833-1837. Accessed 3/28/2015 12:50:35 PM. doi: 1723778 [pii].

127. Roberts C, Daly M, Kumar K, Perkins D, Richards D, Garne D. A longitudinal integrated placement and medical students' intentions to practise rurally. *Med Educ*. 2012;46(2):179-191. doi: 10.1111/j.1365-2923.2011.04102.x; 10.1111/j.1365-2923.2011.04102.x.

128. Colegrove DJ, Whitacre BE. Interest in rural medicine among osteopathic residents and medical students. *Rural Remote Health*. 2009;9(3):1192.

129. Deutsch T, Lippmann S, Frese T, Sandholzer H. Who wants to become a general practitioner? student and curriculum factors associated with choosing a GP career - a multivariable analysis with particular consideration of practice-orientated GP courses. *Scand J Prim Health Care*. 2015;33(1):47-53. doi: 10.3109/02813432.2015.1020661 [doi].

130. Poole P, McHardy K, Janssen A. General physicians: Born or made? the use of a tracking database to answer medical workforce questions. *Intern Med J*. 2009;39(7):447-452. doi: 10.1111/j.1445-5994.2008.01717.x; 10.1111/j.1445-5994.2008.01717.x.

131. Svirko E, Lambert TW, Goldacre MJ. Influence of training changes on the stability of specialty choices of UK medical graduates: Surveys of the graduates of 2002 and 2008. *J R Soc Med*. 2015;108(1):17-27. doi: 10.1177/0141076814555937 [doi].

132. Kotter J. Leading change: Why transformation efforts fail. *Harvard Business Review*. 2007.

133. Kotter JP. What leaders really do. *Harv Bus Rev*. 1990;68(3):103-111.

134. Bennis WG, Thomas RJ. Crucibles of leadership. *Harv Bus Rev*. 2002;80(9):39-45, 124.

135. Heifetz RA, Laurie DL. The work of leadership. *Harv Bus Rev*. 1997;75(1):124-134.

136. Rooke D, Torbert WR. 7 transformations of leadership. *Harv Bus Rev*. 2005;83(4):66-76, 133.

137. Goleman D. What makes a leader? *Harv Bus Rev*. 1998;76(6):93-102.

138. Collins J. Level 5 leadership. the triumph of humility and fierce resolve. *Harv Bus Rev*. 2001;79(1):66-76, 175.

139. Wheatley M. *Leadership and the new science.* Third Edition ed. San Francisco: BK; 2006.