Labour Market Preferences, Attitudes and Expectations of Prospective Health Workers in Guinea

Christopher H. Herbst, BA (KCL), MSc (LSE)

Student Number: 31375751

PHD Public Health

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Lancaster University

I declare that this thesis is my own work and has not been submitted for the award of a higher degree elsewhere

Abstract

Title: Labour Market Preferences, Attitudes and Expectations of Prospective Health Workers in Guinea

Background: This study identifies the stated attitudes, expectations, and locational job preferences (and factors influencing these preferences), of final year medical and nursing students in Guinea, West Africa. Such evidence can help design interventions that influence the supply side behaviour of graduates, and thus improve the availability and distribution of health workers in Guinea.

Methods: The study uses a nationally representative cross-sectional survey design to sample 193 and 192 final year nursing and medical students, respectively, from across medical and nursing schools in Guinea. Percentage analysis and statistical tests were applied to explore differences in attitudes, expectations and locational preferences of medical and nursing students. Binary logistic regression was applied to identify predictors of the stated locational outcome variables (i.e. Conakry/outside Conakry, rural/urban, public/private, and national/abroad preferences of the health students).

Results: The stated attitudes and expectations, in terms of working in the health labour market, differ for medical and nursing students in Guinea. For example, whereas both medical and nursing students expect to find good working conditions once posted, significantly more medical than nursing students expect to be posted into a job within 6 months of graduating, earn more from informal income generation activities, and find it acceptable to earn extra income during working hours and work less hours than stated in their contract. In terms of locational preferences, overall there is a strong short-term preference to work outside of Conakry, in urban locations, in the private sector, and to migrate abroad. The extent of these preferences varies between medical and nursing students, some of which change in the medium term, and are explained by a number of stated monetary and non-monetary factors, and statistically associated with and number of predictor variables that mostly vary between medical and nursing students.

Conclusions: The study confirms the existing heterogeneity of attitudes, expectations and locational labor market preferences of medical and nursing students. There is a need for different education and labor market interventions, to mitigate unmet expectations and potentially disruptive attitudes, and to increase job uptake particularly in rural areas and to reduce migration abroad. The design of such interventions should take into account the different monetary and non- monetary, education and profile related factors that are influencing the supply side preference of medical and nursing students in Guinea.

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I. Introduction

The Ebola outbreak in Guinea (2014-2016), one of the poorest countries in Western Africa, has highlighted critical health systems weaknesses, in particular with regards to Human Resources for Health (HRH), which are low in numbers and unevenly distributed across geographical and sectoral divides. The low number of health workers in the public sector, and outside of the capital Conakry and in remoter and rural parts of Guinea, was a major bottleneck to the Ebola response and subsequent recovery effort. (McPake et al, 2019)

From a health labour market economic perspective, such labour market outcomes can be understood to be partly shaped by the supply side behaviour of health workers – the preferences and choices health workers make, about where, when and how to work in the health labour market (Soucat et al, 2013, Scheffler et al 2016; WHO 2016). While labour market demand - the financing needed to employ health workers - is also important, the preferences and behaviours of health workers remain an important determinant to where health workers end up in the labour market. Such preferences or behaviours are largely understood to be driven by monetary and non-monetary considerations, as well as the character traits, profiles and training experiences of health workers themselves (Scheffler et al 2016).

To date, very little research on the supply side behaviour of health workers in Guinea exists (Govindaraj et al 2018; McPake et al, 2019). Targeted research, to better understand the stated attitudes, expectations and locational job preferences – of working in Conakry or outside Conakry, in urban areas or rural areas, in the public sector or in the private sector, in Guinea or abroad - as well as the factors influencing these preferences, is lacking. Such research is critical to help inform the policy dialogue on the health workforce in Guinea, in order to identify and

implement solutions to improve the availability and distribution of health workers across the country (Govindaraj et al 2018).

This PhD was designed to help address these gaps, by generating new evidence on the supply side preferences of prospective health workers, specifically nursing and medical students, in Guinea. A nationally representative cross-sectional survey of final year medical and nursing students in Guinea was used to elicit findings. These are presented, and supported by common statistical tests, and multivariate logistic regressions were applied to identify some of the significant predictors for the locational job preferences of medical and nursing students in Guinea. The findings and conclusions of this PhD can be used to inform the policy dialogue and future research agenda on the health workforce in Guinea. They also provide clarity on the extent to which such findings can be generalized to other low-income countries: in short, what this PhD shows is that the preferences of prospective health workers vary greatly, and country and cadre specific analyses are needed in order to benefit specific country planning efforts.

1.1 Background

Guinea is a West African nation bordered to the north by Guinea Bissau, Senegal, and Mali, and to the south by Sierra Leone, Liberia, and Côte d'Ivoire. Guinea is home to a population of 12.7 million (2017), the majority (i.e. 52%) of which is employed in the agriculture sector (World Bank 2019). Guinea is one of the poorest countries in the world, with a gross national income (GNI) per capita of just over 2000 USD (UNDP 2019) and 55 percent of the population living in poverty (World Bank 2018 (a)). Although natural resources are vast, poor governance, lagging

infrastructure, low human capital (education and health outcomes) and lack of access to job opportunities limit economic inclusion (World Bank 2018 (b)). Guinea is administratively divided into eight regions (Table 1 and Figure 1), with the Conakry Region, home to the capital city Conakry, reporting higher per capita expenditure and lower poverty incidence than the other regions, many of which, outside of their regional capital, are largely remote and rural.

Table 1. Poverty Indicators According to Region

Region	Population (%)	Poverty incidence (%)	Per capita expenditure (GNF)
Boké	10.1	58.9	3,285,413
Conakry	17.4	27.4	5,183,357
Faranah	8.1	64.8	2,963,846
Kankan	13.6	48.7	3,725,699
Kindia	15.9	62.5	3,192,636
Labé	9.3	65.0	3,140,259
Mamou	8.0	60.8	3,221,060
Nzérékoré	17.7	66,9	3,052,875
Total	100	55.2	3,575,515

Source: World Bank 2018 (b)

Figure 1: Map of Guinea (with Regions Indicated)

Source: https://www.geographicguide.com/africa-maps/guinea.htm

In 2018, Guinea was ranked 174 out of 189 countries and territories on the Human Development Index (UNDP 2019), a summary measure of average achievement in key dimensions of **human development**: a long and healthy life, being knowledgeable and have a decent standard of living. Guineas life expectancy is 59 years, well below the overall world average of 68. The vast majority of reproductive, maternal, newborn and child health indicators favour urban areas. (World Bank 2018 (b))

Guinea's epidemiological profile reflects a health system that faces severe shortages of funding and inefficient systems to deliver adequate services, especially in rural areas. Public sector financing for health is extremely limited and insufficient to effectively cover health services in the

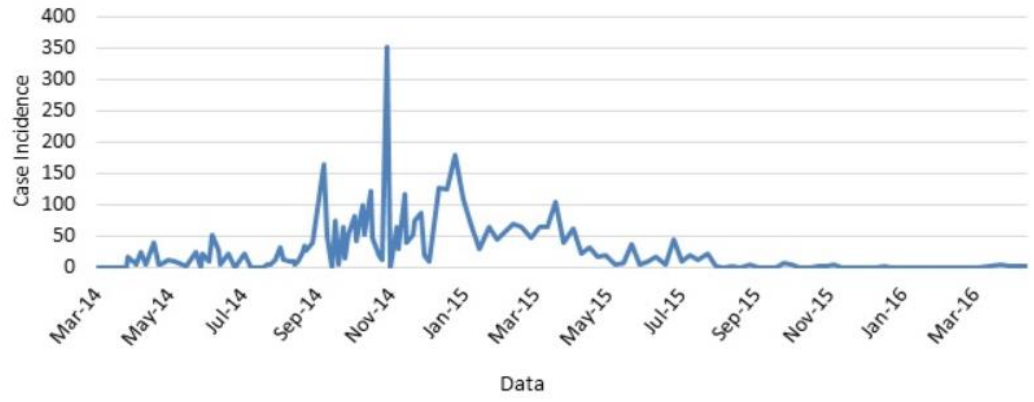
public sector, particularly outside of Conakry. Per capita spending on health has been historically low, ranging between 2-5 percent of the national budget, but growing to 8 percent in 2017, following the Ebola crisis (World Bank 2018 (b)). Of the public sector funds, most are linked to, and spent on, a centralized bureaucracy and health worker salaries. Furthermore, spending is unevenly allocated. Although Conakry is home to only 15 percent of the population, around one third of public sector spending benefits Conakry, with other regions struggling to finance "free" health services, without sufficient funding allocated by the government (World Bank 2018 (b)). Private expenditures on health account for 4.3 percent of GDP which is higher than the regional average of 3.5 percent. 92 percent of private expenditures are out of pocket expenditures which is higher than the 62 percent across Sub-Saharan Africa (World Bank 2018 (b)).

The public wage bill covers only a small proportion of health workers in Guinea, with many providing services in the private sector. This seems to be done informally (i.e. offering services in exchange for money) or formally (working in private sector hospitals, pharmacies or clinics) (World Bank 2018 (b)). Anecdotal evidence suggests that low public sector salaries and the absence of accountability systems including lack of legal enforcement, means that many health workers augment their salaries, some within- and some outside their primary post of employment, through informally demanding fees for services and supplies. (World Bank 2018 (b) Empirical evidence on the extent to which such informal income generation is widespread in Guinea does not exist, nor is there evidence on how such fees are perceived by the patients and other staff, or how often services and medicines are denied to those who cannot pay. It is likely however that the poor are disproportionately affected. Insurance programs, to support free

delivery of certain health services and provide financial protection for poor households are largely nonfunctioning or nonexistent (World Bank 2018 (b)).

The Ebola Crisis of 2014-2016 weakened an already weak health system. The World Health Organization (WHO) officially declared an Ebola Virus Outbreak in Guinea on March 23, 2014, and a Public Health Emergency of International Concern (PHEIC) by August 2014. This marked the beginning of a two and a half years crisis that peaked in November 2014 (Figure 1.1), and ultimately ended in more than 28,600 confirmed cases of the Ebola Virus and 11,325 deaths (Govindaraj et al, 2018). Guinea was declared Ebola free in June 2016, with the crisis leaving behind a shattered nation and economy, as well as a new-found global commitment towards a focus on health system strengthening (Govindaraj et al, 2018).

Figure 1.1: Frequency of New Cases in Guinea during the Ebola Outbreak from March 25, 2014 to April 13, 2016



Source: (CDC 2020)

The Ebola virus disease (EVD) outbreak crisis of 2014-2016 has exposed critical vulnerabilities of the health system in Guinea, in particular with regard to Human Resources for Health (HRH). The rapid spread of EVD and the subsequent containment challenges were attributed in large part to an extremely weak health system, including a particularly weak health workforce (Govindaraj et

al, 2018; McPake et al, 2019). Already prior to the epidemic, extremely low numbers and inadequately performing health workers, particularly in remote areas, were a critical bottleneck to effective service delivery, and this has been further exacerbated by the Ebola epidemic itself (Evans et al, 2015). Health workers are a critical input for any functioning health system, and the link between the availability of well performing health workers and health outcomes is widely accepted (Soucat et al 2013; WHO 2016, Scheffler et al, 2016.

A "fit for purpose health workforce" is considered a critical element towards the achievement of Universal Health Coverage (UHC), the provision of health care and financial protection to all residents of a particular country (WHO 2016). Accelerating progress towards UHC is reflected in goal 3 of the Sustainable Development Goals (SDGs), the set of goals adopted by the international community in 2015 to end poverty and ensure peace and prosperity by 2030. Target 3.c highlights the importance of the workforce with its aim to "Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing states" (WHO 2016; Scheffler et al, 2016)

In Guinea, the number of health workers are far below the threshold needed to achieve UHC. Data from the Ministry of Health (MOH) shows that of the total of 11,527 staff working at public health facilities in Guinea, 1400 are doctors, 1500 nurses and 500 midwives (MOH 2015). The remainder encompass various auxiliary cadres, community health workers and non-health cadres including drivers and cleaners. When taking into account population numbers, these numbers are low. Numbers of doctors, nurses or midwives per 1000 population employed on government payroll is 0.28, well below the WHO minimum threshold of 4.5 per 1000 population associated

with achieving Universal Health Coverage (WHO 2016). The availability of health workers in Guinea is negatively affected by increasing levels of outmigration as well as high rates of turnover and absenteeism (Govindaraj et al, 2018; McPake et al, 2019)

Of those health workers employed in the public sector, the vast majority are employed in the capital Conakry and urban areas, in a context where more than 70 percent of the population live in rural areas and are reliant on primary level care (MOH 2015, McPake 2019). MOH data shows that of the 11,527 staff, 55 percent are located in Conakry which is home to only around 16 percent of the population. The rest are distributed across the remaining 7 regions in Guinea, ranging from 6 percent of health workers in the Kankan region (home to 17 percent of population) to 9 percent in the Kindia region (home to 15 percent of the population) (MOH 2015). Within the regions, nurses and midwives and in particular doctors are disproportionately employed in urban areas, where most of the hospitals are located. Rural and remote areas are largely dependent on community health workers and auxiliary cadres for their care (McPake et al 2019).

The proportion of health workers who are unemployed, employed in the private sector, or who migrate abroad, is not known. What is known is that Guinea produces a relatively large number of health workers a year, many from private sector training institutions. As identified by the MOH documentation received through personal communication, in the sample frame of medical and nursing schools and their students, Guinea has three medical schools, one of which is a public sector institution, which graduates around 400 medical doctors a year. In addition, there are a total of 24 schools, the vast majority of which are private, graduating over 1000 nurses and 500 midwives a year. Given this relatively high level of production, vis a vis the low numbers of health

workers registered as employed in the public sector, a key assumption is that many graduates are likely to be either unemployed, employed in the private sector, or migrate abroad. A small number may also be employed as something other than a medical doctor or nurse.

Guinea has made the aim of strengthening its health workforce, in particular doctors, nurses, midwives and community health workers, a core feature of its Post-Ebola Recovery Plan (Govindaraj et al 2016). In addition to scaling up the numbers of community health workers for rural areas, the Health Systems Recovery Plan (2015-2017) emphasizes a need to increase the public sector recruitment of doctors and nurses outside of Conakry, as well as in rural areas (Govindaraj et al 2018). The plan is for these cadres to work in tandem with community health workers in the remote parts of the country and reinstall trust in the health system, trust that was largely lost during the Ebola crisis. Reducing the high turnover and absenteeism rates, and to reduce high prevalence of informal income generation and dual practice, are further goals (Govindaraj et al 2018; McPake et al 2019)

To support the process of identifying and developing targeted policies to achieve these aims, the health system recovery plan also stresses the importance of carrying out different kinds of health labour market assessments (Govindaraj et al, 2016). This is in line with key recommendations from the World Bank (WB) and the World Health Organization (WHO) which state that an assessment of the dynamics of the health labour market, including different aspects of labour market need, supply and demand, is a critical pre-condition for evidence-based workforce planning and policy development (see Soucat et al 2013, Scheffler et al 2016; WHO 2016).

The use of a labour market approach permits **a greater insight into key factors** that affect need, demand and supply of health workers which is a dynamic system that helps determine the availability, distribution and performance of the health workforce (Scheffler et al 2016). The labour market approach assumes inefficiencies in terms of a disconnect between ***labour need*****:** the number of health workers needed to provide healthcare to everyone, ***labour*** **demand**: the number of jobs a country's public and private sectors can create with the budget and funds it has and ***labour*** **supply**: the number of trained health workers in the country that can potentially be recruited and willing to work (Scheffler et al 2016). In other words, there is often a mismatch between the number of health workers required to meet service delivery or epidemiological needs (labour need), with the number of health workers produced and willing to work in the health sector (labour supply), and the financial resources available to employ and absorb health workers (labour market demand). A labour market assessment can help generate new evidence and knowledge on all three concepts, or any one of these concepts in greater detail, to support evidence- based policy making on the health workforce (Scheffler et al 2016). The focus of this thesis is on an aspect of labour market supply.

A labour market perspective on workforce supply rests on the notion that health workers are not passive actors in a health system, they make choices about where, when, and how to work on the basis of personal circumstances, different incentives, and the institutional and organizational environment in which they operate. The choices that health workers or students make, to take up a particular employment post, in the capital or outside the capital, in a rural or urban area, in the public or private sector, in Guinea or outside of Guinea, for example, can be understood to be influenced by a variety of monetary and non-monetary factors, and the living and working

conditions that are associated with different kinds of jobs, (Soucat et al 2013; Scheffler et al, 2016).

Characteristics and profiles specific to the health workers themselves, as well as education related factors, have also been shown to influence supply side preferences or behavior of health workers. Research from Ethiopia (Serra et al, 2010) and Rwanda (Lievens et al, 2010), for example, has shown that lower level cadres, health workers who are younger and more altruistically inclined, were also less likely to migrate abroad, and more likely to work in rural areas than health workers with the opposite traits. In Ghana, a study found that health workers from lower socio-economic backgrounds, rural backgrounds, and whose families had never lived abroad, were more likely to work in rural areas than health workers without these backgrounds (Krug et al 2010). A survey of medical students in Poland found that the strongest predictor for choosing public over the private sector work was being male (Gasiorowski et al. 2015). And in Canada, a 2010 article argued that medical students who are trained in rural and decentralized locations were more likely to work in rural and remote locations than students who are trained in urban locations (Strasser and Neusy 2010). A comprehensive review of the relevant literature is discussed in chapter 3 of this PHD.

Understanding the choices and or preferences health workers or students have for particular jobs, and the factors influencing them, is particularly important for the design of evidence based and targeted education and labour market policies and interventions (WHO 2016, Scheffler et al 2016). In Guinea much of the literature on workforce supply focuses on descriptive "macro-issues", concerned primarily with describing the number, skill mix, and basic distribution of the work force. Dynamic evidence on the supply side preferences or behavior of either health

students or health workers, and the different factors that shape or are associated with such behavior, does not exist (Govindaraj et al 2018).

1.2 Research Aim and Question

The aim of this PhD is to investigate the stated supply side preferences of final year medical and nursing students in Guinea and identify some of the key factors explaining these preferences. The objective is to contribute towards an understanding of the health labour market choices of final year medical and nursing students in Guinea, to inform the design of policies and interventions to increase the number of doctors and nurses outside of Conakry, in rural areas, in the public sector, in the country itself, and overall the generalisability to other low income settings.

Specifically, the PhD seeks to answer the following primary research question: *What are the Labour Market Preferences of prospective Medical and Nursing students in Guinea, and the factors associated with these preferences? Labour market preferences* refer *to* the short-and medium-term job preferences of medical and nursing students, namely a job in Conakry or Outside Conakry, urban or rural locations, the public or private sector, and a job within Guinea or abroad. The factors associated with these preferences refer to the financial and non-financial attributes associated with the specific jobs

A secondary question is: *what are the profiles, characteristics, attitudes and labour market expectations of final year medical and nursing students in Guinea, and how do they differ between these cadres.* This question is designed to help inform the primary research question but also

generate important evidence in its own right. Once in the labour market, health worker preferences change quickly if expectations are not met, and the performance of workers, once posted, can be affected by their attitudes.

Analyses to help answer the research questions will include generating information on the socio demographic and profile characteristics of students, their attitudes and expectations about employment in the health labour market, the locational preferences of nursing and medical students in Guinea and the factors associated with such preferences in Guinea. The differences in medical and nursing students will be explored. This will allow cadre specific policy implications as well as any wider generalizations to be drawn.

1.3 Thesis Outline

The remainder of this PhD thesis is organized as follows: Chapter II provides a short overview of the theoretical and conceptual underpinnings of the research. Chapter III summarizes the findings from a systematic review of the global literature on the supply side preferences of medical and nursing students. Chapter IV provides an overview of the Methods applied in the study and Chapter V presents the main findings and results from the analysis. Chapter VI discusses the findings and results and Chapter VII provides a short conclusion.

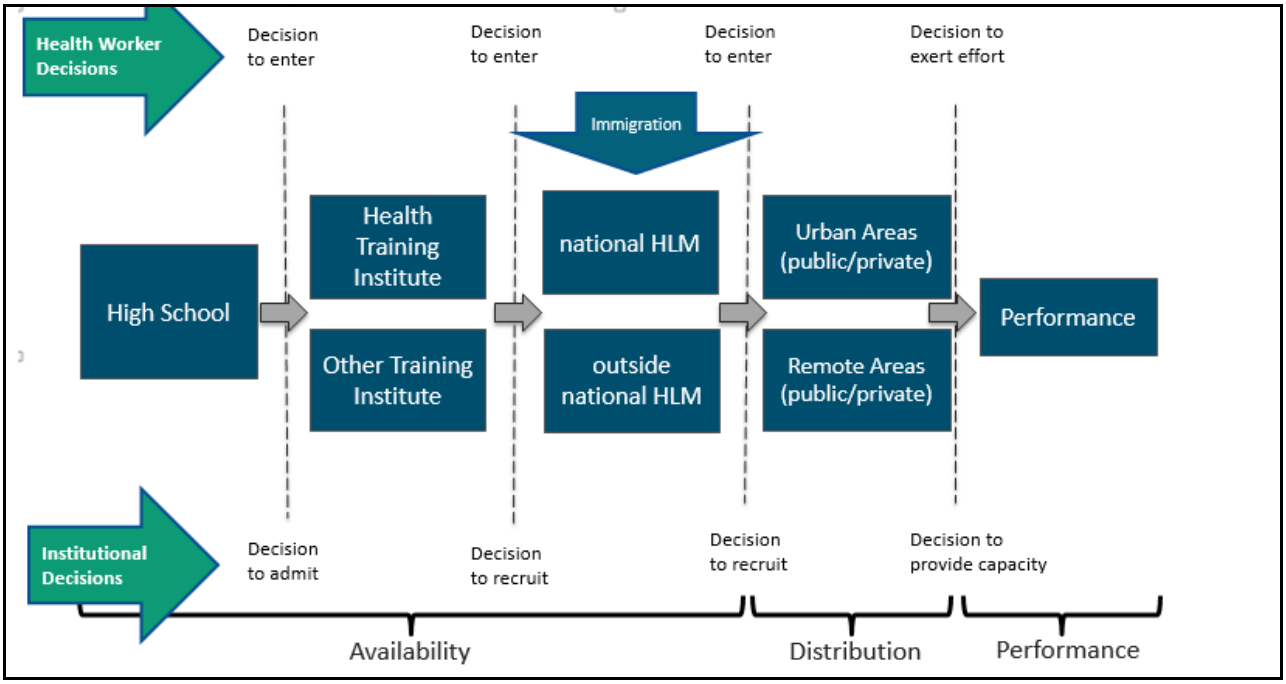
II. Conceptual and Theoretical Framework

There are many theories and models which try to explain the factors involved in workers' mobility (i.e. factors that determine health labour market supply). Classical theory held that health

workers are where they are, because of central level planning efforts. This position posited that health workers are simply agents of the public sector, with limited choices, and are posted as per the planning efforts of the Ministries that employ them. Regulations and policies at the central level were in line with planning efforts (Soucat et al 2013; Scheffler et al, 2016).

More recently, and with the increased role of the private sector in the provision of employment opportunities, the literature has argued that health worker placements and job uptake need to be analysed and understood in the larger context of the health labour market (WHO 2016). Health labour markets in developing countries such as those in Africa have changed significantly in recent years, and the public sector no longer has the monopoly on employment (Soucat et al 2013). This view sees that health workers are now economic actors within a diverse and complex health labour market of hiring institutions, and that job uptake is determined by both the preferences and decisions of health workers themselves to enter into a particular job as well as the decisions of institutions themselves to admit or recruit a health worker (Scheffler et al 2016). It is the decision making of *both* health workers and institutions which ultimately determines the availability, distribution and to some extent the performance of health workers within a health labour market (see figure 2.1).

Figure 2.1: Visual depiction of the health worker dynamics within a health labour market and



Source: author

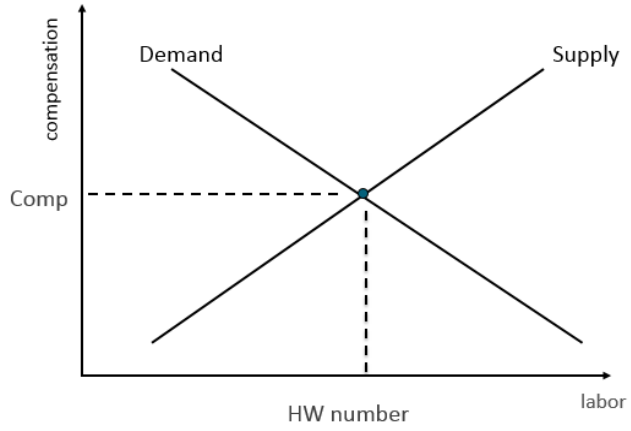
Neoclassic Wage Theory suggests that the preferences or decision making of economic actors within a labour market are driven largely by financial motives and by the probability of finding employment (in Lehmann et al, 2008). In this sense, it has been argued that "a health worker will have preference for, or accept a particular job, if the benefits of doing so outweigh the opportunity cost" (Hongoro, Normand, 2006).

This argument is closely linked with health labour market economic theory (as described in Andalon and Fields 2011; Soucat et al 2013 and Scheffler et al 2016). Labour market theory suggests that health *labour market supply*, defined as the willingness and ability of health workers to enter into a particular job, is one of two forces that determine a particular job uptake, whether

rural or urban, private or public, national or international, etc. The other force is health labour market *demand* –the willingness and capacity of employers to recruit or absorb health workers. Labour market supply and demand is determined by the level of compensation offered to these actors and institutions within the health labour market, with variations in the level of compensation determining whether the labour market is balanced (i.e. in equilibrium) or imbalanced (i.e. there is undersupply or a shortage).

Health labour market theory suggests that the labour market is in a desirable position when it is in equilibrium, a situation where labour *demand* (i.e. available financing and demand for specific skills) matches labour supply (the willingness of health workers to work in a particular job). In this situation (shown in Figure 2.2), the compensation level is considered to be set at the optimal level, to ensure that the health worker is willing to take the job, and equally that the hiring institution is willing and able to recruit the worker.

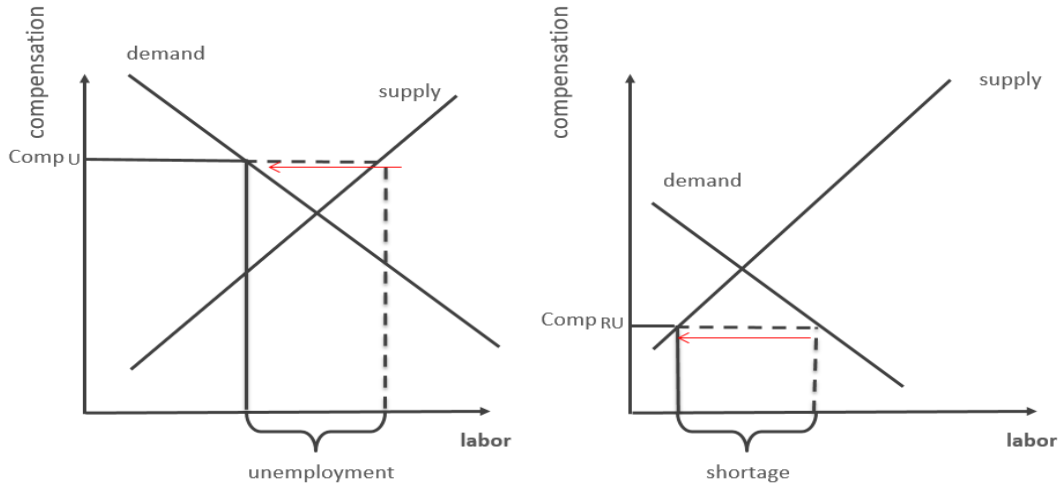
Figure 2.2: Economic depiction of a health labour market in equilibrium



Source: adapted from Andalon and Fields 2011

In reality, and as depicted in Figure 2.3, most labour markets are in disequilibrium, with a situation of under-employment often observed in urban areas and a shortage situation common in rural areas (Andalon and Fields, 2011; Soucat 2013; Scheffler 2016). A situation where there is more labour market supply than there is demand, can result in health workers being unemployed: a common situation in urban locations in many developing countries (Soucat 2013). This could occur because the compensation level (wages and other income) is often much higher in urban areas than it is in rural areas. Conversely, a situation where there is more demand than there is supply can result in a shortage situation, i.e. there are more funded job vacancies than health workers willing to fill these vacancies. Here the compensation level is too low to attract a sufficient number of health workers. In Guinea, for example, this may be one reason why supply is low in rural and remote areas of the country, which makes a thorough understanding of the supply side preferences or behaviours and the factors influencing such preferences and behaviours particular important.

Figure 2.3: Labour markets in disequilibrium



Source: Adapted from Andalon and Fields, 2011

The broader literature has shown that the supply side behaviour and related preferences of health workers is not solely determined by levels of compensation (financial and non-financial). Other key factors, including socio demographic backgrounds of health workers (gender, age, socio-economic background, rural background, intrinsic motivation etc) and education related variables (location or type of training institution, exposure to rural practice etc) can all influence the preference or decision making of specific health workers (and the extent to which their decision-making or preferences are motivated by different levels of compensation). See for example Huntington et al. (2011) or Kizito et al. (2015) who demonstrate the importance of demographic, character and training related factors in addition to monetary and non-monetary factors in shaping the preferences and decision making of health workers

These notions in particular are tested in this thesis, including for example whether someone from a lower socioeconomic background is less likely to migrate abroad or more likely to take up a rural post than someone with the opposite background, crucial policy related questions which may impact upon service delivery. The literature including that from Rwanda and Ethiopia has shown that different factors determining decision making or preference do not influence health workers' preferences or decisions for location or practice in an isolated manner, but rather interact and influence each other (Serra et al, 2010; Lievens et al 2010).

Labour Market Economic theory appears to be more relevant in some contexts than others in terms of explaining job uptake of health workers. It may be more applicable in countries that have a large private sector and/or diverse public sector, providing health workers with a choice

over different types of jobs. Secondly it may be applicable in contexts where there is little government intervention in terms of assigning or deploying health workers into particular jobs (temporarily or otherwise). It can, though, also be applicable in contexts where there is government intervention (i.e. for example rural bonding requirements), but this is not adequately enforced. Evidence from countries such as Ethiopia has shown that even with government set mandatory rural work requirements, many health workers could get themselves out of such obligations (See Serra et al, 2010). In Guinea, a large private sector, heterogeneity of public sector jobs, and zero government intervention concerning deployment means potentially a new health labour market conceptual framework is required, as is a better understanding of the supply side behaviour of health workers, particularly relevant and applicable in supporting valid and robust research in this area where limited current evidence is available to guide policy.

III. Literature Review

The above has highlighted that when taking into account a labour market theoretical framework, understanding the job or career preferences of current or prospective health professionals can be important from a workforce planning perspective. Where a labour market is relatively free from intervention, stated job preferences – for example of working in a rural or urban location, in the public or private sector, or even nationally or internationally - can be indicative of where health workers will actually end up (see for example, Serra et al. 2010). Generating an understanding of what explains such locational preferences can then inform the development of targeted policies to help influence the supply side behaviour of health workers towards a workforce distribution that is in line with service delivery needs.

The objective of this chapter is to identify, evaluate and synthesize the global (English Language) literature on the locational job preferences of prospective health workers as well as the factors that influence or are associated with such preferences. The aim is to identify the gaps in the literature and to generate information to help inform the design of a study on the locational job preferences of students in Guinea. The review does not explore preference to specialize, which is already widely covered in other reviews: see Puertas et al, (2013), for example. The focus of this review is in line with the immediate priority of many low-income countries to improve job uptake in rural areas, the public sector, and to minimize migration abroad.

Specifically, **the review seeks to answer the question:** *What is the global evidence on the locational job preferences of prospective health workers, and the factors linked to and/or associated with these preferences? Locational job preference* in this review refers to a particular career, job or occupational intent or preference to work in a particular geographic location (rural/urban), sector (public/private), and within and outside the country (migrate abroad). *Prospective health workers* refer to medical, nursing and or midwifery students in their final year of undergraduate studies.

I. The Review Strategy

Inclusion and exclusion criteria: All relevant, publicly accessible qualitative and quantitative studies published between 2004/01/01[1] to 2018/01/01 were included in the review. Quantitative

[1] 2004 was chosen as a suitable starting point because the WHO launched the *Joint Learning Initiative* (JLI) that year which called for a need to generate more evidence to help inform health workforce policy and planning.

studies searched for included different types of observational studies, and qualitative studies included focus group discussions and semi-structured interviews carried out with methodological rigor. Other qualitative reports where no evidence was presented, including opinion pieces or commentaries as well as presentations, editorials, letters to the editor, proceedings papers, news items, book reviews, and meeting abstracts were excluded from the review. A key inclusion requirement was to report on at least one of the three dimensions of locational job preference: rural/urban; public/private, and migration/non-migration. Studies were excluded if they did not explore at least one factor linked to or associated with the observed locational job preference or intent.

Studies were included where the study population were medical, nursing and or midwifery students in their final and/or pre-final years of undergraduate studies. Studies that focused on career or job intentions of students at the beginning of their training, postgraduate students already in the field (carrying out an internship), or of doctors, nurses and or midwives already in the labour market, were thus excluded. Studies that mixed early and later cohort years (for example those that surveyed all medical students across all years at a university) were excluded, whereas studies that reported on two separate student's cohorts (for example year 1 medical students and year 4 medical students) were included and had findings only extracted for the latter or final year students.

The decision not to mix study years reflect findings that job or career preferences vary substantially between different years of studies, as it does between students and health workers

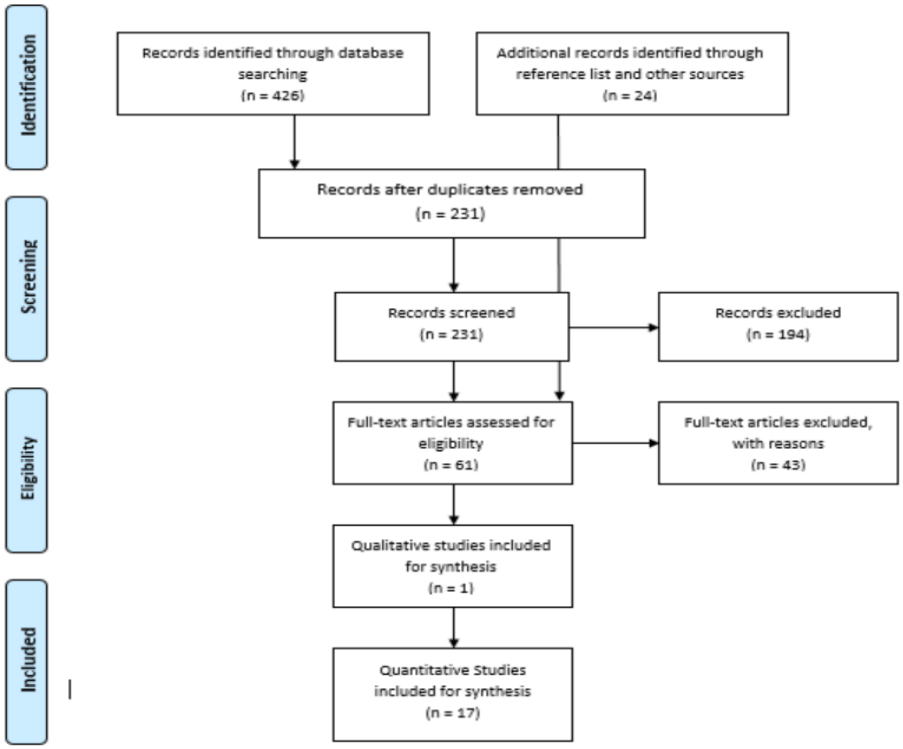
already employed. Several studies have shown that with changing life circumstances and changing priorities job preferences change (see, for example, Serra, Serneels et al. 2010, Johnson, Nakua et al. 2011, Rockers, Jaskiewicz et al. 2013, Santric-Milicevic, Terzic-Supic et al. 2014, Silvestri, Blevins et al. 2014, Gasiorowski, R et al 2015). Other explanations for the changing preference are that with more experience and knowledge, health professionals have more information upon which to base their preferences or intentions (Johnson 1978; Miller 1984; Caldwell and OReilly, 1985)

Search Strategy: The aim of the search strategy was to find all published studies through a comprehensive search of relevant electronic data bases and hand searches of the reference list of journals and other publications. The databases that were searched were: Web of Science, Cochrane data base, CINAHL, MEDLINE, PubMed, EMBASE, PsycINFO, Science Direct, Scopus. In addition, google and google scholar were searched for books or reports on the topic. Websites of large international organizations, including from the World Health Organization (WHO) and the World Bank (WB), were also searched for relevant articles including those not yet published in scientific journals (but published in other formats).

To obtain the literature included in the review, a five- step strategy was adopted, details of which are summarized in Annex A. First, a systematic search was carried out using appropriate MESH and title search terms across all the above-mentioned databases and sources which yielded a total of 426 search results. **Second,** the search results were exported to Endnote where they were categorized into separate folders (by database). All internal duplicates (duplicates within

databases) and then external duplicates (duplicates between databases) were removed which resulted in a total of 231 titles **Third**, all 231 titles and then abstracts were screened and 194 studies were excluded for not meeting the inclusion criteria. **Fourth,** 24 additional studies were identified by reviewing the reference lists and adding relevant studies to the remaining references. **Fifth**: A full text review of 61 articles was carried out which resulted in a further exclusion of 43 articles with reason (see annex A). A final number of 18 articles was deemed suitable for inclusion in the review. The search strategy results are summarized in the Prisma Chart in Figure 3.1 below.

Figure 3.1: Prisma chart of search strategy results



Quality Appraisal: Before final inclusion, each of the 18 articles was appraised for quality. Whereas the quality of the studies varied (see discussion on quality below), it was deemed sufficient for keeping all 18 studies in the review. The appraisal used a quality checklist designed

for cross sectional and observational studies and one designed for qualitative studies developed by the Joanna Briggs Institute (See Annex C for the templates used). Appraisal of the quantitative studies focused on 1) clarity of inclusion of sample,2) clarity of description of study subjects and setting 3) validity and reliability of measurement of exposure, 4) objectivity of measurement criteria 5) identification of confounding factors, and strategies to deal with them, 6) validity and reliability of outcome measurement and 7) use of appropriate statistical analysis. Appraisal of the qualitative study focused on quality dimensions such as *rigour,* i.e. whether a thorough and appropriate approach was applied, *credibility*, whether findings were well presented and meaningful, and *relevance*, on the usefulness of the findings. An overview of the quality dimensions of each study, focusing on the above with regards to the qualitative study, and on biases and potential systematic errors, namely selection bias, measurement bias, and confounding bias of the quantitative studies is provided in Table 3.4 below.

Data Extraction and Synthesis: A simple data extraction tool was developed to obtain and extract the information needed for the review. The data extraction form, included in Annex B of this chapter, was designed to capture data for the following fields 1) author, 2) country of study 3) study population 4) locational outcome variable explored 5) type of study, 6) method of analysis, 7) findings on student intent/willingness to accept post, 8) financial determinants of locational intent 9) non -financial determinants of locational intent, 10) demographic and character determinants 11) training related determinants and 12) authors conclusions.

The extracted data of both the quantitative and qualitative articles was then synthesized to summarize the 1) general findings on the nature and quality of literature and then 2) the specific

findings on the three locational preference dimensions reviewed – rural/urban, public/private and preference to migrate aboard. The findings on the factors linked to or associated with the locational preferences are categorized into i) monetary factors, ii) non-monetary factors, iii) education and training related factors and iv) profile and characteristic related factors. Findings are presented in narrative form including Tables and Figures to aid in the data presentation where appropriate.

II. General Findings (on nature and quality of literature)

The number of studies on locational job intent or preference of health worker students is generally low, with the majority carried out in low income country contexts. This is largely the opposite of the literature on the intent of health workers to *specialize* which is mainly carried out in developed countries (see Puertas et al, 2013). Table 3.1 shows that out of the 18 articles retrieved for the review, 10 articles focused on students in countries in Africa, 3 on countries in Asia (two of which are low income countries), 3 on Eastern Europe, 1 on a country in the middle east and 1 on the USA. Globally then, the literature on the locational job intentions of health students is very sparse- and no study on the locational career preferences of students exists for Guinea.

Table 3.1: Countries covered in the literature

Article	Africa	Asia	Eastern Europe	Middle East	Americas
1. (Agyei-Baffour, Kotha et al. 2011)	Ghana				
2. (Akl, Maroun et al. 2007)				Lebanon	
3. (Assefa, Mariam et al. 2017)	Ethiopia				
4. (Bailey, Mandeville et al. 2012)	Malawi				
5. (Burch, McKinley et al. 2011)	South Africa, DRC, Kenya, Nigeria, Tanzania, Uganda				
6. (Dossajee, Obonyo et al. 2016)	Kenya				
7. (Gasiorowski, Rudowicz et al. 2015)			Poland		
8. (Hou, Xu et al. 2016)		China			
9. (Huntington, Shrestha et al. 2011)		Nepal			
10. (Johnson, Nakua et al. 2011)	Ghana				
11. (Kizito, Mukunya et al. 2015)	Uganda				
12. (Krajewski-Siuda, Szromek et al. 2012)			Poland		
13. (Kruk, Johnson et al. 2010)	Ghana				
14. (Lievens, Serneels et al. 2010)	Rwanda				
15. (Rockers, Jaskiewicz et al. 2013)		Laos			
16. (Santric-Milicevic, Terzic-Supic et al. 2014)			Serbia		
17. (Serneels, Lindelow et al. 2007)	Ethiopia				
18. (Xierali, Maeshiro et al. 2014)					USA

The majority of studies are descriptive observational studies, with most making use of a cross sectional survey design to obtain evidence on the locational job intent of students. The majority of articles that made the inclusion criteria were quantitative studies, with only one qualitative study making the list (Bailey, Mandeville et al. 2012). Out of the 17 quantitative studies, 16 relied on a self or interviewer administered cross sectional survey, and one (Xierali, Maeshiro et al. 2014) used a standardized student graduation exit survey, to obtain the needed information. The only qualitative study relied on semi structured interviews (of a small sample) to collect data. Overall, a cross sectional survey design demonstrated to be a common and useful method to collect quantitative data.

The majority of studies assess the job preference of *medical* students only, with only very few focusing on nursing students or both, and none specifically on midwifery students. Out of the 18 articles included in the review, only three studies included an assessment of the locational intent of nursing students (Serneels, Lindelow et al. 2007, Lievens, Serneels et al. 2010, Rockers, Jaskiewicz et al. 2013), with one of those three mixing both nursing and midwifery students into the same group (Lievens, Serneels et al. 2010). Of the three studies that do include nursing students, two comparatively assessed both nursing and medical students at the same time (Serneels, Lindelow et al. 2007, Lievens, Serneels et al. 2010). This reveals a significant gap in the literature with regards to on the locational preferences of nursing and midwifery students, as well as a comparative analysis of medical and nursing and midwifery students together.

By far the most common locational outcome variables assessed in the literature are student preference to work in rural/urban locations, and preference to migrate abroad. Table 3.2 shows that 12 out of the 18 studies covered rural/urban locational intent as 12 studies also covered intent to migrate abroad. Six of these studies covered both rural/urban and emigration intent. Only three studies covered intent to work in the public or private sector. With the exception of the only qualitative study (Bailey, Mandeville et al. 2012), no study assessed all three locational outcome variables at the same time. All in all, the findings thus reveal a particular gap in the literature on all three locational preference dimensions, as well as in particular on the public/private dimension of student preference.

Table 3.2: Locational outcome intent covered in the literature

Article	Rural/Urban	Public/Private	Migration abroad
1. (Agyei-Baffour, Kotha et al. 2011)	X		
2. (Akl, Maroun et al. 2007)			X
3. (Assefa, Mariam et al. 2017)	X		
4. (Bailey, Mandeville et al. 2012)	X	X	X
5. (Burch, McKinley et al. 2011)			X
6. (Dossajee, Obonyo et al. 2016)	X		X
7. (Gasiorowski, Rudowicz et al. 2015)		X	X
8. (Hou, Xu et al. 2016)	X		X
9. (Huntington, Shrestha et al. 2011)	X		X
10. (Johnson, Nakua et al. 2011)	X		X
11. (Kizito, Mukunya et al. 2015)			X
12. (Krajewski-Siuda, Szromek et al. 2012)			X
13. (Kruk, Johnson et al. 2010)	X		
14. (Lievens, Serneels et al. 2010)	X	X	X
15. (Rockers, Jaskiewicz et al. 2013)	X		
16. (Santric-Milicevic, Terzic-Supic et al. 2014)			X
17. (Serneels, Lindelow et al. 2007)	X		
18. (Xierali, Maeshiro et al. 2014)	X		

The factors found to be linked to or associated with these preferences can generally be grouped into four different categories: monetary factors, non-monetary factors, demographic and profile related factors, and training related factors (as done in the data extraction form). Whereas only 10 studies identified non-monetary variables as important determinants for locational job uptake (either of the 3), 11 studies identified monetary factors as important determinants (mostly in relation to outmigration), 13 studies identified training related factors as important determinants (mostly in relation to rural/urban preferences, and 15 out of the 18 studies identified demographic and character related variables as important determinants (see Table 3.3). A detailed review of the findings of the factors associated or linked to the different locational outcome preferences of students is provided further below.

Table 3.3: Factors associated with locational job uptake identified in the literature

Article	Monetary factors	Non-financial factors	Demographic and character	Training related factors
1. (Agyei-Baffour, Kotha et al. 2011)			X	
2. (Akl, Maroun et al. 2007)	X	X	X	X
3. (Assefa, Mariam et al. 2017)			X	X
4. (Bailey, Mandeville et al. 2012)	X	X	X	X
5. (Burch, McKinley et al. 2011)	X	X	X	X
6. (Dossajee, Obonyo et al. 2016)			X	X
7. (Gasiorowski, Rudowicz et al. 2015)			X	
8. (Hou, Xu et al. 2016)			X	X
9. (Huntington, Shrestha et al. 2011)	X	X	X	X
10. (Johnson, Nakua et al. 2011)	X	X		X
11. (Kizito, Mukunya et al. 2015)	X	X	X	X
12. (Krajewski-Siuda, Szromek et al. 2012)	X	X	X	X
13. (Kruk, Johnson et al. 2010)	X	X		
14. (Lievens, Serneels et al. 2010)	X		X	X
15. (Rockers, Jaskiewicz et al. 2013)		X	X	
16. (Santric-Milicevic, Terzic-Supic et al. 2014)	X		X	X
17. (Serneels, Lindelow et al. 2007)	X	X	X	
18. (Xierali, Maeshiro et al. 2014)				X

The majority of studies make use of percentage analysis to present result for locational choice and around half use regression to identify the factors associated with career intention. Almost all of the studies used percentage analysis to show the proportion of student preferences towards a particular career or job. While one study was purely descriptive and did not use any econometrics – see (Burch, McKinley et al. 2011), and another was the only qualitative study which focused on framework analysis from the stakeholder consultation data to generate results (Bailey, Mandeville et al. 2012). Nine studies in total used logistic regression to identify the factors associated with the locational outcome preference variable. One study used ordinal regression (Johnson, Nakua et al. 2011). Logistic regression was shown to be a particular popular, relatively easy to use, and useful model, to generate odds ratios for the likelihood of a particular

preference, which are controlled for multiple confounders, and thus help reduce any confounding bias.

In addition, some studies made use of more advanced econometric modeling, although largely to address slightly different research questions. The study by Hou, Xu et al. (2016) used Logit models to estimate the Maximum Likelihood Estimation (MLE) techniques to explore the factors predicting students' preferences. Others used more advanced econometric modelling to generate results from Contingent Valuations (CVs): see (Lievens, Serneels et al. 2010) and (Serneels, Lindelow et al. 2007) and mixed logit models for Discrete Choice Experiments(DCEs): See (Kruk, Johnson et al. 2010) and (Rockers, Jaskiewicz et al. 2013). Whereas regression modeling was thus used by studies that attempted identify the different variables associated with these preferences, more advanced econometric modeling was more often used to answer slightly different research questions, namely: what is the relative importance of different monetary (contingent valuation) and/or non-monetary variables (DCE) in changing the preference of health students towards a particular job.

On the quality dimension, the vast majority of studies in this review can be classified as high quality or medium quality studies (see Table 3.4). Taking into account bias that can occur during sampling, data collection, data analysis and interpretation, whilst at the same time recognizing that appraisal is somewhat suggestive, seven out of the 17 quantitative studies are classified as high quality and eight as medium quality. The high more than the medium quality studies demonstrated that 1) the difference between characteristics of study participants and eligible

participants not selected for the study was limited, 2) the systematic over or understatement of the value of measurements was limited and 3) the presence and influence of extraneous variables on the results was identified and sufficiently dealt with. The only qualitative study (by Bailey, Mandeville et al, 2017) was classified as medium largely due to its extremely small sample size of eight students but deemed sufficient to remain included due to being otherwise convincing in terms of rigour, credibility and relevance.

Only one study was classified as low Quality- the only multi-country survey of select students in select schools which provided largely descriptive information and little discussion or treatment of confounding variables. Given its multi-country focus, which makes it not directly comparable with the single country studies, and findings that are nonetheless still interesting (because of the cross-country comparison), the study was not omitted from the review.

Table 3.4: Overview of quality appraisal of articles included in the review

Quantitative Studies						
Article	**Type of study**	**Nationally representative**	**Selection Bias**	**Measurement bias**	**Confounding Bias**	**Overall Quality**
1. (Agyei-Baffour, Kotha et al. 2011)	Census of final year students	YES	Low	Low	Low	**High**
2. (Akl, Maroun et al. 2007)	Census of final year students	YES	Medium	Low	Medium	Medium
3. (Assefa, Mariam et al. 2017)	Cross sectional Survey	YES	Low	Low	Low	**High**
4. (Burch, McKinley et al. 2011)	Cross sectional Survey	No	High	Medium	High	Low
5. (Dossajee, Obonyo et al. 2016)	Cross sectional Survey	No	low	low	low	**High**
6. (Gasiorowski, Rudowicz et al. 2015)	Cohort Survey	No	High	Medium	Medium	Medium
7. (Hou, Xu et al. 2016)	Cross sectional Survey	YES	Low	Low	Low	**High**
8. (Huntington, Shrestha et al. 2011)	Cross sectional Survey	No	Low	Low	Low	**High**
9. (Johnson, Nakua et al. 2011)	Census Survey	YES	Low	Low	Low	**High**

10. (Kizito, Mukunya et al. 2015)	Census Survey	Unclear	Unclear	Low	Low	Medium
11. (Krajewski-Siuda, Szromek et al. 2012)	Cross sectional Survey	No	Medium	Low	Low	Medium
12. (Kruk, Johnson et al. 2010)	Cross sectional Survey (DCE)	YES	Low	Low	Low	**High**
13. (Lievens, Serneels et al. 2010)	Cross sectional Survey (CV)	No	Medium	Low	Medium	Medium
14. (Rockers, Jaskiewicz et al. 2013)	Cross sectional Survey (DCE)	No	Medium	low	Low	Medium
15. (Santric-Milicevic, Terzic-Supic et al. 2014)	Cross Sectional Survey	No	Medium	Medium	Medium	Medium
16. (Serneels, Lindelow et al. 2007)	Cross Sectional survey (CV)	No	Medium	Low	Low	Medium
17. (Xierali, Maeshiro et al. 2014)	Retrospective Survey	YES	Medium	Medium	Medium	Medium
Qualitative studies						
Article	**Type of study**	**Nationally representative?**	**Rigour**	**Credibility**	**Relevance**	**Overall quality**
18. (Bailey, Mandeville et al. 2012)	Qualitative interviews	No	Medium	Medium	Medium	Medium

The following section summarizes the specific findings from these studies on the locational job preferences, including the factors linked to or associated with such preferences, grouping these into monetary, non-monetary, education and profile and characteristic related categories. It discusses first the job preference most often discussed (rural/urban preference), then outmigration, and then public private preference, for which evidence is very sparse. In reading and interpreting the below, the quality dimensions of the studies should be taken into account throughout.

II. Rural vs Urban preference

The assessment of student preferences between a rural or an urban post is one of the most salient issues assessed and discussed in the literature. In this review, 12 of 18 studies selected for inclusion assessed the issue (see Table 3.2 above).

Despite variations by country/study, student preferences are often directed towards urban practice. In Nepal for example, 88 percent of medical students stated their expectation to work in urban jobs after graduation (Huntington, Shrestha et al. 2011); in Kenya, 75 percent of medical students (Dossajee, Obonyo et al. 2016), and in China 71 percent stated a preference to work in cities (Hou, Xu et al. 2016). Rural preference was also highlighted. A relatively high 55 percent of medical students in Ghana stated a preference to work in rural areas after graduation (Agyei-Baffour, Kotha et al. 2011); 21 percent of medical students in the USA planned to practice in remote areas (Xierali, Maeshiro et al. 2014); 8.7 percent of medical students in Ethiopia stated an intent to work in districts or small towns, (Assefa, Mariam et al. 2017), and only 4.8 percent of medical students in Six Sub Saharan countries stated intention to practice in rural areas (Burch, McKinley et al. 2011).

The literature also indicates that preferences vary by cadre and change over time. There is evidence to suggest that a preference for rural areas may be bigger for nurses than for medical students, and bigger in the short term than the longer term for both cadres. In Rwanda for example, 37 percent of medical students and 39 percent of nursing students were found to prefer work in a rural area in the short run, however 92 percent of medical students and 73 percent of nursing students prefer urban jobs in the long run (Lievens, Serneels et al. 2010). Findings with similar conclusions were made in studies in Ethiopia (Serneels, Lindelow et al. 2007) and Laos (Rockers, Jaskiewicz et al. 2013). The findings would confirm the notion that the opportunity cost to move to a rural area may be larger for higher level cadres than lower level cadres, and lower early on in a career than later (see Govindaraj et al, 2017).

a) Monetary Compensation

Of those studies assessing rural/urban practice preference, only a handful of studies identify a link between monetary compensation and rural/urban preference of health workers. This is done mostly by assessing the extent to which monetary compensation, and different levels of such compensation, would increase the willingness of students to work in a particular job. A survey of medical students in Nepal for example reported that two in three (67%) students surveyed admitted that additional payment from the government would make them more likely to practice in a rural area (Huntington, Shrestha et al. 2011).

Other studies rely on contingent valuation methods (CV) and Discrete Choice Experiments (DCEs) to identify the impact of monetary compensation on the willingness of taking up a rural post. A study of prospective nurses in Rwanda found, through contingent valuation, that a salary increase of 80 percent would increase the willingness of nurses to work in rural areas from 36 to 80 percent (Lievens, Serneels et al. 2010). A similar CV in Ethiopia found that to get all medical and nursing student graduates to take up a post in a rural area would require an increase of the monthly salary by 31 percent and 39 percent, respectively (Serneels, Lindelow et al. 2007). The latter demonstrated that medical students require higher salary increases than nursing students to shift their willingness towards an urban post.

While monetary incentives have been shown to increase the willingness of students towards rural practice, non-compensation related factors have often been shown to be more effective. A Discrete Choice Experiment (DCE) carried out with medical students in Ghana found that shorter contracts and salary bonuses were indeed associated with increased rural job preferences, but not as much as non-monetary incentives (Kruk, Johnson et al. 2010). Similarly, a DCE in Laos found that nursing students were most willing to give up salary in exchange for

specific non-monetary incentives (Rockers, Jaskiewicz et al. 2013). The following section discusses the findings on non-monetary factors in greater detail.

b) Non-Monetary factors

Several of the studies show a link between living and working conditions, supportive management and rural/urban practice preference. The qualitative study by Bailey et al (2012), albeit relying on a very small sample of informant interviews, does show that poor living and working conditions in rural areas were key reasons why medical students in Ghana preferred to work in urban areas. And two studies in Ghana found improved equipment most strongly associated with increased job preferences of medical students, followed by supportive management (Kruk, Johnson et al. 2010)(Johnson, Nakua et al. 2011).

Opportunities for promotion was found to be another important variable affecting rural/urban preference. In Ethiopia, opportunities for promotion is the second most important highly significant attribute explaining willingness to work in urban areas for nursing students, and the third most important for medical students (Serneels, Lindelow et al. 2007). In Rwanda, nursing and medical students listed promotion opportunities as the second most important reasons, and quality of the working environment as the third most important reason, for preferring work in urban areas (Lievens, Serneels et al. 2010). In Laos, nursing students in rural areas were most willing to give us salary in exchange for direct promotion to permanent staff, alongside housing and transportation provisions(Rockers, Jaskiewicz et al. 2013).

A final factor associated particularly with longer term locational job preferences is related to access to education for children. A survey of medical and nursing students in Ethiopia found that

having access to education for children, particularly for medical students, was attributed with the highest significance of explaining preference of work in urban areas (Serneels, Lindelow et al. 2007). Similarly, among medical and nursing students in Rwanda, access to good education for children was ranked among the three most important characteristics by those preferring urban service.(Lievens, Serneels et al. 2010). This may be one reason why longer-term preferences or intentions of students vary from shorter term preferences, and more broadly, preferences from student populations may vary from older populations already in the health labour market.

c) Education/Training related factors

Heterogeneity in willingness to work in rural areas amongst health students in the same country from different universities possibly point towards the influence of different training approaches. A survey from six medical schools in Ethiopia for example found significant increased odds of intention to work in rural areas among medical students from the Addis Ababa University, compared to students from all other medical schools (Assefa, Mariam et al. 2017).

None of the studies in this review however reported on or found a link between the rural/urban preferences and the geographic location or sector of the medical or nursing school in which they trained. In addition, none of the studies explored or found a link between the sector ownership of the school (i.e. public or private) and the rural urban preference of students. Anecdotal evidence sometimes suggests that health workers who are trained in urban areas are more likely to work in urban locations than those who are trained in schools located in rural areas (see for example Govindaraj et al 2016). As for the association between school sector and locational preference this remains a big gap in the literature.

There is some evidence that the type of training provided is associated with a preference to work in rural areas. The study of medical students in the USA found a significant association between student perceptions of their instructions in public health and community medicine at their school and plans to practice in underserved areas. Those who felt better prepared in community medicine were more likely to have a preference for rural areas (Xierali, Maeshiro et al. 2014).

At the same time, this review found no evidence of a link between actual quality of education or competency levels of health workers, and their preference for an urban or rural post. No evidence was found that the quality of education per se, or the skills level of health students, influences their decision to work in urban or rural areas. A test of whether less-skilled health workers—as measured by a medical knowledge test—are more likely to work in rural areas found no evidence for such adverse selection in Ethiopia (Serneels, Lindelow et al. 2007)

The review found some evidence that educational scholarship policies to be associated with rural/urban preference of health worker students. The study of medical students in Nepal found that Ministry of Education (MOE) scholarship students were strongly associated with intention to practice rurally(Huntington, Shrestha et al. 2011). This however could be explained by the scholarship being linked with mandatory practice which was not tested as a confounding variable. The same study found that students who indicated a greater likelihood of rural practice were more likely to have received a scholarship from the MOE that requires rural service.

Finally, there is some evidence that access to further education and specialized training can help explain urban/rural preferences. The study in Ethiopia found that those medical and

nursing students who stated a preference for an urban post in the long term (sort term was not assessed) put "access to further training and specialization" (45%) as the most important reason for this decision, while this did not make the list for those with a rural preference. (Lievens, Serneels et al. 2010). Similarly the study of medical students in Malawi also found the desire to specialize as the most common reason given by participants for working in an urban area (Bailey, Mandeville et al. 2012).

d) Demographic and Profile Characteristics:

Several studies show that gender is often associated with rural/urban preference. In Ghana, female gender was significantly associated with reduced willingness to work in rural areas (Agyei-Baffour, Kotha et al. 2011). A study of medical students in Ethiopia found significant increased odds of intention to work in rural areas among male as opposed to female students (Assefa, Mariam et al. 2017). In Nepal too, medical students who indicated a greater likelihood of practicing in a rural area were more likely to be male (Huntington, Shrestha et al. 2011). Security or marriage-related reasons are sometimes argued to explain this (see Dussault and Franceschini 2006). Not every study however finds an association. The study of medical students in Kenya, for example, found no significant association between rural intention and gender or marital status (Dossajee, Obonyo et al. 2016).

Age is another variable shown to be associated with rural/urban preferences. In Ghana for example, age (being younger) was associated with greater willingness to work in rural areas (Agyei-Baffour, Kotha et al. 2011). In Ethiopia, younger health workers have been shown to be more likely to take up a rural post, although their preparedness to work in a rural area was shown

to fall rapidly once they enter the labour force (Serneels, Lindelow et al. 2007). That same study found that for nursing students the reservation wage to accept a rural job is lower the younger the nurse. Having less to lose (i.e. including not being married yet, not having children, not in a position to moonlight) as well as being more altruistically inclined in younger years is sometimes attributed to such findings (-see literature outside this review by Lemiere et al 2014).

Parental education and socio-economic status can also be associated with rural/urban preference. In Ghana, medical students with high PPES (parental professional and education status) were significantly associated with reduced willingness to work in rural areas (Agyei-Baffour, Kotha et al. 2011). A study on medical students in Ethiopia however, which adjusted for confounders, found no statistical significant difference in work place preference relative to parents level of education (Assefa, Mariam et al. 2017). The other study on medical and nursing students in Ethiopia, found 'expenditure of parent's household' (being better off economically) to be significantly associated with willingness to want to work in rural areas (Serneels, Lindelow et al. 2007). The same study found that coming from a wealthier family implied a higher reservation wage to work in a rural area. In Nepal, rural bound students were found to be less likely in the highest family income bracket as compared to the lowest income bracket, and were less likely to have a relative who is a physician (Huntington, Shrestha et al. 2011).

Rural origin also seems to be a common predictor of rural intent. A qualitative study in Malawi found that two out of 8 students who were interviewed expressed the desire to work at the remoter district level because this is where their families came from (Bailey, Mandeville et al. 2012). The same study found one participant listing "being from a rural area" as a key motivation for working at the district level ("I've seen how people struggle there, and I've struggled once in

my life and there has to be change somehow"). These findings are backed up by quantitative studies. The study of 156 medical students in Kenya found that students with rural origin were 2.5 times more likely to practice in rural areas than students from urban origin. (Dossajee, Obonyo et al. 2016). The study of 3020 medical students in China found those who preferred to work in rural areas upon graduation were more likely to be those who lived in rural areas when 1-15 years old, and those more likely to have parents living in rural areas (Hou, Xu et al. 2016). And in Nepal, students who indicated greater likelihood of practicing in rural areas were more 3.2 times more likely to have been born in a village than born in a city (Huntington, Shrestha et al. 2011). Interestingly, in Ghana, rural exposure factors of medical students did not significantly increase willingness of students to work in rural areas (Agyei-Baffour, Kotha et al. 2011)

Closely related, there was also some evidence on a link between the location and type of high school education and the rural/urban preference of students. The study of medical students in China found that those who preferred to work in rural areas after graduation were more likely to be those who went to high school in rural areas(Hou, Xu et al. 2016). And the study of medical students in Nepal found that students who indicated a greater likelihood of practicing in rural areas were more likely to have gone to a government secondary school (Huntington, Shrestha et al. 2011).

Finally, altruistic or intrinsic inclinations have also been shown to be associated with urban/rural job preference. The study of medical students in Ghana found a significant association between strong intrinsic motivation and willingness to work in rural areas (OR 1.92) (Agyei-Baffour, Kotha et al. 2011). The study of 959 medical students in Ethiopia found the odds of intention to work in rural areas higher among those who had the desire to serve within the

country than counterparts without this desire (AOR: 1.62) (Assefa, Mariam et al. 2017). Quantitative studies for Ethiopia and Rwanda found that a simple question measuring health worker *willingness to help the poor* was strongly correlated with willingness to work in rural areas (Serneels, Lindelow et al. 2007, Lievens, Serneels et al. 2010). Interestingly, in Nepal there was no statistically significant associations between rural intention of medical students and the desire to improve the health of the population (Huntington, Shrestha et al. 2011). The same study, however, also found that students who intended to practice in rural areas were more likely to agree that they had a duty to help people and that a period of rural service should be made mandatory to all Nepali physicians, than students intending to practice in urban areas.

III. Preference for a job abroad

An equally salient student locational preference assessed and discussed in the literature is the preference to work in the home country or migrate abroad after graduation. As with urban/rural preferences, and shown in the above Table 3.2, 12 out of the 18 studies selected in this review assessed this dimension. While elsewhere in the literature, factors influencing outmigration are sometimes been referred to as 'push' and 'pull' factors (Zurn et al, 2004, WHO, 2004), in the literature reviewed here, emigration is assessed and discussed as a preference between jobs at home or abroad, with the factors associated with such preferences, as with the other locational choices, categorized into monetary, non-monetary, education and profile related factors.

A substantial portion of the literature found student intent of preference to migrate abroad to be relatively high. Starting with the only qualitative study in this review, most of the students

interviewed in the qualitative study in Malawi intended to study or work abroad for some time, but then return (Bailey, Mandeville et al. 2012). Such a preference was confirmed by students in several quantitative studies. Of the medical students surveyed in six Sub-Saharan African countries, 40 percent stated intent to train abroad, and 21 percent specifically to relocate outside of Africa (Burch, McKinley et al. 2011). In Ghana, over two thirds of 304 medical students surveyed contemplated emigration after graduation (Johnson, Nakua et al. 2011). In Uganda, close to 45 percent had an intention of leaving the country (Kizito, Mukunya et al. 2015). The survey of 1177 medical students in Poland found 62 percent of students planning to seek employment abroad after graduation, with the probability of migrating calculated at 50 percent (Krajewski-Siuda, Szromek et al. 2012). And in Serbia, more than 84 percent of 444 students considered the option of leaving the country to work (Santric-Milicevic, Terzic-Supic et al. 2014)

The evidence also illustrated the heterogeneity of migratory preference however, and found that in other countries, the intent to emigrate was much lower. In Rwanda, more than 80 percent of health students did not expect to migrate abroad in the coming five years (including 83 percent of the 124 medical students, and 81 percent of the 288 nursing students)(Lievens, Serneels et al. 2010). In Nepal, 88 percent of medical students thought it was very likely they would practice in Nepal(Huntington, Shrestha et al. 2011). Similarly, in Kenya, 88 percent of medical students stated an intent to practice domestically after their training (Dossajee, Obonyo et al. 2016). In another study from Poland, more than half of medical students declared Poland as their preferred country of work (Gasiorowski, Rudowicz et al. 2015). The study in China of over 3000 medical students from 16 schools found that only 1 percent preferred to go abroad after

graduation (Hou, Xu et al. 2016). Clearly migratory preference very much differs from country to country.

a) Monetary factors

Of those studies assessing student intention to obtain a job abroad (or remain in the country), a large number report the importance of monetary compensation as a key motivating factor shaping student preferences. Several studies reported financial considerations to be the strongest variable associated with intention or preference to take up a job abroad.

The potential for greater earnings abroad is a relatively commonly stated reason for why students migrate aboard. In the qualitative study in Malawi, the main reasons cited for medical students leaving the country was the possibility of higher salaries abroad, which could better support their families or pay them through specialist training (Bailey, Mandeville et al. 2012). In the survey of medical students in six Sub-Saharan countries, which included South Africa, DRC, Kenya, Nigeria, Tanzania and Uganda, 96 percent of the 990 students surveyed rated salary as very or somewhat important in their intention to leave Africa for medical practice (Burch, McKinley et al. 2011). In Uganda, 75 percent of the 251 medical students surveyed listed being paid a higher salary as key reasons for leaving the country (Kizito, Mukunya et al. 2015). Similarly in Poland 78 percent of medical students indicated that higher salaries was a main motivation for emigration (Krajewski-Siuda, Szromek et al. 2012).

Findings on the association between migratory preference and the financial situation of the student however are mixed. A study in Lebanon, using logistic regression with backward

elimination, found a statistically significant association between intention of medical students to train abroad and the financial conditions of students (Akl, Maroun et al. 2007). In Serbia however, also relying on logistic regression, the financial situation was not found to be a significant predictor of the 84 percent medical students who considered migrating abroad (Santric-Milicevic, Terzic-Supic et al. 2014).

Findings on the obligation to the education sponsor as being a key reason for the intent to stay in the home country are also mixed. The survey of 251 medical students in Uganda found through percentage analysis, that a key stated reason of those intending to stay in the country was "paying back to the government for sponsoring the student education" (Kizito, Mukunya et al. 2015). The study by (Huntington, Shrestha et al. 2011) on the other hand, which used logistic regression to identify significant factors associated with intent to practice in Nepal, found that medical students whose tuition was paid by the government to be no more likely to indicate an intention to practice in Nepal than students paying their own tuition at private schools.

(b) Non-financial Factors

Several studies found that better working and/or living conditions are important reasons for intent to migrate abroad. The qualitative study of medical students in Malawi listed "better working conditions abroad" and the inability in the home country to "use specialist skills due to lack of resources" as key reasons for emigration. (Bailey, Mandeville et al. 2012). In Lebanon, a statistically significant association between medical student intention to train abroad and perceived working conditions of doctors was found (Akl, Maroun et al. 2007). In Uganda, 53.6 percent of medical students listed safe and good working conditions abroad as key reasons to

leave the country(Kizito, Mukunya et al. 2015). In the study on Medical students in six Sub-Saharan African countries, 95 percent listed better access to medical equipment and technology as very or somewhat important in their intention to leave Africa, and 90 percent listed better regulation of the work environment as important or somewhat important in their intention to leave Africa(Burch, McKinley et al. 2011). In Poland 75 percent of medical students mentioned better working conditions as a main motivation for migration (Krajewski-Siuda, Szromek et al. 2012).

Several studies found links between Job and career opportunities with the preference for outmigration. In Poland, 66 percent of the 1177 medical students surveyed stated *the opportunity to gain new experiences* as a main reason for their preference to migrate abroad, and 58 percent identified *better professional stability* (no risk of unemployment) as the main motivation(Krajewski-Siuda, Szromek et al. 2012). In Lebanon, a statistically significant association was found between intention to train abroad and the perceived impact on career and job opportunities of medical students (Akl, Maroun et al. 2007).

Others found links between the preference to migrate aboard and the broader social and political situation. The study in Lebanon found a statistically significant association between intention to train abroad and perceived political conditions(Akl, Maroun et al. 2007). Similarly, In Nepal, the odds of a student intention to go abroad was associated with agreement to the statement " the political situation in Nepal in the last 15 years has made leaving the country more necessary" (Huntington, Shrestha et al. 2011). The study in six-Sub-Saharan African countries found over 80 percent of medical students listing politics, personal safety, personal freedom and

social conditions as important or somewhat important factors in their consideration to leave the country(Burch, McKinley et al. 2011).

(c) education/training related factors

Better opportunities for continued education and training was found to be a particularly common factor explaining student intention to migrate aboard. The qualitative study in Malawi found that a key reason for medical students wanting to migrate to be the opportunity to pursue specialist training abroad (not readily available in Malawi)(Bailey, Mandeville et al. 2012) 84 percent medical students surveyed in six sub-Saharan countries listed quality of specialist training, 81 percent the availability of specialist training and 85 percent the opportunity for further education as very or somewhat important factors influencing their intention to leave (Burch, McKinley et al. 2011). In Poland, 78.5 percent of the 1177 medical students surveyed listed improved access to specialty training as one of the main areas that would have them reconsider their plans to migrate abroad (Krajewski-Siuda, Szromek et al. 2012). In Uganda, 58 percent of the 251 medical students listed their desire to continue with academic studies as a key reason to leave the country (Kizito, Mukunya et al. 2015). In Nepal the odds of a medical students going abroad was significantly associated with agreeing with the statement "I need to leave Nepal to get enough training in my field" (Huntington, Shrestha et al. 2011).

A few studies found evidence on the link between previous exposure to training aboard, as well as merely receiving information on training aboard, and a preference to migrate. In Kenya, for example, having received training abroad was more likely to result in a preference to work

abroad after graduating (Dossajee, Obonyo et al. 2016). This finding could rationalize the opinion that the training of students outside their home country should be discouraged. In Serbia, having trained abroad was shown to increase the likelihood of having a firm plan to work abroad among fifth year medical students (Santric-Milicevic, Terzic-Supic et al. 2014). Interestingly, a finding from Lebanon found a significant association between the preference of medical students to migrate aboard and simply "receiving information about training aboard"(Akl, Maroun et al. 2007).

Whereas not many studies focused on this angle, the type of training received was also shown to be associated with a preference to migrate abroad. While no studies assessed curricula type, exposure to clinical training was shown to be associated with student intention to train abroad - in the study of medical students in Lebanon, there was a statistically significant association between intention to train abroad and clinical training received (Akl, Maroun et al. 2007).

Finally, one study found a negative association between the financing source for medical education and migration intent. In Nepal, whether a medical student's tuition was paid by the government or by their family at a private school appeared to make no difference as to whether they thought they were likely to practice abroad.(Huntington, Shrestha et al. 2011)

(d) demographic and profile related factors

The evidence on the importance of gender and marriage status on migration intent is limited. In Poland, there was a significant relationship between gender and the desire to migrate (Krajewski-Siuda, Szromek et al. 2012). In Rwanda on the other hand, nursing students who were not married or engaged were found to have a higher reservation wage to stay in Rwanda, and

thus were more likely to migrate aboard, although the result was not statistically significant (Lievens, Serneels et al. 2010)

Age was found to be significantly associated with a preference to migrate in a few studies. In Uganda, the only factor significantly associated with medical students leaving the country was age (Kizito, Mukunya et al. 2015). In Poland, a study of medical students found that the probability to emigrate decreased with age; for men it decreased by 17 percent and for women by 50 percent between year 4 and year 5 of medical school. (Krajewski-Siuda, Szromek et al. 2012) The study found that by being a year older, the willingness of a person to leave Poland was reduced by 16.9 percent (Krajewski-Siuda, Szromek et al. 2012).

There is very limited evidence on the association of socio-economic backgrounds and migratory preference. Only one study found a significant finding. Among 469 medical students in Nepal, students who indicated greater likelihood of practicing abroad came from families with higher incomes. Odds of intention to practice abroad were more than three times higher for those in the highest family income bracket as compared with the lowest)(Huntington, Shrestha et al. 2011)

A few studies found Academic performance, as well as being able to speak another language, was linked to migration intent, Among medical students in Nepal, the odds of practicing abroad were twice as high for students whose self-assessed medical school performance was "excellent", compared to those who rated themselves only "average" (Huntington, Shrestha et al. 2011). No significant difference in grades was observed in Poland, between those contemplating migration and those planning on remaining in Poland (Krajewski-Siuda, Szromek et al. 2012). What was

found elsewhere however is that being able to speak a language can be significant. In Serbia, speaking two languages was one of only two significant predictors of intention to emigrate for 5th year students. (Santric-Milicevic, Terzic-Supic et al. 2014)

Some evidence exists on the link or association between suggestions of intrinsic motivation and migratory preference. Among medical students in Nepal, students who intended to go abroad were less likely to believe that they had "a duty to the people of Nepal" (Huntington, Shrestha et al. 2011). In the survey of medical students from six sub-saharan African countries, 86 percent stated a desire to improve medicine in Africa as "very important" or "somewhat important" in their intention to remain, and live and work in Africa. (Burch, McKinley et al. 2011).

Similarly, some evidence seems to suggest a link between extrinsic motivation and outmigration. Students in Nepal who indicated greater likelihood of practicing abroad were more likely to think that earning a good salary was very important to their decision to become a physician (Huntington, Shrestha et al. 2011). Similarly, students in Ghana considering emigration ranked salary as more important than students not considering emigration (Johnson, Nakua et al. 2011). Amongst medical students in Poland, attaching low importance to high earnings was also attached to be a significant predictor for choosing Poland as a preferred place of medical career. (Gasiorowski, Rudowicz et al. 2015).

Finally, several studies found the location of friends or family to be linked with migration intent. In Lebanon, the association between the medical student's intention to train aboard and the two following factors were statistically significant: having family members or friends living abroad and witnessing resident traveling to retrain abroad (Akl, Maroun et al. 2007). In Serbia,

having a relative or friend abroad significantly increased the likelihood of having a firm emigration plan among fifth year students (Santric-Milicevic, Terzic-Supic et al. 2014). In the survey of medical students from six sub-saharan African countries, 82 percent of students listed an attachment to spouse or partner as a critical factor in their intention to remain and live and work in Africa (Burch, McKinley et al. 2011). Similarly, in Uganda, family and social ties were listed as key reasons for medical students who decided to stay in the country (Kizito, Mukunya et al. 2015).

IV. Public vs Private Preference

Far fewer studies assessed the intention of students to enter into public vs private practice (Table 3.2). Structured interviews with 8 medical students in Malawi found that most preferred to work for the government over the private sector in the foreseeable future (Bailey, Mandeville et al. 2012). In the survey of 119 medical students in Poland, 40 percent favoured work in public sector and only a minority preferred work in the private sector after graduation. The rest planned to work in a combined public/private sector capacity (Gasiorowski, Rudowicz et al. 2015). In China, over 73 percent of 3020 students stated a preference to work in public hospitals after graduation, while only around 3 percent preferred to work in the private sector (Hou, Xu et al. 2016). The survey with medical students from six sub-saharan countries found that only 29 percent intending to work in the public sector and close to 30 percent intended to work in private practice after graduating (Burch, McKinley et al. 2011).

a) Monetary factors

There is close to no evidence in the literature on the association of monetary factors with the public or private sector preference of students. All of the above studies listing the public private preference of graduates failed to produce evidence on how monetary compensation may have influenced these preferences. The Qualitative study in Malawi, did note there was a perception that working for the government meant that they would be better looked after than working in the private sector (Bailey, Mandeville et al. 2012). There was no explanation beyond this, although it could refer to the suggestion made elsewhere that the public sector offers greater benefits than the private sector (see for example Soucat et al, 2012).

(b) Non-financial Factors

Non-financial factors such as working and living conditions could be important when choosing a job, however were not further assessed in the existing literature. Work in high-income countries suggested that access to good equipment and supplies, good management practices and leadership are all important factors influencing health worker decision making in their job decision (Bloom et al. 2014); evidence for health worker students and from low income countries, however, on these and other variables related to working and living conditions, remains absent.

There is some limited evidence that public-sector practice may be seen as a good stepping-stone for later practice in the private sector. The literature shows that the intent to work in the public or private sector may be different in the short vs the longer term, with longer term intentions favouring more the private sector. In Rwanda for example, 54 percent of nursing students and 55 percent of medical students expect to work in a public facility in five years, with

40 percent of nursing students and 31 percent of medical students wanting to work in the public sector in the long run. (Lievens, Serneels et al. 2010).

(c) education/training related factors

There is limited evidence that access to postgraduate training opportunities can be linked to public/private sector preference. Having access to training is important to some students and the public sector is often shown to provide the most opportunities for continued training and specialization. In the qualitative study on Malawi for example, a key reason for wanting to work for the government in the near future was because of better postgraduate training opportunities (Bailey, Mandeville et al. 2012). This study is small and not representative, and no quantitative study in this review confirmed an association.

There is no evidence on any other education factor, including the association between studying in a public/private educational institution and intent to practice in the public/private sector. Theoretical considerations of whether health workers who study in the private sector are also more likely to end up working in the private sector, for example, are not explored nor confirmed in any of the studies included this review. Such evidence remains absent and reveals a substantial gap in the literature.

(d) Demographic and profile related factors

There is some evidence that intrinsic motivation can be associated with public/private preference. In Poland, medical students attaching importance to the prospect of preforming socially important and interesting work was a strong predictor of preference for public sector work (Gasiorowski, Rudowicz et al. 2015). The same study found that attaching low importance

of achieving high earnings was found to be a strong predictor of choosing public sector work. And in Rwanda, comparing "willingness to help the poor" as a proxy for altruism, with a measure for altruism obtained from an experimental game, provided evidence that both are significant predictors for preferring to work in the NGO sector (Lievens, Serneels et al. 2010)

There is also some limited evidence on the association of gender on public/private preference. The survey of 119 medical students in Poland found that the strongest predictor for choosing public sector work was being male (Gasiorowski, Rudowicz et al. 2015). In Poland, moreover, a positive, but non-significant, preference for choosing public over private sector work was found for those medical students coming from a city of more than 100,000 inhabitants. (Gasiorowski, Rudowicz et al. 2015).

V. Conclusion

This systematic review of the global literature on the locational preferences of medical and nursing students and the factors linked to or associated with them finds this field to be relatively sparse. Only 18 publications of which 17 were quantitative surveys fit the inclusion criteria including the requirement to focus on at least one of the locational preferences studied. Very few studies are nationally representative, and all suffered from various degrees of bias. Quality appraisal revealed only 7 to be of high quality, with the majority classified as medium quality demonstrating larger potential limitations with regards to selection, measurement and confounding bias. Furthermore, the majority of studies focused primarily on medical students with evidence on nursing preferences particularly sparse. Much of the focus is on rural/urban and migratory preferences, with evidence on public/private preferences particularly limited. Only

two studies assessed all three locational dimensions at the same time: see (Bailey, Mandeville et al. 2012) (Lievens, Serneels et al. 2010). Only two studies assessed the locational preference of medical and nursing students simultaneously. **No study exists on Guinea**.

The findings from the review have highlighted the heterogeneity of locational preferences and factors associated with these preferences that exist by country, type of school and cadre. Findings from one country, one school, or one cadre cannot translate to another. Beyond the drivers for locational preference which can be categorized as financial and/or non-financial, training and or profile related, **the specific findings from one country, school or cadre cannot be generalizable to another**. This points to the importance of carrying out such research at country level, covering both medical and nursing students and all three dimensions of locational preference: rural/urban, Public/Private and country/abroad. It points to the importance of carrying out a study in Guinea, one that is nationally representative, and takes into account some of the global findings and lessons learned in its design. The review has shown the usefulness of cross-sectional survey techniques and use of logistic regression to collect and analyse the data on locational preferences of students. It has also been helpful in identifying the various monetary, non-monetary, education and profile and characteristic related variables that are commonly associated with locational preferences, all of which can support the design and interpretation of a similar study for Guinea and elsewhere.

IV. Methods

This chapter describes the Methods for the research designed to determine the locational preferences of final year medical and nursing students in Guinea, as well as the factors associated with such preferences. It provides a brief overview of the guiding research philosophy, followed by more detailed information on the research strategy and study population, ethical issues, data sources, data elements and variables utilized, and the processes employed in the analysis of data.

I. Research Philosophy

The philosophical underpinnings of this research draw on a positivist paradigm, a particular assumption about the world (ontology) and an assumption about how we know that world (epistemology). While the precise definitions of positivism vary in the literature (see for example Crossan 2003 and Mackenzi and Knipe, 2006), a positivist research paradigm stands in contrast to an interpretivist paradigm, and usually places emphasis on hard facts, quantitative research, rigor and scientific enquiry (Gray 2004; Bryman 2007).

The research design follows an empiricist perspective and a belief that reality exists external to the observer, can be measured through independent observation, translated into numerical data, statistically manipulated, and generalized across wider populations (Rolfe 2013; Gray 2004). As can be observed throughout the chapter, study design is very much in line with a positivist paradigm: the research is largely based on deductive reasoning (ideas and theory came before the empirical research), and data collection and analysis is quantitative and generalizable.

Table 4.1: Research philosophy and associated features of the research

Philosophy	Brief Description	Type of Data/Data Collection	Ontology	Epistemology
Positivism	Aims to mirror scientific method. Uses deductive reasoning, empirical evidence and hypothesis testing	Quantitative data, surveys based on scientific methods, larger sample sets, numeric	The world is objective and independent of our subjective experience	The world is knowable, and this knowledge is communicable between agents

II. Research Design

The study draws on a cross sectional survey design to answer the proposed research questions, administering a semi-structured questionnaire to a representative sample of final year medical and nursing students in public/private medical and nursing schools across the Republic of Guinea.

The use of a cross-sectional survey, commonly associated with an empiricist, objectivist research perspective (Collis and Hussey 2013), was considered a useful tool in generating the descriptive and analytical information needed to answer the research questions (as shown in the literature review in the previous chapter). The study was designed to capture information at one point in time - including the *stated* labour market "preferences" of students, the *stated* factors that drive such preferences, as well as the more hidden factors inherent in the different profiles, characteristics, training experiences and attitudes of the students themselves that could be associated with such preferences.

The survey was carried out across health training institutions for doctors and nurses in the Republic of Guinea. The study population are final year medical and nursing students in the year before their internship or residence across Guinea. For nursing students this translates into year

3 and for medical students, year 4. Together, nursing and medical school students represent more than 35 percent of all health graduates in Guinea, with more than 1200 nursing students graduating annually from 24 training institutions, and more than 400 medical students from 3 medical schools. The largest proportion of graduates in Guinea are technical auxiliary cadres, a form of community health worker with one-year training who represent close to 50 percent of all yearly health student graduates. Given Guinea's plan to phase these cadres out, and a plan to increase the number of doctors and nurses on government payroll and in rural areas, the focus is on medical and nursing students.

The focus on *final* year students (rather than first year students or a mix of students from different years) was largely dictated by the finding that career *preferences* of health students are primarily dictated by their postgraduate experience (Watmough et al 2007) and that student preferences at the beginning of their training varies significantly with that of students in later years of their training (Clenand 2014; Kloster et al, 2007; McCann et al, 2010).

Sampling

Probability sampling (a sampling technique where the sample is selected randomly) was used to select the schools and students within the schools in order to draw a cross country representative sample to survey. Specifically, a stratified two stage random sample design was applied, where 1) the schools were organized into strata and randomly sampled in the first stage, using probability proportional to size and 2) the students were randomly sampled within each selected school in the second stage. Probability sampling is grounded in a positivist paradigm and

the assumption that findings from sampled study populations can be generalized (Bowling 2009; Bryman 2012). The technique is applied to reduce bias in the selection of the study population ensuring representativeness and generalization or results (May, 2011).

In addition to emphasizing the importance of clearly identifying the sample population, Fowler (2002) stresses the importance of providing sufficient details on probability sampling, mainly (i) the sample frame (those people who actually have the opportunity to be sampled); (ii) the sample design (the particular strategy used for sampling); (iii) the rate of response (the percentage of those sampled from whom the data are actually collected) and (iv) the size of the sample. The following provides an overview of each of these areas.

(i) Sample Frame

Sampling was based on a complete list of medical, nursing, midwifery and ATS (Community Health Worker) schools and the final year students linked to these schools, detailing their region, and whether they are public or private (Table 4.2). The list was provided by the Human Resource Department of the Guinea Ministry of Health. Looking specifically at nursing education, the list showed a total of 24 training institutions in Guinea who train nurses, only one of them public and the rest private. Eight of these schools are in Conakry, whereas the remaining 16 are outside of Conakry. Together they listed a total of 1217 nursing-students enrolled in their final year of study. In terms of medical education, Guinea has 3 medical schools, one public and two private all of them located in Conakry. Together they listed 404 medical students enrolled in their final year.

While the type of institutions listed were considered to be accurate and up to date, there was some degree of uncertainty over the actual number of final year medical and nursing students listed on the list (which would only be made clear during the site visits).

Table 4.2: Sample Frame of Health Worker schools and number of final year students

Stratum	School	Ownership	Location	Number of students				
				ATS	Nursery	Midwifery	Medical	Total
A	Université Gamal Abdel Nasser	Public	Conakry	-	-	-	316	**316**
B	Université Koffi Annan	Private	Conakry	-	-	-	75	**75**
C	Université la Source	Private	Conakry	-	-	-	13	**13**
D	École Nationale de la Santé de Kindia	Public	Kindia	-	142	75	-	**217**
E	École Nationale de la Santé Communautaire	Public	Faranah	196	-	-	-	**196**
E	École Nationale de la Santé Communautaire	Public	Boké	325	-	-	-	**325**
E	École Nationale de la Santé Communautaire	Public	Labé	350	-	-	-	**350**
E	École Nationale de la Santé Communautaire	Public	N'Zérékoré	506	-	-	-	**506**
E	École Nationale de la Santé Communautaire	Public	Kankan	593	-	-	-	**593**
F	Institution Professionnel de Formation initiale (IPFI)	Private	Conakry	12	35	25	-	**72**
G	École Supérieure des sages Femmes (ESSF)	Private	Conakry	-	-	65	-	**65**
H	Institution de Formation et de Perfectionnement du Personnel (IFPG)	Private	Conakry	-	17	8	-	**25**
H	Institution René Levesque	Private	Conakry	-	17	19	-	**36**
H	Département Formation Professionnelle UNIC	Private	Conakry	-	19	18	-	**37**
H	Institution de Formation et de Perfectionnement en Santé (IFPS)	Private	Conakry	-	32	20	-	**52**
H	Institution « Roi Mohamed VI »	Private	Conakry	-	20	35	-	**55**
H	Centre de Formation et de Perfectionnement en Santé (CFPS/ISIM)	Private	Conakry	-	36	40	-	**76**
H	Institut de formation professionnelle en santé (ESPOIR)	Private	Conakry	-	70	35	-	**105**
I	Institut Professionnelle D'Assistance Sociale et Humanitaire Bel Averin	Private	Mamou	84	36	-	-	**120**
J	Institut de Formation Professionnelle Dara Etoile	Private	Labé	36	79	48	-	**163**
K	Institut de Formation Technique et Professionnelle La Part Dieu	Private	Kissidougou	30	-	-	-	**30**
K	Institut de Formation Technique et Professionnelle Boni Bandjougou Camara	Private	Siguiri	117	-	-	-	**117**
L	École Privée de Santé Ahmed Sékou Touré	Private	Macenta	-	34	-	-	**34**
L	École Privée de santé Les Sauveurs Plus	Private	Labé	-	91	-	-	**91**
M	École supérieure de Sages Femmes Pr. Mamadou Kaba Bah	Private	Labé	-	-	49	-	**49**
N	Institut Professionnelle de Formation en Santé El Hadj Damantan Camara	Private	Boké	-	13	11	-	**24**
N	Institut de Formation Technique et Professionnelle Bambo Kèba Fadiga	Private	Kindia	-	15	19	-	**34**
N	Institut Privée de formation en santé (Ben Sékou Sylla)	Private	Coyah	-	23	13	-	**36**
N	Institut de Formation Technique et Professionnelle Néssy et Yomba	Private	Boké	-	33	14	-	**47**
N	Institut professionnelle de formation en santé (El Hadj Mohamed Diawara)	Private	Dubréka	-	41	19	-	**60**
N	École Privée de Santé Hadja Djénabou Chérif Haidira	Private	Kindia	-	54	20	-	**74**
N	Institut de Formation Technique et Professionnelle UDECOM	Private	N'Zérékoré	-	57	35	-	**92**
N	Institut de Formation Technique et Professionnelle El Hadj M'Bemba Touré	Private	Kankan	-	57	41	-	**98**
N	École Internationale de santé Ellen Johnson Sirleaf	Private	N'Zérékoré	-	66	49	-	**115**
N	École Africaine des services sociaux et de santé	Private	Kindia	-	115	40	-	**155**
N	École Privée de Santé Waliou de Gomba	Private	Kindia	-	115	40	-	**155**
	Total			2,249	1,217	738	404	**4,608**

(ii) Sample strategy

Probability sampling was used to select the schools and students within the schools in order to draw a cross country representative sample to survey. Specifically, a stratified two stage random sample design was applied, where 1) the schools were organized into strata and randomly sampled in the first stage, using probability proportional to size and 2) the students were randomly sampled within each selected school in the second stage. The target sample was drawn in the field using simple random sampling (SRS). Stratification of the schools was applied to sort

the students into homogenous groups as best as possible in order to draw a more representative sample. The following provides more detail on each step.

***Stratified Sampling of the Schools**:* As shown in Table 4.3, of a total of the 27 health training institutions providing medical and nursing education, all three medical schools and 10 out of the 24 nursing schools were selected, taking into account potential cluster differences. Those strata that contained only one school, 5 in total, were selected with certainty. Schools from strata that had 2 or more were selected with a probability proportional to size (PPS) sampling method using the strategy outlined in the UN Statistics Division manual (UNSTATS), which had the advantage of directly delivering the selection methodology. The actual selection of the schools through the PPS depended on the so called 'random start' -- a uniformly distributed random number between 0 and 1. Different random starts would have delivered different samples. In our case, the random start is 0.698.

Table 4.3: Names of selected medical and nursing schools from strata, and probability of selection

School Strata	# schools	# selected	Selected schools	Selection probability
Public medical school Conakry	1	1	- University Gammal Abdel Nasser De Conakry	1
Private medical school Conakry	2	2	- Universite Koffi Anan De Guinee	1
			- University La Source	
Public Nursing and Midwifery school, outside Conakry	1	1	- Ecole Nationale de La Sante De Kindia	1
Private ATS, Nursing and Midwifery school in Conakry	1	1	- Institute Professionnel De Formation Initiale (IPFI)	1
Private nurse and midwifery schools in Conakry	7	2 (PPS)	- Centre De Formation et de Perfectionnement en Sante (CFPS/ISIM)	0.394
			- Institution Rene Levesque	0.186
Private ATS and nursing school out of Conakry	1	1	- Institute Prive Bel Avenir Pour Tous	1
Private ATS, nursing and midwifery school out of Conakry	1	1	- Dara Etoile Labe	1
Private nurses school out of Conakry	2	1 (PPS)	- Sauveur Plus (Labe)	0.728
Private nursing and midwifery school out of Conakry	11	3 (PPS)	- Ecole Africainde Des Services Sociaux et de sante de Kindia	0.522

			- Institut Prive de Formation en Sante Ben Sekou Sylla (Coyah)	0.121
			- Formation Technique et Professionnelle El Hadj M'Bemba TOURE Kankan	0.330
Total	**27**	**13**		

Sampling of Students: from the sampled schools, a relatively uniform target sample was identified per student category, namely 193 medical students and 192 nursing students. This was a number deemed possible to survey (given time and budget constraint) and sufficiently large and self-weighted to ensure accuracy and validity of significance tests in the analysis of the two principle groups of interest of the analysis: nursing and medical students (see discussion on sample below). The distribution of the target sample across the various training institutions (see Table 4.4), which are not as even and self-weighted as perhaps desired, reflect the quest to ensure a uniform total medical and nursing student sample, our principle groups of interest. This inevitably meant larger target samples in the 3 medical schools, than the 10 nursing schools. It also reflects the capacity limitations of the survey team to manage more surveys - in several of the schools the enumerators were also tasked to survey midwifery and ATS students (not assessed in this study) in addition to the medical and nursing students, which reflects why smaller sample targets are observed in some the nursing schools. In other schools, targets were lower because the overall sample frame was low (for example the medical school in Conakry only had a sample frame of 13). Box 4.1 provides further detail on the larger sampling strategy.

Box 4.1**: The sample strategy reached beyond nurses and medical students used in this PhD**. The survey team also collected data on 193 ATS students and 193 midwifery students (not the focus of this research), and to achieve this feasibly, the strategy was to have a sample target at least 30 students per institution, spread across the types of students that existed in each institution. If only one type of student was trained in a particular institution, for example nurses, then the sample target was all 30 nurses (or all if there were less than 30). If there were two types of cadres, for example nurses and midwives, the target would be 15 nurses and 15 midwives. If three types, nurses, midwives and ATS, 10 nurses, 10 midwives and 10 ATS would be targeted. If

there was less than 30 of any type in total, the target would have to less than 30. Moreover, the much larger targets in the medical schools reflect the fact that there were only 3 medical students to draw from, and in order to meet the overall target similar to that of nursing students, the medical school target had to be increased. Our study focuses only on nurses and doctors which is reflected in the target samples shown.

Despite this, the remaining target sample sizes for medical and nursing students still correspond to more than the minimum required for each strata, and at least the absolute minimum required in each school. On this, while researchers such as Pett (1997) and Salkind (2004) point to the often referred to rule of 30, i.e. n>30 as a minimum sample size per group required for parametric tests, others such as Warner (2008) encouraged using n>20 as a minimum and n> 10 per group as an absolute minimum. Overall, moreover, when considering the larger groups, a sample size of 193 and 192 of medical, and nursing students together, was considered sufficiently large to carry out some of the initially planned statistical tests (largely to identify a difference between nursing and medical students- logistic regression for medical and nursing students independently was not planned for at the time of the sampling).

Table 4.4: final year medical and nursing Students, total numbers expected and target samples

Type of School	ownership	School name	Student sample frame	Target Sample
Medical schools in Conakry	Public	1. University Gemmal Abdel Nasser De Conakry	316	120
Medical School in Conakry	Private	2. Universite Koffi Anan De Guinee	75	60
		3. University La Source	13	13
Medical Students			439	**193**
Nursing School, outside of Conakry	Public	1. Ecole Nationale de la Sante Kindia	142	40
Nursing school in Conakry	Private	2. Institut Professionnel de Formation Initiale (IPFI)	35	10
		3. Centre de Formation et de Perfectionnement in Sante (CFPS/ISM)	36	30
		4. Institution Rene Levesque	17	17
Nursing School outside of Conakry	Private	5. Institut Prive Bel Avenir Pour Tous	36	10
		6. Dara Etoile Labe	79	10
		7. Sauveur Plus (Labe)	91	30
		8. Ecole Africainde Des Services Sociaux et de Sante de Kindia	115	15
		9. Institute Prive de Formation En Sante Ben Sekou Sylla (Coyah)	23	15

		10. Formation Technique et Professionnelle El Hadi M'Bemba Toure, Kankan	57	15
Nursing Students			572	**192**
Total Students			1011	**385**

Drawing of the sample: The target student sample in each school (of 193 medical students and 192 nursing students) was recruited through simple random sampling (SRS), a suitable method where each member of the population is equally likely to be chosen as part of the sample. The logic behind simple random sampling is that "it removes bias from the selection procedure and should result in representative samples" (Gravetter et al, 2011). During their site visits, Enumerators were asked to *list the actual number of final year students studying in the school*, using a separate listing tool for each type of student to enter the name of the school, code, and the total student of that type actually studying there. Once the total actual list was produced, and each student name corresponded with a number, enumerators were asked to *conduct the simple random sampling* of the students, by opening a sealed envelope with instructions on how many students are likely to be there and how many needed to be sampled for each type. The envelope also contained a random number pad which the enumerators then used to find the sampled students, from left to right and from top to bottom (see Table 4.5 as example). The enumerators then listed the sampled student in the third column of the listing form. For example, using the above random pad, needing to sample 10 nursing students from 30, enumerators needed to sample student number 22, 13, 12, 20, 6, 16, 25, 10, 2 and 24.

Table 4.5: Random pre-prepared number pad which data collectors would draw their sample from

22	13	12	20	6	16	25	10	2	24
27	1	8	31	19	18	17	11	26	21
28	32	15	31	5	4	29	9	23	7
3	30	14	.	.	.	.	.	.	.

***Replacement to meet the target quota*:** The sample strategy did incorporate some elements of quota sampling to ensure that the target sample numbers within institutions could be met. Experience from other countries and surveys on health workers has shown this to be a common strategy in contexts where absenteeism at the facility or institutional level is often very high (see Box 4.2). In practice, the quota sampling elements means that enumerators could draw an additional sample from the same institution, using the same numbering pad to draw the sample, should a drawn individual be absent, and the target sample could not be met. For example, using the same number pad above, if 2 additional students were needed for the target sample in a school, in addition to the ones already selected, they would include 27 and 1, and continue until 10 individuals were selected. In addition, if insufficient students were available in one school (for example by having lower than expected student enrolees), the enumerators could draw the additional required students from another school (i.e. go beyond the planned sample quota, using the numbering pad), to make up overall numbers, ensuring as best as possible this school was in the same strata.

Box 4.2: the use of Replacement or substitution sampling

Despite some controversy, replacement, or 'substitution', is highly prevalent as a sampling strategy, particularly in school surveys. Lynn (2004) notes up to 12 different varieties of replacement, defined as a function of the stage at which replacement occurs, whether the interviewer or 'office' makes the selection, and the means of selecting the replacement units. The sample substitution employed in this survey is commensurate with Kish's (1959) 'supplement samples' procedure, in which a 'reserve' sample is drawn at the first stage of sampling (by adding numbers to the random sampling pad beyond) and issued only in the event of failing to meet a pre-specified sample size from the original or 'first' sample. Whilst acknowledging that the use of replacement sampling has been the source of an ongoing controversy, with Prais (2003) arguing it contravenes consensually accepted principles of statistical/probability sampling (i.e. everyone has an equal chance of being selected), the OECD (Adams, 2003) has been justifying its use as both an acceptable and standard practice in the field.

The fact that the sampled schools of this survey were highly stratified, and its student population deemed relatively homogenous within each school helped justify the decision to substitute a sample when not available.

Substitutions from other schools and final sample: For the nurses, lower than targeted sample quotas were obtained from 3 of the 10 institutions, which led to the drawing of additional students from other schools within the same strata, and one drawing from a school outside the strata, to make up for this. Two of these were within the private nursing school in the Conakry strata. A planned target sample of 30 could not be collected from the SFPS nursing school, because the total number of nurses enrolled was only 28 and 2 nursing students were absent on the day of the survey. This allowed the team to survey only 26 from the planned 30. Similarly, in the Institute Renee Lavesque, the target sample of 17 could not be achieved leaving the survey team short on one. To address the total shortfall of 5 from both schools, 5 additional students were randomly selected in the third school in the same strata, IPFI. Finally, due to an error, the team was short of two at the only public nursing school in Guinea, the Ecole Nationale de Sante de Kindia. Since no other school existed in that same strata, the team resorted to making up for

the sample by drawing two additional samples from the IPFI school as well. Table 4.6 provides information on the actual final number of students sampled, and how this is distributed.

Table 4.6: final year medical and nursing Students, expected and actual total student number and samples, including samples absent en route to target

Type of School	ownership	School name	Student sample frame #	Target Sample #	Actual Student #	Actual # Sampled	# Absent En route
Medical schools in Conakry	Public	1. University Gemmal Abdel Nasser De Conakry	316	120	330	120	19
Medical School in Conakry	Private	2. Universite Koffi Anan De Guinee	75	60	80	60	0
		3. University La Source	13	13	29	13	0
Medical Students			404	**193**	439	**193**	**19**
Nursing School, outside of Conakry	Public	1. Ecole Nationale de la Sante Kindia	142	40	140	38	10
Nursing school in Conakry	Private	2. Institut Professionnel de Formation Initiale (IPFI)	35	10	31	17	2
		3. Centre de Formation et de Perfectionnement in Sante (CFPS/ISM)	36	30	28	26	0
		4. Institution Rene Levesque	17	17	16	16	0
Nursing School outside of Conakry	Private	5. Institut Prive Bel Avenir Pour Tous	36	10	36	10	10
		6. Dara Etoile Labe	79	10	82	10	8
		7. Sauveur Plus (Labe)	91	30	91	30	14
		8. Ecole Africainde Des Services Sociaux et de Sante de Kindia	115	15	66	15	10
		9. Institute Prive de Formation En Sante Ben Sekou Sylla (Coyah)	23	15	28	15	2
		10. Formation Technique et Professionnelle El Hadi M'Bemba Toure, Kankan	57	15	57	15	15
Nursing Students			631	**192**	**576**	**192**	**71**
Total Students			1035	**385**	1015	**385**	**90**

Replacement/absence Rate: Overall all planned sample targets were achieved for nursing and medical school students. Not a single student drawn refused to participate or exited during the consent requirement. An explanation for this is that absent students during the sample draw were replaced with new students using the random sampling pad to reach the sample targets. The metric of interest in this research is thus not the response rate (which, for example, would have been relevant had a survey been sent to the schools or to each student with a request to fill this out). Instead it is how many absences were recorded *en route* to achieving the quota

within each school and or strata. The number of absences recorded en route to achieving the target sample target. Table 4.6 shows that they ranged from a low 0 absences to achieve a target of 60 in a school with 80 students, to a high absenteeism of 15 to achieve a target of 15 in a school with 57 registered students. The ease in which quotas were achieved hence varied by school, pointing to the fact that some schools had much higher absences of students on the day of the survey than others.

(iii) Appropriateness of Sample Size:

The sample size of 385 medical and nursing students stratified into 193 medical students and 192 nursing students, was calculated based on a larger study which also sampled community health workers and midwives across a large variety of facilities in Guinea. A key concern for this PHD is the sample size of medical and nursing students, and in particular the probability of making type I errors and type II errors in statistical tests. The main tests planned for and considered during the setting of the sample size was for tests to identify the statistical difference between health student cadres. Logistic regression using individual cadres, as ultimately carried out here, was not planned for at the time. The limitation of applying logistic regression with the (small) sample size are discussed in the limitations section.

Probability of Type I Error: The PhD sets the probability of finding a difference that is not actually there (i.e. rejecting the null hypothesis when in fact true) at 5 percent. This means there is a 5 percent probability of committing a type I error (also called alpha error). Social science research has widely shown that the probability of making a type I error is 5 percent (Grunkemeier 2007).

Accordingly, the PhD uses an alpha level of 0.05, also called the significance level. Any alpha level of $p<0.05$ is deemed significant.

Probability of Type II Error: The probability of detecting no differences when in fact a difference does exist, i.e. a type II error (also called β-"Beta"- error), is low. An accepted level of power in the social science literature is usually 0.8 or greater (Grunkemeier 2007); that is, you should have at least 80 percent chance of finding a statistically significant difference when there is one. The Calculation of power is: Power= 1 – β so according to the literature an acceptable chance of making a type II error (i.e. β) is 0.2 (20%) (Grunkemeier 2007).

Power for two sample t-test: The probability of finding a statistically significant difference when there is one was found to be high during the planning phase of the PhD and the probability of making a type II error low. An online calculator[2] was used to calculate the power of the sample size for an independent two sample t test. Using a medium effect size (0.5), the probability of finding a difference in means when this exists is 100 percent. Conversely, with the sample, the probability of making a type II error, of not detecting a difference when there is one, is 0 percent.

Statistical Test	Sample Size	Effect size	Significance Level	Sample Type	Alternative	Power	β-"Beta"-
T-Test	385.000	0.2	0.05	Two-Sample	Two-Sided	0.7904	0.2096
T-Test	385.000	0.3	0.05	Two-Sample	Two-Sided	0.9858	0.0142
T-Test	385.000	0.5	0.05	Two-Sample	Two-Sided	1.000	0.0000

[2] https://www.masc.org.au/stats/PowerCalculator/PowerTtest

The power calculations reflect a number of different results. The type of statistical test selected was a two **two-sample**: to compare the mean value between two samples (i.e. nursing and medical students). **A two-sided hypothesis was chosen** to test whether a sample is either greater than or less than a certain range of values. The chosen significance level was 0.05 (i.e. the significant level is attained when less than 0.05). No other effect sizes were identified from the literature, so a number of different effect sized were used to calculate power. Cohen (after which the term *Cohens d* was termed) suggested that d=0.2 be considered a 'small' effect size, 0.5 represents a 'medium' effect size and 0.8 a 'large' effect size (McLeod 2019). This means that even if it is statistically significant, the difference is trivial if two groups' means don't differ by 0.2 standard deviations or more.

Representativeness of sample (of nursing and medical student population)

The margin of error calculated for both the medical and nursing student sample show the extent to which the sample is representative of the actual medical and nursing student population. A **margin of error** is a statistic that can provide information on how many percentage points the results from the descriptive analysis will differ from the real population value. The margin of error (in general) is half the width of the confidence interval (i.e. the interval that might contain the true value). The margin of error can also be used to calculate Confidence Intervals from the proportion of students who gave a certain answer. A margin of error considered "acceptable" in the research community is usually one that falls between 4 percent and 8 percent at the 95% confidence level[3].

[3] http://www.surveystar.com/startips/oct2008.pdf

Of the total sample: A simple calculation using an online sample size calculator [4] applying a confidence level of 95%, and a proportion percentage of 50 percent, found that a sample of 385 medical and nursing students (193 medical, and 192 nursing) out of a total student population of 1621 (404 medical students + 1217 nursing students) results in an error margin[5] of 4.36 %. This is lower at 90 percent confidence level. The calculation at a 95 percent confidence level reassured us that if for example 47 percent of this sample picks an answer, we could be "sure" that if asking the same question to the entire population, between 42.64% (47-4.36 %) and 51.36% (47+4.36%) – i.e. a confidence interval CI=42.64 – 51.36, would have picked that answer (with a 95% certainty that the percentage of the population who would pick the answer lies within the margin of error).

Of the nursing student Sample: And a sample of 192 out of 1217 nursing students results in a margin of error of 6.49% at 95% confidence and 5.45% at 90% confidence. The calculation at a 95% confidence level reassured us that if for example 47% of the nursing student sample picks an answer, we could be "sure" that if asking the same question to the entire population, between 40.51 % (47-6.49) and 53.49 % (47+6.49), i.e. a confidence interval CI=40.51-53.49, would have picked the answer (at 95% certainty)

Of the medical student Sample: With a confidence level of 95%, a sample of 193 out of 404 medical students results in a margin of error of 5.10%, and with a confidence level of 90% the

[4] https://goodcalculators.com/margin-of-error-calculator/
[5] The margin of error (in general) is half the width of the confidence interval (i.e. the interval that might contain the true value)

margin of error is 4.28%. The calculation at a 95% confidence level reassured us that if for example 47% of the medical student sample picks an answer, we could be "sure" that if asking the same question to the entire population, between 41.9% (47-5.10) and 52.10% (47+5.10) , i.e. a confidence interval CI 41.9 – 52.10, would have picked the answer (at 95% certainty)

Table 4.7: Margin of Error of total sample main group and sub-groups, at different confidence levels

	Total students	Medical students	Nursing Students
95% confidence level	4.36 %	5.10%	6.49%
90% confidence level	3.66%	4.28%	5.45%

The Questionnaire

A semi-structured questionnaire covered a range of relevant questions to capture the desired information for this study and any subsequent analyses that may be desireable. The questionnaire (see Annex D) was identical for medical and nursing students (with some minor variations) and covered a broad range of topics alphabetically organized into 12 sections (A-L) - see Table 4.8. the sections included multi-choice and binary closed questions to obtain the information relevant to this research, including the use of Likert Scales to capture attitudes and satisfaction. The use of closed questions very much fits the overall positivist paradigm of this research, and while critics point towards their restrictive nature, the benefit of closed questions is that they are fast, structured, and responses harmonized (Bryman 2012). Contingent valuation (CV) questions in section (J) sought to capture the extent to which different wage levels can influence the stated preferences of different students. CV is not further discussed here as this is intended for analysis beyond the scope of this particular research.

Table 4.8: Overview of questionnaire modules

	Module Title	Content
Section A	Administration and identification	Administrative Data to be entered by Enumerator
Section B	Completed by the data entry agents	Data entry Administrative Content
Section C	What motivated you to work in the health sector	Questions on what motivated students to work in the health sector
Section D	Appraisal of Training	Questions to identify the quality of training and of the student
Section E	Practical Training	Questions on the extent and nature of practical training
Section F	Sources of Financing of training	Questions related to the financing of the training and the obligation to the financier
Section G	Expected Income	Questions related to expected income
Section H	Other Expectations and attitudes	Questions related to what students expects about working in the labour market
Section I	Job Preferences and stated reasons for preferences	Questions about the job preferences of students (sector, rural/urban; Conakry/outside Conakry; in Guinea/outside Guinea) and main reason for preference response categories
Section J	What will it take to influence your decision	A contingent valuation looking at how much financing would be required for students to take up a particular job post, i.e. urban/rural; district hospital or health center; health center or health post, outmigration
Section K	General Demographic information on student	Questions on the demographic nature of the students
Section L	General Environment of the student	Questions on profile variables specific to the student
Section M	End of Interview	End of interview administration – entered by enumerator

The questions in the questionnaire are a combination of binary as well as multiple response questions with Likert scales used to capture information on the attitudes of students. On the latter, standardized response categories of "strongly agree" to "strongly disagree" were used (as in the traditional Likert scale), but also other ordered continuum response categories (as in "Likert like" scales). The use of attitude scales has its limitations, including their association with "error of central tendency" where respondents tend to ignore answering the extreme ends of the scale, or the "halo effect" where one response attitude affects another (Streiner and Norman, 2008; McGivern 2006; May 2011). The use of a traditional attitude scale is generally a common and accepted approach to obtaining quantitative and structured response information that is

ranked on a continuum (Streiner and Norman, 2008). Whereas the 5-point scale is the most common scale used in the literature (which includes the *neutral* category), our questionnaire used the 4-point scales which does not include the *neutral* category. This was done to 1) "force" respondents to choose a category; 2) ensured that respondents were more discriminating and more thoughtful, and 3) eliminated the possible misinterpretation of mid-point (Losby et al, 2012).

Questionnaire design efforts focused on minimizing some of the frequently argued limitations of using questionnaires in terms of not capturing reality as intended: i.e. questions may not be understood as intended, and responses skewed because questionnaires offer little room for participatory dialogue (Bryman 2012, May 2011). The design of the questionnaire took into account a number of different approaches to maximize *validity* (in addition to ensuring sample representativeness – discussed above) by ensuring as best as possible that the questions asked measured what they were supposed to be measuring.

Question and statement construction followed best practice recommendations (see for example Olsen 2012; May 2011) and 1) kept questions simple and easy to understand as possible for the survey population: several of the outcome variable questions for example were simple binary yes/no questions 2) minimized the use of memory questions from the past (i.e. given the potentially fickle nature of human memory), and 3) minimized social desirability bias as best as possible: the collection of potential predictor variables for stated outcomes masked the link, as well as 4) questions that embarrass, threatened or were otherwise not considered acceptable (weeded out during pretesting).

The survey questionnaire was subjected to review and feedback, by experts at Oxford Research Management (OPML) a research firm that provided helpful review comments on earlier drafts of the questionnaire. OPML is a leading research consultancy firm with expertise in carrying out similar surveys in other contexts. An expert review was also provided by 2 individuals from the Ministry of Health (MOH) in Guinea, who had knowledge of the local situation. OPML found the questionnaire to be well designed and sufficient to collect the desired information. OPML recommended small changes including changing likert scales from a 5 scale to a 4 scale (leaving out the neutral option). OPML also suggested to simplify some of the questions and response categories. These changes were taken into account. The MOH individuals commented that the questionnaire was overall appropriate for the local context and made small edits to the French version of the questionnaire. Some small fine tuning of the language was done following the comments. While face validity is often criticized to be on the soft side as an active measure of validity (see Engel et al, 2013) it is nonetheless the most widely used form of validity in developing countries (Sangoseni et al, 2013).

Questions were drawn from those already tested in the literature and different contexts to maximize content validity and ensure a full range of answers and options captured. The questionnaire was developed in the first instance by reviewing the known and tested instruments and ultimately choosing appropriate items from existing questionnaires developed by (Serra et al, 2010) and (Lievens et al, 2010). Both studies had used a similar questionnaire and successfully applied these in the context of Ethiopia and Rwanda, respectively. In addition, questions from key other studies included in the global literature review were reviewed and borrowed as

needed. This is in line with suggestions that the use of pre-existing questions that have been tested can be useful in generating higher quality and validity (see Hymn et al, 2006).

The tool was pre-tested with local respondents on two occasions to further maximize the content validity. The tool (translated into French) was first pre-tested with a group of 6 nursing students and 6 medical students in a classroom setting in January 2017, and took the form of a group debriefing assessment between the researcher and the respondents, where respondents were asked to take the survey in the presence of the researcher, section by section, and then provide feedback and reactions on each section and question as a focus group. The questionnaire was pretested a second time shortly before its piloting in November 2017, with the group of enumerators during their data collection training session. This was a final pre-test done to familiarize the enumerators with the questionnaire, but also to test the response latency of the final questionnaire and ensure the final questions sound clearly articulated, and response options are relevant and comprehensive (in line with McKay et al 1996). The feedback obtained during the pretesting sessions resulted in numerous edits and changes, as well as a reduction in the length of the questionnaire by reducing the complexity of some questions (for example only asking respondents to list their *main* choice of locational preference, rather than list and rank multiple choices).

Data Collection

Training of enumerators. A team of enumerators, comprised of doctors and nurses, were recruited to collect the required data. A total of 16 enumerators, four of which were given the

task of supervisors, were thoroughly trained by the author of this thesis, together with 2 french speaking colleagues and survey experts, in a 3- day workshop in Conakry in December 2017.

A fieldwork manual (see Annex E) served as the basis for training and provided guidance for supervisors and enumerators on the procedures for carrying out the field work. The final manual used for this survey, contained three sections: A first section which provided a general overview of the survey, including survey objective (and research questions), an overview of the survey instrument, data collection strategy, and the specific roles and responsibilities of the survey team (including on day or survey). The second section provided general instructions on how to carry out the survey in the field and how to maintain data quality, both for enumerators and team leads. The third section presented instructions for handing out the Participant Information Sheet and attaching the informed consent form. The training was organized around these sections.

Of note: The field manual design was adapted from the World Bank's *Field Manual: Guidelines for Field Enumerators, Supervisors, Editors and Data Entry Operators: Baseline Household Survey.* This manual was prepared by the Health Results-Based Financing (RBF) team at the World Bank and is available online (see below address): While some sections were adapted, other sections were kept verbatim, given the applicability for the Guinea context and survey.
www. siteresources.worldbank.org › 5.05a_Household_Surv_Field_Manual.docx.

Piloting the Questionnaire: The training session was followed immediately by the small-scale piloting of the data collection process, on a group of medical and nursing students in and around Conakry, November 2017. The trained enumerators visited three health training institutions covering a total of 27 respondents (14 nursing students and 13 medical students). The literature shows that such piloting can provide early feedback including on clarity of questions and length and barriers of the questionnaire itself (Bowling 2009). Such feedback can be instrumental in

refining the questionnaire and question construct following the pilot (May 2011), and further contribute towards ensuring that the best possible data is collected. The pilot testing demonstrated that the training of enumerators was mostly sufficient but led to some additional training to be provided particularly on the sample recruitment (using the numbering pad strategy discussed above).

Data Collection roll out: The roll out of the data collection commenced at the end of December 2017 and was completed at the end of January 2018, with site visits carried out to 18 health training institutions in 9 cities – See Annex G for full list of health facilities visited, by date, and the data that was collected. Enumerators were organized into 4 data collection teams organized into Team A-D, comprising a total of 16 team members (4 supervisors, one per team, and 12 researchers/enumerators). Gender composition of the teams were: Team A: 3 men and 1 woman; Team B: 3 men and 1 woman; Team C: 1 man and 3 women, and Team D: 2 men and 2 women.

Questionnaire Administration: After collecting the local actual sample frame and drawing the sample in each health training institution, supervisors assembled the recruited sample, not larger than 30 students, into a classroom setting. Following an overview of the study objective and read out of the Project Information Sheet (PIS), students were then asked to fill out their consent form after which students were asked to fill out the questionnaire (section by section). The enumerators supervised this process and guided students through the questionnaire. The Field Manual, which guided this process and includes all the details of the data collection is found in Annex E. Self-self-administration holds a number of advantages including minimizing biases that can occur from posing questions a certain way and minimizing any issues arising from posing

more sensitive questions (Olsen 2004; May 2011). *Supervised* self-administration was deemed appropriate, given its potential to ensure greater control over the data collection, including who answers the questionnaire and that questions are adequately understood and sufficiently answered (Olsen 2004). Students could ask questions or clarifications, an approach intended to elicit the best possible answers.

Data entry and management: A team of local data entry clerks were trained in March 2018 in Guinea to transfer the collected data from the questionnaires into a simple database. Sphinx Survey solutions, a fully integrated freely available software package for survey management and data analysis, was used to enter the data. The rationale for using this program was that it was freely available and already downloaded onto the local computers of the data entry clerks (who were contractors of a local research institution). Familiarity of this program among the data entry clerks already existed which minimized the need for substantial training. In addition, although it did not allow for more sophisticated data entry quality assurance methods, it was deemed sufficiently appropriate to produce a database that could subsequently be transferred to SPSS. The data was entered by 8 data entry clerks, with the data entry done twice in order to ensure accuracy and eliminate any discrepancies. Once entered, the data was transferred to SPSS version 23 format for further cleaning, coding (in line with the questionnaire codes) and subsequent analysis.

III. Data Analysis

Data Analysis Program. SPSS Version 23 was used to clean, code and analyse the collected data. It was deemed suitable for implementing the analytical plan which consisted of descriptive and

inferential statistics, including logistic regression, to generate the planned findings. SPSS was chosen due to its user-friendly nature and sufficiency in carrying out the planned analysis including several of the statistical tests. As detailed below, while the Chi Square tests for associations, as well as the logistic regression was carried out in SPSS, some of the other tests, including the Man Whitney U test and Z-Test of Proportions used in this research were done through online calculators (deemed more user friendly).

Descriptive analysis: Descriptive frequency tables, mean, and percentage analysis was carried out to provide an overview of the characteristics and profiles of the sample, the attitudes and expectations of the medical and nursing students, as well as the locational preferences and stated reasons for such preferences. Particular important findings were highlighted by illustrating them in a visual bar chart.

Statistical tests for differences. Various statistical tests were carried out to identify a statistically significant difference in responses from medical and nursing students. Showing that such differences are representative of such difference in populations can influence the type of intervention that may need to be considered for medical vis a vis nursing students.

For continuous variables that were normally distributed, *an independent sample t-test* was planned to be used to test a statistical difference in population means[6]. After checking skewness

[6] The independent sample t-test is different to the one sample t-test, which tests a significant difference between the sample mean and a hypothesized or known population value. It is also different to the paired samples t-test, which is compare means at different times (pre-test and post test).

and kurtosis, as well as their histograms, all of the continuous variables used in the analysis were found to be non-normally distributed. This was largely due to several outliers. The parametric independent sample t-test could not be used.

Instead the 2 independent *Mann Whitney U test* was applied for continuous variables. It is a suitable non-parametric test, equivalent to the t-test, to compare differences when the dependent variable is either continuous or ordinal, but not normally distributed. When the shape of the distributions of the two independent samples was found to be similar, the test is useful in testing a significant difference in medians (not affected by outliers). When the shape was found not to be similar, the test is useful in comparing mean ranks. An online calculator[7] was used for the Mann Whitney U Test since this could not be calculated in SPSS.

For ordinal variables: The 2 independent *Mann Whitney U test* was also carried out for the analysis of differences between ordinal data, to identify whether an observed difference in medians or mean rank was statistically significant, including some of the results from the Likert scale data. There are competing discussions in the literature as to whether to use a parametric test such as the t-test vs the non-parametric test such as the Mann Whitney U Test (Jamieson 2004; Agresti 2010). Most of the literature however does suggest that a key precondition for such a test should be that the scale should be at least a 5-point scale (in addition to having a large enough sample size and a normal distribution) (Agresti 2010). The 4-point scale used in this research was thus one reason for this decision.

[7] https://www.socscistatistics.com/tests/mannwhitney/default3.aspx

For categorical variables: The *Z-test for two population proportions* was used to test the difference between proportion (percentages) of medical and nursing school data, i.e. to provide the probability that a difference at least as large as noted would have occurred by chance if the two population proportions were in fact equal. The *z*-score test for two population proportions is used when you want to know whether two populations or groups (e.g., medical students vs nursing students) differ significantly on some single (categorical) characteristic - for example, whether they are female, married or engaged, have children etc. the test is identical to the chi square test, except that we estimate the standard normal deviate (z). The square of the test statistic (z^2) is identical to the Pearson's chi square statistic X^2. The Z test for two populations proportions was calculated using a simple online calculator[8].

Statistical Techniques for Testing Relationships. Mainly two such tests were carried out, the first as an initial univariate analysis to help identify the potentially associated variables for the large multivariate analysis, in order to identify the significant independent variables that are associated with the dependent variables (in the case of this PhD the locational preferences).

For categorical variables a Chi Square test of Independence (Association) was applied, a suitable bivariate test to identify a relationship/association between categorical variables. It does not consider relationships among multiple variables at the same time so was used largely to identify the variables for inclusion in the regression model (below). The chi^2 test is a common non

[8] https://www.socscistatistics.com/tests/ztest/default2.aspx

parametric test used to determine whether an association (or relationship) between 2 categorical variables in a sample is likely to reflect a real association between these 2 variables in the population. This test was done in SPSS.

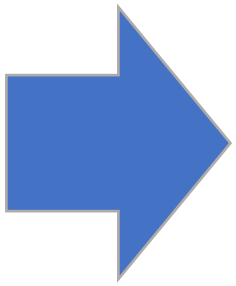
In the case of 2 variables being compared, the test can also be interpreted as determining if there is a difference between the two variables (for example in lieu of the Z-test, to test the difference in two proportions). For this PHD, the Chi Square test was only used to test for an association, not test the difference between two variables.

Regression modelling was carried out to identify key statistically significant predictors of the outcome variables (i.e. the rural/urban, public/private, and national/abroad preferences of the health students). Because *linear regression* could not be applied as the dependent variables are not continuous but nominal or categorical in nature, *logistic regression* analysis was applied to explain the statistical relationship between aggregate measure of independent categorical variables (i. e. monetary and non-monetary, education and demographic and profile factors) and the (dichotomous/binary) categorical dependent variables (i. e. rural vs urban, Conakry/Outside Conakry, etc).

In the (binary) logistical regression model applied in this study, dependent and independent variables were grouped where needed, so that all variables used were binary or dichotomous (i.e. having exactly two outcomes). Accordingly, binominal rather than multinomial logistic regression, could be carried out.

Figure 4.1: Select examples of independent and dependent variables

Dependent Variables (binary/dichotomous)
Conakry/Outside Conakry Preference
Rural/Urban Preference
Public/Private Preference
National/Abroad Preference



Independent (predictor) variables etc (binary/dichotomous)
Socio-Demographic Variables: Gender, age, rural/urban background; parental background, having friends abroad etc
Education related variables: Rural/urban exposure; location of training institution (public/private; rural/urban); satisfaction/non-satisfaction with training etc
Attitudes and Expectations expectation to engage in informal income generation/not engage in information income generation, expectation of favourable working conditions/non favourable working conditions, etc

Logistic regression, shown to be widely and successfully used in similar studies (see chapter III of this PHD), was selected in particular given its ability to control for numerous confounders, something which simple univariate analysis cannot do. It is a powerful process that produces an odds ratio whose value has been adjusted for other covariates (including confounders).

The decision as to which independent variables to include in the regression models was based on 1) those found to be significant in our initial bivariate analysis (using the square chi test), 2) variables that were shown to be significant in previous research and 3) variables that are frequently argued or assumed to be associated with the outcome variable (but for which evidence does not exist). Instead of a forward or backward stepwise approach of selecting the variables, this approach is in line with Flom, P. (2018), who emphasizes the importance of approaches that rely on expert knowledge, including the leaving in of non-significant variables in building the model.It also rests on the finding that sometimes insignificant variables in the bi-

variate analysis can become significant in a complex multivariate analysis and that building models calls for substantive literature support for a priori causality, if it exists (James et al, 2013).

Chosen Significance level: Overall, this study will recognize findings with significance levels of 0.05 or lower, referring to the willingness to accept a risk of 5 percent or less that the null hypothesis may actually be false, when it is actually true (a type I error).

Bonferroni adjustment: Given that a large number of statistical tests were carried out, with each test run increasing the probability of a significant result, a Bonferroni correction to the alpha level was considered, as sometimes advocated in the literature. Given that the probability of finding a significant result increases with each test run, a Bonferroni adjustment can reduce the probability of identifying significant results that do not exist (i.e. it can guard against making type I errors) in the testing process (Perneger 1998; McDonald 2014). It is a simple calculation, where the set alpha level (α) (in this case of 0.05), is divided by the number of tests that were done, to obtain a new and more conservative alpha level (see below example).

Example of calculating Bonferroni adjustment: 25 different hypothesis tests were carried out. The probability of finding a false positive by testing 25 different hypotheses, can be mitigated by a Bonferroni correction of: $\alpha/n = .05/25 = .002$. For this set of tests, the null hypothesis would be rejected only if the p-value is smaller than .002.

Ultimately, it was decided against the correction, on a number of grounds rooted in the literature (see for example Perneger 1998; Frane 2015; Moran 2003; McDonald 2014): 1) The conservative nature of the correction will result in the erroneous rejection of an association or difference, even if this is true 2) in this study, it is not imperative to avoid a type 1 error (as it would be perhaps in

a different study on health issues). A single false test will not have grave consequences in terms of policies, and the erroneous rejection of significance was deemed a bigger problem than identifying a false significance 3) there is no agreement on how to define a family in all cases (and adjusted tests may vary depending on number of tests included in the family of hypothesis). This in itself makes this correction somewhat arbitrary.

IV. Ethical Considerations

The study proposal was reviewed and approved by Lancaster Ethics Committee in May 2017. It was also approved by the Guinea Medical Ethics Committee in November 2017. The committees reviewed the study proposal and related consent forms and concluded that key principles set out in the Framework for Research Ethics and The Research Ethics Guidebook[9], were taken into account in all stages of the research cycle. These principles include the need to a) ensure integrity and quality in all aspects of project design; b) ensure that the research is fully independent, c) ensure that study participants are fully informed about the purpose, methods and uses of the research to allow participants to give informed consent; d) ensure that participation is voluntary and free from coercion; e) avoid any harm to the participants and the researcher; f) respect and ensure the anonymity of the research participants and the confidentiality of any data or information supplied.

Central to the Ethical considerations was the Participant Information Sheet (PIS) and the Consent Form (CF). Prior to filling out the questionnaire, each study participant was provided with a copy

[9]Accessed: http://www.esrc.ac.uk/funding/guidance-for-applicants/research-ethics/

of a PIS and CF (See Annex F for both). Study participants were given time to read through the PIS and CF and asked to sign the form if they were happy with all the ethical aspects of the survey. While the PIS provided an overview of the study, the CF asked the participants to confirm a number of statements, including that the information provided on the information sheet is fully understood, that there had been opportunities to ask questions, that participation is voluntary, that participants understand the stated anonymization and confidentiality of data, and ultimately that participants are fully willing to participate in the study. Should a recruited participant at the beginning of the working session decide not to sign his or her consent, students could leave and then be replaced by an alternative student. Furthermore, the study enumerators communicated to all study participants that they can withdraw or request their information not to be used up to 2 weeks after the working session (see Annex E for instructions provided on this to enumerators in the Field Manual).

While the study drew on some key best practice principles on ethics and research, it is not unconceivable that some pressures remained and affected the provision of consent. The advance Ministry of Health request to nursing and medical schools to carry out the study and the subsequent administration of the survey in a public classroom setting, with enumerators guiding and managing the survey completion process, for example, may have put some pressure on some students to consent. Much Francophone Africa, education including in health sciences, continues to follow very much a top down method as opposed to a more modern and less didactic and innovation-sensitive practices in many Anglophone systems (Marcheta and Dilly, 2019). This was potentially also reflected also in the management of some aspect of survey administration, which

could not have been possible without the support of the MOH, the heads of health training institutions, and the enumerators who responded and clarified survey requirements to the students.

V Study Limitations

***Generalizability**:* Given the heterogeneity of preferences and behaviors of different health workers and students, this study does not have a high level of *generalizability* to other populations or countries, nor was this an objective or expectation of the research. In line with such a recognition in previous literature (see Scheffler et al, 2016 and WHO 2016) labour market analyses need to be done for each country, type of worker and context. Findings from one country or cadre cannot be rolled over to another – hence the focus on conducting this research for medical and nursing students in Guinea. While not generalizable beyond Guinea and the study subjects, within given error margins, the findings on the medical and nursing students are generalizable to the larger medical and nursing student population in Guinea however.

***Remaining Sampling Bias**.* Some forms of **selection bias** in particular are likely. One is potential *sampling bias* which may have occurred from the sample replacement strategy, which meant that despite the use of the numbering pad, not all recruits may have had an equal opportunity in being selected. Those students who were absent and had to be replaced could have had disproportionate traits that affected outcomes. As mentioned previously in the report (in the discussion on the sampling strategy) Prais (2003) argued that a replacement strategy contravenes consensually accepted principles of statistical/probability sampling (i.e. everyone has an equal chance of being selected), while institutions such as the OECD (Adams, 2003) has been justifying

its use as both an acceptable and standard practice in the field. Finally, **the sample distribution**, while evenly distributed across nursing and medical students, was not always even across the different strata (i.e. different health schools), potentially leading to an over or under presentation of particular characteristics. This stemmed from the fact that a target sample of around 30 was given per school, which in some schools included the sampling of heath cadres beyond medical and nursing students (i.e. midwifery and community health worker students). In other schools, the sample frame was less than 30. Given however that schools were not separately analyzed, this was not deemed too problematic.

Limitations of questionnaire: In addition to selection bias, some forms of **measurement bias**, the systematic over or under stating of the true value of a measurement, are likely to have occurred. Unfortunately, as discussed in the next paragraph below, statistical demonstration of *validity*, but in particularly the *reliability* of the tool was not possible. Finally, *Response bias* reflecting the tendency of a person to answer questions untruthfully or misleadingly is always a possibility, in particular with regards to the main reasons provided for their choice, which was very high on "to help people". Whereas the survey strategy offered anonymity, and eliminated as best as possible the enumerators awareness of the respondent answer – key strategies to reduce social desirability response bias (Krosnik and Presser, 2009) – enumerators were nonetheless present during the data collection, i.e. students were led through the survey by enumerators rather than completing it independently. As such social desirability response bias, particularly on questions related to the satisfaction and quality of their training for example, their motivation to become a health worker, or on their expectation around their engagement in dual practice and additional income generation, was unlikely to have been fully eliminated.

A key limitation is that Validity* and *Reliability* of Questionnaire was not demonstrated statistically.** The questionnaire design did not allow for a statistic demonstration of *validity*, nor *reliability*. The demonstration of ***Construct validity, by showing whether multiple indicators of a measure produce similar or identical results could not be done given that the questionnaire was not designed to measure a construct that is not directly observable (for example pain, or quality of recover). A demonstration of ***concurrent validity,*** a form of *criterion validity* that can be obtained by comparing specific indicators in the questionnaire with pre-existing external indicators that already have high face validity was also not possible, given the lack of comparable and available indicators. However, while validity was generally proven otherwise, a key limitation is that the questionnaire design did not take into account to allow for a number of different statistics to demonstrate the **reliability** of the tool, i.e. the degree to which it produces *stable* and *consistent* results. Common methods to establish ***internal consistency*** *(for example Cronbach's' alpha)*, a measure of how well related but different items all measure the same thing was not possible because the questionnaire was not set up into multiple items designed to measure the same construct. Other measurements of reliability, such ***parallel forms reliability*** which evaluates consistency by correlating the scores from two alternate versions of a questionnaire measuring the same constructs and provided to the same group was also pursued due to time and budget reasons. Finally, a strategy to ***test and retest*** the questionnaire to identify and calculate whether a measure or question yields the same responses at different points in time was also not carried out, as access to the same test respondents was not possible.

Limitations of Sample Size. While the power of the sample was largely deemed to be sufficient for running key statistical tests and was certainly sufficient for running some of the non-parametric tests for differences, the sample size for the logistic regression may have been towards the smaller end, according to some of the literature. A sample size of 192 or 193 is within the limits of some recommendations in the wider literature. While there is no agreement on the exact minimum sample needed for logistic regression, recommendations from the literature have ranged from a minimum of 100 (Long 1997) to 500 (Bujang et al, 2018), and many numbers in between (see Marks 1966; or Bujang et al, 2018). Whereas a combined medical and nursing student sample would have had more power for logistic regression, the relatively small sample size of 192 (nursing students) and 193 (medical students), in particularly given the many predictor variables used, can be said to have resulted in not observing some possible associations as well as the relatively wide confidence intervals of some of the associations identified.

Limitations with data analysis and interpretation. A key limitation with the results may stem from the fact that by running many simultaneous tests, the probability of a significant result increases with each test run. With a significance level of 5 percent, by chance one may expect 1 in 20 tests to give an erroneous significant result. This should be taken into consideration when interpreting the results. As discussed in section III, it was decided against applying a Bonferroni correction, which reduces the probability of finding false positives, primarily because finding a false positive was deemed less problematic than not finding positives when they actually exist (which would occur if the alpha level is reduced through the Bonferroni correction).

Limitations of cross sectional study: Overall not capturing causality: A key limitation of this research and surveys more generally, is that they are not designed to capture causal relationships, as other variables beyond the ones selected, and not observed in the research, may be important (May 2011; Bowling 2009). Causality can be defined as the relation between a set of factors (causes) and a phenomenon (the effect). The literature generally agrees that surveys are suitable to test the strength of a relationship between variables (in our case for example demographic factors and locational preference), but they are limited in the ability to draw valid conclusions on such relationships (Bowling 2009). This limitation is duly acknowledged, in addition to the fact that locational preference is not the same as the *actual* decision making of health workers which would be reflected in health workers actually taking up the post that they state they have a preference for. This later, and the relationship between locational presence and actual decision making could be identified in a longitudinal study using the same cohort.

V. Results

The following summarizes the findings on I) profiles and characteristics of students II) the stated expectations and attitudes of medical and nursing students of working in the health labour market III) the stated locational labour market preferences of nursing and medical students, and the factors determining these preferences. Statistics were used to identify whether observed differences, associations or predictors were statistically significant. Box 5a below provides a quick overview of how to interpret the various statistical results throughout this analysis.

Box 5a: How to interpret the data from the statistical tests:

Interpreting the P-values: The p values linked to the different statistical tests to identify differences in mean, medians, proportions or in associations, are the probability values that indicate whether a particular hypothesis statement is probably true or not. A statistically significant result is demonstrated if the p-value falls in the rejection region (for example a two tailed region, in the case of our analysis), and the null hypothesis can be rejected. If the p-value falls outside the rejection region, it means the results cannot reject the null hypothesis. Ultimately, the smaller the p-value, the more confidence can be had that the evidence is considered of good quality. The following provides a quick example of the null hypothesis and alternative hypothesis for each test applied below.

Z score test of proportion. The null hypothesis is that there is no difference in proportions, with a two tailed test leading us to reject the null hypothesis in favour of an alternative hypothesis that there is a difference. Statistical significance indicates that we can reject the result if there is no difference in proportions at the probability rate below the given alpha (i.e. $p<.05$ or $p<.001$)

The Mann Whitney U test: the null hypothesis is that the observed differences between both groups are statistically the same, with the alternative hypothesis being that they are not the same. Statistical significance indicates that there is no difference, and the null hypothesis can be rejected in favor of a difference at the probability rate below the given alpha (i.e. $p<.05$)

Chi Square test for Independence (associations): the null hypothesis is that there is no association between a dependent variable and independent variable, and the alternative being that there is. Where the p-value is less than the chosen significance level (i.e. $\alpha = 0.05$) the null hypothesis that there is no association between variables can be rejected. This can be written as ($X^2(1) = 5.442$, $p < .05$). Where the p-value is higher than the chosen significant level, the null hypothesis that there is no association can be accepted.

The p values of the Chi Square Test for independence are presented using ***Yate's continuity correction***. This was done in SPSS in order to minimize overestimation of statistical significance for small data, and it is recognized that this may overcorrect and result in type II error (with little consequences, however, for our study).

Logistic regression: The odds ratios for the categorical variables produced in the logistic regression show the likelihood that the population with the predictor variable (the independent variables) is linked to the outcome variable (i.e. for example, students who attend a private school are 2.3 times more likely to have a preference for an Outside Conakry posting than students who attend a public school). All of this at the probability level provided. The associated confidence interval (CI) indicates the actual range the OR falls within the population, at 95 percent certainty (in line with the chosen alpha level). The wider the CI, the weaker the results.

I. Select Sample Profiles and Characteristics

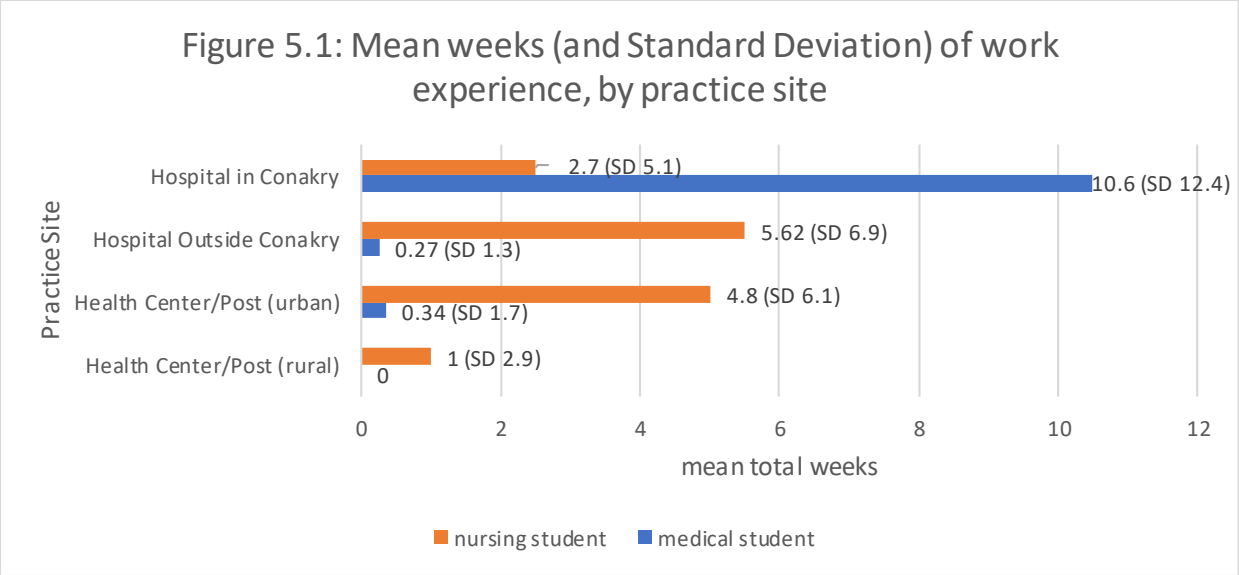
The medical and nursing student sample is significantly different on a number of characteristics (Table 5.1). Whereas both medical and nursing students tend to be young, a much larger proportion of nursing students are female, engaged or married, and have children. The vast majority of both medical and nursing students were born outside of Conakry however the vast majority grew up in urban areas (the number of years lived in rural areas is quite low). Overall, medical students are predominantly trained in Conakry and in public sector institutions, while a much larger proportion of nursing students are trained outside Conakry and in private sector institutions. Interestingly, medical students report to come from less well-off households than nursing students, although they list their father's academic achievement as more advanced. More medical students than nursing students have been to another country in Africa and have family and friends outside of Africa. Although the majority of both student cadres are satisfied or highly satisfied with life, nursing students are more satisfied than medical students with their monetary situation. The Z test for proportions shows the difference in proportion between medical and nursing students to be highly significant for most variables.

Table 5.1: key profile and characteristics of sample, valid percentage (out of total respondents)

	Medical Students	Nursing Students	P value
1. Age (mean)	25.3 (185) *SD 1.8*	24.9 (188) *SD 3.7*	-
2.Female	29.7 % (192)	77.1 % (192)	.000
3.Married or Engaged	22.8% (193)	57.1% (191)	.000
4. Has children	15% (187)	58.5% (188)	.000
5. Born in Conakry	39.6% (192)	28.1% (192)	.017
6. Home grown up in: urban area	80.6% (191)	81.8% (192)	.771
7. Numbers of years lived in a rural area (Mean, years)	5.98 (185) *SD 7.503*	4.63 (150) *SD 6.97*	.149
8. Studying in Conakry	100% (193)	47.4% (192)	.000
9. Studying in Public Sector Institution	62.2% (193)	17.5% (177)	.000
10. Parental socio-economic class: middle class/rich	29.5% (193)	65.4% (191)	.000
11. Parental academic achievement: > secondary education	35.3% (190)	20.1% (189)	.000
12 Has been to another country in Africa	38.9% (193)	32.3% (192)	.177
13. Has friends or family outside of Africa	89.6% (193)	65.6% (189)	.000
14. Satisfied/highly satisfied with life overall	68.4% (193)	78% (191)	.033
15. Satisfied/highly satisfied with monetary situation	43.8 % (192)	69.3% (192)	.000

Note: Z score test for two population proportions was used to test the significance of the differences in proportion for variables 2-6, and 8-15. The Mann Whitney U test was applied to test the differences in mean ranking for variable 1 and 7.

Both medical and nursing students receive little mandatory practical training outside a hospital environment, although the medical students significantly less than the nursing students (figure 5.1). Medical students report receiving an average of around 11 weeks and nursing students around 14 weeks of practical mandatory work experience as part of their studies (prior to their post graduate studies), most of which is at the hospital level in Conakry, and they report almost no mandatory work experience at any other level. Nursing students on the other hand divide their experience largely between the hospital level outside of Conakry and health centres/posts outside of Conakry. Nurses report a mean of only 1-week practical work experience in rural health centres/posts. The Mann Whitney U test found each of the four differences in mean weeks that were observed between medical and nursing cadres to be highly significant at *p>.001.*

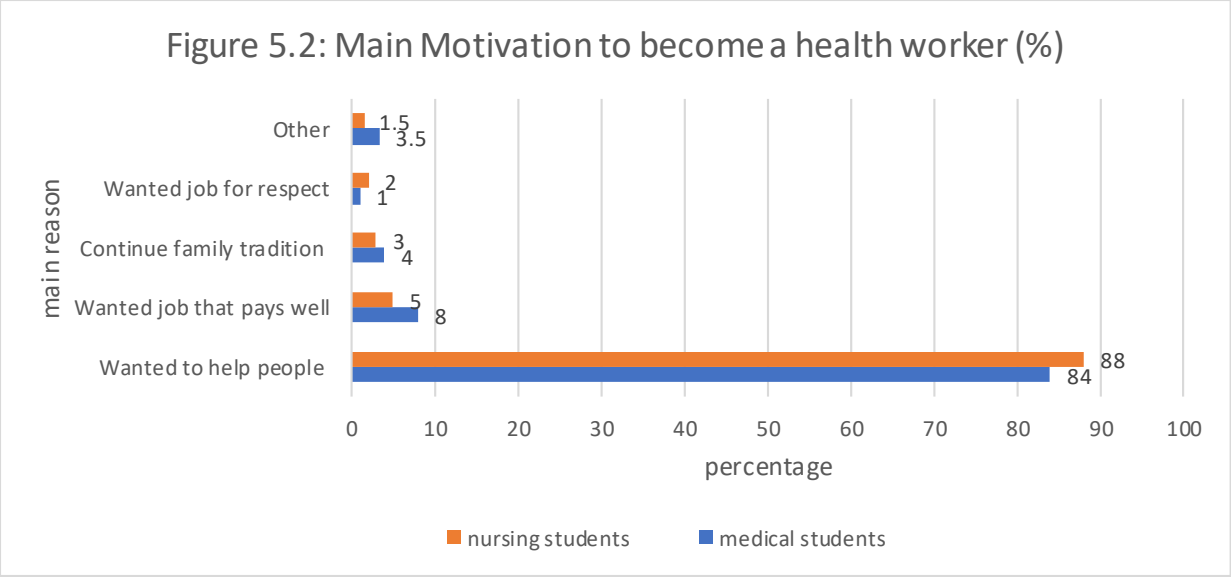


Note: P values reflect the test results of the Man Whitney U test

II. Select attitudes and Expectations

On becoming a health worker

The overwhelming majority of both medical and nursing students in the sample state their main motivation of becoming a health worker as *to help people* (Figure 5.2). Only around 10 percent of the 193 medical students, and 5 percent of the 192 nursing students, all of whom responded to this question, list financial considerations as the main motivation to become a health worker. The Z test for proportions shows the difference in proportion between medical and nursing students in their response "wanting to help people" not to be significant.



Note: The p value for the z test for proportion is .25014 (to test different between "wanting to help people" response)

On satisfaction with training, and feeling prepared to work in rural facility

Although both medical and nursing students are overwhelmingly happy with their training, nursing students are significantly more satisfied than medical students (Table 5.2). Overall 16 percent of medical students were unsatisfied or very unsatisfied with their training, compared to zero percent of nursing students. Whereas the median response for medical students is 2 (satisfied) and for nursing students it is 1 (very satisfied), 16 percent of medical students are *unsatisfied* or *very unsatisfied* with the training received. The Mann Whitney U test found the differences in satisfaction between medical and nursing students to be highly significant at *p>.001.*

More nursing students than medical students feel prepared/sufficiently trained to work in a rural health facility. For medical students, the median answer is 2 (agree) and for nursing student

students it is 1(strongly agree) with the Mann Whitney U test detecting a statistical difference at p>.001. Overall the findings show however that only a very small proportion feels prepared, in terms of skills and competencies, to work in a rural facility.

Table 5.2: Satisfaction with training received, and feeling prepared to work in rural facility (percentage)

	Medical Students	Nursing Students	P value
Satisfaction with training experience	**(193/193)**	**(192/192)**	
Very satisfied (1)	21 %	74.0 %	.000
Satisfied (2)	62 %	26.0 %	
unsatisfied (3)	14.5 %	0 %	
Very unsatisfied (4)	1.5 %	0 %	
Feels sufficiently prepared to work in a rural facility	**(193/193)**	**(190/192)**	
Strongly Agree (1)	24.4 %	57.9 %	.000
Agree (2)	49.7 %	33.2 %	
Disagree (3)	14.5 %	4.7 %	
Strongly Disagree (4)	11.4 %	4.2 %	

Note: P values reflect the test results of the Man Whitney U test

On getting a job

Both medical and nursing students perceive themselves (and their families) as the main funder for their education and feel relatively free of any obligations to their funders once they graduate (Table 5.3). Only 20.7 percent of medical students and zero percent of nursing students state that the government is the main funder of their education. Perhaps not surprisingly then, 58 percent of medical students say they did not feel an obligation if someone else other than themselves helped finance their education, and close to 75 percent of nursing students said the same. The Z test for proportions shows the difference in proportion between medical and nursing students to be highly significant for most variables.

Table 5.3: Sources of Financing, obligation to funder

	Medical Students	Nursing Students	p-value
Main source of Financing Education	**(193/193)**	**(192/192)**	
Government	20.7% (40)	0% (0)	.00001
Family	68.9% (133)	83.9% (161)	.00056.
Student	6.7% (13)	16.1% (31)	.00374.
Other	3.6% (7)	0% (0)	.00782.
Do you feel obligation to pay back funder?	**(181/193)**	**(159/192)**	
Yes	42% (76)	15.7% (25)	.00001.
No	58% (105)	84.3% (134)	.00001.

Note: P values reflect the test results of the z test for proportions.

Both nursing and medical students expect to be posted into a job within 6 months of graduating, although significantly more medical students expect this than nursing students (Table 5.4). The median answer of both nursing and medical students is to agree with the statement that they expect to be posted (2). The mean answer for medical students is 1.99 and for nursing students it is 2.43, suggesting that nursing students disagree more than medical students that they will be posted within 6 months. The 2 independent Mann Whitney U Test confirms that there is statistically significant difference between the nursing and medical student's answers, at p<.001.

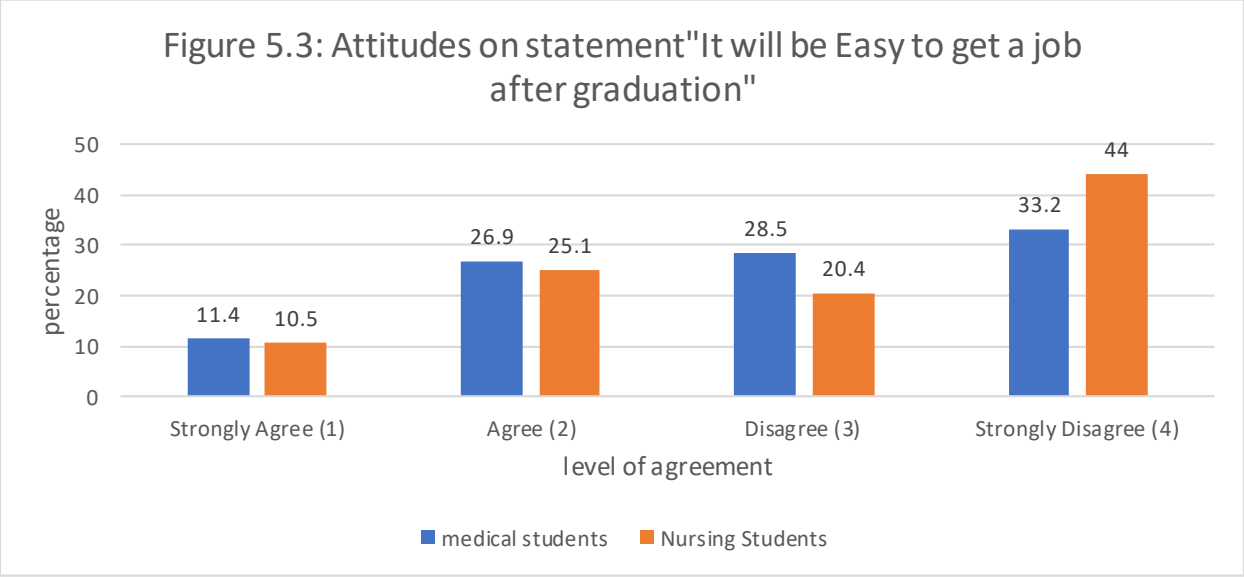
Table 5.4: Expectation on job posting, percentage

	Medical Students	Nursing Students	P value
Will be posted and start my job within 6 months after degree	**(193/193)**	**(192/192)**	
Strongly Agree (1)	34.7	29.7	.000
Agree (2)	40.4	26.0	
Disagree (3)	15.5	15.6	
Strongly Disagree (4)	9.3	28.6	

Note: P values reflect the test results of the Man Whitney U test

Neither medical nor nursing students however indicate it will be easy to get a job upon graduating (Figure 5.3). On ease of getting a job, more than 60 percent of the 191 nursing students and 193 medical students who responded to the question, disagree or strongly disagree

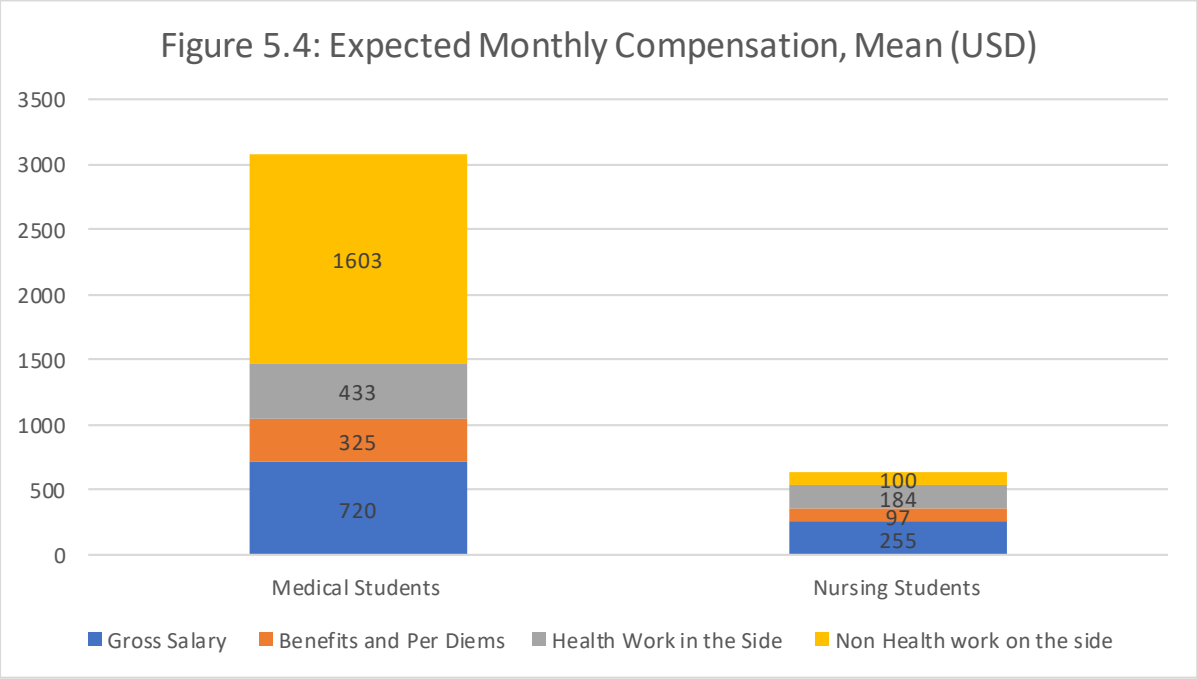
that it will be easy to find a job after graduation. Both answers have a mean of 3, which is to disagree with the statement that it is easy to get a job in the current labour market. The 2 independent Mann Whitney U test confirms that there is no statistically significant difference between the students.



On expected Monetary Compensation

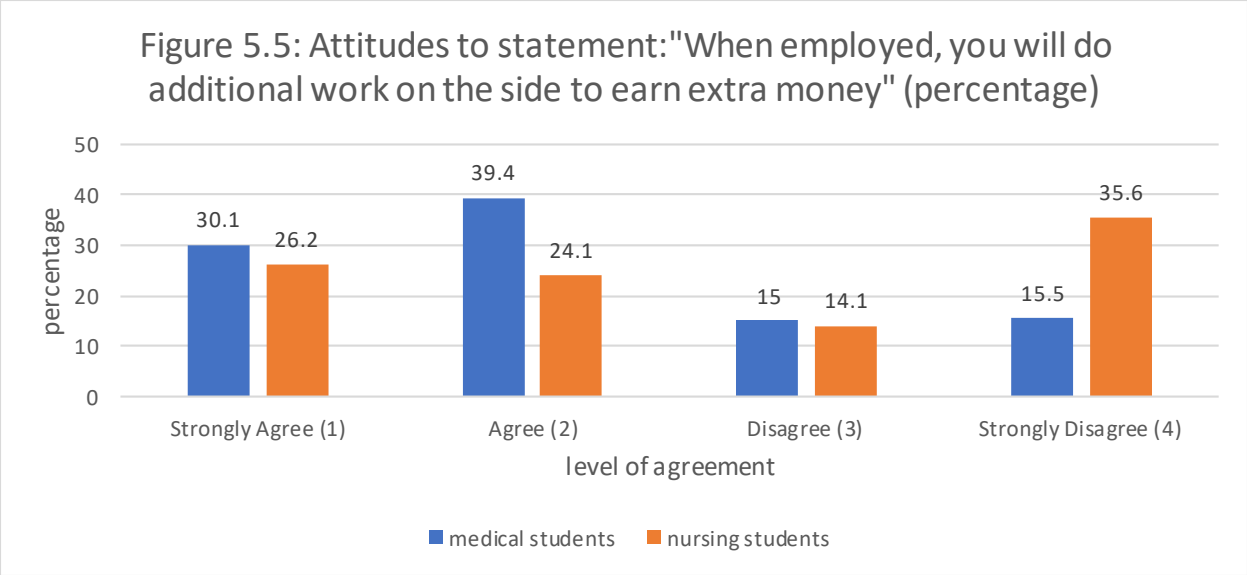
Medical students expect to earn significantly more per month than nursing students, in particular from non-health work on the side. The below figure 5.4 presents the mean compensation expectations of the students. Medical students expect to earn on average around 3 times more per month in basic salary than nurses, as well as around 3 times more in additional earnings from bonuses and per diems and more than twice as much in health work on the side. Medical students in particular expect to earn more than 1600 USD a month from non- health related work on the side, 16 times more than their nursing counterparts. The below figure outlines the overall expected monthly compensation of students (the mean). The 2 independent

Mann Whitney U test confirms a highly significant statistical difference in (median) expectations of all four forms of compensation, at *p<.001*.



On Informal income generation

The expectations on compensation are reflected in student attitudes on informal income generation, with significantly more medical than nursing students expected to earn money on the side. Figure 5.5 shows that 70.4 percent of medical students, and 50.3 percent of nursing students agree or strongly agree with the statement that they expect to earn additional health related work on the side when posted in the labour market (i.e. in a secondary job in the health sector, outside their primary place of employment). The Mann Whitney U test finds the difference to be statistically significant at *p<.05*. This is largely in line with the reported attitudes of medical and nursing students on informal income generation, presented further below.



*Notes: 193/193 medical students, and 191/192 nursing students responded to this question. The p value for differences in mean, from the Mann Whitney U test is .001

A very large proportion of both medical and nursing students agree that accepting informal income from patients is acceptable, and there is no statistical difference between either cadre. A very large proportion of medical and nursing students believe that accepting informal income from patients who express gratitude is acceptable. 69.5 percent of medical students, and 50.3 percent of nursing students agree or strongly agree that accepting informal income from patients is acceptable.

Medical students significantly more than nursing students feel that earning extra income during work hours, either in the facility they are posted to or a facility outside, is acceptable (Table 5.5). 40.8 percent of medical students and 50 percent of nursing students agree or strongly agree that earning extra income during work hours in the facility they are posted to is acceptable 24.8 percent of medical students and 13.5 percent of nursing students agree or strongly agree

that earning extra income in another facility during work hours is acceptable. The Mann Whitney test shows that both these differences are significant, at p<.05 and p<.001, respectively.

Table 5.5: attitude towards informal income generation (percentage)

	Medical students	Nursing students	P value
Accepting informal payments from patients expressing gratitude is acceptable	(191/193)	(191/192)	
Strongly Agree (1)	22.0	27.7	
Agree (2)	48.7	28.3	.158
Disagree (3)	26.7	38.2	
Strongly Disagree (4)	2.6	5.8	
Earning extra income in the facility that I am posted during work hours is acceptable to me	(193/193)	(192/192)	
Strongly Agree (1)	18.7	22.9	
Agree (2)	30.1	19.3	.017
Disagree (3)	28.5	12.0	
Strongly Disagree (4)	22.8	45.8	
Earning extra income in another facility during work hours is acceptable	(193/193)	(192/192)	
Strongly Agree (1)	6.7	7.8	.000
Agree (2)	18.1	5.7	
Disagree (3)	26.4	11.5	
Strongly Disagree (4)	48.7	75.0	

Note: P values reflect the test results of the Man Whitney U test

On shirking and working hours

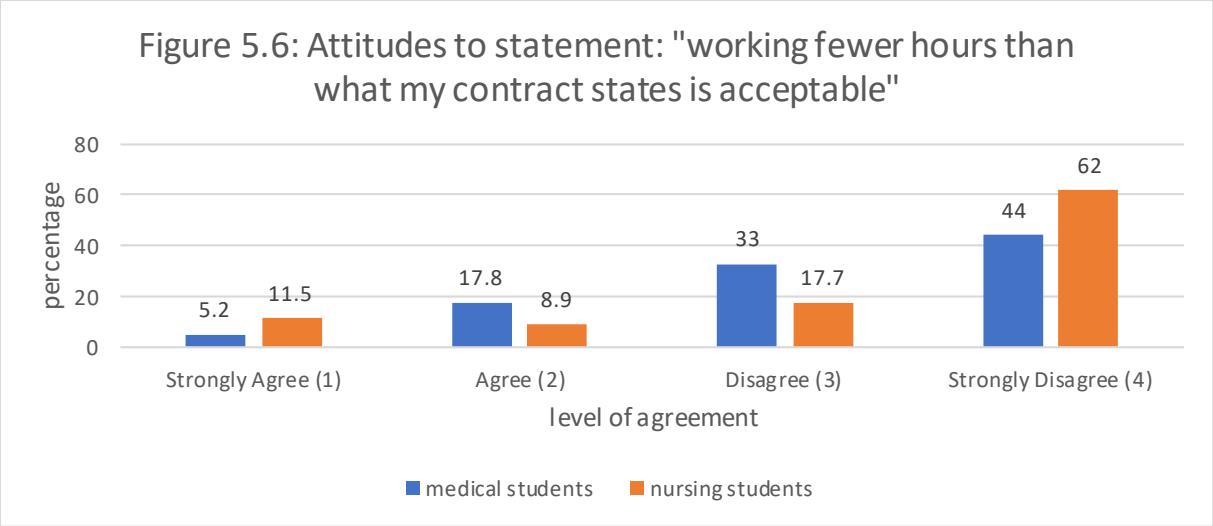
The vast majority of both medical and nursing students are in agreement that they would stay at the facility until all patients have been seen, with nursing students significantly more than medical students (Table 5.6). 90.7 percent of medical students and 96.9 percent of nursing students agree or strongly agree that they will stay working until all patients have been seen. The median answer for both students is 1 (strongly agree) with the mean for medical students slightly higher (so towards agree/away from strongly agree) than for nursing students: at 1.53 vs 1.26, respectively, a difference that is significant at P<.001.

Table 5.6: self-perceived working trait expectations of students (percentage)

	Medical students	Nursing students	P-value
I will stay at the health facility until all waiting patients are seen (even if not paid extra)	(193/193)	(192/192)	
Strongly Agree (1)	57.5	79.7	.000
Agree (2)	33.2	17.2	
Disagree (3)	7.8	.5	
Strongly Disagree (4)	1.6	2.6	

Note: P values reflect the test results of the Man Whitney U test

A large proportion agree or strongly agree for it to be acceptable to be working fewer hours than stated in a contract, and medical students significantly more than nursing students. Figure 5.6 shows that out of 191 medical students and the 192 nursing students who responded to the question, 77 percent of medical students and 79.7 nursing students disagree or strongly disagree that working less hours than what is stated in the contract is acceptable. However, 23 percent of medical students, and more than 20% of nursing students would agree with the statement that working less hours than the contract states is acceptable. The median answer for medical students is 3 (i.e. they disagree with that statement) and for nursing students it is 4 (they very much disagree). The Mann Whitney U test suggests that there is a significant difference between the two at $p<.05$



Note: P value for Mann Whitney U test was .010

On expected working conditions

The overwhelming majority of medical and nursing students expect to find good working conditions once posted, with medical students more so than nursing students (Table 5.7). 96.4 percent of medical students and 89.6 percent of nursing students agree or strongly agree with the statement that they will have sufficient supplies and equipment at their disposal once posted. In terms of agreement with the statement of having sufficient housing once posted, the median response of medical students is 1 (strongly agree) whereas the median response of nurses is 2 (agree) with the difference found to be statistically significant (at $p<.001$). Moreover, the mean answer of medical students on the expectation of having good access to continued training was 1.28, and of nursing students 1.48, indicating that medical students are slightly more in agreement than nursing students with the difference found to be statistically significant (at $p<.05$). And more than 20 percent of nursing students and more than 17 of medical students did

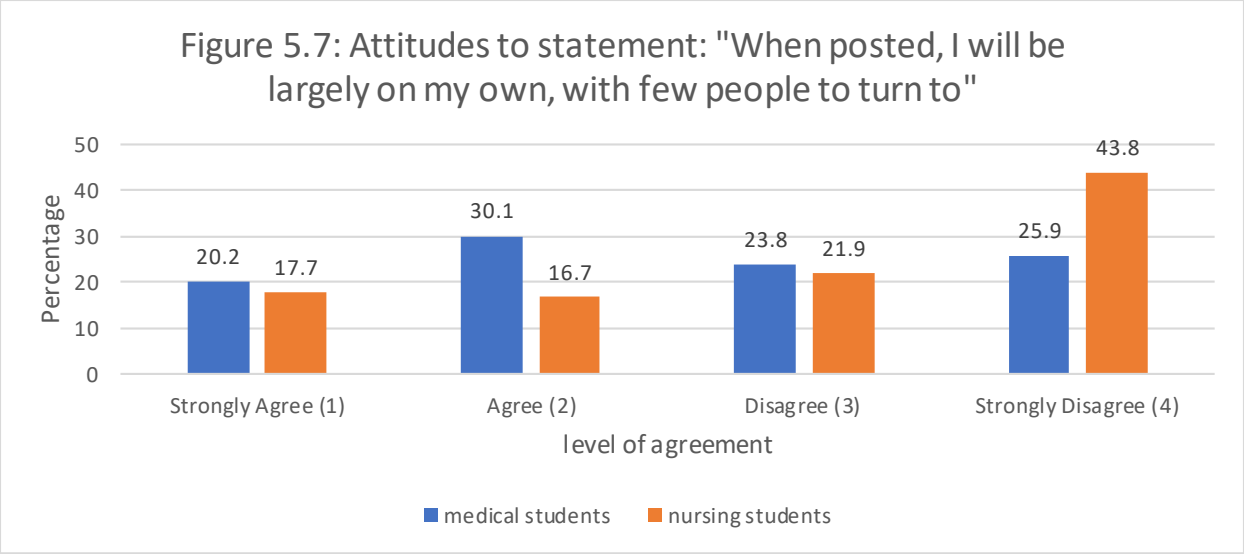
not agree with the statement that community health volunteers are integral parts of the workforce team.

Table 5.7: expectation of non-monetary compensation at facility level (percentage)

	Medical students	Nursing students	P value
When posted, I will have access to sufficient equipment and supplies	(193/193)	(192/192)	
Strongly Agree (1)	76.2	67.2	.074
Agree (2)	20.2	22.4	
Disagree (3)	3.1	5.7	
Strongly Disagree (4)	.5	4.7	
When posted, I will have access to sufficient housing	(193/193)	(190/192)	
Strongly Agree (1)	74.1	48.9	.000
Agree (2)	20.2	32.6	
Disagree (3)	3.6	7.4	
Strongly Disagree (4)	2.1	11.1	
When posted, I will have opportunities for on-the-job training	(193/193)	(192/192)	
Strongly Agree (1)	76.2	67.2	.025
Agree (2)	20.2	22.4	
Disagree (3)	3.1	5.7	
Strongly Disagree (4)	.5	4.7	
CHV are an integral part of the workforce team at the facility	(193/193)	(192/192)	
Strongly Agree (1)	40.4	39.6	.624
Agree (2)	42.5	40.1	
Disagree (3)	9.8	9.9	
Strongly Disagree (4)	7.3	10.4	

Note: P values reflect the test results of the Man Whitney U test

However, a large proportion of students expect to be largely on their own once posted, with few people to turn to, an expectation particularly prevalent among the medical students. Figure 5.7 shows that 50.3 percent of medical students (of 193 who responded) and 34.4 percent of nursing students (of 192 responded) agree or strongly agree with the statement that they will likely be on their own when posted, with few people to turn to. The median answer for medical students is 2 (agree), whereas the median answer for nursing students is 3 (Disagree). The Mann Whitney U test identified a difference to be statistically significant at $p<.05$.



Note: Mann Whitney U test found significance level at p=.001

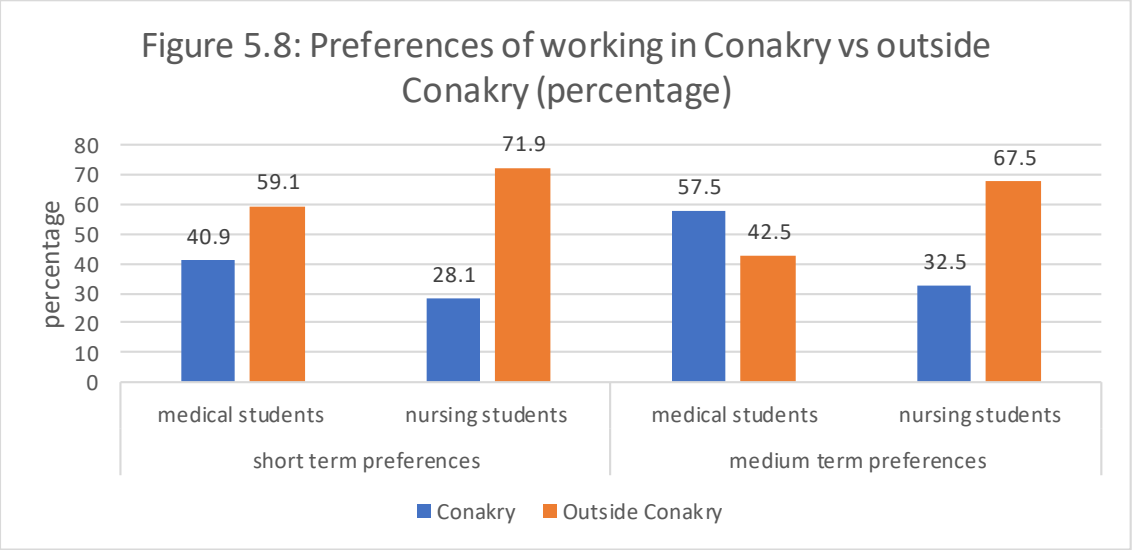
III. Locational Labour Market Preferences

This section summarizes the findings on the labour market preferences of students, and the variables associated with such preferences, with regards to jobs in 1) Conakry vs outside Conakry, 2) rural vs urban location, 3) public vs private sector, and 4) Guinea vs Abroad.

A. Conakry vs Outside Conakry preferences

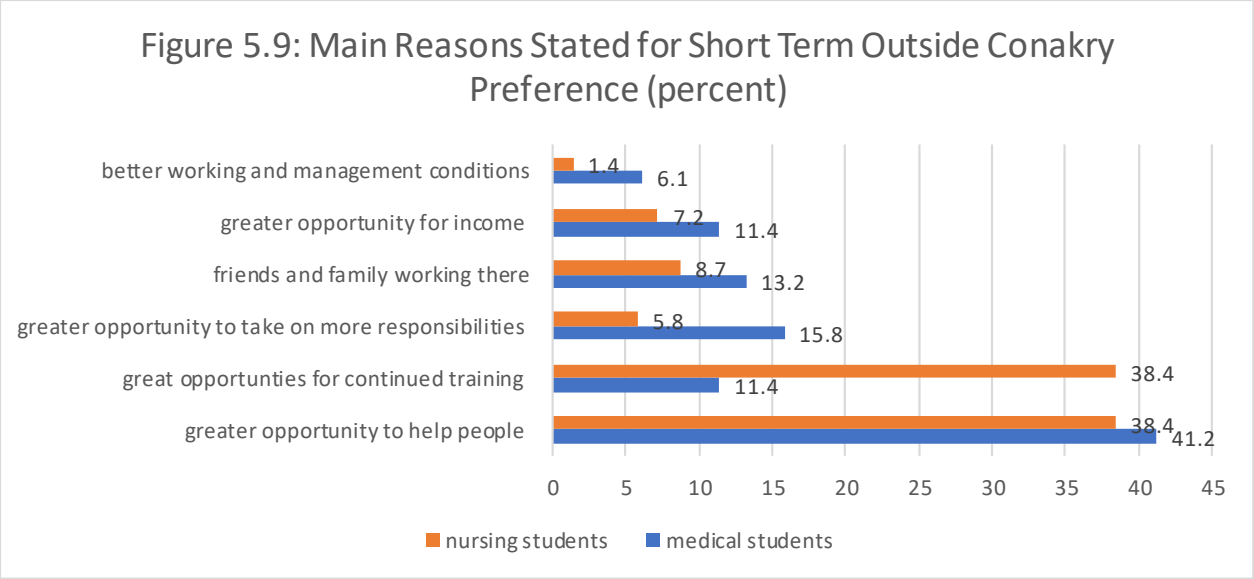
The majority of medical and nursing students - with nursing students significantly more than medical students - have a preference for a job outside of Conakry in the short term (Figure 5.8). In the short- term 60 percent of the 193 medical students and more than 70 percent of the 192 nursing students state a preference to work outside of Conakry in the next 1-3 years, a difference that is significant at p<.01 (z-test for proportions, with p=.008). In the medium term (in next 4-7 years) the proportion with a preference to work outside of Conakry is reduced to 42 percent of

medical students and 67 percent of nursing students, with this difference also significant at p<.01 (z test; p=.000).



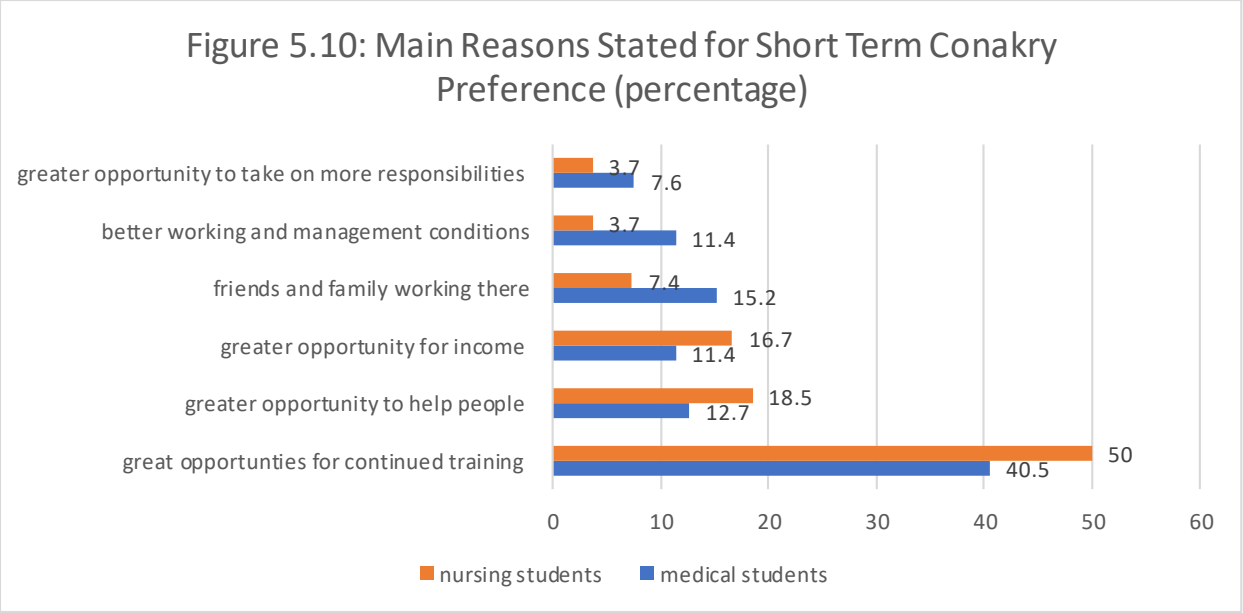
Stated Reason for job Preference

Outside Conakry Preference: Figure 5.9 shows that the most frequently stated main reason for an Outside Conakry job preference in the short term, for both medical and nursing students, was the "*opportunity to help people*". The second most often stated reason by nursing students was "*greater opportunities for continued training*" with significantly fewer medical students stating this as a main reason, a difference that is significant at p<.001 (z test p=.000). "*greater opportunity to take on more responsibilities*" was the second most often stated reason by medical students, with much fewer nursing students stating this, a difference that is significant at p<.01 (z test p=.009). All other reasons were much less prominent.



Note: above percentage is out of total of **1**14 medical students and 138 nursing students who indicated a short-term preference for a job outside of Conakry

Conakry Preference: The most frequently stated main reason by medical and nursing students for preferring to work in Conakry in the short term is "greater opportunities for training" (see figure 5.10). 40 percent of medical students and 50 percent of nursing students stated "*Greater opportunities for continued training*" as a main reason, with no evidence that this difference is statistically significant (using z test). Whereas having friends and family was the second most often stated reason by medical students, for nursing students it was the opportunity to help people. Greater opportunity for income, moreover, was stated by close to 17 percent of nursing students and 11 percent of medical students as their main reason.



Note: above percentage is out of total of **79** medical students and 54 nursing students who indicated a short-term preference for a job in Conakry

Bivariate Analysis (Chi Square)

In order to identify some of the possible predictor variables to include in the logistic regression model, a simple bivariate analysis was carried out between the outcome variable and the independent variables. The Chi Square test of Independence (Association) identified a number of different independent variables, for medical and nursing students, that were significantly associated (with continuity correction) with a Conakry/Outside Conakry Preference. Table 5.8 provides an overview of these variables showing that the most highly associated variables are rural/urban preference ($p<.001$ for both nursing and medical students), level preference ($p<.05$ for nurses), gender ($p<.05$ nurses) and region born ($p<05$ medical students). Other variables were found to be significant at $p<.10$

Table 5.8: Variables significantly associated with "Conakry/outside Conakry Preference using Chi Square test

	Nursing Student		Medical student	
	Value with continuity correction	Asymptotic significance (2 tail)	Value with continuity correction	Asymptotic significance (2 tail)
Rural/Urban Preference	18.893	**.000**	12.834	**.000**
Level Preference (hospital vs HC or below)	5.442	**.020**	.027	.869*
Region born (Conakry/Outside Conakry)	.220	.639	4.700	**.030**
Gender (Male/Female)	5.034	**.025**	.899	.343
Marriage status (married vs not)	1.430	.232	3.669	**.055**
Education financing source (public vs private)	na	na	3.097	**.052**
Satisfaction with education (high vs low)	na	na	3.679	**.055**
Recognition of importance of CHWs (high vs low)	3.268	**.071**	.000	.998
Expectation of having adequate housing when posted	1.854	.173	3.582	**.058**

*2 cells had expected count less than 5.

Logistic Regression: Predictors for Outside Conakry preference

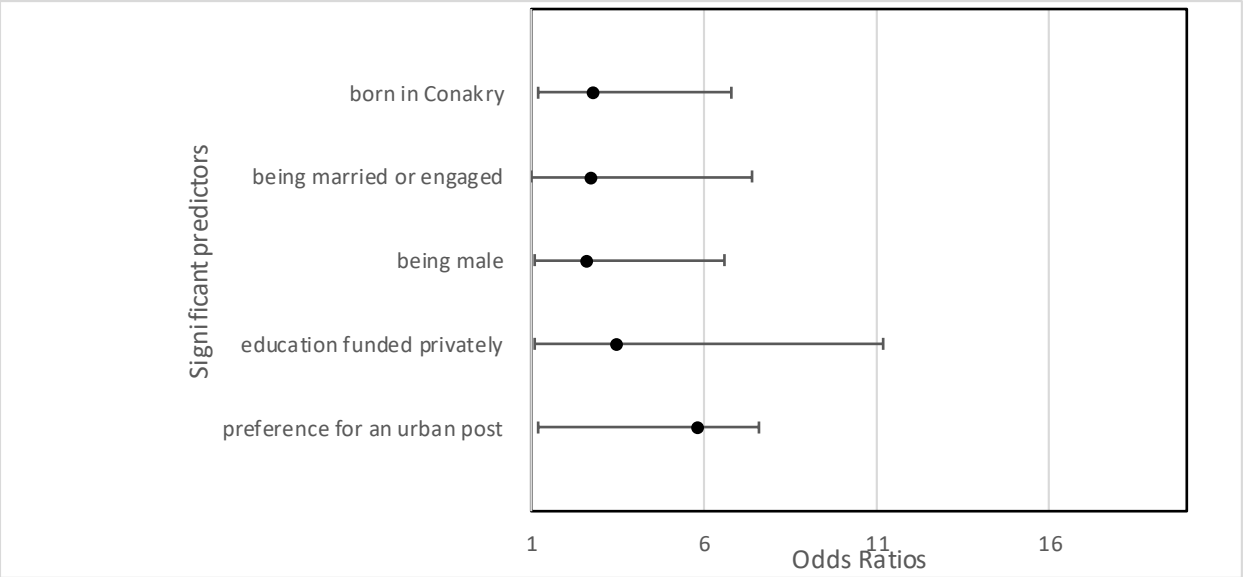
The Regression Model: In order to understand the predictors for students having an outside Conakry preference, logistic regression was carried out. A logistic regression model was built and populated with variables based on 1) significance in the above univariate analysis 2) relevancy based on the global literature and expert knowledge of the topic, 3) statistical soundness of the model (see box 5-b) and 4) that included the same predictor variables for medical students as for nursing students. This approach rather than the forward or backward stepwise approach of selecting variables is in line with the views of Flom, P. (2018) or James et al (2013) who emphasize the importance of expert knowledge and adding predictor variables even when not significant (but instead were expected to be significant in the literature or elsewhere). The details of the models – including all variables included in the medical and nursing student models - are included in Annex H.

Box 5-b: Soundness of the Model: The statistical appropriateness of the models was confirmed by a number of tests, produced in SPSS when carrying out the regression, that confirmed the overall soundness of the models (see Annex H for details). These tests were deemed appropriate by (Pallant, J. 2016) and could be automatically generated in SPSS. The **omnibus tests of model coefficient**, a goodness of fit **test to show** whether the explained variance in the data **is** significantly greater than the unexplained variance (Pallant, J. 2016), overall shows that the model performs very well with a high level of significance, showing a significance of .001 for the medical student model and .002 for the nursing student model. Results of the **Hosmer and Lemeshow Goodness of test fit**, which tests whether the models are well calibrated (assessing the similarity of expected and observed event rates in sub-groups) (Pallant, J. 2016) also shows that the models are worthwhile, with a significance value greater than .05, which in this case is a positive result. **The Cox and Snell R square as well as the Nagelkerke R square** further provide indication of the usefulness of the model (Pallant, J. 2016), indicating that between 24.2 percent and 32.6 percent of the variability in the medical student model is explained by the chosen set of variables, and 23.5 percent and 33.7 percent by the chosen set of variables in the nursing model.

For medical students, a total of four variables contributed significantly to the predictive ability of the model at p<.05, and one variable at p<.10. Major factors that influence whether a medical student has a preference for a labour market post outside of Conakry are 1) having a labour market preference for an urban post (OR 5.8; 95% CI=2.5-13.5) 2) having been born in Conakry (OR 2.8; 95% CI =1.2-6.8), 3) covering training/school fees privately (OR 3.5; 95% CI=1.1-11.2) 4) being male (OR 2.6; 95% CI=1.2-6.8). A less significant predictors (at p<.10) is being married or engaged (OR 2.7; 90% CI= 1.0-7.4) Figure 5.11 provides an overview of these predictors and their odds ratios as well as the confidence interval. Detailed outcome tables are included in Annex H.

Example of how the OR and CI can be read: medical students with a preference for an urban post are 5.8 times more likely to have a preference for an Outside Conakry post than students who with a preference for a rural post. We can be 95% certain that the actual value of the OR in the population lies somewhere between 2.5 and 13.5.

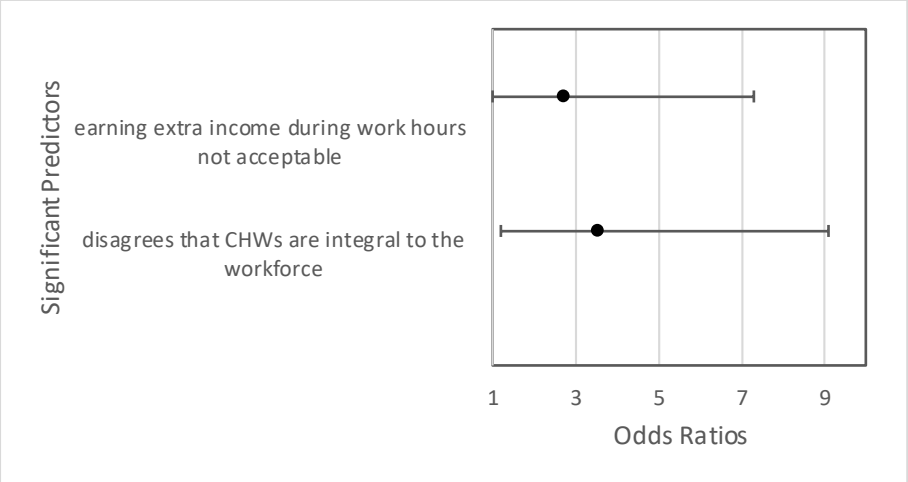
Figure 5.11: Medical Student Predictors for out of Conakry Preference



Note: being married or engaged is p<.10. All others are p<.05.

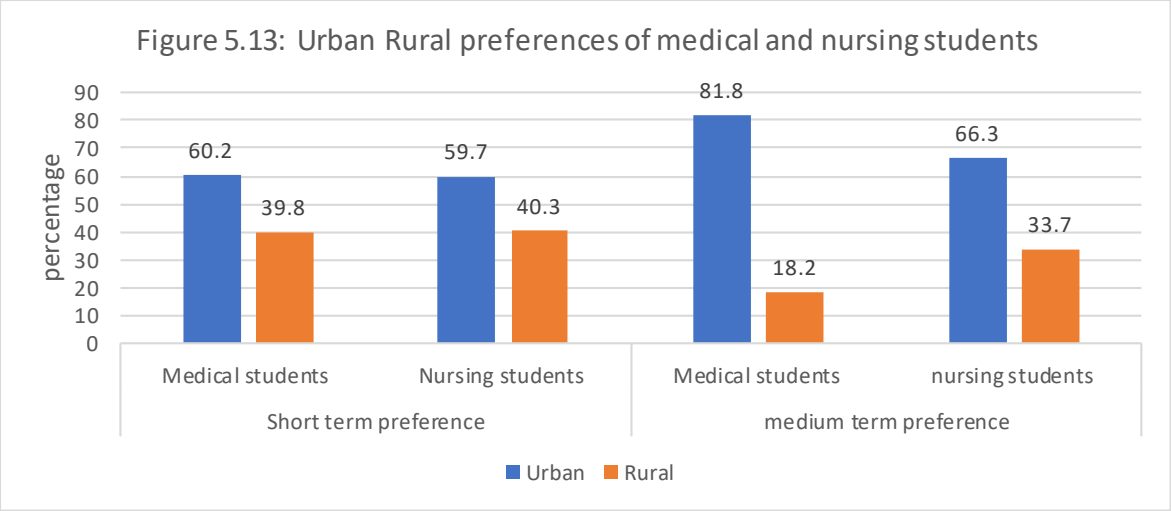
For nursing students, a total of three variables contributed significantly to the predictive ability of the regression model at p<.05. They are 1) a belief that earning extra income during work hours is not acceptable (OR 2.7; 95% CI=1.0-7.3) and 2) disagreeing the CHWs are integral parts of the health team (OR 3.5; 95% CI=1.2-9.1). Figure 5.12 provides an overview of these predictors and their odds ratios as well as the confidence interval. Another variable which was shown to be associated is having a preference for an urban post (OR 11.4; 95% CI=3.6-35.8). Given the wide confidence interval however it was not included in the below figure. Detailed outcome tables are included in Annex H.

Figure 5.12: Select Nursing Student Predictors for out of Conakry Preference



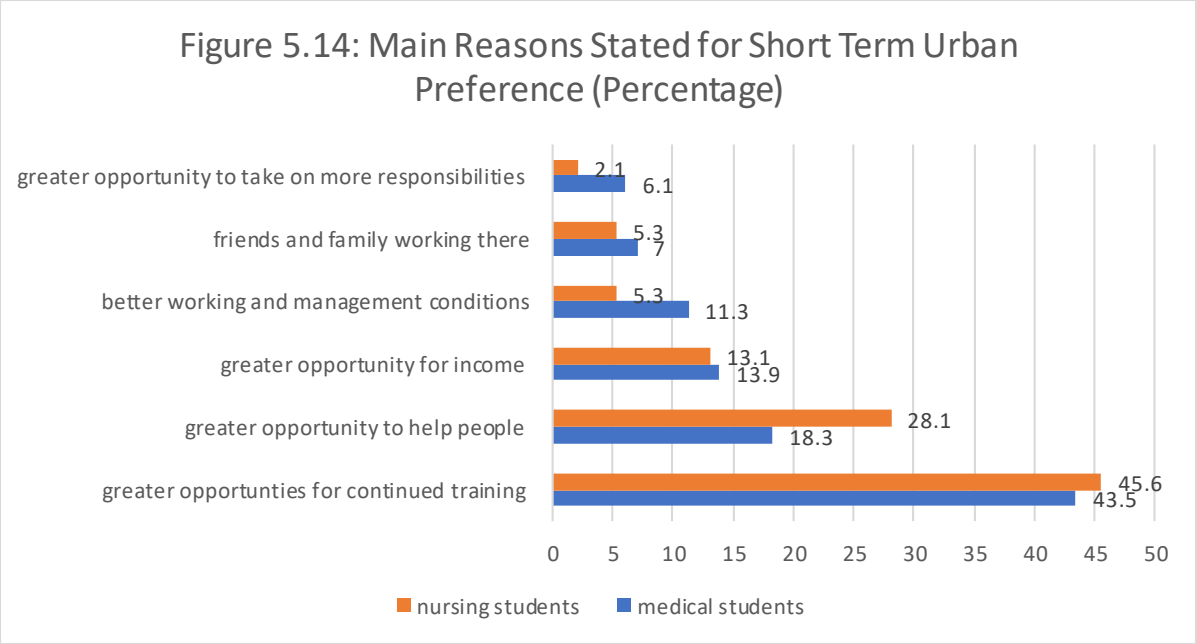
B. Rural/Urban Preferences

Urban postings are more attractive to both medical and nursing students in both the short and medium term (Figure 5.13). Around 60 percent of the 191 medical and the 191 nursing students who responded, have a preference to work in urban locations in the short-term vis-a-vis rural locations. Urban preference increases to around 80 percent for medical students, and 65 percent for nursing students in the medium term. Overall, although the proportion of students with a preference for an urban location is larger in both the short and medium term, the proportion of students who have a preference for a rural job is substantially bigger in the short compared to the medium term.



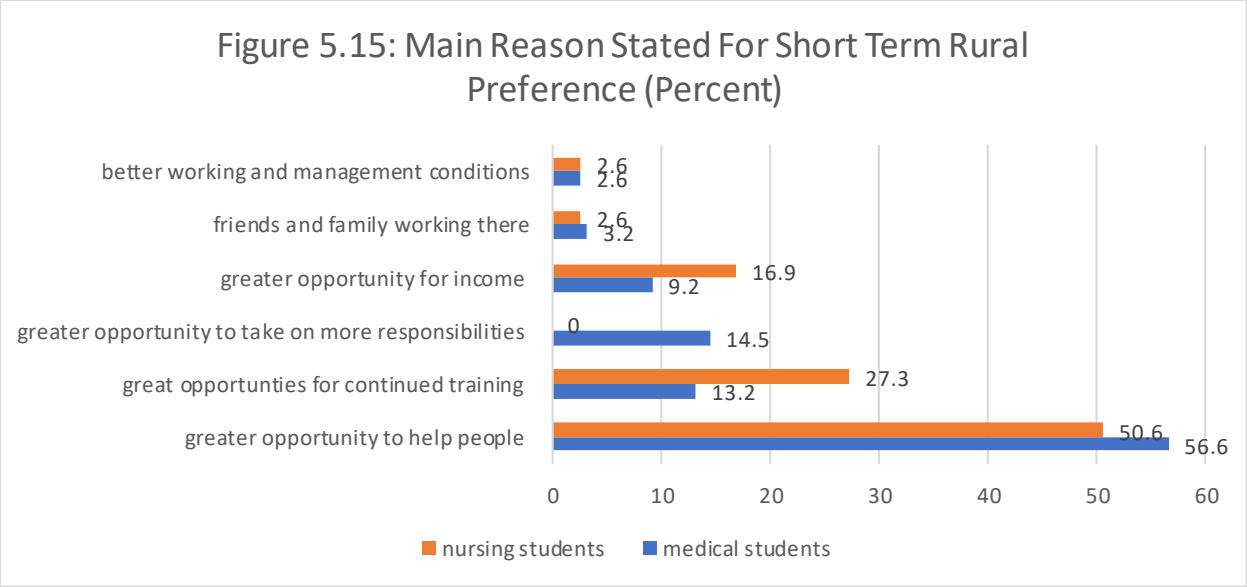
Stated reasons for Preference

Urban preference: **Figure 5.14 shows that close to half of both medical and nursing students with preference for an urban post in the short-term** state ***greater opportunities for continued training*** as their main reason for this preference. *Greater opportunities to help* people was the second most often stated main reason for having an urban preference (particularly of nursing students), followed by greater opportunities for income generation. Indeed, close to 14 percent of medical students and 13 percent of nursing students stated greater opportunities for income generation as a main reason for their preference to work in an urban area.



Note: above percentage is out of total of 115 medical students and 114 nursing students who indicated a short-term preference for a job in an urban area

Rural Preference: The top two reasons for both medical and nursing students of having a preference for a rural job are having a greater opportunity to help people followed by having greater opportunities for continued training (figure 5.15). Interestingly too, close to 17 percent listed greater opportunity for income as a main reason for a rural preference. Notable also is that greater opportunities to take on more responsibilities was listed as the main reasons by close to 15 percent of medical students, however this was not listed by any nursing students, a difference that is statistically significant at $p<.001$ (z test for different proportions where $p=.000$).



Note: above percentage is out of total of 76 medical students and 77 nursing students who indicated a short-term preference for a job in a rural area.

Bivariate Analysis (Chi Square)

Once again, a simple bivariate analysis was carried out between the outcome variable and the independent variables to identify possible predictor variables to include in the logistic regression model. The Chi Square test of Independence (Association) identified a number of different independent variables, for medical and nursing students, to be significantly associated (with continuity correction) with a rural urban preference. Table 5.9 shows that regional preference is highly associated for both medical and nursing students, at $p<.001$. Feeling prepared to work in a rural area is found to be associated for medical students at $p<.01$. Sector preference is associated at $p<.05$ for nurses, and attitude towards earning extra income and expectations on being alone once posted were significant at $p<.05$ for medical students. Several other factors are significant at $p< .10$.

Table 5.9: Variables significantly associated with "Rural/Urban" Preference using Chi Square test

	Nursing Student		Medical student	
	Value with continuity correction	Asymptotic significance (2 tail)	Value with continuity correction	Asymptotic significance (2 tail)
Regional Preference (Conakry vs Outside Conakry)	18.893	**.000**	12.834	**.000**
Sector Preference (public vs Private sector)	4.721	**.030**	2.716	**.099**
Level Preference (hospital vs below)	3.469	**.063**	.044	.331
Perceived parental socio-economic status (richer vs poorer)	2.303	.129	2.424	.119
Marriage status (married vs not)	2.874	**.090**	.121	.728
Satisfaction with education (high vs low)	na	na	3.758	**.053**
Feeling Prepared to work in a rural area (very vs not)	.544	.461	7.328	**.007**
Earning extra income during work acceptable (agree/vs not agree)	3.374	**.066**	4.167	**.041**
When posted, I will be largely on own (agree/not agree)	2.303	.129	4.660	**.031**

Logistic regression: Predictors for Rural preference

In order to understand the predictors for students having a rural preference, logistic regression was carried out. A logistic regression model was built and populated with variables based on 1) significance in the above univariate analysis 2) relevancy based on the global literature and expert knowledge of the topic, 3) statistical soundness of the model (see box 5-c) and 4) that included the same predictor variables for medical students as for nursing students. This approach rather than the forward or backward stepwise approach of selecting variables is in line with the views of Flom, P. (2018) or James et al (2013) who emphasize the importance of expert knowledge and adding predictor variables even when not significant (but instead were expected to be significant in the literature or elsewhere). The details of the models – including all variables included in the medical and nursing student models - are included in Annex H.

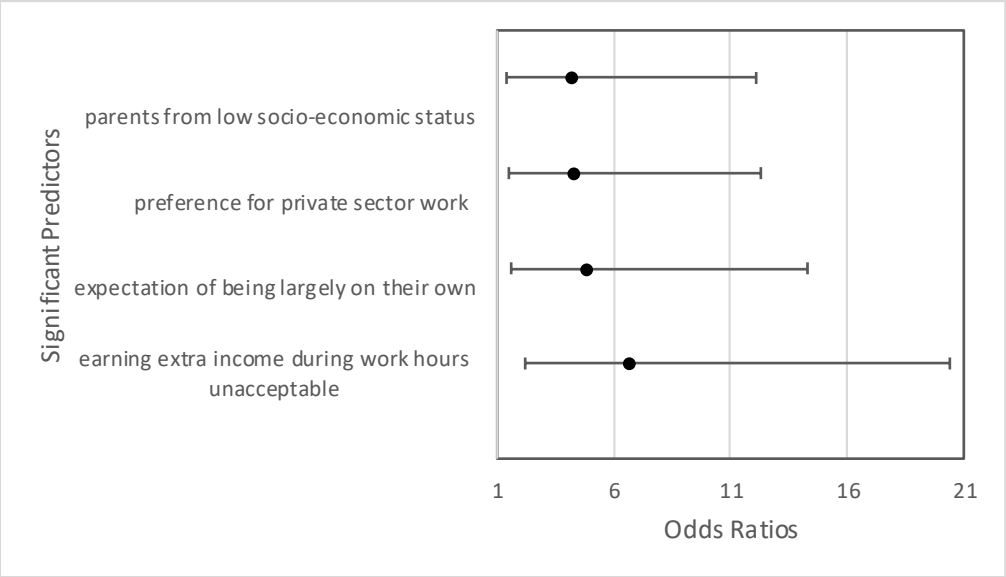
Box 5-c: Soundness of the Model: The usefulness of models was confirmed by a number of tests, produced in SPSS when carrying out the regression, that confirmed the overall soundness of the models (see Annex H). These tests were deemed appropriate by (Pallant, J. 2016) and could be automatically generated in SPSS. The **omnibus tests of model coefficient**, a goodness of fit **test to show** whether the explained variance in the data **is** significantly greater than the unexplained variance (Pallant, J. 2016), overall shows that the models perform very well with a high level of significance of .000 for both the medical students and the nursing student model. Results of the **Hosmer and Lemeshow Goodness of test fit** which tests whether the models are well calibrated (assessing the similarity of expected and observed event rates in sub-groups) (Pallant, J. 2016), shows that the medical student model is worthwhile, with a significance value greater than .05, which in this case is a positive result. The nursing student model is slightly less well calibrated (significance value is slightly below .05). **The Cox and Snell R square as well as the Nagelkerke R Square** further provide indication of the usefulness of the model (Pallant, J. 2016), indicating that between 31.2 percent and 41.9 percent of the variability in the medical student model is explained by the chosen set of variables, and 39.1 percent and 53.0 percent by the chosen set of variables in the nursing model.

For medical students, a total of 4 variables contributed significantly to the predictive ability of the model at p<.05, and 1 variable at p<.10. Major factors that influence whether a medical student has a preference for a rural job are 1) having been born in Conakry (OR 2.8; 95% CI=1.04-7.43), 2) having a preference for a private sector post (OR 2.6; 95% CI=1.1-6.3), 3) having a preference for work outside of Conakry (OR 7.6; 95% CI=2.9-19.5) 4) disagreeing that earning extra income during work hours is acceptable (OR 3; 95% 1.2-7.6). A factor less significant (at p<.10) is being satisfied with monetary situation (OR 2.7; 90% CI=1.0-7.3). Figure 5.16 provides an overview of a select number of these predictors and their odds ratios. Annex H holds the detailed outcome table from the regression.

Figure 5.16: Medical Student Predictors for rural Preference

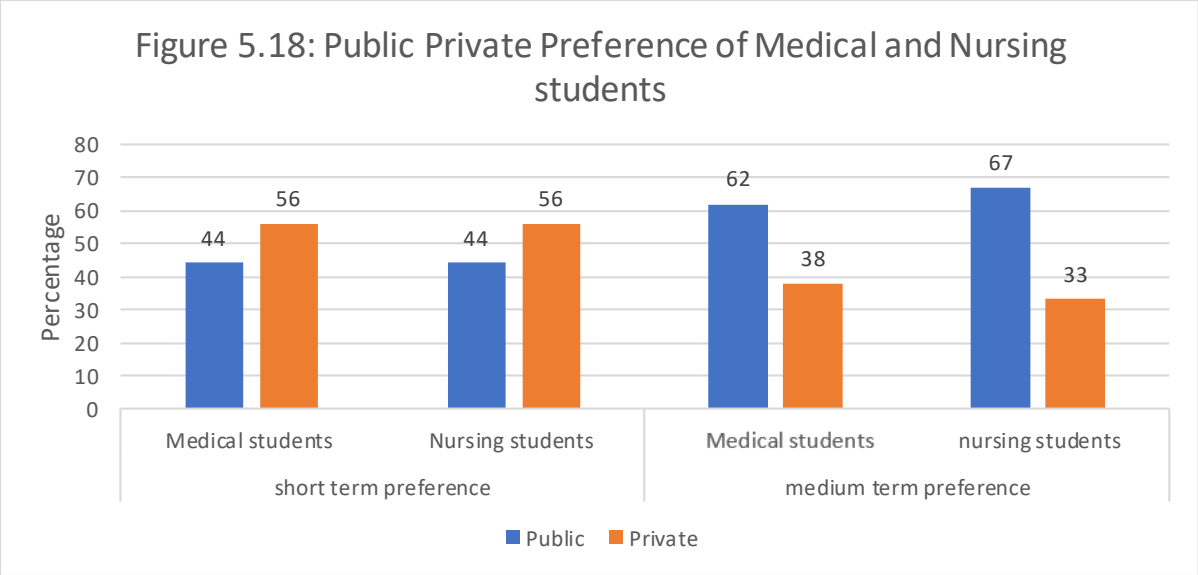
For nursing students, a total of 6 variables contributed significantly to the predictive ability of the model at p<.05. Major factors that influence whether a nursing student has a preference for a rural job (at P<.05) are 1) having parents from low socio-economic backgrounds (OR 4.2; 95% CI=1.4-12.1), 2) a preference in the private sector (OR 4.3; 95% CI= 1.5-12.3) 3) being in disagreement that earning extra income during work hours is acceptable (OR 6.9; 95% CI= 2.2-20.4) 4) being in agreement that when posted, they will be largely on their own (OR 4.8; 95% CI 1.6-14.3). Figure 5.17 provides an overview of some of these predictors with attached odds ratios and confidence intervals. Two other predictors were found to be significant, however not included in the figure because of their wide confidence intervals: 5) having a preference for work outside of Conakry (OR 17.8; 95% CI= 4.4-72.1) and 6) having friends or family outside of Africa (OR 6.8; 95% CI=1.57-29.78). The detailed regression table is included in Annex H.

Figure 5.17: Select Nursing Student Predictors for rural Preference



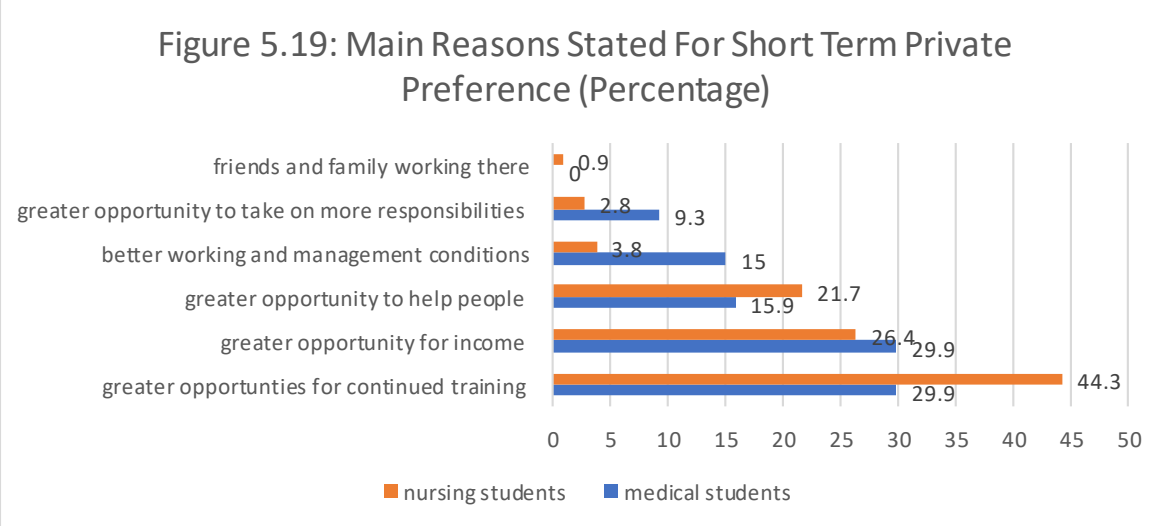
C. Public/Private Preference

Whereas the private sector is more attractive in the short term, the public sector is more attractive in the medium term. Figure 5.18 shows that a larger proportion, 56 percent of the 193 medical students, and 56 percent of the 190 nursing students who responded to the question, state a preference to work in the private sector in the short term, something that is reversed for the medium term. Hence while the majority have a preference to work in the private sector in the short term, in the medium term the public sector is more popular.



Stated Reasons for Job Preference

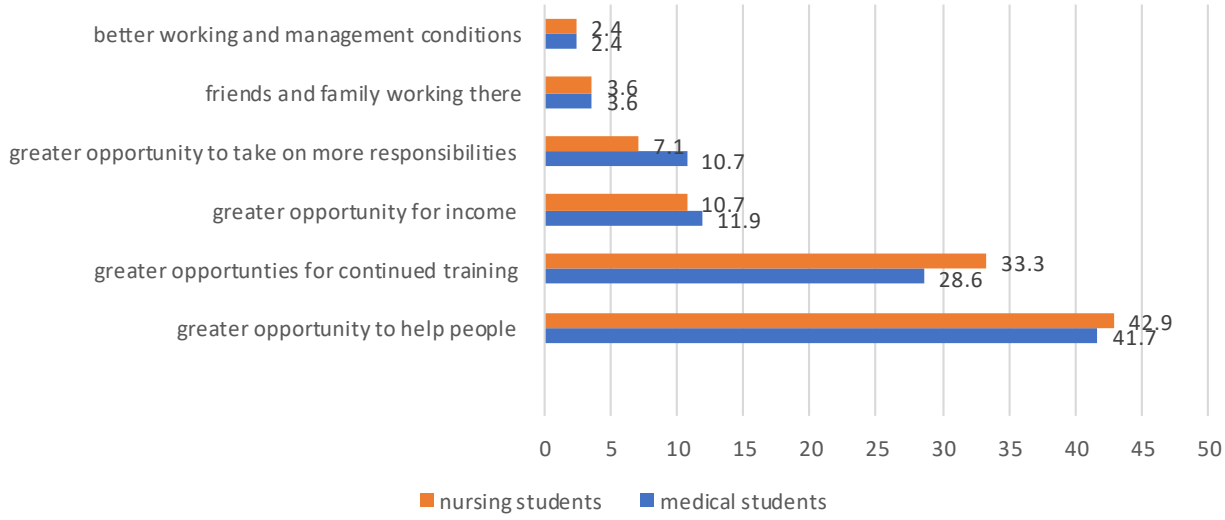
Private sector Preference: *Greater Training opportunities* and *opportunities for greater income generation* are the top two most often stated main reasons why both medical and nursing students want to work in the private sector in the short term (figure 5.19). The difference in the stated reason being greater opportunities for training between medical and nursing students is statistically significant at p<.05 (in the Z test for proportions where p=.029).



Note: above percentage is out of total of 107 medical students and 106 nursing students who indicated a short-term preference for a job in the private sector.

Public sector preference: Notions of "greater opportunities to help people" as well as greater *opportunities for continued training* are the top two main reasons stated by both medical and nursing students for their preference for a public sector post (figure 5.20). Greater opportunities for income was the third most often quoted reason, by around 12 percent of medical students and 11 percent of nursing students.

Figure 5.20: Main Reasons Stated for Short Term Public Sector Preference (percentage)



Note: above percentage is out of total of 84 medical students and 84 nursing students who indicated a short-term preference for a job in the public sector.

Bivariate Analysis (Chi Square)

The Chi Square test of Independence (Association) identified a number of different independent variables, for medical and nursing students, to be significantly associated (with continuity correction) with a public private preference for possible inclusion into the logistic regression model. Table 5.10 shows that school sector was found to be highly associated at P<.01 for nursing students, and p<.10 for medical students. Other variables such as locational preference

(rural/urban), marriage status, attitude to informal income generation, and having friends of family outside of Africa were all found to be associated with the public/private preference of nurses at p<.05 with the remainder at p<.10. For medical students only migratory preference was associated at p<.05 with all other variables at p<.10.

Table 5.10: Variables significantly associated with "public/private" Preference using Chi Square test

	Nursing Student		Medical student	
	Value with continuity correction	Asymptotic significance (2 tail)	Value with continuity correction	Asymptotic significance (2 tail)
Locational Preference (rural vs urban)	4.721	**.030**	2.716	**.099**
Migratory Preference (guinea vs abroad)	.325	.569	5.249	**.022**
Gender (male vs female)	1.114	.291	2.267	.132
Marriage status (married vs not)	4.933	**.026**	.990	.320
Earning extra income during work acceptable (agree/vs not agree)	4.663	**.031**	.707	.400
Location of School (Conakry vs Outside Conakry)	2.930	**.087**	na	na
Sector of School (Public vs Private)	6.883	**.009**	3.604	**.058**
Satisfaction with Monetary Situation (Satisfied vs dissatisfied)	.294	.588	3.836	**.050**
Having been outside of Africa (Yes vs no)	.873	.350	3.703	**.054**
Having been to another country in Africa (yes vs no)	.873	.350	3.703	**.054**
Having friends of family outside of Africa (yes vs no)	4.157	**.041**	.022	.883

Logistic Regression: Predictors for public sector preference:

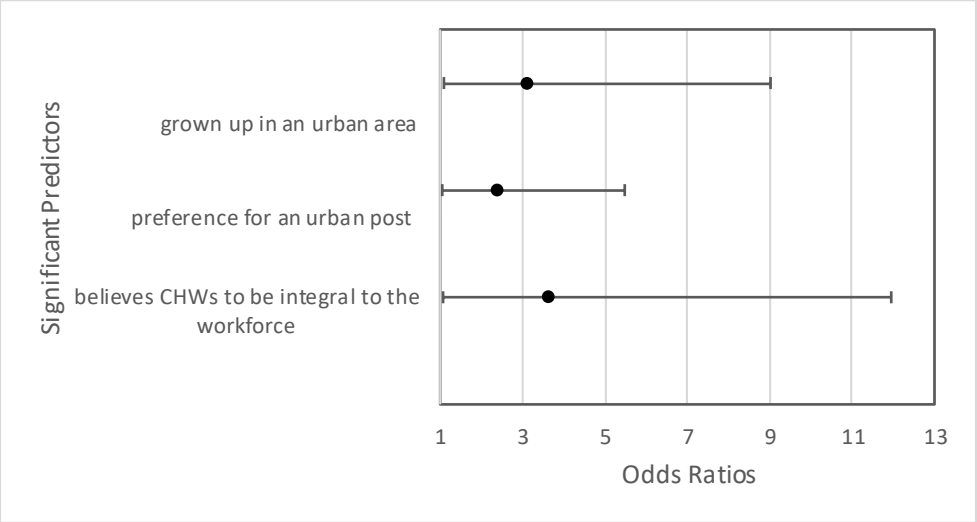
The Regression Model: In order to understand the predictors for students having a public sector preference, in the short term, logistic regression was carried out. A logistic regression model was built and populated with variables based on 1) significance in the above univariate analysis 2) relevancy based on the global literature and expert knowledge of the topic, 3) statistical soundness of the model (see box 5-d) and 4) that included the same predictor variables for medical students as for nursing students. This approach rather than the forward or backward stepwise approach of selecting variables is in line with the views of Flom, P. (2018) or James et al

(2013) who emphasize the importance of expert knowledge and adding predictor variables even when not significant (but instead were expected to be significant in the literature or elsewhere). The details of the models – including all variables included in the medical and nursing student models - are included in Annex H.

Box 5-d: Soundness of the Model: The usefulness of the models was confirmed by a number of tests that confirmed the overall soundness of the models (see Annex H). These tests were deemed appropriate by (Pallant, J. 2016) and could be automatically generated in SPSS. The **omnibus tests of model coefficient**, a goodness of fit **test to show** whether the explained variance in the data **is** significantly greater than the unexplained variance (Pallant, J. 2016), shows that the model performs very well with a high level of significance of .031 for the medical student model and .005 for the nursing student model. Results of the **Hosmer and Lemeshow Goodness of fit test,** which tests whether the models are well calibrated (assessing the similarity of expected and observed event rates in sub-groups) (Pallant, J. 2016) , also shows that the models are worthwhile, with a significance value greater than .05, which in this case is a positive result. **The Cox and Snell R square as well as the Nagelkerke R Square** further provide indication of the usefulness of the model (Pallant, J. 2016), indicating that between 31.2 percent and 41.9 percent of the variability in the medical student model is explained by the chosen set of variables, and 39.1 percent and 53.0 percent by the chosen set of variables in the nursing model.

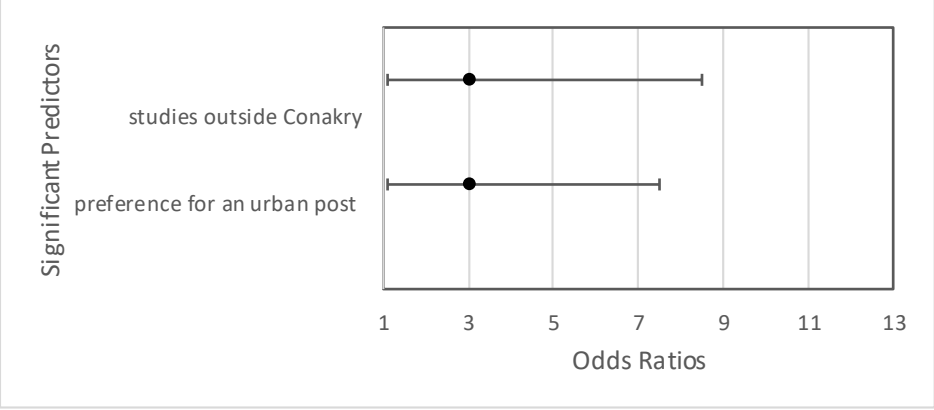
For medical students, a total of 4 variables contributed significantly to the predictive ability of the model at p<.05. So, in this model, the major factors at p<.05 that influence whether a medical student has a preference for a public-sector posting are 1) having grown up in an urban area 2) having a preference for an urban post, 3) agreeing that Community Health Workers (CHWs) are integral to workforce. Figure 5.21 provides an overview of some of the predictors and their odds ratios. Another significant predictor, not included in the figure is 4) feeling prepared to work in a rural area (OR 3.5;95% CI=1.3-9.4). The detailed outcome table from the regression is included in Annex H.

Figure 5.21: Select Medical Student Predictors for Public Sector Preference



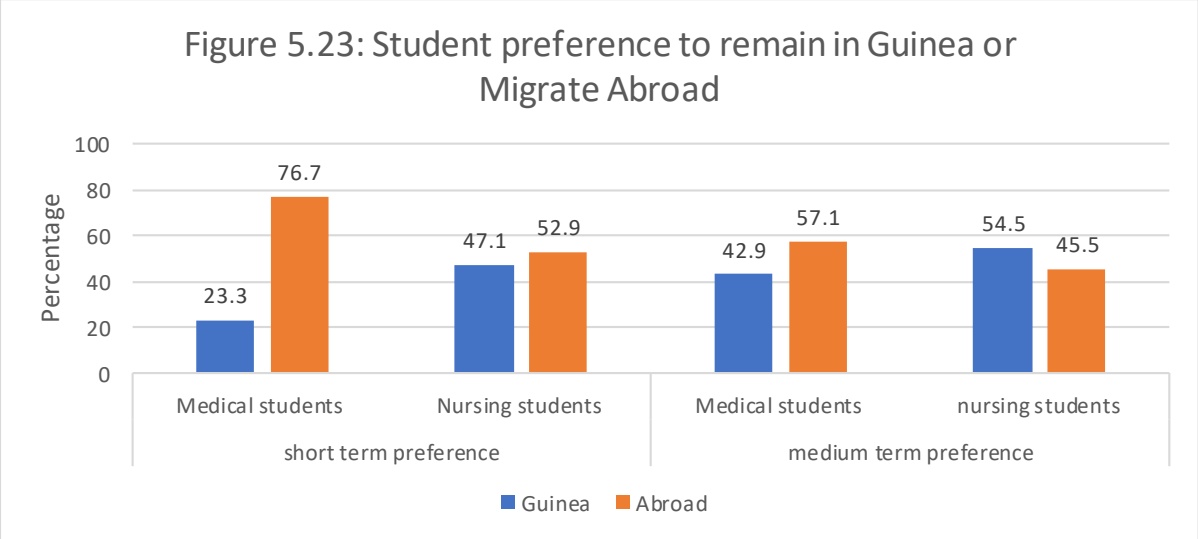
For nursing students, a total of 2 variables contributed significantly to the predictive ability of the model at p<.05, and 1 variable at p<.10. In this model, the major factors that influence whether a nursing student has a preference for a public-sector posting are 1) having a preference for an urban post (OR 3; 95% CI=1.1-7.5), 2) attending a health training institution outside of Conakry (OR 3; 95% CI 1.1-8.5). Figure 5.22 provides an overview of a select number of these predictors and odds ratios with their confidence intervals. The predictor that is less significant at p<.10 is having friends or family outside of Africa (OR 3.4; 90% CI=1.1-10.0), not included in the table. Detailed results are found in Annex H.

Figure 5.22: Select Nursing Student Predictors for Public Sector Preference



D. Guinea vs Outmigration Preference

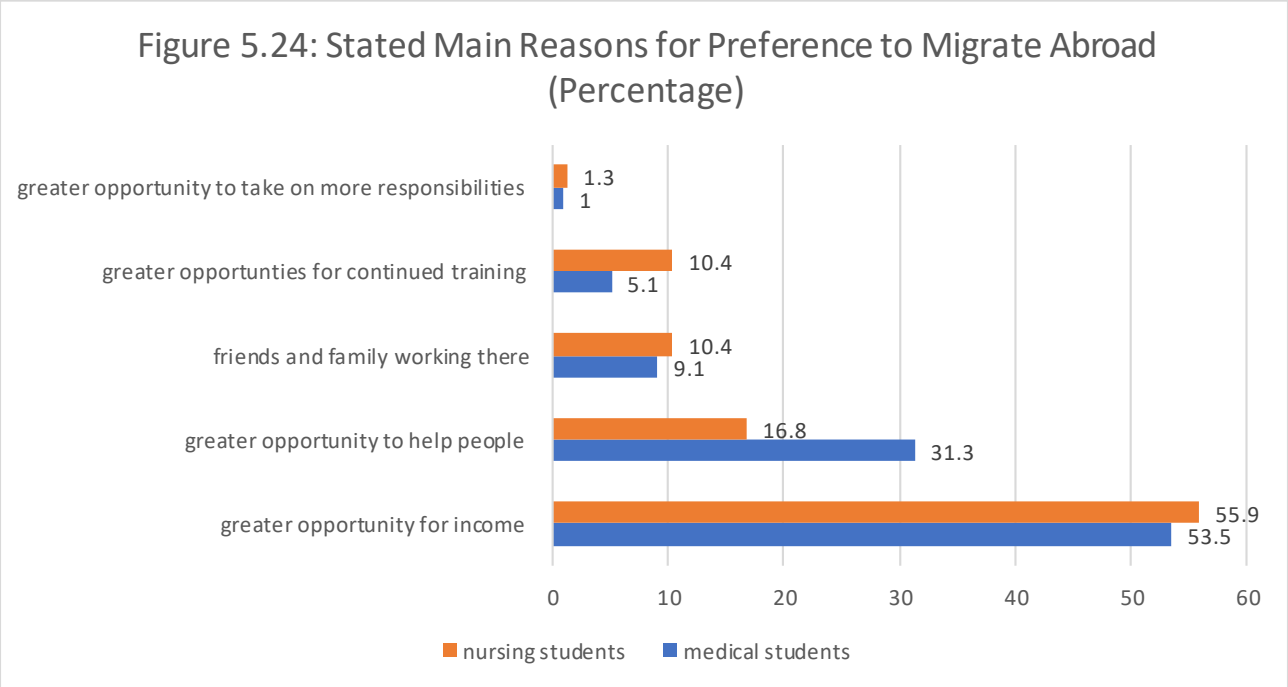
The vast majority of students, and medical students significantly more so than nursing students, have a preference to migrate in the short term (figure 5.23). Close to 77 percent of the 193 medical students who responded to this question, and 53 percent of 191 nursing students who responded, stated a preference to migrate abroad in the short term. Using the z test for differences in proportion finds that this observed difference in proportion between medical and nursing students is significant at p.001 (p=000). The proportion of students with a preference to remain in Guinea (i.e. not migrate abroad) is larger in the medium term.



Stated Reasons for job preference

Reason to migrate abroad: **Higher compensation was the most often stated main factor for wanting to migrate abroad (figure 5.24).** This was followed by greater opportunity to help people (possibly interpreted as being able to make more money to support their families back home). Interestingly, training opportunities, often a key reason for outmigration was listed only by 10

percent of nursing students and 5 percent of medical students as a main, primary reason for their preference to migrate abroad.



Note: above percentage is out of total of 84 medical students and 84 nursing students who indicated a short-term preference for a job in the public sector.

Bivariate Analysis (Chi Square)

The Chi Square test of Independence (Association) identified a number of different independent variables, for medical and nursing students, to be significantly associated (with continuity correction) with a preference to migrate/not to migrate (see Table 5.11). These variables were then included in the logistical regression model below, detailed in Annex H.

Table 5.11: Variables significantly associated with "migration/non-migration" Preference using Chi Square test

	Nursing Student		Medical student	
	Value with continuity correction	Asymptotic significance (2 tail)	Value with continuity correction	Asymptotic significance (2 tail)
Perceived parental socio-economic status (rich vs poor)	3.440	**.064**	.087	.768
Sectoral Preference (public vs private)	.325	.569	5.249	**.022**
Main motivation to become HW (financial vs other)	4.369	**.037**	3.191	**.074**
Main motivation to become HW (to help people)	.355	.551	2.987	**.084**
Readiness to work in a rural facility	.056	.813	5.725	**.017**
When posted, I'll have opportunities for continued training (agree vs disagree)	2.951	**.086**	.000	1.00
Working fewer hours than what is stated in contract is acceptable (agree vs disagree)	6.115	**.013**	3.883	**.049**
Earning income during work hours is acceptable (Agree vs Disagree)	.5799	**.016**	3.404	**.065**
Satisfaction with Monetary Situation (Satisfied vs dissatisfied)	3.908	**.048**	5.474	**.019**
Satisfaction with Life Overall (Satisfied vs Dissatisfied)	4.679	**.031**	2.990	**.084**
Having friends of family outside of Africa (yes vs no)	4.271	**.039**	.000	1.0
When posted, I will have adequate housing (agree vs not agree)	8.626	**.003**	.000	1.0

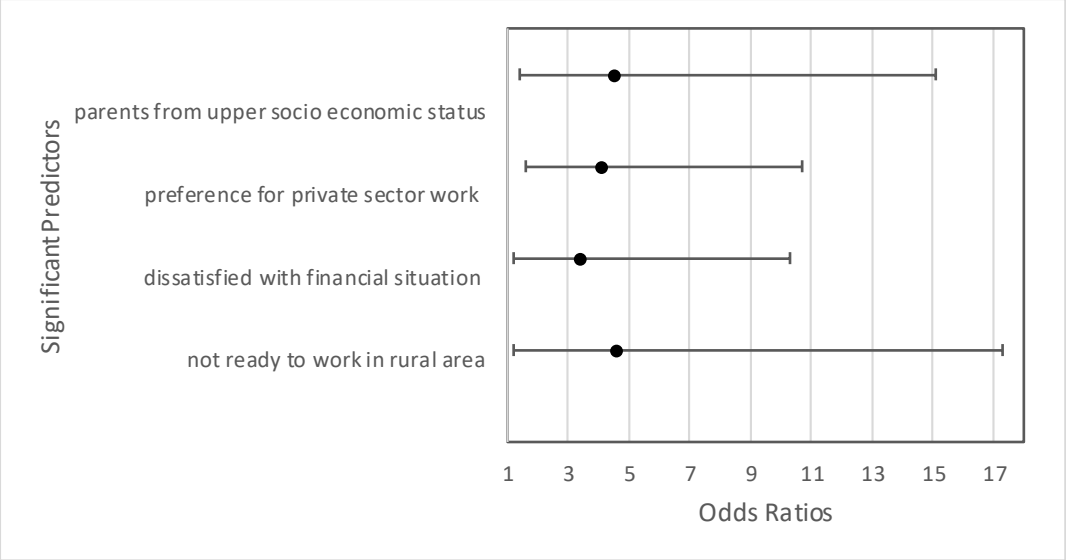
Logistic Regression: Predictors for Migratory Preference

The Regression Model: In order to understand the predictors for students having a migratory preference, logistic regression was carried out. A logistic regression model was built and populated with variables based on 1) significance in the above univariate analysis 2) relevancy based on the global literature and expert knowledge of the topic, 3) statistical soundness of the model (see box 5-e) and 4) that included the same predictor variables for medical students as for nursing students. This approach rather than the forward or backward stepwise approach of selecting variables is in line with the views of Flom, P. (2018) or James et al (2013) who emphasize the importance of expert knowledge and adding predictor variables even when not significant (but instead were expected to be significant in the literature or elsewhere). The details of the models – including all variables included in the medical and nursing student models - are included in Annex H.

Box 5-e: Soundness of the Model: The usefulness of the models was confirmed by a number of tests that confirmed the overall soundness of the models (see Annex H). These tests were deemed appropriate by (Pallant, J. 2016) and could be automatically generated in SPSS. The **omnibus tests of model Coefficient**, a goodness of fit **test to show** whether the explained variance in the data **is** significantly greater than the unexplained variance (Pallant, J. 2016), shows that the model performs very well with a high level of significance, showing a significance of .032 for the medical student model and .011 for the nursing student model. Results of the **Hosmer and Lemeshow Goodness of fit test** which tests whether the models are well calibrated (assessing the similarity of expected and observed event rates in sub-groups) (Pallant, J. 2016), also shows that the models are worthwhile, with a significance value greater than .05, which in this case is a positive result. **The Cox and Snell R square as well as the Nagelkerke R Square** further provide indication of the usefulness of the model (Pallant, J. 2016), indicating that between 20.1 percent and 30.5 percent of the variability in the medical student model is explained by the chosen set of variables, and 23.2 percent and 31.0 percent by the chosen set of variables in the nursing model.

For medical students, a total of 4 variables contributed significantly to the predictive ability of the model at p<.05. In this model, the major factors that influence whether a medical student has a preference for a job outside of Conakry at p<.05 are: 1) Having parents perceived to be upper middle class or rich (OR 4.5; 95% CI=1.4-15.1); 2) being dissatisfied with the financial situation (OR 3.4; 95% CI= 1.2-10.3); 3) having a preference to work in the private sector (OR 4.1; 95% CI=1.6-10.7); and 4) not ready to work in a rural health facility (OR 4.6; 95% CI=1.2-17.3). Figure 5.25 summarizes the predictors and linked odds ratios. Detailed statistics are found in Annex H.

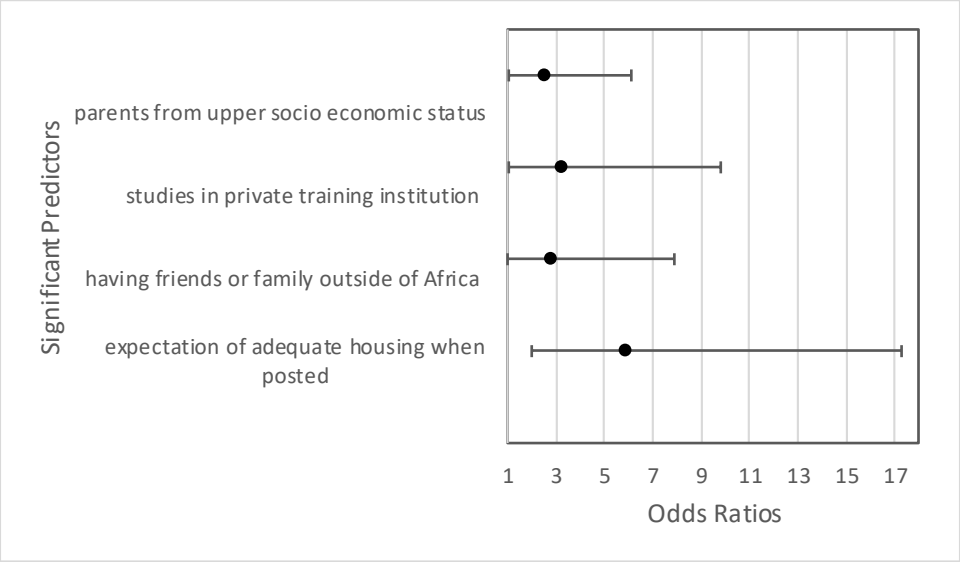
Figure 5.25: Select Medical Student Predictors for Preference to Migrate Abroad



Note: ""Socio economic class of parents: upper middle to high" is the reciprocal of the odds ratio in the model, calculated as 1/. 218. The confidence interval was equally inversed.

For nursing students, a total of 4 variables contributed significantly to the predictive ability of the model at p<.05. In this model, the major factors that influence whether a nursing student has a preference for outmigration are 2) having parents who come from upper middle class or richer backgrounds (OR 2.5; 95% CI=1.05-6.12); 3) having friends or family living outside of Africa (OR 2.8; 95% CI=1.0-7.9), and 4) expectation of adequate housing once posted (OR 5.9; 95% CI=2.0-17.3). Attending a private nursing school was just outside of P<.05 (OR 3.2; 90% CI=1.05-9.82), but close enough to be included. Figure 5.26 provides a select overview of some of the predictors and odds ratios and confidence intervals, with details of the statistics in Annex H.

Figure 5.26: Nursing Student Predictors for Preference to Migrate Abroad



Note: "Socio economic class of parents: upper middle to rich" is the reciprocal of the odds ratio in the model, calculated as 1/.393. The Confidence interval was equally inversed.

VI. Discussion

The findings on the expectations, attitudes and locational preferences of medical and nursing students are relevant to the policy discourse on health workers in Guinea. The finding that a large proportion of students, particularly nursing students, are educated in the private sector, and that a majority see themselves as the main financer of their education with little obligation to pay back the funders reaffirms the relevance of this study. Students in Guinea are relatively free to make choices on where to work in the labour market, the opposite to countries where the public sector is the main educator and financing source, where job placement and or bonding requirements are common, and where regulatory capacity is sufficiently strong to enforce such practices.

This remainder of this chapter reflects on, and discusses, some of the key findings on, and the implications of, the locational preferences of nurses and physicians in Guinea**,** first 1) the different locational preferences - Conakry/outside Conakry, rural/urban public/private, and Guinea/Outside Guinea, and then 2) the stated expectations and attitudes of the students. These have implications on the retention and performance of students once posted in the labour market.

I. Understanding the *Outside Conakry* Preference

The predominant preference of both medical and nursing students to work outside of Conakry in the short term was perhaps unexpected. What was made clear however is that **Outside Conakry preference does not equate with a rural preference as the majority of both student types still prefer a job in an urban area**, and "having a preference for an urban job" was found to be a strong predictor of an Outside Conakry preference of both medical and nursing students.

The shifting preference towards a job in Conakry in the medium term is in line with findings from other studies, that with changing circumstances, job preferences change over time (see for example the cohort study from Ethiopia by Serra et al, 2010). What is apparent is that interventions to increase job uptake outside of Conakry may do well by focusing on recent medical and nursing graduates, rather than health workers already employed in the labour market in Conakry. But what does the evidence suggest on how this can be achieved?

Living and Working Conditions

This research has shown that the preference for a job outside of Conakry is not very strongly linked to financial considerations. Overall only a very small proportion, around 10 percent of students (7% nursing students and 11% medical students), listed opportunities for greater income as a main reason for this preference. This is not surprising, the opportunity to earn income - both formal and informal - is generally lower outside of the capital than it is in Conakry (Govindaraj et al 2018). Nursing students with a preference to work outside of Conakry are more likely to be those who find it less acceptable to earn extra income during work hours in a facility. Overall there is limited evidence that student preference to work outside of Conakry is shaped by financial reasons. Key other variables play a bigger role.

Having family and friends outside of Conakry was listed as a primary reason for an outside Conakry job preference by around 9 % of nursing students and 13 % of medical students. The attractiveness of a job is enhanced if friends or families live nearby and the findings highlight this potentially important variable to be taken into account in job postings. The finding is similar to other studies, including in China, where medical students were found to be more likely to live in those areas where their parents lived (Hou, Xu et al. 2016).

In addition, a relatively small proportion of medical students (15%) and nursing students (6%) also list greater responsibilities as a main reason for working outside of Conakry. This is in line with findings from elsewhere which have shown that the lack of other health workers, as often

found outside of the main capital hubs, allows or even forces medical workers to carry out greater roles and responsibilities (see for example McPake and Mensah, 2008).

Education Related factors

Education related variables seem to play a substantial role. A much larger proportion of nursing students (40%) than medical students (10%) listed opportunities for continued training as a main reason for a job preference outside of Conakry. The global literature has found the desire for continued training and specialization to be a key explanation for the locational job preference of students (Lievens, Serneels et al. 2010); (Bailey, Mandeville et al. 2012). In the case of Guinea, for nurses who are trained mainly outside of Conakry and in the private sector, such training opportunities exist at the facility level where they will be posted. For medical students on the other hand, continued training opportunities exist mainly in Conakry. The fact that a large proportion of medical students list opportunities for continued education as a key reason for a job preference in Conakry helps to confirm this.

Another interesting finding was that medical students who finance their education through private means, are more likely to have a preference for a job outside of Conakry. Qualitative research may be needed to obtain more insights, but one potential explanation is that publicly trained (and funded) medical students are considered of higher quality, and are thus more likely to be absorbed in the Conakry labour market and are recruited by many of the big training institutions. With the space for continued training or job opportunities tight in Conakry, many of

the privately trained (and funded) medical students will find and embrace alternative opportunities outside of Conakry.

Profiles and Characteristics

Intrinsic motivation could partly explain an out of Conakry preference. The opportunity to "help people" was listed as the primary main reason by a larger proportion of both medical and nursing students (40%) for their job preference outside of Conakry. A much smaller proportion listed this to be a primary reason for their job preference in Conakry. The finding that health workers who are less advanced in their career, such as students, are more altruistically inclined than health workers further down in their career, was similarly found in other research (Serneels et al, 2014; Agyei-Baffour, Kotha et al. 2011).

The association of other variables such as gender and marriage with the preference of medical students for a job outside of Conakry is also in line with other studies. For medical students being male, married or engaged, are key predictors for a job preference outside of Conakry. Once married or engaged, medical students may be more willing to move outside the capital, including to follow their spouses. Interestingly for nurses neither gender nor marriage status was found to be linked to out of Conakry job preferences. Females have been found to be less likely to work outside the capital than males due to security issues or marriage reasons (potentially the notion that they will find more desirable partners in the capital, as suggested in Rwanda by Lievens et al, 2010)

What is somewhat unexpected, is that medical students born *in* Conakry are more likely to have a preference for a job *outside of* Conakry than those who are born outside of Conakry. And that other variables such as having grown up or lived in a remoter or rural area, were not associated with a preference or a job outside of Conakry. Findings from elsewhere have shown that students born in the capital or central urban areas are much more likely to work in the these locations (see for example (Dossajee, Obonyo et al. 2016) or (Huntington, Shrestha et al. 2011). Once again evidence on nursing students was generally sparse highlighting the importance of other factors for them.

Overall Conclusions and implications:

A large proportion of students are willing to work outside of Conakry in the short term, a preference not driven by financial considerations but a combination of other factors, discussed above, that vary by cadre. In part, the fact that many of the nursing schools are already heavily decentralized to many of the regional capitals, and many of the nursing students come from outside of Conakry, is of particular policy relevance for nurses. The decentralization of education and training, frequently touted as an effective intervention for uptake and retention in underserved areas, should continue to be supported in Guinea, particularly of public nursing schools (Evans et al, 2016; Scheffler et al, 2016; Soucat et al, 2013).

Keeping in mind the variations between doctors and nurses, the findings point towards a need to promote the value of out of Conakry postings. This includes promoting the notion that roles and responsibilities are greater for health workers in remote areas than in Conakry. Such

messaging could be woven into the training in each school and could be as simple as having nurses or physicians speak in schools, and student tours of health facilities outside of Conakry, to learn about the essential and increased roles and responsibilities.

The findings also point towards the potential to target recruitment for out of Conakry positions towards specific health worker profiles, including 1) nursing more than medical students 2) male medical students over female medical students 3) students who predominantly financed their education through private sources. The findings also highlight the importance of deployment in those regions where students already have friends and family. Planners could obtain such information from the different medical and nursing schools and use this to guide the public sector recruitment/deployment effort.

Finally, the findings point towards a labour market intervention to support graduates with continued training and professional development in out of Conakry locations. Offering continued training and support, provided in particular in underserved areas, including through e-learning and mentoring where possible, is widely seen as an effective strategy to encourage job uptake and retention in underserved locations (Evans et al 2016; Soucat et al 2013)

Planners should keep in mind that much more evidence was available for medical than nursing students, and that additional evidence may be needed to generate greater insights (for example through Discrete Choice experiments to identify the relative impact of incentives on locational decision making).

II. Understanding the *Rural* Preference

While the majority of medical and nursing students have a preference for an urban post after graduation, interestingly a substantial proportion of medical and nursing students nonetheless had a preference for a rural area in the short term (about 40%), one that is considerably reduced in the medium term. Interestingly, medical students with a preference for work in rural areas are much more likely to be those who have a preference for work outside of Conakry and job postings in the private sector. Neither link is surprising. Rural areas and a large private sector (relative to the public sector) is found outside of Conakry in Guinea.

Working and Living Conditions:

There is a limited suggestion that medical and nursing student preference for rural postings is driven by some financial considerations. The finding that medical students, who find it unacceptable to earn extra income during work hours, are more likely to have a rural job preference than those who find it acceptable supports this. Interestingly, being satisfied with the financial situation is a key predictor for medical student preferences in rural areas. At the same time, it is not unsubstantial, close to 10 percent of medical students and close to 17 percent of nursing students do list greater opportunities for income generation as a key reason for rural preference. Over 13 percent list this as a main reason for urban practice. This could possibly be explained partly by the difficulty for some students, particularly nursing students, to obtain a job in Conakry after graduating (particularly nurses who are trained mainly by the private sector and are thus not as employable). For some, self/private sector employment in rural areas may be a bigger opportunity for income generation, relative to the lack of employment in an urban area.

There is much less evidence on the influence of non-monetary factors determining the preference for rural posts. A small proportion of medical students (around 15%) but no nurses list having greater responsibilities as one of their main reasons for choosing rural area. Those with a preference for urban areas did not list this as a reason, confirming the notion that the lack of other health workers in rural areas (in particular other doctors) shift greater responsibilities on those who are posted there. The lack of other workers and general isolation stated to be experienced by many health workers in rural area is in line with the expectation of nursing students of being largely *on their own* when posted, an expectation that was shown to be a significant predictor for rural preference.

Education Related factors

A relatively small proportion of medical students (13%) but a larger proportion of nursing students (30%), listed opportunities for access to continued education as a key reason for their preference for rural areas. Whereas opportunities for continued training are usually larger in urban areas - and this is usually a key reason provided for a preference of an urban post in this survey - it reflects the fact that opportunities for continued education in Guinea do exist in rural areas. As an example, a recent World Bank Project – the Guinea Health Service and Capacity Strengthening Project - currently being implemented is providing concerted training opportunities in rural health centers across the country (WB 2018).

A curriculum and education that adequately prepares students for rural practice is often stated as critical to increasing rural job uptake. A study on medical students in the USA had found that those who felt better prepared in community medicine were more likely to have a preference for rural areas (Xierali, Maeshiro et al. 2014). In Guinea, feeling sufficiently trained and prepared to work in a rural health facility was not found to be significant for either medical or nursing students. Qualitative research may be required to better understand this finding.

Finally, one of the most often touted associations, that between health worker rural practice and the rural location of their health training institution, could not be demonstrated by this research. Although the global literature review of this paper had found no such link overall, several studies have found such associations from surveying health workers already employed in the health labour market (see for example Strasser and Neusy, 2010). It is often a powerful argument to promote the decentralization of training institutions from urban to rural areas (see Govindaraj et al, 2018). For medical students such a link could not be established due to the sampling frame - all medical students came from schools located in Conakry. For nursing schools, the sampling frame was uneven – the location of the school Conakry/Outside Conakry did not come up as a significant predictor for rural preference. Perhaps not surprising, as it does not quite measure rural/urban school location.

Profiles and Characteristics

Rural preference was found to be linked more to altruistically inclined students, particularly medical students. Once again "to help people" was listed by over 50 percent of medical and

nursing students as a main explanation for their rural preference. This link however was not statistically underscored by the finding that to *help people* was not a significant key predictor of rural preference for either nursing or medical students. The association between some form of intrinsic motivation and rural preference has been demonstrated in several studies including on Ghana (Agyei-Baffour, Kotha et al. 2011), Ethiopia (Assefa, Mariam et al. 2017) (Serneels, Lindelow et al. 2007,) Rwanda (Lievens, Serneels et al. 2010) and Nepal (Huntington, Shrestha et al. 2011).

Interestingly, rural background, including having been born or grown up in a rural area was not found to be a significant predictor for rural preference in Guinea, for neither medical students nor nursing students. Elsewhere this was found to be strongly associated with rural preference, although it should be kept in mind that the measurement of the rural background variables differs between the studies so no direct comparisons can be made. In Malawi, rural background focused on a qualitative notion of "being from a rural area", (Bailey, Mandeville et al. 2012); in Kenya it centered on having "grown up in a rural area" (Dossajee, Obonyo et al. 2016) in China on students who lived in rural areas when 1-15 years old (Hou, Xu et al. 2016) and in Nepal, students who were born in a village.

Interesting too is that while nursing students from perceived lower socio-economic households are more likely to have a rural preference than those who come from better off households (as has been found elsewhere, see Agyei-Baffour, Kotha et al. (2011) or Serneels, Lindelow et al. (2007), for medical students those who were born in Conakry, and seem to be more satisfied with

the monetary situation are more likely to have a rural preference than medical students with opposite traits. The frequent notion is that if you come from poorer backgrounds you are more likely to accept lower salaries and work in simpler working conditions (Sierra et al, 2010). While this may help explain the nursing student picture, the finding on medical students could suggest that having greater financial security makes a temporary rural stint interesting and less risky.

Overall Conclusions and implications:

A much larger proportion of medical and nursing students than expected have a preference for working in rural areas after graduation, with such a preference closely associated with a preference for out of Conakry work (not surprising since Conakry is urban) and the private sector (nor surprising, since the public sector infrastructure is weak in rural areas). Financial considerations are not a main reason for wanting to work in a rural area (although for some there are greater opportunities to make money in rural areas than in urban areas). Instead, many students who do have a rural preference are altruistically driven in addition to being influenced by a number of other factors, discussed above.

Based on some of these, interventions to increase overall rural uptake of health workers could focus on targeted recruitment of 1) nursing students over medical students 2) medical students who are satisfied with their financial situation 3) recent graduates over health workers already employed in the health labour market. Several countries, including Liberia, have mandated the need for rural practice and rotation, after graduation, in order to fill staffing needs (Evans et al 2013)

The findings also suggest that health science schools could aim to emphasize the merits of rural service and focus on building altruistic motivations of students early on. This in combination with other strategies could increase rural uptake of students. Research on altruism in health workers has highlighted the importance of appealing to altruistic values as an alternative strategy to education and incentive interventions to increase recruitment and retention (Smith et al, 2012)

The findings also point towards the importance of maximizing opportunities for continued training and education in rural areas. Nursing and medical schools in underserved regions could also provide the infrastructure to offer continuing education opportunities to existing staff in rural locations, including at health center levels, which globally has been argued to reduce attrition of nurses once employed (Evans et al, 2016).

The findings also point towards the need to decentralize training itself to rural areas, a particular opportunity to maximize staffing. Globally, the literature has argued that decentralizing the training of nurses or physicians to rural areas is an important cost-effective strategy to staff rural facilities (Mbemba et al 2013). Decentralization of training would involve establishing branches of nursing or medical colleges in rural communities and training and recruiting young people from these communities. These branch campuses would fall under the licensing and accreditation of existing schools and could leverage their faculty as well.

II. Understanding Sector Preference

The majority of students were found to have a preference for the private sector in the short term, and a preference for the public sector in the medium term. And where the preference for the

private sector is associated with a preference for a rural job, a preference for the public sector is associated with an urban job. The private sector first, then public sector preference is contrary to findings from other countries showing the public sector to be an early stepping-stone to a more desirable private sector (Sierra et al, 2010). The greater stability and long-term benefits of the public sector over the private sector may explain the preference in Guinea. The following reflects on and discusses the findings associated with a public sector preference.

Working and Living Conditions:

Financial considerations are not high on the list as a main reason for having a public sector preference, selected by only about 10 percent of medical and nursing students as a main reason (it was much more prominently listed by those who have a private sector preference). Other than financial considerations instead play a larger role.

A few non-financial factors seem to be important explanatory variables for a small proportion of medical and nursing students for their public sector choice. Around 10 percent of medical students and 7 percent of nursing students state "taking on greater responsibilities" as a main reason for their public sector preference, a proportion that was similarly listed by those students with a private sector preference. As expected, the public sector preferences were not shaped by a belief in better management and working conditions – instead 15 percent of medical students and 4 percent of nursing students listed this as a main reason for having a private sector preference. Sub-optimal management and working conditions in public sector facilities, vis a vis the private sector, have frequently been found elsewhere (Soucat et al, 2013).

Education Related factors

Opportunities for continued training were stated to be key reasons for student choice, this time for either the public or the private sector. The qualitative study carried out in Malawi (Bailey, Mandeville et al, 2012) found having access to training to be a key factor in student preferences for the public over private sector. In Guinea, about 30 percent of both medical and nursing students give this as a main reason for their public sector preference. It reflects the existing continued education programs that exist in the public sector at various levels in Guinea (in addition to similar training programs existing in the private sector).

Some of the findings require more research. A key predictor for a public sector preference of nursing students was coming from a school located outside of Conakry (as opposed to inside Conakry). This also requires further investigation to understand why this might be the case. Finally, the finding that medical students who felt sufficiently prepared to work in a rural area are more likely to have a preference for the public sector than those with an opposite trait, also requires more follow up research and understanding. Overall, the lack of literature in this area, as demonstrated by the global literature review, and the fact that it is out of the scope of this research to allow for further investigation of these issues, requires follow up in the future.

Profiles and Characteristics

Over 40 percent of both nurses and medical students stated “to help people” as a main reason for their preference to work in the public sector. Only around 15 percent of medical students and

20 percent of nurses stated this to be a main reason for preference for the private sector. Once again more altruistically inclined profiles are linked to a public sector preference, although there was no statistically significant association between those who stated "to help people" as their main motivation to become a health worker (a proxy for altruism) and public sector preference. In any case, in Guinea the public sector is free of charge, in contrast to the private sector, and largely serves the majority of the population who are poor (Govindaraj 2018). A study in Poland had shown that medical students attaching importance to the prospect of preforming socially important work was a strong predictor of preference for public sector work (Gasiorowski, Rudowicz et al. 2015).

For medical students, those who grew up in urban areas were more likely to have a public sector preference than those who grew up in rural areas. This once again is similar to the finding from Poland, which showed that students who come from larger cities were more likely to work for the public sector (Gasiorowski, Rudowicz et al. 2015). It could point to the fact that the public sector is usually much more developed in urban than in rural areas, and exposure could have been greater. For nursing students, the association between having friends or family outside of Guinea (i.e. within and outside of Africa) and having a public sector preference is more difficult to interpret. And while self-perceived socio-economic status of parents was not found to be associated with a public sector preference, it could nonetheless point to a notion that students whose families are better off have more opportunities, and thus preference to work and become employed by the public sector.

Overall Conclusions and implications:

This PhD garnered new insights into the short-term sector preference of medical and nursing students in Guinea, a topic very much untouched in the literature to date. Further in-depth work will be required to generate a better understanding on the associations and dynamics observed. What is clear is that the tremendous shortage of health workers in the public sector in Guinea vis a vis the numbers needed and associated with Universal Health Coverage where all have access to the health care needed requires policies and interventions that maximize uptake, including after graduation from medical or nursing school.

The findings suggest interventions to maximize public sector uptake and retention could include 1) strategies that communicate the merits of public sector service to students to strengthen their altruistic tendencies 2) recruitment strategies that target medical students who grew up in urban areas and 3) strategies to strengthen continued medical education in the public sector – this is a large general determinant.

In addition, generating more evidence to determine whether graduate preference to the private sector is linked to the lack of opportunities for jobs in the public sector after graduation, in particular for those students from the private training institutions, is also critical.

Perhaps one of the most critical interventions to consider however is to strengthen regulatory efforts over the private sector (education and health facilities), not only by the Ministry of Health, but also the Ministry of Education and by any Medical Council or 'licensing and certification'

boards present in Guinea. The global literature has argued that *joint efforts* by the health sector and the education sector and, ideally also the Ministry of Labour/Economics, would likely hold most promise in ensuring and upholding standards in both education institution and service delivery institutions of the private sector (Evans et al 2016). Given the large graduate preference for the private sector after graduation, such intervention is critical.

IV. Understanding preference for jobs abroad

The finding that both medical and nursing students, and in particular medical students, have an overwhelming preference to work outside of Guinea in the short term is a policy concern. The preference is reduced in the medium term, but nonetheless remains high. While migratory preference of students has been shown to vary, usually between 20% - 60% (see chapter 3 in the literature review, for example Burch, McKinley et al. 2011), the very high preference for outmigration observed in Guinea is in line with some other countries such as Serbia, where more than 84 percent of students considered the option of leaving the country to work after graduation (Santric-Milicevic, Terzic-Supic et al. 2014). A higher migratory preference in the short term over the medium term is contrary to findings in other studies for example Ethiopia, where migratory preferences were found to be much higher in the medium term (Serneels et al, 2016).

Working and living conditions

In Guinea, nursing students who expect "housing will be adequate when posted" are more likely to have a preference to migrate abroad than nursing students with the opposite view. This seemingly reflects the higher expected working and living conditions abroad. Of all of the locational preferences, the preference to migrate aboard can be most prominently explained by

financial reasons. These seem to play a big role, more than 50 percent of all nurses and doctors stated this to be the main reason for their job preference abroad. This is very much in line with the literature from elsewhere: In a multi-country Africa study 96 percent of medical students stated salary as very or somewhat important in their intention to leave Africa (Burch, McKinley et al. 2011), in Uganda 75 percent of students list higher salary as a key reason (Kizito, Mukunya et al. 2015), and in Poland 78 percent list higher salary as a main motivation for outmigration (Krajewski-Siuda, Szromek et al. 2012). The importance of financial considerations in the migratory preference of students in Guinea is reinforced by several findings on specific profile and characteristics of students, discussed below.

Education related factors

Only limited evidence was found on the importance of education related factors in shaping a preference to migrate abroad. Interestingly, medical students who do not feel adequately prepared to work in a rural health facility have been found to be more likely to migrate aboard. This is somewhat in line with the literature from elsewhere that has argued that the adoption of a curricula that prepared students for local and rural practice reduces out of country and urban practice (Strasser and Neusy 2010). There are some indications that the migratory preference of nurses is potentially linked to whether a nursing school is private or public. For nurses, attending a private nursing school was just outside significance as a preference to migrate abroad. Coming from a private sector school, the prospects of a job in the public sector are much less guaranteed and offers greater flexibility of taking up a post abroad.

In many other countries opportunities for continuing education are often listed as a primary reason for outmigration, something not found to be the case in Guinea. For example, 85 percent of medical students in a multi-country study in Africa (Burch, McKinley et al. 2011) and 78.5 percent of students in Poland (Krajewski-Siuda, Szromek et al. 2012) and 58 percent of students in Uganda (Kizito, Mukunya et al. 2015) list the opportunity for continued education or specialization as a key reason for outmigration. In Guinea, only 5 percent of medical students and 10 percent of nurses state greater opportunities for continuing education as a main reason for out migration. The lack of importance of outmigration could have been masked by the fact that students were only asked to list their main reason – which as in most of the above listed studies also, tends to be driven by financial considerations.

Profiles and Characteristics

The second most stated reason for those with a preference to migrate abroad was "to help people" which at first instance may seem perplexing, but ultimately does not counter the financial arguments. Over 30 percent of medical students and just under 20 percent of nurses list this altruistic reason as a primary reason for their preference to migrate abroad. Helping people was thus likely understood to be an important motivation, which would not discount the fact that another important motivation is also to make money. Qualitative evidence from Malawi was able to qualify this in another context. The main reasons cited for medical students leaving the country was the possibility of higher salaries abroad, *which could better support their families* (Bailey, Mandeville et al. 2012).

Our analysis found that students from perceived better off socio-economic backgrounds, yet those that have grown up in rural areas and nevertheless state dissatisfaction with their financial situation, are more likely to migrate aboard. For medical and nursing students, having parents from higher socio-economic backgrounds was a key predictor for a preference to migrate aboard. This is in lined with findings from elsewhere, including studies on medical students in Ghana (Aggyei-Baffour et al, 2011), Ethiopia (Serra et al, 2010) and Nepal (Huntington, Shrestha et al. 2011) which found students from higher socio-economic backgrounds having a higher preference to migrate abroad, than those who come from lower socio-economic backgrounds. At the same time, having grown up in a rural area, and feeling dissatisfied or highly dissatisfied with their monetary situation were also predictors. These findings further reinforce the idea that a migration preference may be more prevalent with students from richer backgrounds (they may see more realistic opportunity to migrate abroad), yet is largely shaped by financial considerations (the financial needs of students from more well off backgrounds may be higher than those from less well-off students, as has been shown elsewhere – See for example Serra et al, 2010).

Finally, having family and friends abroad was also found to be linked to the preference to migrate abroad. Around 10 percent of both doctors and nurses listed their main reason for this preference as having friends and family abroad. For nursing students, having friends and family living abroad was also found to be a significant predictor of having a preference to migrate aboard. Having friends and family abroad has been shown elsewhere to greatly influence motivation for outmigration, such as in Lebanon (Akl, Maroun et al. 2007), Serbia (Santric-

Milicevic, Terzic-Supic et al. 2014) and countries in Africa (Burch, McKinley et al. 2011) (Kizito, Mukunya et al. 2015).

Overall Conclusions and implications:

The high preference for outmigration of both medical and nursing students in the short term is a major policy concern. It seems driven largely by the motivation to earn money abroad, to help themselves and their families create a better life.

Outmigration is very difficult to stop in contexts such as Guinea where earning potential is relatively low, however a number of smaller interventions, based on this evidence, could be considered to reduce prevalence. Interventions should consider 1) efforts to scale up the number of nurses educated and graduating from public sector training institutions in Guinea, given that outmigration preference is particularly prevalent among those who study in private sector institutions, and 2) admission preference to poorer and lower income students who are less likely to migrate abroad following graduation 3) strengthening opportunities for continued education and specialization in Guinea and linking such education to practice and licencing requirements after graduation. Increasing in-country opportunities for continued education and professional development, in particular specialization, has been globally argued to be one of the most effective interventions to reduce outmigration (Soucat et al, 2013)

Finally, interventions should be considered that focus on 3) reforming curricula in medical and nursing schools prepare students to work in local including rural contexts. Such interventions are often linked to the uptake and retention in rural areas also and are often described as part and parcel of rural pipeline strategies (Evans et al, 2016; Soucat et al, 2013). The notion is generally

that if students are trained through locally adapted curricula, that prepare students for country specific including rural contexts, health workers are more equipped and willing to work in the country in which they are trained (Evans et al, 2016; Soucat et al, 2013).

V. Understanding Expectations and Attitudes

The findings on the expectations and attitudes of medical and nursing students in Guinea indicate potential challenges with regards to student retention and performance once posted in the labour market. Policies or interventions that aim to increase the uptake of medical and nursing students outside of Conakry, in rural areas, in the public sector, and to reduce outmigration, are unlikely to have a lasting or appropriate effect without correcting some key expectations or attitudes. This section will discuss these briefly.

The general optimism of getting a job relatively quickly after graduation, despite recognition that it might not be easy, is potentially problematic. Whereas becoming self-employed and or engaging in private practice may be easier, those who have a preference for the public sector are likely to face significant challenges in getting a job. Several studies have shown that the overall fiscal space of the government to recruit and absorb health workers on public sector payroll is extremely limited, and many graduates are resigned to a long wait list or towards practice in the private sector in the meantime (see Govindaraj et al 2018; McPake et al 2019).

A somewhat unexpected finding was of student expectations of excellent working conditions at the facilities they will be posted to. Other evidence has shown working and living conditions in

Guinea in both the public and the private sector, not to be of the highest standard, with shortage of other health workers, infrastructure and equipment, housing and many other aspects common (Govindaraj et al 2018). While most of the students probably correctly expect to be working largely on their own, with few people there to support them, the overwhelming majority nevertheless expect to have sufficient supplies and equipment at their disposal once posted (96.4% medical students vs 89.6 % nursing students) as well as adequate housing (94.5 % medical vs 81.5 % nursing). The lack of exposure and practical experience in service delivery sites (shown to be extremely limited) could help explain this. This presents a danger of demotivating students or preventing them from carrying out service delivery at optimal standards.

The expectations of monetary compensation of both medical and nursing students in Guinea are higher than the usual rates. On the one hand this could be explained by the fact that these expectations reflect students who intend to work in the public sector as well as those who intend to work in the private sector. But an analysis of preference between these two groups, carried out as part of the data analysis of this PHD, did not find a significant difference. The expected baseline salaries of medical students of 700 USD per month is about twice as high as the actual public sector remuneration of a doctor, and the nursing salary almost twice as high as the actual public sector starting salary in the labour market. Benefits are more in line with the actual remuneration. There is a danger of both medical and nursing students becoming demotivated upon realizing this.

Medical students, moreover, expect to make a lot of money from health and non-health work on the side. Health work on the side usually refers to work outside the primary place of employment (i.e. in the private sector if employed in the public sector). Work on the side outside the health sector could be work in a sector such as agriculture (for example raising and selling livestock), which anecdotal evidence suggests is a common additional income generation activity for many. For those employed by the public sector, this is problematic for various reasons, but primarily because it will reduce the time worked in the public sector. The negative impact of dual practice on the performance of health workers in their primary job has been widely discussed elsewhere (see for example McPake et al 2016). Attitudes concerning informal income generation were shown to be a potential concern, in particular among doctors, with a large proportion finding it acceptable to accept informal income from patients (illegal in Guinea) and engaging in extra income generation within the primary facility of practice and even during work hours. Although many of the students indicated a willingness to be on call and work until all patients have been seen, the large proportion of students indicating it to be acceptable to work less hours than is stated in a contract further illustrates the intent for dual practice.

Finally, attitudes on community health workers (CHWs) may need to change in Guinea for a substantial proportion of the students. The government plan is to widely increase the number of community health workers particularly in rural areas, and to have these closely integrated into the service delivery team (supervised by nurses) (Govindaraj et al 2018). Although a substantial proportion of both medical and nursing students recognize the value of CHWs, a big proportion nonetheless do not. Interestingly, nursing students who disagree that CHWs are integral

members of the service delivery team, are more likely to have a preference for out of Conakry jobs than those who recognize their value. This is potentially problematic in that those health workers who are likely to actually end up in areas outside of Conakry are also more likely to not want to work with CHWs (which are integral to the service delivery model outside of Conakry). The lack of acceptance of community health workers value by nurses is an important issue that has been frequently reported elsewhere (See for example Kane et al 2016).

Conclusions and implications:

This PhD has generated new evidence on the expectations and attitudes of medical and nursing students that could compromise the retention and delivery of quality services once posted. A number of interventions could be considered:

Students should be sensitized on the salaries and compensation to expect once posted. Currently television advertisements of medical and nursing schools, in particular the private sector schools, advertise high returns of medical and nursing school study, inflating initial earnings. Health training institutions should sensitize their students on the actual salaries to be expected, to minimize demotivation once posted. In addition, students should be sensitized and prepared early on some of the challenges and capacity constraints that exist in Guinea at the facility level. The best strategy for that may be to expose students to practice in remoter and rural areas and teach problem solving skills specifically geared for work in capacity constrained contexts (Evans et al, 2016).

A policy could be developed clarifying the scope for dual practice, and regulatory capacity should be strengthened to enforce such a policy (i.e. at minimum, no dual practice during work hours and no informal charging of fees). Research and policy conclusions on interventions to address dual practice has argued that in those countries with limited ability to remunerate public sector staff, less developed health markets, weak regulatory capacity and porous public–private boundaries, policy options could include top-down government regulation of dual practice, separation of private services and informing patients of their rights to access care without being charged (McPake et al, 2016).

Finally, efforts should be directed to further increase the general acceptance and understanding of the role of community health workers in Guinea, particularly in rural areas, and vis a vis nurses. Globally, the use of Community health workers as health extension workers, to reach the marginalized and hard to reach populations, working closely with health center level staff, has been argued to be critical in order to meet health needs in poor country contexts (Tulenko et al, 2013).

VII. Conclusions

This PhD has generated new evidence on the supply side preferences of final year medical and nursing students in Guinea. A situation where the majority of health workers, in particular doctors, are located in Conakry, in urban areas, the private sector and abroad is a major bottleneck to meeting service delivery needs, particularly for the poor. High levels of absenteeism, turnover rates, and performance challenges add to the existing challenges. As

outlined in the national health sector strategy the government is committed to addressing the existing workforce challenges in Guinea (see Govindaraj 2018) and the evidence generated in this PhD can help support this effort.

Evidence on the supply side preference of medical and nursing students, as well as their expectations and attitudes of working in the labour market after graduation, did not exist for Guinea. The topic is also sparsely addressed in the global literature, where the focus is largely on health workers already employed in the labour market, and/or preference to specialize.

The findings of this study point towards the need for both education and labour market interventions, to increase uptake of jobs outside of Conakry, in rural areas, in the public sector and to reduce the pursuit of jobs abroad. Interventions should be targeted and take into account some of monetary and non-monetary, education and profile related factors that influence the supply side behavior of medical and nursing students in Guinea. In addition, interventions are equally needed in order to maximize retention and optimize performance of health workers once they are posted.

A focus on strategies that manage expectations and reduce the unrealistic income and working expectations of students, as well as those that address high rates of dual practice, but also the existing skepticism on the role of community health workers, is critical. All of this will need to go hand in hand with efforts to strengthen government regulatory capacity over the private sector, through collaboration between Ministry of Health, Ministry of Education and the professional

bodies, to ensure quality and implementation success both in terms of health professional education, and subsequent labour market practice (Evans et al, 2013).

What this study has found and confirmed is the existing heterogeneity between medical and nursing students. Their characteristics and profiles are different. As are their attitudes, expectations and locational labour market preferences, highlighting the importance of carrying not only country and context, but also cadre specific research on the behaviours or stated preferences of health workers. Also different are the short term and medium- term preferences of workers, with an implication that the interventions designed for final year students need to be very different from those designed for workers already in the labour market. Preferences and behaviours shift over time, as circumstances and priorities change. Additional research on health workers further on in their career will thus be critical.

What this PhD generated in terms of evidence is a significant contribution towards a much greater need for evidence. More evidence on the supply side behavior of health workers can be generated through additional qualitative studies, discrete choice experiments, and studies that measure causality (for example collecting and using panel data), and impact evaluations can be designed and linked to interventions being implemented. In addition, however, efforts to better understand the role of labour market demand in explaining the existing workforce distribution patterns, whether in Guinea, in Conakry, outside Conakry, in urban or in rural areas, are equally important. As this PhD has shown, job uptake in the labour market is determined both by the supply side behavior of health workers (or students), and by the capacity and willingness of the employer to hire them, whether public or private.

In Guinea there are indications that labour market demand in the public sector is very low and plays an important role in job uptake. Guinea is training close to a combined 1600 doctors and nurses every year, yet the total number of doctors and nurses registered as employed with the MOH are only 1400 and 1500, respectively. The absorption capacity of the government to hire and recruit health workers into the civil service is limited, and evidence on labour market demand is needed alongside evidence on labour market supply to generate informed policy solutions to address this challenge.

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Annex A: Details of Search Strategy

To obtain the literature included in the review (prior to the quality assessment), a five-step strategy was adopted.

First, a search was carried out across all the above databases. The articles were searched by a combination of MESH terms for the medical students, and terms by title as outlined in Table A.1 below. The search varies slightly according to the database but was largely structured around key terms of *health worker student*, and *job intent* and the many variants for these terms. It was decided to keep the search relatively open, with an added search term related to pecuniary and non-pecuniary motivating factors in the search not opted for so as not to restrict the literature found. The keyword (title) terms were entered into the databases in combination with the use of Boolean operators (And; OR) where applicable. The limiters included the date range searched, which was for articles between 2004-2018. Titles/abstract search was considered, however ultimately this was not adopted because screening via a titles-first approach is often considered more efficient than screening titles and abstracts together (Mateen et al, 2013).Overall, there is no consensus on whether screening titles alone or titles and abstracts together is the preferable strategy for inclusion of articles in a systematic review (Mateen et al, 2013).

Table A.1: terms used in the literature search (in title heading)

Terms for health students (population)	**Terms for job intention, preferences and expectations**	
Students, health occupations (MESH term)	Job preference	Location preference
Students, health occupations (Title)	Job intent	Location choice
Medical students	Expected job	Geographic preference
Nursing students	Job expectation	Occupational preference
Midwifery students	Job choice	Occupational Choice
	Career preference	Occupational intent
	Career intent	Expected occupation
	Career expectation	Sector preference
	Career Choice	Sector Choice
	Expected career	Sector intent
	Stated intent	Willingness to migrate
	Practice preference	Migration preference
	Practice location	Intent to migrate

Secondly, the search results from all sources, a total of 426 references, were exported and managed in Endnote categorized in separate folders (by database). Once in Endnote, all internal duplicates (duplicates within databases) and external duplicates (duplicates between databases) were removed. Following the removal of duplicates, what was left was a total of 231 references (see Table A.2).

Table A.2: Overall database literature search (step 2)

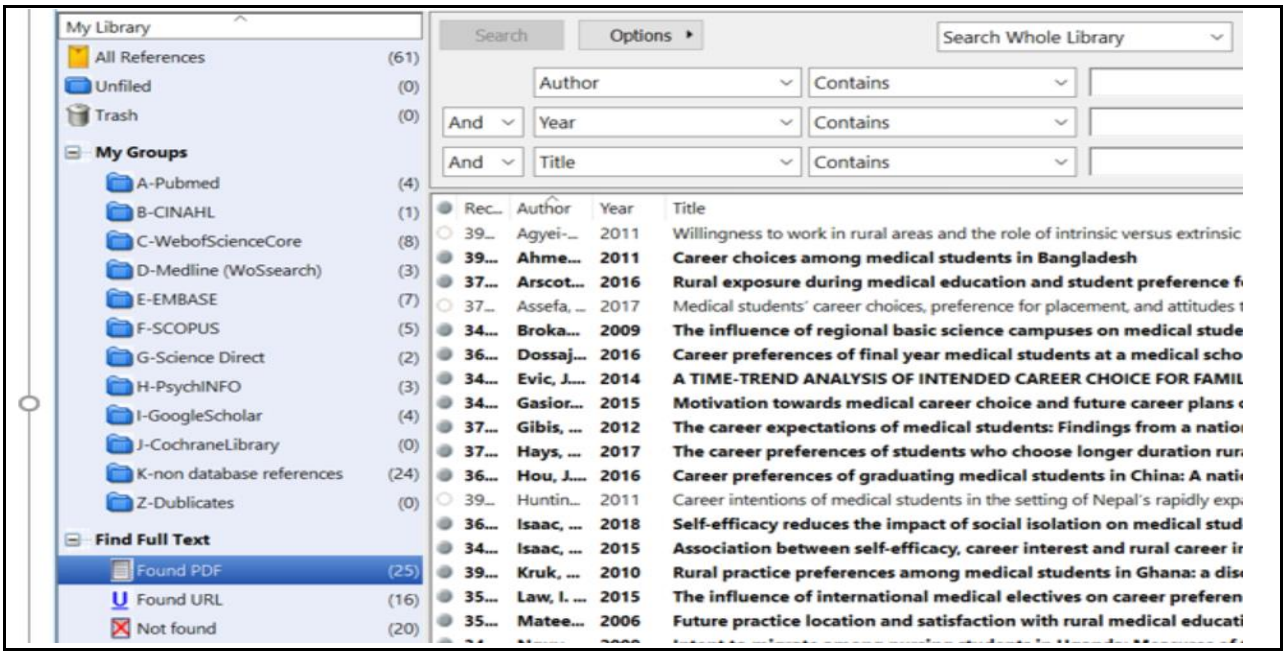
Data Source	Limits	Duplicate Results

Database	Vendor	Date Searched	Engl. only?	Time Period Searched	Publication Types	Other limits	Items Found	Inner Dups	Ext Dups	New
Medline (through Web of Science)	Ovid	May 17, 2018	yes	2004-2018	All	none	53	0	33	20
EMBASE	Ovil (Lancaster University)	May 18, 2018	yes	2004-2018	Articles	none	101	2	44	55
Web of Science (Core Collection)	Thomson Reuters	May 17, 2018	yes	2004-2018	Articles	none	39	0	0	39
Scopus	Elsevier	May 18, 2018	yes	2004-2018	Articles	none	24	0	9	15
CINAHL	EBSCO	May 18, 2018	yes	2004-2018	Academic Journals	none	23	0	10	13
PubMed	NLM	May 17, 2018	yes	2004-2018	All	none	102	0	71	31
Cochrane Library	Wiley	May 21, 2018	yes	2004-2018	All	none	9	1	1	7
PsychINFO	EBSCO HOST	May 21, 2018	yes	2004-2016	Academic Journals Only	none	33	0	16	17
Google Scholar	google	May 21, 2018	yes	2004-2018	All	Include citation box ticked	16	0	5	11
Science Direct	Lancaster	May 18, 2018	yes	2004-2018	Research Articles and Book Chapters	none	26	0	3	23
TOTALS							**426**	**3**	**192**	**231**

Third, following the removal of duplicates, titles and then abstracts were screened and removed if not deemed relevant. The screening of the titles of the remaining 231 references resulted in the removal of 44 titles, leaving a total of 187 reference from the databases. The screening of all remaining abstracts resulted in the removal of a total of another 150 studies, leaving a total of 37 studies. Studies that were removed did not fit the inclusion criteria, for example focused on preference or career intentions in mental health or psychology, and/or included study populations not in their final undergraduate years, and/or did not include one of the four locational outcome dimensions explored in this review. Studies remained included where this information was insufficiently obvious without a detailed review of the full article.

Fourth. 24 additional new studies that were found from other sources and through a review of reference lists were added to endnote to complement the 37 remaining references. In total thus, 61 studies were identified for full text review of the study criteria and quality assessment. Searching in endnote to find the full text (connecting to Lancaster online) immediately found the PDFs of 25 studies, the URLs (no PDFs) for 16 and no PDF or URL for 20 articles (see Figure A.1 below). Google and other sources including ResearchGate were used to locate the physical PDFs as best as possible, where this was not automatically provided or only a URL was included.

Figure A1: Screenshot of Final number of studies considered for full text extraction (from Endnote)



Fifth A full text review was carried out which resulted in a substantial amount of further exclusion of articles with reason. The full text review of the 61 studies resulted in 43 articles not deemed eligible (with 18 studies remaining included for the review – see Prisma chart) with the reasons for their exclusion as follows:

10 articles could not be found or accessed: of those 8 articles were excluded because of they were *not accessible/available free of charge* (Edwards, Smith et al. 2004, Rhyne, Daniels et al. 2006, Tolhurst 2006, Lee and Moon 2013, Giang, Minh et al. 2015, Shoqirat and Abu-Qamar 2015, Lee 2016, Playford and Puddey 2017). 2 articles were excluded because of the *inability to locate text online* (Rosenblatt and Andrilla 2005, Abuosi and Abor 2015);

15 articles combined early and later trainees in the same sample: 15 articles were excluded because they *combined students of both early and later years of study* (Mateen 2006, Sousa, Schwalbach et al. 2007, Nguyen, Ropers et al. 2008, Ahmed, Majumdar et al. 2011, Gibis, Heinz et al. 2012, Mandeville, Bartley et al. 2012, Sheikh, Naqvi et al. 2012, Yeganeh-Arani, Chandratilake et al. 2012, Silvestri, Blevins et al. 2014, Gouda, Kitt et al. 2015, Law and Walters 2015, Zambrano, Pereyra Elías et al. 2015, Arscott-Mills, Kebaabetswe et al. 2016, Hays 2017, Herd, Bulsara et al. 2017).

8 studies did not explore any of the four locational outcome variables or provide sufficient explanation: of those 7 studies were excluded because they *did not explore any one of the 4 study outcome variables* explored in the review (Artsexamen, en Gezondheid et al. 2008, Matsumoto, Inoue et al. 2008, Rogers, Searle et al. 2010, Deutsch, Lippmann et al. 2014, Evic, Pavlekovic et al. 2014, Amalba, Abantanga et al. 2017, Sadawarte, Kakeri et al. 2017). 1 article

was excluded because it *did not offer an explanation for a given locational preference* (Huda and Yousuf 2006).

9 articles did not target students in their final years of undergraduate studies: of those 6 articles were excluded because they *focused on students who already graduated from their undergraduate training* (Brokaw, Mandzuk et al. 2009, Serra, Serneels et al. 2010, Imran, Azeem et al. 2011, Orzanco, Lovato et al. 2011, Zimmerman, Shakya et al. 2012, Suciu, Popescu et al. 2017). 1 article was excluded because it *focused on students at the beginning of their training* (Somers and Spencer 2012); and 2 because the year of training was not specified (Isaac, Walters et al. 2015, Isaac, Pit et al. 2018).

1 article was found to be a duplication: 1 article was *excluded as a duplication* previously not spotted – two versions of the title exist online (Dossajee, Obonyo et al. 2016)

Annex B: Data Extraction Matrix (Lit review)

Data Extraction Sheet Used											
Author	Country	Study Population	Main Outcome variables explored	Type of study	**Method of analysis**	**Preference for post**	**Financial Explanations**	**Non-Financial Explanations**	**Demographic and profile explanations**	**Training/education explanations**	Authors conclusions
1. Agyei Baffour et al, 2011	Ghana	302 out of 310 Fourth-Year - medical students (from two out of four public medical schools)	Willingness to Accept rural postings	Computer based survey (self - reported)	Multivariate Logistic regression to assess association between student's willingness to accept rural postings and their professional motivations, rural exposure and family parental and educational status (PPES)	55.5% of students stated they were likely or definitely would work in an underserved area	X	X	**Association:** Female gender associated with reduced willingness to work in rural areas (0.50 95% CI 0.29-0.88) High PPES (parental professional and educational status) associated with reduced willingness to work in rural areas (0.42 95% CI 0.24, 0.71) Age (being younger) was associated with greater willingness to work in rural area (1.23 95% CI 1.00-1.52) Significant association between strong intrinsic motivation and willingness to work in rural area (1.92, 95% CI 1.18-3.13) **No association:** Rural exposure factors did NOT significantly increase willingness to work in rural areas.	X	Need to build on intrinsic motivation during medical training, Favour lower PPES students for admission. Given that rural origin did not influence student's willingness to practice in rural areas, findings also highlight the heterogeneity of trends in motivation dynamics for rural practice and **the importance of locally relevant data for decision making**
2. Akl et al, 2007	Lebanon	430 out of possible 576 eligible Students in pre final and final years of medical school (response	Intention to emigrate /train abroad	Cross sectional survey	Frequency tables and percentages Bivariate analysis using students t test and the Chi Square test to assess whether a factor is associated with	(not included)	Statistically significant associations with intention to migrate/train abroad and: financial conditions of medical residents (OR=8.5; 95% CI=1.6-45.1)	Statistically significant association between intention to train abroad and: Working conditions of residents (OR=48.5;95% CI =6.2-382.5); Impact on career (OR-15.9; 95% CI=2.8-89.3)	Statistically significant association between intention to train abroad and" Receiving information about abroad training from doctors who trained or are training aboard was statistically significant (OR=9.7; 95% CI=1.7-56.6)	Statistically significant association between intention to train abroad and: clinical training (OR=30.7; 95% CI=4.5-207.8);	The authors propose a conceptual framework around the influencing factors of migrating abroad.

		rate of 74%)			any of the demographic or educational variables Multivariate logistic regression to assess whether intention to train aboard was associated with different factors		Financial conditions of doctors (OR=64.8; 95% CI=7.2-581.5)	Job opportunities (OR=11.0 95% CI-1.9-63.9) Working conditions of doctors (OR=79.2; 95% CI=8.6-713.3) Political conditions (OR=10.1; 95% CI=1.1-94.1) certification process (OR 6.5; 95% CI=1.1-38.7) getting a visa (OR=12.7; 95% CI=1.2-132.8)	having family members or friends living abroad (OR=6.9; 95% CI=1.4-35.7) Witnessing resident traveling to retrain abroad (OR=22.2; 95% CI-4.5-111.1)		
3. Assefa et al, 2017 (record number 3755)	Ethiopia	959 fifth and sixth year medical students from six (out of 33) public medical schools in Ethiopia. Response rate of 82.2 percent.	Intent to work in rural area	Self-administered cross sectional survey	Logistic regression model to identify factors associated with the intention of medical students to work in rural and remote areas	Only small proportion indicated intent to work in rural areas: 21% in zonal and 8.7 in district/small towns.	x	x	Statistically significant association between rural intent and: Being male AOR 1.55; 95% CI; 1.05,2,28) Having the desire to serve within the country (AOR: 1.62, 95% CI; 1.18. 2.25) No statistically significant association between rural intent and: parent's education (p.0.05).	Statistically significant association between rural intent and: Being enrolled in Addis Ababa University (AOR: 2.34, 95% CI; 1.64, 3.34)	Attention should be given to influence medical students attitude to work in rural and remote locations. This may already be done in Addis Ababa University.
4. Bailey et al, 2012	Malawi	8 Fourth year medical students (8) from one medical school in Malawi	Intention to migrate aboard Intentions of working in remote area (i.e. district hospitals) Intention of working	Qualitative – semi structured interviews	Analysis carried out using framework analysis approach, responses coded and grouped into themes	Most students thought they would like to study/work aboard for a short time and then return There is little intention of moving into the private sector Seven of the 8 students said they would rather experience working in district hospitals after graduation (and before	The main reasons cited for emigrating abroad was the possibility of higher salaries abroad, which could better support their families or pay them through specialist training.	Another reason for intention to migrate was feeling disillusioned at being unable to use specialist skills due to lack of resources, and better working conditions abroad, Preference for urban areas was explained by frustration with lack of resources at district level, including high workload, lack of other health workers, and inadequate housing and living conditions	Two out of 8 students expressed the desire to work at the district level because this is where their families came from. One participant listed being from a rural area as a key motivation for working at the district level (I've seen how people struggle there, and I've struggled once in my live and there has to be change somehow)	A key reason for wanting to migrate aboard pursue specialist training abroad The most common reason given by participants for working in an urban area is desire to specialize and hence work at a big hospital. A key reason for wanting to work for the government	Opportunities to pursue postgraduate training appear to have more influence on future career plans than salary There is little reasons to fear movement into private sector Medical students not very enthusiastic about

			in private sector			specializing) but only for a short time period				over the private sector in the near future was because of better postgraduate training opportunities, and a perception to be better looked after	working at district level
5. Burch et al, 2011	Six Sub-Saharan countries: South Africa, DRC, Kenya, Nigeria, Tanzania and Uganda	990 (78%) of 1260 final year medical students from nine medical schools in SSA (of before mentioned countries – 4 in SA, and one each in the other countries) This represents approximate 10% of the estimated annual output of 10,000 graduates from all schools in SSA	Intention to stay or leave Africa (other intentions were identified but reasons were not explained)	Cross sectional survey (administered)	Basic descriptive analysis – use of percentage to determine difference in career preferences and driving factors No regression and calculation of associations of outcome with predictor variables).	4.8 percent intended to practice in rural areas 40% planned to train abroad 79% of students reported an intention to practice in Africa for their clinical practice 21% intended to relocate outside Sub-Saharan Africa 30.1 % intended to work in private practice 29.1 % intended to pursue government medical practice	96% of students rated salary as very or somewhat important in their intention to leave Africa for medical practice	Percentage of students who rated very important or somewhat important the following <u>reasons to leave Africa</u>: 90%: regulation of the work environment 90%: career options 85%: politics and health care in home country 86 %: personal safety 85%: opportunity for experience in a different environment, 82%: social conditions 80% personal freedom Percentage of students who rated very important or somewhat important the following <u>reasons to live and work in Africa</u>: 92%: good career options 85% listed personal safety considerations 82 %: attachment to spouse or partner 95%: access to medical equipment and technology	86% stated a desire to improve medicine in Africa as very important or somewhat important in their intention to live and work in Africa.	Percentage of students who rated very important or somewhat important the following education related <u>reasons to leave Africa:</u> 84%: quality of specialist training, 81 %: the availability of specialist training 85%: the opportunity for further education Percentage of students who rated very important or somewhat important the following education related <u>reasons to stay in Africa:</u> 88%: opportunity for further education 88%: quality of training 87%: the availability of specialist training	Strategies to make an academic career more attractive for students need to be explored

6. Dossaj ee et al, 2016	Kenya	156 (out of 260) final year medical students at one public University (University of Nairobi) using simple random sampling.	Preferen ce to work in urban vs rural area	cross section al survey	Bivariate analysis carried out by gender between listed factors and outcome variables with calculation of chi-square statistics. logistic regression model to score the independent categorical variables affecting choice of locational practice.	75 percent of students who intend to practice in Kenya intend to practice in urban areas 88 percent of students intend to practice in Kenya after their specialty training, and only 12 percent abroad	x	x	Rural origin significantly increased odds of practicing in a rural area (OR 2.5, 95% CI=1.04-6.04) **No significance with either preference to work in rural area of abroad:** religious affiliation, Gender, or marital status.	Having trained abroad significantly increased odds of having a preference to work abroad (OR 9.27 95% CI=2.1-41.9)	Choice of locational practice is multi-dimensional and multifactorial. Addressing maldistribution of doctors requires multidimensional responses.
7. Gasior owski et al, 2015	Poland	119 out of 135 final year medical students registered in year 6 (88.1 response rate) in one medical school	Future preferen ces to work in public vs private sector Future preferen ce to work in hospital vs clinic Future preferen ce to work in Poland or outside Poland	Self admini stered cross section al survey	Multivariate logistic regression analyses to determine independent predictors of the dependent variables: work abroad vs work in Poland, and private vs public work.	40 percent favoured work in public sector and only a minority preferred work in the private sector. The rest preferred combination of public/private sector. The majority of students point towards a hospital to be their preferred setting Half of students declared Poland as their preferred country of work	x	x	Statistically significant (or almost significant) predictors for a <u>preference for public sector work</u>: Being male ($p < .05$) Coming from a city of more than 100,000 inhabitants (($p=.06$). Attaching low importance to "the certainty of finding work ($p<.01$) Attaching low importance of achieving high earnings ($p<.01$) Attaching importance to the prospect of preforming socially important and interesting work ($p=.02$) Statistically significant (or almost significant) predictors for a <u>preference to work in Poland:</u>	x	Future research needs to explore actual decision making, not just preferences.

									Attaching low importance to high (p<.001) Importance of gaining high social status and prestige (P=.06)		
8. Hou et al, 2016 (record number 3665)	China	3020 medical students in their final year at medical school, from 16 medical schools.	Preference of working in rural/urban areas Preference of working abroad	**Nation wide** Cross Sectional Study. Self administered questionnaire	Descriptive statistics Logit models to estimate using Maximum Likelihood Estimation (MLE) techniques to explore facts predicting students preferences regarding working in rural areas/PCPs Chi square tests conducted to compare participants preferences regarding work in rural areas when 1-15 years old, whether graduated from high school in rural areas, or whether parents place of residence was in rural areas.	Stated preference after graduation of medical students: 48.5%: work in urban public hospitals u 73.6 %: work in public hospitals five years after graduation 2.9 %: work in a private hospital/clinic after graduation. 8.1 %: work in a public primary care provider (PCPs) Less than 1 %: work abroad after graduation 71%: work in cities 23.8 % work in counties 2.7 % work in towns or villages.	x	x	Preference for work in rural areas upon graduation significantly associated with: Having lived in rural areas when 1-15 years old (P<0.001) Having parents place of current residence in rural areas (P<0.001)	Preference for work in rural areas upon graduation significantly associated with: Having attended high school in rural areas (p<0.001)	Students with rural backgrounds presumably have more real contact with rural population. Exposure to hardship may help to establish internal empathy and balance out the appreciation of good rewards and promising career prospects. Moreover, medical students with a rural background may find it easier to fit into the rural environment.
9. Huntington et al, (2011)	Nepal	469 medical students in last 2 years of study (85% of eligible study population) from four	Intention to practice in rural areas Intention to practice in Nepal	Survey to students	Descriptive percentage analysis Multivariate Logistic regression analysis, adjusting rural practice intention	88 % indicated intent to practice in urban areas. 88 % indicated intent to practice in Nepal	Students who stated an intention of going abroad were: Significantly less likely to believe that they could earn a good salary in Nepal (OR 0.5; 95% CI=0.4-0.9).	The odds of a student intention to go abroad was associated with agreement to the statement "the political situation in Nepal in the last 15 years has made leaving the country more necessary (OR 2.5; 95% CI-1.4-4.6)	Odds of intention to practice abroad were significantly higher for students who reported the following: Self-reported premedical school performance as excellent (as opposed to average) (OR 2.8; 95% CI=1.5-5.5)	Odds of intention to practice abroad were significantly higher for students who reported the following: Having received a scholarship from the Ministry of	Medical schools should consider selecting students from rural backgrounds or government secondary schools

		medical schools (1 public, and 3 private) sampled through convenience sampling			for the eight significantly associated demographic variables found in a bivariate analysis.		Significantly more likely to state that earning a good salary was very important to their decision to become a physician. (OR 2.8; 05% CI=1.7-4.8)	Students intending to practice in rural areas were less likely to agree that they would feel isolated in a rural area (OR 0.4; 95% CI=0.2-0.8)	Coming from families with higher incomes (odds ration OR 3.3; 95% CI=1.6-6.7) Reporting that desire to improve the health of the population was "not important" to their decision (95% CI=1.7-7.2). Not feeling having a duty to the people of Nepal to practice in Nepal (OR 0.4; 95% CI 0.2-0.6) <u>Odds of intention to practice in rural areas</u> were significantly higher for students who reported the following: Not being in the self-assessed middle (OR 0.5; 95% CI=0.3-0.9) or highest family income bracket (OR 0.37; 95% CI-0.2-0.9) as compared with the lowest income bracket Not having a relative who is a physician (OR 0.5; 95% CI=0.2-0.6) or living in the West (OR 0.4; 95%CI=0.2-0.6) Being male. (OR 2.0; 95% CI=1.1-3.7), Having been born in a village (OR 3.2; 95% CI=1.8-5.6) A belief that a period of rural service should be made mandatory to all Nepal physicians (OR 2.2; 95% CI=1.1-4.2). **There was no statistically significant associations**	Education that requires rural service (OR 4.4; 95% CI=2.1-9.1) Agreement with statement of" I need to leave Nepal to get enough training in my field" (OR 3.3' 95%CI=1.5-7.5) <u>Odds of intention to practice in rural areas</u> were significantly higher for students who reported the following: Having attended a government secondary school. (OR 5.8; 95% CI=2.3-14.7) Having received an MOE scholarship (adjusted OR 5.0; 95% CI=1.7-14.0)	Schools should increase the number of postgraduate positions, weighed towards rural health needs, to retain students in Nepal.

									between rural intention and: The "desire to improve the health of the population"		
10. Johnson et al, 2011	Ghana	302 fourth year medical students from 4 medical schools in Ghana. (97% response rate)	Rural intent Intent to migrate abroad.	Cross sectional self administered survey of students (with facilitators on hand)	Bivariate and multi-variate ordinal logistic regression to estimate association between attribute valuation and students demographic background, education experience and future career plans	Over half of students stated that they were likely to OR definitely will work in a rural area (49% and 6.6 %, respectively). Over two thirds of students had the intent to emigrate after graduating (68.1%)	Students considering emigration ranked salary as more important than students not considering emigration (OR 1.93 (1.11-3.36)	Students willing to work in a rural area ranked infrastructure as more important than students who were unwilling (OR 1.59 (CI 1.03-2.46) Students were willing to work in a rural area ranked management style as a more important rural practice attribute than those who were unwilling to work in a rural area. (OR1.59 (1.02-2.47)	Students with rural living experience ranked salary as less important than those with no rural experience (OR 0.58 (0.35, 0.97) Fee paying students ranked salary as less important than sponsored students (OR 0.53 (0.28-1.00)	Students studying in Kumasi (remoter town) ranked contract length as more important than those in Accra (capital)	There is huge heterogeneity in results, hence important to study in local contexts Interventions to improve rural practice conditions are likely to be more persuasive than salary incentives to Ghanaian medical students who are willing to work in rural environments a priory.
11. Kizito et al, 2015	Uganda	251 final year medical students from 4 national medical schools (not clear what total was)	Intention to emigrate abroad	Cross sectional survey, Face to face questionnaires	Descriptive/Percentage/frequency analysis Logistic regression models to assess factors associated with leaving the country (bi-variate and multivariate analysis)	44.6 % had an intention of leaving the country after graduating (no huge difference between males and females)	75 5 of students listed being paid a higher salary as key reasons for leaving the country A key reason listed of those intending to stay in the country was "paying back to the government for sponsoring the student education	53.6% listed as safe and good working conditions a key reasons to leave country	Family and social ties were listed as key reasons for those who decided to stay in the country **The only factor significantly associated with leaving the country was age** (OR=1.64; 95% CI"1.00 -4.82).	58% listed desire to continue with academics as key reasons to leave the country.	Many students intend to migrate. Salaries seem to be an important factor influencing the decision to leave. Bigger study is recommended to follow up on this
12. Krajewski et al, 2012	Poland	1177 5th and 6th year medical students from five out of eleven medical schools in Poland (covering all major regions in Poland and	Desire to Emigrate	Cross sectional survey	Descriptive, percentage calculations Correlation analysis including using Pearson correlation coefficient and Spearman's rank coefficient, Chi-square, and other tests	62% of respondents plan to seek employment abroad after graduation Average probability of migration was 50% with no significant difference between males and females ($p<0.0001$)	78 % of students indicated that higher salaries was a main motivation for emigration 79.2 % stated that higher remuneration would have them reconsider their plans to migrate aboard	75% stated better working conditions as a main motivation for migration 66 % stated the opportunity to gain new experiences as the main pill factors for migration 58% stated better professional stability (no risk of unemployment) as the main motivation.	There was a significant relationship (P.0286) between gender and the desire to migrate (although strength negligible) Being a year older. The willingness ($P<0.0001$) of a person to leave Poland is reduced by 16.94 percent. The probability to emigrate decreases with age; for men it decreased by 17% and for	78.5% listed that improved access to specialty training is one of the main areas that would have them reconsider their plans to migrate abroad.	The majority of students consider migration, however the observed decline in ambition to leave of students in their final (6) year) compared to the penultimate year, shows that the rate may not be as high as often assumed.

		geographic differences. Survey is representative of whole country.							women by 50% between year 5 and year 5 of medical school.		
13. Kruk et al, 2010	Ghana	302 fourth year medical students in one school in Ghana (97% of students responded).	Assessing how stated preference for rural job preference was influenced by various job preferences	Cross sectional Survey, DCE instrument	Mixed logic model, Discrete Choice Experiment (DCE)	x	Shorter contracts and salary bonuses were associated with increased rural job preference (but not as much as improved equipment and supportive management)	Improved equipment was most strongly associated with increased rural job preference (beta=-1.42, 95%CI:1.17-1.66) Also most strongly associated with increased rural job preference was supportive management (beta =1.17, 95% CI:0.96 to 1.39) Discontinuing the provision of basic housing had a large native influence on rural preference (beta=-1.59; 95% CI:-1.88 to-1.31)	x	x	Better working conditions were strongly associated with stated choice of hypothetical rural postings among fourth year medical students. Studies are needed to find out whether job attributes determine the actual uptake of rural jobs by graduating physicians.
14. Lievens et al, 2010	Rwanda	288 final year cohort nursing/midwifery students[10] (53% of total cohort) and 124 final year medical students (77 percent total cohort) from public and church owned schools	Expectation of working in public vs private sector Expectation of working in rural vs urban area Expectation of emigrating	Cross sectional survey (self administered) with facilitators	Descriptive statistics and correlational analysis Contingent valuation to identify reservation wage of medical and nursing students to take up hypothetical post	**Sector Preference:** In the long term, only 40 % of nursing students and 31% of medical students expect to work in the public sector 31 % of nurses and 48 % of medical students prefer to work in the private sector/NGO in their long term **Rural/urban preference** In the long run, 92% of medical students and 73% of	To get 80% of nursing students to take up a rural post, the current average salaries would have to be increased by 80% At current salary levels, 36 percent of nurses and 10% of medical students would take up a rural post	Of those who prefer to work in urban areas, promotion opportunities was listed as the second most important reason (12%) and quality of the working environment (11%) as the third most important reason.	The most important reason of those who want to work in rural area is the: opportunity to help the poor"(28 %) , followed by access to good health care (25%) and closeness to families and friend (14%) "opportunity to help the poor" is ranked last by those with an urban service preference Reservation wages are significantly lower (p=0.01) for those nursing and medical students who indicate that the first reason to take up a rural post is to "help the poor".	Of those who want to work in urban areas put "access to further training and specialization" as the most important reason (46%) Access to good education for children is ranked among the three most important characteristics by those preferring urban service.	There is significant heterogeneity in career intentions by cadre and altruism is a strong factor.

[10] Of note: Nursing sample is diluted - it mixed in some first year students

						nursing students prefer to work in an urban area (significantly different at p<.01) 39 percent of nursing students and 37 percent of medical students expect to start their career in a rural setting **Preference for work abroad:** More than 80 % of health students do <u>not</u> expect to migrate abroad in the coming five years (83 percent of medical students, and 81 percent of nursing st8udents)			Students who are more altruistic have a higher propensity to work in a rural service area over the long-and medium-term goal. More altruistic students have a higher preference for the public sector in the long term and require a lower salary to accept a job in Kigali as opposed to a job abroad. Nursing students who are not married or engaged tend to have a higher reservation wage to stay in Rwanda, and thus tend to be likely to migrate aboard, although the result is not statistically significant (P=0.19) Medical students who are younger, have higher reservation wages relative to older students, but the results are not statistically significant		
15. Rockers et al, 2013	Lao Peoples Democratic Republic	256 final year (year 3) nursing students from three sampled rural provinces in Laos This represented 62.7% of all eligible students from those provinces	Investigation of preference for attributes of job postings within rural settings	Survey with Discrete Choice experiment	Discrete Choice Experiment Mixed logit models to estimate stated preferences and willingness to pay for attributes	**Rural/urban preference** 9% of medical students and 34% of nursing students expressed preference for working in a rural location in the long term 91% of medical students and 66 % of nursing students preferred to work in an urban area in the long term	x	Nursing students were most willing to give up salary in exchange for direct promotion to permanent staff, housing provision and transportation provision for work and personal use	<u>The most important stated reason of those who wanted to work in a rural area</u> (both nurses and doctors) were 1) provide health care where it is needed (more than 50%), 2) having access to good health care (little less than 20%) and promotion opportunities (little more than 10%) <u>The most important reasons for working in an urban area</u> (both nurses and doctors) were 1) promotion opportunities (more than 30 percent)	x	DCE data may be used in conjunction with labour market data to inform the development of specific policy recommendations. These have to be different for students vis a vis those already working in the field, and also different for medical students and nursing students.

									2) access to good education for children (more than 10 percent) 3) access to good health care		
16. Santric Milicevic et al, 2014	Serbia	444 fifth year medical students from university of Belgrade (in addition to 494 first year students whose findings are not reported here)	Intention to migrate aboard (and having a FIRM plan to migrate abroad)	Cross sectional survey	Descriptive statistics of the sample Logistic regression analyses of medical undergraduate intention to work abroad, as well as one of those having a FIRM plan to migrate abroad	84% of fifth year students considered the option of leaving the country to work.	Financial situation was not significantly associated as a predictor of intention migrate abroad for 5th year students	x	The following were the significant predictors for intention to migrate abroad: Only speaking too languages (OR=2.104; 95% CI:1.170-3.783) Increased motivation level (OR=1.458;95% CI: 1.034-2.057) The following was highlighted as not significant predictors for intention to migrate abroad: . Having someone close abroad or having been abroad before The following was a significant predictor of having a FIRM plan to migrate abroad: Having a relative or friend aboard (OR 14.134; 95% CI:1.790-111.602)	Having gone abroad, for example as an exchange or for training for short term education, increases the likelihood of having a FIRM plan to work abroad among fifth year medical students (OR 4.552;95% CI:1.520-13.635)	Policies to reduce outmigration of students should be part of general workforce policy for health professionals.
17. Serneels et al, 2006	Ethiopia	Final year Nursing students (219) which is 16 % of cohort and medical students (90) which is 49% of cohort in Ethiopia, sampled from 8 clinical nursing	Assessing willingness to work in rural areas and how much it would cost to get a target population of students to take	Cohort survey (self administered, supervised questionnaire.	Using contingent valuation questions, ordinary least squares estimation of the reservation wage to work in rural area and maximum likelihood estimation of the reservation wage to work in a rural area (payment cards)	Two thirds of nursing students and 90% of medical students prefer to work in an urban area in the long run.	Contingent valuation shows that to reach 80 percent of nurses to take up a rural post nurses require a premium of 57% of their salary and doctors a premium of 83%.	Having access to education for the children (particularly for doctors) is attribute with the highest significance of explaining willingness to work in urban areas Opportunities for promotion is the second most important highly significant attribute explaining willingness to work in urban areas for nursing, and the third most important for medical students	For nurses the reservation wage to accept a rural job is lower the older the nurse. For nurses the reservation wage to accept a rural job is lower the higher the intrinsic motivation. Coming from a wealthier family implies a higher reservation wage. Nursing and medical student's expenditure of parents household (better off) is closely linked to	x	There is substantial heterogeneity in willingness to service in rural areas. (reservation wage higher for doctors than for nurses)

		school sand three medical faculties from around the country.	up a rural post					No evidence was found that the quality of education, or level of skill of health students, influences their decision to work in urban or rural areas	willingness to want to work in rural areas (highly significant at 1% level) Nursing and medical student's willingness to work in rural areas is highly associated with their intrinsic motivation (willingness to help the poor) (significant at 1% level) Women less likely to want to work in rural areas than men (however this is not significant when controlling for other characteristics) There is no evidence that less skilled students, those with lower test results, self-select into rural areas. Being more familiar with rural areas increases one's willingness to work there (but association is weak)		
18. Xierali et al, 2014	USA	108,408 final year, graduating medical students (who completed the graduating survey by the American Medical Association	Intent to practice in underserved areas and health Care Practitioners shortage Areas (HPSAs)	Medical School Graduation survey completed by medical school graduates in the US between 1997-2004	Bivariate analysis to assess association between student perceptions of the instructions in public health and community medicine and plans to practice in undeserved areas	21.8% of respondents planned to practice in underserved areas	x	x	x	Significant association between student perceptions of their instructions in public health and community medicine and plans to practice in underserved areas (P<0.0001)	Institutions should continue to incorporate population health perspectives into undergraduate medical education to potentially help improve physician distribution and better prepare physicians who are interested in practicing in underserved areas.

Annex C: Appraisal Check Lists used (Lit review)

C.1 JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies

Reviewer_____ Date_____

Author _____ Year_____ Record Number_____

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	□	□	□	□
2. Were the study subjects and the setting described in detail?	□	□	□	□
3. Was the exposure measured in a valid and reliable way?	□	□	□	□
4. Were objective, standard criteria used for measurement of the condition?	□	□	□	□
5. Were confounding factors identified?	□	□	□	□
6. Were strategies to deal with confounding factors stated?	□	□	□	□
7. Were the outcomes measured in a valid and reliable way?	□	□	□	□
8. Was appropriate statistical analysis used?	□	□	□	□

Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

_____

_____

_____

C2: JBI Critical Appraisal Checklist for Qualitative Research

Reviewer_____Date_____

Author _____Year_____Record Number _____

		Yes	No	Unclear	Not applicable
9.	Is there congruity between the stated philosophical perspective and the research methodology?	□	□	□	□
10.	Is there congruity between the research methodology and the research question or objectives?	□	□	□	□
11.	Is there congruity between the research methodology and the methods used to collect data?	□	□	□	□
12.	Is there congruity between the research methodology and the representation and analysis of data?	□	□	□	□
13.	Is there congruity between the research methodology and the interpretation of results?	□	□	□	□
14.	Is there a statement locating the researcher culturally or theoretically?	□	□	□	□
15.	Is the influence of the researcher on the research, and vice-versa, addressed?	□	□	□	□
16.	Are participants, and their voices, adequately represented?	□	□	□	□
17.	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	□	□	□	□
18.	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	□	□	□	□

Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

_____

_____

_____

Annex D: The Survey Questionnaire

ID code
(To be filled by the interviewer)

School		Cadre	Student		

A. Administration and Identification (To be filled by the interviewer)

A.1	Name of the supervisor		
A.2	Code of the supervisor		
A.3	Name of the interviewer		
A.4	Code of the interviewer		
A.5	Date of interview	Day: Month: Year:	
A.6	Interview start time	Hour: Minute:	
A.7	Code of the school		
A.8	Write the code of the school a second time		
A.9	Name of the school		
A.10	Number of groups		
A.11	Write the random number of the respondent (According to the list provided by the school)		
A.12	In case of replacement: Random number of the replacement.		

B. To be filled by data upload team

First upload:			
B.1	What is the date of the first data entry?	Day: Month: Year:	
B.2	What is the time of the first data entry?	Hour: Minute:	
B.3	Fill in your Name		
B.4	Fill in your Code		
B.5	Name of your supervisor of entry		
Second upload:			
B.6	What is the date of the second data entry?	Day: Month: Year:	
B.7	What is the time of the second data entry?	Hour: Minute:	
B.8	Fill in your Name		
B.9	Fill in your Code		
B.10	Name of your supervisor of entry		
When you see this grey box, please put down your pen and wait for instructions.			

C. Motivation of working in the health sector?

Number	Question	Answer options	Write down answer code
C.1	What is the main reason for you to have chosen to become a health professional? Only one choice is possible, please indicate the main reason.	I wanted to get a job that pays well …1 I wanted to continue the family tradition …2 I wanted to help people .....3 I wanted to be respected .....4 I did not choose but was assigned this profession by the government.....5 Others, specify .....97 I don't know.....98	
C.1 a	Other, please specify (Write in CAPITAL LETTERS)		
C.2	Which factor most influenced your decision to become a health professional? **Only one** choice is possible, please indicate the main factor	Parents.....1 Friends.....2 Teacher.....3 An acquainted health professional ....4 Television / Radio / Books.....5 Other, please specify below in C.2a .97 I don't know.....98	
C.2 a	Other, please specify (Write in CAPITAL LETTERS)		
When you see this grey box, please put down your pen and wait for instructions.			

D. Perceptions of received training

D.1	**Do you feel ready to work in the health sector? Please indicate to what extend you agree with the following:**		
D.1a	You feel ready to enter the job world and practice what you have learned	I agree very much .....1 I agree .....2 I disagree .....3 I disagree very much.....4	
D.1b	You feel ready and you know now what to do when you meet a patient suffering from malaria	I agree very much .....1 I agree .....2 I disagree .....3 I disagree very much.....4	
D.1c	You feel competent to work in a rural health facility	I agree very much .....1 I agree .....2 I disagree .....3 I disagree very much.....4	
D.1d	You feel competent to work in an urban health facility	I agree very much .....1 I agree .....2 I disagree .....3 I disagree very much.....4	
D.1e	You know the importance of community health professionals for the basic health services	I agree very much .....1 I agree .....2 I disagree .....3 I disagree very much.....4	
D.1f	Community health volunteers* are an integral part of the workforce team at the primary healthcare level ** a volunteer is a person working voluntarily and without remuneration from the health facility*	I agree very much .....1 I agree .....2 I disagree .....3 I disagree very much.....4	
D.2	How satisfied are you with the training received in your school?	I am highly satisfied .....1 I am satisfied .....2 I am dissatisfied.....3 I am highly dissatisfied 4	
D.3	How many times did you have to repeat a year in the course of your medical studies?	Never .....1 Once .....2 Twice .....3 More than two times.....4	
	How many subjects did you have in the second session of September 2016?	*Indicate the number of subjects in sessions:*	
When you see this grey box, please put down your pen and wait for instructions.			

E. Study internships / Practical trainings

E.1	How many weeks of practical training (PT) have you had in a health-facility. *Separate the mandatory from the voluntary practical training* *Estimate the number of weeks* • *For three weeks, write "3"* • *4 weeks part-time correspond to two weeks fulltime.*		**Mandatory training**	**Voluntary training**
E.1a	Urban hospital in Conakry (HN,CMC)	*Weeks in total (Write 0 if no PT)*		
E.1b	Urban hospital outside of Conakry (HR, HP)	*Weeks in total (Write 0 if no PT)*		
E.1c	Urban health centre or health post	*Weeks in total (Write 0 if no PT)*		
E.1d	Rural health centre of health post	*Weeks in total (Write 0 if no PT)*		

When you see this grey box, please put down your pen and wait for instructions.

F. Sources of funding for training

F.1	What is the main source of funding for your studies (amount of all expenses related to schooling: tuition, accommodation, living expenses)	Government.....1 Family.....2 Myself.....3 Others, specify below in F.1a 97	
F.1a	Other, specify (Write in CAPITAL letters)		
F.2	If someone other than yourself is covering your fees, do you feel that you have the obligation towards that person?	Yes.....1 No (jump to section G).....2	
F.3	What is the nature of your obligation?	Accept a position (An employment) proposed by the funder.....1 Go to question F.4 Repay the loan.....2 Go to section G Others, specify below in F.3a 97	
F.3a	Other, specify (Write in CAPITAL letters)	*Explain and move on to section G*	
Please state how much you agree with the following			
F.4	*If you have to accept a position*	Strongly agree.....1 Agree.....2	

	You can express a preference for the locality where you have to work	Disagree .....3 Strongly disagree.....4	
F.5	*If you have to accept a position* You can express a preference for the facility where you have to work	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
F.6	*If you have to accept a position* You can buy yourself out of your obligation	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
F.7	*If you have to accept a position* If you do not respect your obligation, there will not be any negative consequences	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	

G. Expected income once posted in labour market

When you start to work, there are several ways to generate income: receiving a salary, bonuses and per diem payments from your main employer, but also generating income by working elsewhere in the medical field, or by working in non-health related fields.

G.1	What do you expect that your gross monthly salary (before taxes) from your health job will be during the first year of work (excluding bonuses)?	Write amount in thousand (,000) Guinea Franc per MONTH	
G.2	How much do you expect to earn in addition to your basic salary each month from bonuses, per diem etc. during the first year of work?	Write amount in thousand (,000) Guinea Franc per MONTH	
G.3	How much money do you expect to make from other health-related work on the side?	Write amount in thousand (,000) Guinea Franc per MONTH Write "0" if you do not expect to make any money from health work on the side	
G.4	How much money do you expect to make from other non-health work on the side?	Write amount in thousand (,000) Guinea Franc per MONTH Write "0" if you do not expect to make any money from health work on the side	

When you see this grey box, please put down your pen and wait for instructions.

H. Expectations of working in labour market

H.1	**Please indicate your level of agreement with each of the following statements about your expectations concerning support and mentorship.**		
H.1.1	When posted, you will always have access to an experienced mentor in the context of your work	Strongly agree.....1 Agree.....2 Disagree.....3 Strongly disagree.....4	
H.1.2	When posted, you will have access to a mentor or professional supervision	Strongly agree.....1 Agree.....2 Disagree.....3 Strongly disagree.....4	
H.1.3	When posted, you will be mostly on your own with few people to turn to for advice and help	Strongly agree.....1 Agree.....2 Disagree.....3 Strongly disagree.....4	
H.1.4	When posted, you will have access to the equipment and supplies you need to work	Strongly agree.....1 Agree.....2 Disagree.....3 Strongly disagree.....4	
H.1.5	When posted, you will be working in a team with other health workers	Strongly agree.....1 Agree.....2 Disagree.....3 Strongly disagree.....4	
H.2	Please indicate your level of agreement with each of the following statements about your expectations concerning working conditions.		
H.2.1	When posted, you will have adequate housing conditions	Strongly agree.....1 Agree.....2 Disagree.....3 Strongly disagree.....4	

H.2.2	When posted, you will have a supervisor who will support you	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.2.3	When posted, you will have opportunities to attend on-the-job training and career advancement	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3	Please indicate your level of agreement with each of the following statements about your expectations concerning your future jobs.		
H.3.1	Presently, it would be easy for you to find a job	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.2	You expect to be posted and start your job within 6 months after your degree	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.3	You don't mind being on call at night	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.4.	You will stay at the health facility until all waiting patients are seen, even if this means you are not paid extra	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.5.	Working fewer hours than what your contract states is acceptable	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.6.	Accepting small informal payments from patients expressing gratitude is acceptable	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.7.	Earning extra income in the facility that you are posted in during work hours is acceptable to you	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.8.	Earning extra income in the facility that you are posted in after work hours is acceptable to you	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	

H.3.9.	Earning extra income in another facility during working hours is acceptable	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	
H.3.10	When you become employed as a health worker, you will do additional health work to earn extra money	Strongly agree.....1 Agree.....2 Disagree .....3 Strongly disagree.....4	

When you see this grey box, please put down your pen and wait for instructions.

I. Short and Medium-Term Job preferences and reason for preference

	Preferences: Sector		**Place your answer in each of the boxes**	
I.1	In which sector would you prefer to work?	Government/ Public sector .....1 Private sector.....2 Private, NGO.....3 Religious organisations.....4 Outside of the health sector.....5	Short term (1-3 years)	Middle term (4-7 years)
I.2	What is the **main reason** for your choice? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	Higher baseline salary.....1 Greater opportunities for extra income generation.....2 Greater opportunities for continued training .....3 Friends/family working there .....4 Greater opportunity to help people ...5 Greater opportunity to take on greater responsibilities.....6 Better overall working/management conditions .....7 Other (specify: _____)..97	Short term (1-3 years)	Middle term (4-7 years)
I.2.a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)
I.3	Which sector do you think you will be working in, most realistically	Government/ Public sector .....1 Private sector.....2 Private, NGO.....3 Religious organisations.....4 Outside of the health sector >>I.5 5	Short term (1-3 years)	Middle term (4-7 years)
I.4	For which reason?	It's my preferred choice.....1 The government will post me.....2	Short term	Middle term

	PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	There will be fewer jobs elsewhere, so my choice is limited.....3 Others, specify..... 97	(1-3 years)	(4-7 years)
I.4.a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)

	Preferences: Geographical region		Place your answer in each of the boxes	
I.5	In which region would you prefer to work?	Boké 1 Conakry 2 Faranah 3 Kankan 4 Kindia 5 Labé 6 Mamou 7 Nzérékoré 8	Short term (1-3 years)	Middle term (4-7 years)
I.6	What is the main reason for your choice? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	Higher baseline salary.....1 Greater opportunities for extra income generation.....2 Greater opportunities for continued training.....3 Friends/family are close.....4 Greater opportunity to help people ...5 Greater opportunity to take on greater responsibilities.....6 Better overall working/management conditions.....7 Other, specify in 1.6a..... 97	Short term (1-3 years)	Middle term (4-7 years)
I.6.a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)
I.7.	In which region do you think you will most likely be working?	Boké 1 Conakry 2 Faranah 3 Kankan 4 Kindia 5 Labé 6 Mamou 7 Nzérékoré 8	Short term (1-3 years)	Middle term (4-7 years)
I.8.	For which reason? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	It's my preferred choice.....1 The government will post me.....2 There will be fewer jobs elsewhere, so my choice is limited.....3 Others, specify below in I.8.a 97	Short term (1-3 years)	Middle term (4-7 years)
I.8.a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)

	Preferences: level in the health system		Place your answer in each of the boxes	
I.9	At which level would you prefer to work?	National hospital..... 1 Regional hospital ..... 2 Prefectural hospital..... 3 Communal hospital ..... 4 Health centre ..... 5 Health post..... 6 Other specify ...7	Short term (1-3 years)	Middle term (4-7 years)
I.9a	What is the main reason for your choice? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	Higher baseline salary ..... 1 Greater opportunities for extra income generation..... 2 Greater opportunities for continued training..... 3 Friends/family working there ..... 4 Greater opportunity to help people... 5 Greater opportunity to take on greater responsibilities..... 6 Better overall working/management conditions..... 7 Other (specify: _____)..97	Short term (1-3 years)	Middle term (4-7 years)
I.10	What is the main reason for your choice? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	Higher baseline salary ..... 1 Greater opportunities for extra income generation..... 2 Greater opportunities for continued training..... 3 Friends/family working there ..... 4 Greater opportunity to help people... 5 Greater opportunity to take on greater responsibilities..... 6 Better overall working/management conditions..... 7 Other, specify in 1.10a 97	Short term (1-3 years)	Middle term (4-7 years)
I.10a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)
I.11	At which level do you think you will most likely be working?	National hospital..... 1 Regional hospital ..... 2 Prefectural hospital..... 3 Communal hospital ..... 4 Health centre ..... 5 Health post..... 6 Other, specify in I.11a 97	Short term (1-3 years)	Middle term (4-7 years)
I.11a	Other, specify		Short term	Middle term

	(Write in CAPITAL letters)		(1-3 years)	(4-7 years)
I.12	For which reason? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	It's my preferred choice..... 1 The government will post me..... 2 There will be fewer jobs elsewhere, so my choice is limited..... 3 Others, specify below in I.12.a.....97	Short term (1-3 years)	Middle term (4-7 years)
I.12a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)

	Preferences: rural or urban		Place your answer in each of the boxes	
I.13	Do you prefer to work in an urban or a rural area?	Urban.....1 Rural.....2	Short term (1-3 years)	Middle term (4-7 years)
I.14	What is the main reason for your choice? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	Higher baseline salary.....1 Greater opportunities for extra income generation .....2 Greater opportunities for continued training.....3 Friends/family working there.....4 Greater opportunity to help people ...5 Greater opportunity to take on greater responsibilities .....6 Better overall working/management conditions.....7 Other specify below in I.14a 97	Short term (1-3 years)	Middle term (4-7 years)
I.14a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)
I.15	In which region do you think you are you most likely to actually end up working in?	Urban.....1 Rural.....2	Short term (1-3 years)	Middle term (4-7 years)
I.16	For which reason? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	It's my preferred choice .....1 The government will post me .....2 There will be fewer jobs elsewhere, so my choice is limited .....3 Others, specify in I.16a.....97	Short term (1-3 years)	Middle term (4-7 years)
I.16a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)

	Preferences: Migration abroad		Place your answer in each of the boxes	
I.17	Do you prefer to migrate abroad?	Yes.....1 No.....2 ➔ If « no » jump to section J	Short term (1-3 years)	Middle term (4-7 years)
I.18	What is the main reason for your choice? PLEASE SELECT ONLY ONE REASON THAT IS MOST IMPORTANT FOR YOU	Higher baseline salary.....1 Greater opportunities for extra income generation.....2 Greater opportunities for continued training.....3 Friends/family working there.....4 Greater opportunity to help people ...5 Greater opportunity to take on greater responsibilities.....6 Better overall working/management conditions.....7 Other, specify below in I.18.a..... 97	Short term (1-3 years)	Middle term (4-7 years)
I.18.a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)
I.19	Do you think you are likely to migrate abroad?	Yes.....1 No.....2 ➔ If « no » jump to section J	Short term (1-3 years)	Middle term (4-7 years)
I.20	For which reason?	It's my preferred choice.....1 Others, specify in I.20a 97	Short term (1-3 years)	Middle term (4-7 years)
I.20.a	Other, specify (Write in CAPITAL letters)		Short term (1-3 years)	Middle term (4-7 years)
When you see this grey box, please put down your pen and wait for instructions.				

J. What will it take to influence your decision? Contingent Valuation Questions

Medical Students

	Hospital in Conakry compared to a hospital in a rural area (150km or more from Conakry)	
	Imagine that when you finish your studies, you are offered two jobs as a health worker in the public sector, one in Conakry, and one in a rural area 150km from Conakry. Both contracts are for at least 3 years. Both jobs are in a hospital and your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.1.1	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 700,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.2.	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 1,100,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.3.	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 1,500,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.4	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 1,900,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.5	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 2,300,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.6.	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 2,700,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.7.	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 3,100,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.8	Your monthly salary at the hospital in Conakry would be 1.500,000 GF,	

	Your monthly salary at the hospital in the rural area would be 3,500,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.9	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 3,900,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.10	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 4,300,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.11	Your monthly salary at the hospital in Conakry would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 4,700,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.12	If you have not accepted a job at the rural hospital in any of the questions above, what would be the minimum salary against which you choose the rural job?	Write down the salary in GF Total:

	Urban health centre compared to a rural health centre (at 150km or more from Conakry)	
J.2	Imagine that when you finish your studies, you are offered two jobs as a health worker in a health centre (HC) of the public sector. One is in an urban area, the other one in a rural area, at least 150km from Conakry. Both contracts are for at least 3 years. Both jobs are in a health centre, your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.2.1	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 700,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.2.	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 1,100,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.3.	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 1,500,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.4	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 1,900,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.5	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 2,300,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.6.	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the hospital in the rural area would be 2,700,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.7.	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 3,100,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.8	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 3,500,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area

J.2.9	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 3,900,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.10	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 4,300,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.11	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 4,700,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.12	If you have not accepted a job at the HC in any of the questions above, what would be the minimum salary against which you choose the rural job?	Write down the salary in GF Total:

	Job in Conakry compared to migration abroad	
J.3	Imagine you are being offered a permanent position as a health professional in the public sector in Conakry. (health centre, district or regional hospital) Imagine you also had the possibility to emigrate to a country with relatively high incomes (For instance France, Canada, Belgium, etc.). But you do not know, whether you would actually get a job in this country, what kind of job it might be or how much you would earn. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.3.1	Your monthly salary at the job in Conakry would be 700,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.2.	Your monthly salary at the job in Conakry would be 1,100,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.3.	Your monthly salary at the job in Conakry would be 1,500,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.4	Your monthly salary at the job in Conakry would be 1,900,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.5	Your monthly salary at the hospital in Conakry would be 2,300,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.6.	Your monthly salary at the job in Conakry would be 2,700,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.7.	Your monthly salary at the job in Conakry would be 3,100,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.8	Your monthly salary at the job in Conakry would be 3,500,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.3.9	Your monthly salary at the job in Conakry would be 3,900,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.10	Your monthly salary at the job in Conakry would be 4,300,000 GF	

	A. I choose the job in Conakry	B. I choose to emigrate
J.3.11	Your monthly salary at the job in Conakry would be 4,700,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.12	If you have not accepted the job in Conakry in any of the questions above, what would be the minimum salary against which you choose not to emigrate?	Write down the salary in GF Total:

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Nursing and Midwifery Students

	Hospital in Conakry compared to a hospital in a rural area (150km or more from Conakry)	
J.1	Imagine that when you finish your studies, you are offered two jobs as a health worker in the public sector, one in Conakry, and one in a rural area 150km from Conakry. Both contracts are for at least 3 years. Both jobs are in a hospital and your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.1.1	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 700,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.2.	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 1,000,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.3.	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 1,300,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J,1.4	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 1,600,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.5	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 1,900,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.6.	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 2,200,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.7.	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 2,500,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.8	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 2,800,000 GF	

	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.9	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 3,100,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.10	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 3,400,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.11	Your monthly salary at the hospital in Conakry would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 3,700,000 GF	
	A. I choose the job in Conakry	B. I choose the job in the rural area
J.1.12	If you have not accepted a job at the rural hospital in any of the questions above, what would be the minimum salary against which you choose the rural job?	Write down the salary in GF Total:

	Urban health centre compared to a rural health centre (at 150km or more from Conakry)	
J.2	Imagine that when you finish your studies, you are offered two jobs as a health worker in a health centre (HC) of the public sector. One is in an urban area, the other one in a rural area, at least 150km from Conakry. Both contracts are for at least 3 years. Both jobs are in a health centre, your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.2.1	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 700,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.2.	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 1,000,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.3.	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 1,300,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.4	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 1,600,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.5	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 1,900,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.6.	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the hospital in the rural area would be 2,200,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.7.	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 2,500,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.8	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 2,800,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area

J.2.9	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 3,100,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.10	Your monthly salary at the HC in the urban area would be 1.300,000 GF, Your monthly salary at the HC in the rural area would be 3,400,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.11	Your monthly salary at the HC in the urban area would be 1.500,000 GF, Your monthly salary at the HC in the rural area would be 3,700,000 GF	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.2.12	If you have not accepted a job at the HC in any of the questions above, what would be the minimum salary against which you choose the rural job?	Write down the salary in GF Total:

	Job in Conakry compared to migration abroad	
J.3	Imagine that when you finish your studies, you are offered two jobs as a health worker in the public sector, one in Conakry, and one in a rural area 150km from Conakry. Both contracts are for at least 3 years. Both jobs are in a hospital and your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.3.1	Your monthly salary at the job in Conakry would be 700,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.2.	Your monthly salary at the job in Conakry would be 1,000,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.3.	Your monthly salary at the job in Conakry would be 1,300,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.4	Your monthly salary at the job in Conakry would be 1,600,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.5	Your monthly salary at the hospital in Conakry would be1,900,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.6.	Your monthly salary at the job in Conakry would be 2,200,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.7.	Your monthly salary at the job in Conakry would be 2,500,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.8	Your monthly salary at the job in Conakry would be 2,800,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.9	Your monthly salary at the job in Conakry would be 3,100,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.10	Your monthly salary at the job in Conakry would be 3,400,000 GF	
	A. I choose the job in Conakry	B. I choose to emigrate
J.3.11	Your monthly salary at the job in Conakry would be 3,700,000 GF	

	A. I choose the job in Conakry	B. I choose to emigrate
J.3.12	If you have not accepted the job in Conakry in any of the questions above, what would be the minimum salary against which you choose not to emigrate?	Write down the salary in GF Total:

ATS Students

	Urban health centre compared to a health centre in a rural area (150km or more from Conakry)	
J.1	Imagine that when you finish your studies, you are offered two jobs as a health worker in the public sector, one in Conakry, and one in a rural area 150km from Conakry. Both contracts are for at least 3 years. Both jobs are in a health centre and your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.1.1	Your monthly salary at the urban HC would be1,000,000 GF, Your monthly salary at the rural HC would be 600,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.2.	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 800,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.3.	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 1,000,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.4	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 1,200,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.5	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 1,400,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.6.	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 1,600,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.7.	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 1,800,000 GF ?	

	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.8	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 2,000,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.9	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 2,200,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.10	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 2,400,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.11	Your monthly salary at the urban HC would be 1,000,000 GF, Your monthly salary at the rural HC would be 2,600,000 GF ?	
	A. I choose the job in the urban area	B. I choose the job in the rural area
J.1.12	If you have not accepted a job in the rural region in any of the questions above, what would be the minimum salary against which you choose the job in a rural health centre?	Write down the salary in GF Total:

	Urban health centre compared to a rural health post (at 150km or more from Conakry)	
J.2	Imagine that when you finish your studies, you are offered two jobs as a health worker in a rural area at least 150km from Conakry. One job is in a rural health centre (HC), the other in a rural health poszt (HP) Both contracts are for at least 3 years, your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.2.1	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 600,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.2.	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 800,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.3.	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 1,000,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.4	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 1,200,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.5	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 1,400,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.6.	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 1,600,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.7.	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 1,800,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP

J.2.8	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 2,000,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.9	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 2,200,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.10	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 2,400,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.11	Your monthly salary at the HC would be 1,000,000 GF, Your monthly salary at the HP would be 2,800,000 GF	
	A. I choose the job in the HC	B. I choose the job in the HP
J.2.12	If you have not accepted a job at the rural HP in any of the questions above, what would be the minimum salary against which you choose the job in the rural HP?	Write down the salary in GF Total:

	Job in Conakry compared to migration abroad	
J.3	Imagine that when you finish your studies, you are offered two jobs as a health worker in the public sector, in a rural area 150km from Conakry: One job in a rural health centre, the other in a rural community (Below a health post). Both contracts are for at least 3 years. Both jobs are in a hospital and your presence there is required and will be verified. Which job would you choose if…. Draw a circle around the letter of your choice in each of the rows	
J.3.1	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 600,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.2.	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 800,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.3.	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 1,000,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.4	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 1,200,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.5	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 1,400,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.6.	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 1,600,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.7.	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 1,800,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community

J.3.8	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 2,000,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.9	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 2,200,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.10	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 2,400,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.11	Your monthly salary at the HC would be 1,000,000 GF Your monthly salary in the rural community would be 2,800,000 GF ?	
	A. I choose the rural HC	B. I choose the job in the rural community
J.3.12	If you have not accepted the job in the rural community in any of the questions above, what would be the minimum salary against which you choose the job in the rural community?	Write down the salary in GF Total:

K. Demographic information

K.1	What is your sex?	Male..... 1 Female..... 2	
K.2	What is your age?	Enter age in completed years	
K.3	What is your marital status?	Single ..... 1 >>Jump to section K.6 Engaged..... 2 In a living relation..... 3 Married..... 4 Widowed..... 5 >>Jump to section K.6 Divorced ..... 6 >>Jump to section K.6 Separated..... 7	
K.4	Does your spouse/partner work in the health sector?	Yes..... 1 No 2	
K.5	In which region does your partner live (If abroad, write down the country)		
K.6	Do you have children?	Yes..... 1 No ..... 2 ➔ K.8	
K.7	How many children do you have?		
K.8	Please indicate how satisfied you are currently with your monetary situation	Highly satisfied..... 1 Satisfied..... 2 Dissatisfied..... 3 Highly dissatisfied 4	
K.9	Please indicate how satisfied you are currently with life in general.	Highly satisfied..... 1 Satisfied..... 2 Dissatisfied..... 3 Highly dissatisfied..... 4	

L. Household of the respondent

L.1	How many live in your household currently?	Definition Household **Total:**	
L.2	Does your household own any of the following?	A. Refrigerator	
		B. Radio	

	If yes, write ..... 1 If no, write..... 2	C. Cassette/ CD Player	
		D. Television	
		E. Running Water	
		F. Electricity	
		G. Telephone	
		H. Car	
		I. Motorcycle	
		J. Bicycle	
		K. Own Land	
		L. Own House	
L.3	Have you ever been outside of Guinea, in another African country?	Yes..... 1 No 2	
L.4	Have you ever been outside of Africa?	Yes..... 1 No 2	
L.5	Do you have friends/ family living in another country in Africa?	Yes..... 1 No 2	
L.6	Do you have friends/ family living outside of Africa?	Yes..... 1 No 2	
L.7	Which region were you born in?		
L.8	Who owned the dwelling in which you grew up?	A member of the household..... 1 Relations of head of household..... 2 The government..... 3 Company or private enterprise ..... 4 A private individual..... 5 I do not know.....98 Others, specify below in L.8a.....97	
L.8a	Other, specify (Write in CAPITAL letters)		
L.9	Where were you born?	Boké..... 1 Conakry..... 2 Faranah..... 3 Kankan..... 4 Kindia..... 5 Labé 6	

		Mamou..... 7 Nzérékoré..... 8 Others, specify.....97	
L.10	Would you classify the house that you grew up in as being in an urban area or a rural area?	Urban..... 1 Rural..... 2	
L.11	How many years in total did you live in a rural area?	Please state number of completed years (if never lived in rural area, write 0)	months years
L.12	Approximately, how far away was the closest all weather road from the house you grew up in?	Write in kilometres (If the house is on a practicable road, write 0)	
L.13	How would you perceive and classify the socio-economic background of your parents?	Rich..... 1 Upper middle class..... 2 Lower middle class..... 3 Poor..... 4 Very poor..... 5	
L.14	What was/is your father's level of education?	No education..... 1 Still at school..... 2 Completed primary education..... 3 Completed Junior secondary education ..... 4 Completed technical education or vocational training..... 5 University education ..... 6 Don't Know.....98	
L.15	What was/is your father's primary occupation?	Health worker..... 1 Public sector worker..... 2 Private sector worker..... 3 Agriculture manual labour..... 4 Non-agriculture manual labour..... 5 Own business/ trading..... 6 Unemployed..... 7 Others, specify below in L.15a.....97 Don't know.....98	
L.15.a	Other, specify (Write in CAPITAL letters)		
L.16	What was/is your mother's level of education?	No education..... 1 Still at school..... 2 Completed primary education..... 3	

		Completed Junior secondary education .....4 Completed technical education or vocational training.....5 University education .....6 Don't Know 98	
L.17	What was/is your mother's occupation?	Health worker .....1 Public sector worker.....2 Private sector worker.....3 Agriculture manual labour.....4 Non-agriculture manual labour.....5 Own business/ trading .....6 Unemployed.....7 Others, specify below in L.17a.....97 Don't know.....98	
L.17a	Other, specify (Write in CAPITAL letters)		

Thank you for taking part in this study.

M. End of interview

M.1	Interview end time	In 24 hours format	Hour : Minute:
M.2	Interview result	Completed.....1 Incomplete.....2 Others (specify: _____) 8	
M.3	Interviewer's comments		
M.4	Supervisor's comments		
M.5	Supervisor's Signature Questionnaire is complete		

Thank you for taking part in this study.

Annex E: The Field Work Manual

NOTE: This Manual is based on the World Bank's FIELD MANUAL: GUIDELINES FOR FIELD ENUMERATORS, SUPERVISOR, EDITORS AND DATA ENTRY OPERATORS: Baseline Household Survey. The manual was prepared by the Impact Evaluation of Health Results-Based Financing (RBF) Programs at the World Bank. That Manual is publicly available at:
www. *siteresources.worldbank.org › 5.05a_Household_Surv_Field_Manual.docx*.
Whole sections of this manual were used verbatim given the applicability for the Guinea Survey . Many other sections were adapted.

I. Introduction: Purpose of Field Manual

The purpose of the Field Manual is to provide guidance for team leaders and enumerators. The Field Manual contains detailed information on procedures for carrying out fieldwork. All team members should prepare for fieldwork by familiarizing themselves with the manual. Once in the field, the Field Manual serves as a detailed guide that describes procedures for conducting interviews; conducting observation-based data collection; and using specific tools. This version of the Field Manual will be updated periodically, and supervisors and enumerators are encouraged to give feedback and recommendations that will enhance the quality and utility of the manual.

The manual contains three sections. The first section ("A) provides the general Overview of the Survey, including Survey Objective (and research questions), an overview of the survey instrument, data collection strategy, and the specific roles and responsibilities of the survey team (including on day or survey). The second section ("b) provides general instructions on how to carry out the survey in the field and how to maintain data quality, both for Enumerators and team leads. The third section ("C) presents instructions for handing out the Participant Information Sheet and attached informed consent form.

SECTION A: OVERVIEW OF SURVEY

The first section provides the general Overview of the Survey, including Survey Objective (and research questions), an overview of the survey instrument, data collection strategy, and the specific roles and responsibilities of the survey team (including on day or survey).

A.1: Survey Objective

The overall objective of the students' survey is to understand the motivation, behavior, and labour market choices of future health professionals in Guinea. The survey will include questions on the students' demographic and socio-economic characteristics, as well as the motivations and career aspirations of medical, nursing, midwifery and THW students.

The survey will generate descriptive information and statistics and will test several hypotheses including related to job location preference and the association with different monetary and non monetary factors. This survey will also include a contingent valuation method (CVM) module to understand the perceived financial compensation that would be required for different students to offset a particular job uptake (for example for THW students to work at a rural health post, or a midwife to work at a rural health center).

The survey design, analysis and write up is led by Christopher H. Herbst, in collaboration with academics from the University of Lancaster. Support with the formatting of data collection forms, and the training of field workers in French, is provided by Oxford Policy Management (OPM). The data itself will be collected by trained field teams (comprised of doctors and nurses) from local research institution CERREGUI, trained by Christopher H. Herbst and OPM staff.

Research Questions the survey will answer

This will be a nationally representative sample survey on final year medical, nursing, midwifery and THW students in public and private schools located across Guinea. The research will be guided by the following three inter-related research questions:

1. *What are the socio-demographic profiles and training experiences of health students in Guinea?*

2. *What are the stated labour market expectations of health students in Guinea?*

3. *What are the Locational labour market preferences of medical and nursing students, and the factors determining these preferences*

A2: Survey Instrument

The survey will cover final year medical, nursing, midwifery and THW students and will be carried out in relevant public and private health training institutions across Guinea. A semi-structured survey will cover a range of relevant questions to capture the desired quantitative information. The survey and analysis builds on a similar tools administered elsewhere. They will be identical for all four health student cadres with some minor variations (largely on the CVM) only.

The questionnaire was adjusted and informed, following a pretest and discussions held with medical, nursing, midwifery and THW student in January 2017. It consists of primarily closed questions, covering a broad range of topics on student profiles and demographics, background, character traits, education experience, expectations and concerns, job preferences, and monetary and non-monetary factors driving these job preferences.

Contingent evaluation questions in Section J seek to capture the extent to which different wage levels can influence the stated preferences of different students. Questions are designed to allow for the creation of indexes (for example on socio-economic background) and capture data on

various aspects of students' satisfaction using likert scales. The design of these scales borrows from similar scales to meet reliability and validity criteria

Table E1: Overview of Questionnaire Organization

	Module Title	Content
Section A	Administration and identification	Administrative Data to be entered by Enumerator
Section B	To be completed by the data entry agents	Data entry Administrative Content
Section C	What motivated you to work in the health sector	Questions on what motivated students to work in the health sector
Section D	Appraisal of Training	Questions to identify the quality of training and of the student
Section E	Practical Training	Questions on the extent and nature of practical training
Section F	Sources of Financing of training	Questions related to the financing of the training and the obligation to the financier
Section G	Expected Income	Questions related to expected income
Section H	Other Expectations	Questions related to what students expect about the job
Section I	Short-and-medium term Job Preferences and Influencing Factors	Questions about the job preferences of students and the actors influencing these, related to working in a particular: Sector, geographical zone, health facility level, rural/urban location and outmigration
Section J	What will it take to influence your decision	A contingent valuation looking at how much financing would be required for students to take up a particular job post, i.e. urban/rural; district hospital or health center; health center or health post, outmigration
Section K	General Demographic information on student	Questions on the demographic nature of the students
Section L	General Environment of the student	Questions on profile variables specific to the student
Section M	End of Interview	End of interview administration – entered by enumerator

A3: Overview of the data Collection Strategy

Overview: CERREGUI is responsible for data collection and data entry, under the direction of the Lancaster University. The overall survey will be carried out with final year medical, nursing, midwifery and THW (ATS) students across the country. The structured survey will be administered by a team of trained enumerators to all selected study participants in a classroom setting on site of the schools, with the enumerator providing guidance and leading the study participants through the survey on a projector (or without if not available) in the front of the classroom. The students will be led through the survey, question by question by the enumerator, with participants able to ask clarification questions throughout. Surveys will be filled out by each student and handed back to the enumerators upon completion. Enumerators will be closely monitored and supported by team leaders.

Sample Frame There are 36 institutes that are training health students in medical, nursing, midwifery and ATS courses in Guinea. Seven of them are private and 29 are private. A total of 4,608 students are studying in the final year in these institutes including 404 medical, 1,217 nursing, 738 midwifery and 1,217 ATS students.

Table E2: List of all schools in Guinea, and numbers of final year students

Stratum	School	Ownership	Location	Number of students				
				ATS	Nursery	Midwifery	Medical	Total
A	Université Gamal Abdel Nasser	Public	Conakry	-	-	-	316	**316**
B	Université Koffi Annan	Private	Conakry	-	-	-	75	**75**
C	Université la Source	Private	Conakry	-	-	-	13	**13**
D	École Nationale de la Santé de Kindia	Public	Kindia	-	142	75	-	**217**
E	École Nationale de la Santé Communautaire	Public	Faranah	196	-	-	-	**196**
E	École Nationale de la Santé Communautaire	Public	Boké	325	-	-	-	**325**
E	École Nationale de la Santé Communautaire	Public	Labé	350	-	-	-	**350**
E	École Nationale de la Santé Communautaire	Public	N'Zérékoré	506	-	-	-	**506**
E	École Nationale de la Santé Communautaire	Public	Kankan	593	-	-	-	**593**
F	Institution Professionnel de Formation initiale (IPFI)	Private	Conakry	12	35	25	-	**72**
G	École Supérieure des sages Femmes (ESSF)	Private	Conakry	-	-	65	-	**65**
H	Institution de Formation et de Perfectionnement du Personnel (IFPG)	Private	Conakry	-	17	8	-	**25**
H	Institution René Levesque	Private	Conakry	-	17	19	-	**36**
H	Département Formation Professionnelle UNIC	Private	Conakry	-	19	18	-	**37**
H	Institution de Formation et de Perfectionnement en Santé (IFPS)	Private	Conakry	-	32	20	-	**52**
H	Institution « Roi Mohamed VI »	Private	Conakry	-	20	35	-	**55**
H	Centre de Formation et de Perfectionnement en Santé (CFPS/ISIM)	Private	Conakry	-	36	40	-	**76**
H	Institut de formation professionnelle en santé (ESPOIR)	Private	Conakry	-	70	35	-	**105**
I	Institut Professionnelle D'Assistance Sociale et Humanitaire Bel Averin	Private	Mamou	84	36	-	-	**120**
J	Institut de Formation Professionnelle Dara Etoile	Private	Labé	36	79	48	-	**163**
K	Institut de Formation Technique et Professionnelle La Part Dieu	Private	Kissidougou	30	-	-	-	**30**
K	Institut de Formation Technique et Professionnelle Boni Bandjougou Camara	Private	Siguiri	117	-	-	-	**117**
L	École Privée de Santé Ahmed Sékou Touré	Private	Macenta	-	34	-	-	**34**
L	École Privée de santé Les Sauveurs Plus	Private	Labé	-	91	-	-	**91**
M	École supérieure de Sages Femmes Pr. Mamadou Kaba Bah	Private	Labé	-	-	49	-	**49**
N	Institut Professionnelle de Formation en Santé El Hadj Damantan Camara	Private	Boké	-	13	11	-	**24**
N	Institut de Formation Technique et Professionnelle Bambo Kèba Fadiga	Private	Kindia	-	15	19	-	**34**
N	Institut Privée de formation en santé (Ben Sékou Sylla)	Private	Coyah	-	23	13	-	**36**
N	Institut de Formation Technique et Professionnelle Néssy et Yomba	Private	Boké	-	33	14	-	**47**
N	Institut professionnelle de formation en santé (El Hadj Mohamed Diawara)	Private	Dubréka	-	41	19	-	**60**
N	École Privée de Santé Hadja Djénabou Chérif Haidira	Private	Kindia	-	54	20	-	**74**
N	Institut de Formation Technique et Professionnelle UDECOM	Private	N'Zérékoré	-	57	35	-	**92**
N	Institut de Formation Technique et Professionnelle El Hadj M'Bemba Touré	Private	Kankan	-	57	41	-	**98**
N	École Internationale de santé Ellen Johnson Sirleaf	Private	N'Zérékoré	-	66	49	-	**115**
N	École Africaine des services sociaux et de santé	Private	Kindia	-	115	40	-	**155**
N	École Privée de Santé Waliou de Gomba	Private	Kindia	-	115	40	-	**155**
	Total			2,249	1,217	738	404	**4,608**

Total School and Student Sample The sample was stratified by location, type of ownership and type of health workers. Using Probability sampling Proportionate to Size (PPS), 18 schools were sampled from these groups (some groups only have one school, while others have more than one). Some of the sampled schools have fewer students than what we expected to have, so our final sample size is slightly smaller than expected.

Table E3: Selected schools, by strata, and target sample in each school (out of total expected students from the sample frame)

Name of School	Ownership	location	**Doctors**	**Nurses**	**Midwiv**	**ATS**	**Total**
Universite Gammal Abdel Nasser De Conakry	Public	Conakry	120/316				120/316
University Koffi Annan De Guinea	Private	Conakry	60/75				60/75
Universite La Source	Private	Conakry	13/13				13/13
Ecole Nationale De La Sante De Kindia	Public	Kindia		40/142	20/75		60/217
École Nationale de la Santé Communautaire N'Zérékoré	Public	Nzerekore				60 /506	60/506
École Nationale Santé Communautaire Kankan*	Public	Kankan				60 /593	60/593

Institut Profesionnel de Formation Initiate (IPFI)	Private	Conakry		10 (35)	10/25	12 /12	32/72
Ecole Superieur Des Sage-Femmes de Guinea	Private	Conakry			30/65		30/65
Centre de Formation et de Perfectionnement en Sante (CFPS/ISIM)	private	Conakry		30/36	30/40		60/76
Institute Rene Levesque	Private	Conakry		17/17	19/19		36/36
Insitut Prive Bel Avenir Pour Tous	Private	Mamou		10/36		20/84	20/84
Dara Etoile Labe	Private	Labe		10/79	10/48	10/36	30/163
Institut de Formation Technique et Professionelle Boni Bandjougou de Siguiri	private	Siguiri				30/117	30/117
Sauveur Plus (Labe) SAUVEUR PLUS (LABE)	Private	Labe		30/91			30/91
Ecole Superieoure de Sage Femmes Pr Mamadou Kaba Bah Labe	Private	Labe			30/49		30/49
Ecole Africainde Des Services Sociaux et de Sante de Kindia	Private	Kindia		15/115	15/40		30/155
Institut Prive de Formation en Sante Ben Sekou Sylla (Coyah)	Private	Coyah		15/23	13/13		28/36
Formation Technique et Professionnelle El Hadj M'Bemba TOURE Kankan	Private	Kankan		15/57	15/41		30/98
TOTAL			193/404	192/631	192/415	192/1264	769/2714

Announcing the visit. Prior to the site visits, each training institution selected in the sample will be informed by the government of the pending visit, per a communication sent to each facility by the government (responsibility of the MOH). Thereafter, each of the facilities in the sample will be visited by the enumerators and team leads (the data collection team) over the course of approximately one month.

Recruiting the sample and grouping them: Upon arrival, the data collection team will recruit the sample of students needed for that school, and group the needed sample into groups of 30 students maximum (so a sample of 120 will be three groups of 30). Smaller groups may be more manageable to the data collection team, so a sample of 30 can further be divided into two groups of 15. Accompanied by the data collection team, each group will be asked to administer the survey in a classroom setting. **Details on the process for the recruitment of the sample on the day of the visit are found in section B1.**

Filling out administrative data and Providing informed consent: At the beginning of each survey session, the data collection team will provide the Participant Information Sheet (PIS) and attached consent form to each of the students in the class and ask them to read this and fill out the consent form. The PIS will cover the information required for potential study participants to give informed consent. The PIS will include information about the purpose of the study, the voluntary nature of involvement, and confidentiality of collected information and whether there are any potential risks. While the students are reading the PIS and filling out the consent forms, the enumerators will fill out section A of each of the questionnaires. The enumerators will then collect the informed consent forms and check whether any of the students has decided not to

participate. If a student does not provide consent, he will be replaced with another on the sampling framework **(see section B1 for this scenario).**

Administering Survey: Once Section A is filled out by the data collection team in each survey form, and once the students have provided their consent, and handed the forms over to the enumerators, the session can start. Students will be handed the questionnaires and provide quick instructions on how to fill them out (i.e. there are numbers that represent answers, there are skip patterns, and that all students are expected to not leave any blanks. The enumerators will ask that the student don't talk to each other during the survey, although encourage them to ask questions or inform them once sections are filled in. For medical students, enumerators will ask students to read and fill each section out on their own. Students are expected to stop after each section, with the enumerators checking whether all students have completed a section before moving on to the next section. For Nurses, midwives and ATS students, the enumerators will read each question in each section allowed, and continue only to the next question once all students have provided an answer to the question.

A4: Survey Team – Specific Roles and Responsibilities (including on day of survey)

The survey team will consist of a team leader, enumerators, and an overall survey supervisor. Each have very specific roles to plan which are outlined below. Details of what will be expected from them on the day of the survey are included in each Box below.

Team Leader: The team leader is the senior member of each field team. He/she is responsible for the well-being and safety of team members, as well as the completion of the assigned workload and the maintenance of data quality for that team. Each team leader receives his/her assignments from and reports to the Survey supervisor, Professor Balde. The specific responsibilities of the team leader are to make the necessary preparations for fieldwork, to organize and direct the fieldwork, and to carry out data quality maintenance activities. Satisfactory completion of work at all institutions has to be certified by both the Team leader and submitted to the Survey supervisor for review and approval. Without approval at these two levels, the team's work will be deemed incomplete. Table E4 provides a brief overview of the responsibilities of the team leader, on the day of the survey.

Table E4: Team leader on day of survey
1. Ensures all the materials are available and printed double pages and in good quality (survey forms)
2. Arrival at the training institution in the morning
3. Meet with the head of the school for introduction, purpose and permission
4. Collects the list total number of final year students in each school, and identifies/recruits the required sample
5. Ensures the recruited student sample is assigned into groups and placed into a classroom setting and teamed up with the enumerators. Helps set up projectors where necessary and hands all students the PIS and attached consent form.

6. Ensures all enumerators fill out section A on each survey form while the students read through the PIS and provide informed consent to the survey.
7. Ensures all student informed consent forms are collected. If a student decides not to participate, the team leader will be responsible for replacing that student with another one in the sampling framework.
8. Supervises the enumerators in administering the survey and provides support or guidance as necessary. Ensures drinks are available for students or a short break is organized as needed
9. Receives all filled out survey forms from enumerators and ensures students remain in the classroom upon completion
10. Quickly checks survey entries for completeness and quality and decides whether some questions have to be asked again to certain students if blank or illegibly entered
11. Confirms that all forms have been fully filled in and finalized and ensures section M of the survey form is adequately filled out.

Enumerator: The responsibilities of the enumerators include the following: (i) Guide students through each question in the questionnaire; (ii) Ensure that all required questionnaires are completed by students (iii) answer any questions or provide needed clarifications, (iv) check completed survey forms to ensure that all questions were asked and all responses legibly recorded (v) ask any questions that were inadvertently skipped or for which responses were recorded illegibly. Table 5 provides a brief overview of some of the responsibilities on the day of the survey.

Table E5: Enumerator on day of survey
1. Arrival at the training institution in the morning
2. Meet with the head of the school for introduction, purpose and permission (with team lead)
3. Support the team lead to recruit the needed sample, and assign the sample into a relevant classroom setting
4. Once assigned to a classroom with the recruited sample, fill out relevant section A of the survey form, while the students read through the PIS and fill out the consent form, provided to them by the team lead.
5. Read each question aloud if needed (and project questions on projector as needed) and only move to the next question and section once class is ready. Answer any queries as needed.
6. Receives all filled out survey forms from the students
7. Provides a quick first check of the student survey forms for completeness (for example ensures that skip patterns are followed correctly, that there are no blanks, and that all sections have been filled out.
8. Passes survey forms to the team leads for their review, cross check, and final sign off
9. Work with the team lead in ensuring that all sections of a questionnaire are filled out.

Survey Supervisor: The Survey Supervisor (Dr Balde) is the overall local coordinator of the field collection and responsible for coordinating the school visits and data collection teams and ensuring that all Quality Assurance Standards set and required during enumeration are met. During the first few days of the survey, the survey supervisor works very closely with all teams by accompanying the field teams randomly, observing part/full interviews and ensures that enumerators follow the right protocol, interviews are administered as per the set instructions and ensures quality control measures are being followed e.g. use of correct codes in questionnaire, skip patterns are being followed, all questions applicable have been administered, there is no contradictory information etc. In addition, any frequently made errors observed are promptly communicated to all team leaders so that they can be amended and are not repeated for rest of the survey.

SECTION B: GENERAL INSTRUCTIONS ON DATA COLLECTION AND MAINTAINING QUALITY

This section provides general instructions on how to carry out data collection and how to maintain data quality, both for (i) Enumerators and (ii) Team leads. Successful interviewing is an art and should not be treated as a mechanical process. The art of interviewing develops with practice, but there are certain basic principles, which, if followed, will help you become a successful enumerator.

B.1 General Instructions for Enumerators

Building rapport with the respondent

At the beginning of the survey administration, you and the respondent are strangers to each other. The respondent's first impression of you will influence his/her willingness to cooperate with the survey. Be sure that your manner is friendly as you introduce yourself. The following principles help to build rapport:

• ***Make a good impression.*** Ensure to make the students at ease. With a few well-chosen words, you can put the respondents in the right frame of mind for the survey. Open the survey with a smile and greeting such as "good morning" and then proceed with your introduction.

• ***Stress confidentiality of responses.*** If the respondent is hesitant about responding to the survey questions or asks what the data will be used for, explain that the information you collect will remain confidential, no individual names will be used for any purpose, and all information will be grouped together to write a report. You should never mention other survey findings or show completed questionnaires to other enumerators or Team leaders in front of a student or any other person not part of the Survey Team.

• ***Answer all questions from the respondents frankly*.** Before the survey commences, the respondents may ask you some questions about the survey or why he/she was selected. Be direct and pleasant when you answer.

Tips for administering the survey

• ***Be neutral***. Most people have a tendency to provide answers that they think one would want to hear. It is therefore very important that you remain absolutely neutral as you read or explain the questions.

• ***Never suggest answers to the respondent*.** If a respondent's ask for clarification of question, do so, but never suggest an answer to the respondent.

• ***Do not change meaning of questions*.** The wording of the questions and their sequence in the questionnaire should be maintained. If the respondents have not understood the question, you should repeat the question slowly and clearly. In highly exceptional circumstances and only if respondents still do not understand at that point, may you reword the question, or explain the question in the local language, being careful not to alter the meaning of the original question.

• ***Follow instructions in the instrument carefully*.** For some questions on the survey instruments, it is required that you read the list of possible responses to the respondent. Such questions are accompanied by an instruction to "Read List."

• ***Do not hurry reading the questions****:* Read the questions slowly to ensure the respondents understand what is being asked. After you have asked a question, pause and give the respondents time to write. If the respondents feel hurried he/she may give an inaccurate answer.

Providing Guidance to respondents on how to complete questionnaires

All respondents will use pens with blue ink to complete all questionnaires. Enumerators and team leaders will use green or red pens: if both are available, red should be for Team leaders, green for enumerators. Tell the students clearly NEVER LEAVE A RESPONSE BLANK. A blank is recorded as "missing information" because it is not known whether you asked the question or not. If there is no response, the blank must be circled followed the completion of all the surveys and their check.

Explain to the group that most of the questions have responses that are in form of number codes. For respondents to answer, they merely put the number code that corresponds to the reply in the space provided. Below is an example

A.1	What is the name of the degree or qualification you are studying for right now?	Doctor ..... 1 Nurse..... 2 Midwife ..... 3 THW 4	1

Following Skip Patterns

In cases where a particular response makes the next questions irrelevant, an instruction is provided and the " → " symbol will be found, followed by the number of the question that the respondents should jump to. It is important for respondents to follow skip patterns carefully. Every question on a survey form must be answered unless a skip is indicated by a skip pattern or the respondent refuses to the answer the question. **It is VERY IMPORTANT that** all enumerators be very conscientious that respondents follow skip patterns.

Correcting mistakes

It is very important that respondents write their answers neatly. For pre-coded responses, respondents must be sure to circle or write the code for correct response carefully. For open-ended responses, the reply should be written legibly so that it can be easily read. If a mistake is made when entering an answer or the respondent changes his/her mind, they must be sure to cross out the incorrect response and enter the right answer. They should not try to erase the answer. **Ask them to put two lines through the incorrect response and write down the correct response.**

Checking completed survey forms

It is the responsibility of the enumerator to review each survey form quickly when finished with the survey session. This review should be done before the respondents leave, to ensure that every appropriate question was filled, that all answers are clear and reasonable, and that the handwriting is legible.

The enumerator should also check that the skip instructions were followed correctly. Minor corrections can be made, but any serious errors should be clarified by the respondent. When some errors are detected, enumerators will write a check mark on the side, and will explain to the respondent that there is an inconsistency and ask them to write down the answer again. The student can also wait to receive more explanations if needed.

When scanning quickly through the questionnaire: it is important not to read the answer, but only to look for missing fields, check skip pattern and answers are readable. The verification should not take more than 60 seconds overall (3 second per page), to ensure the student doesn't feel scrutinized.

Enumerators and team leaders should not recopy the questionnaires. As long as the answers are clear and readable, it is not necessary that the questionnaire itself be neat. Every time anyone transcribes the answer to a new question, the chance of error increases.

B.2 General Instructions for Team Leaders

The team leader must refer to the manual for the technical conduct of work during any phase of the fieldwork. Instructions have been prepared to provide information needed to effectively carry out his/her tasks. Team Leaders should carefully study these instructions because it is essential for them to fully understand the questionnaires and how the respondents are expected to fill them. It is also important that they check the questionnaires provided by the enumerators, correct them as needed.

Team Leaders are the most senior in the team. It is their duty to ensure the welfare and safety of their team, they must make sure that the workload that falls to the team is completed and are also responsible for maintaining data quality. Team Leaders are especially responsible for the management of fieldwork, as well as monitoring data collected.

General responsibilities

• Team Leaders should establish contact with the health training institutions to be visited. Contacts have already been established prior to the team's arrival. It is the team leader's responsibility to present the team and organize the work in the health training institutions.

• If necessary, team leaders can arrange for housing for team's members.

• Team leaders should select (recruit) the number of all registered final year medical, nursing, midwifery and or ATS students per facility, based on the sampling framework

• Team Leaders should arrange for groups of maximum 30 to be placed into a classroom setting and divide the work among enumerators in accordance with the instructions they were given during training.

• Team Leaders should provide the FINAL check of questionnaires on-site (after the check from the enumerators), to ensure they are complete and properly filled.

• Team Leaders should sort the completed questionnaires by school and student type, ensure they are not mixed up, and deliver them to the survey supervisor during his/her supervision visit or after.

• Team Leaders should communicate any problems that may arise on the field to the survey supervisor.

• Team leaders are responsible for the management of the vehicle and all other materials that you have been given for the work. Make sure they are used only for work and not for other purposes.

• Team Leaders should try to develop a team spirit, maintain a harmonious working atmosphere and well organized activities on the field.

Preparation for the fieldwork

To prepare for the fieldwork, each Team leader—with the support of the Survey coordinator—must:

• Become familiar with the area where the team will be working and determine best arrangements for travel and accommodations. Lodging should be reasonably comfortable, located as close as possible to the training institutions, and provide secure space to store survey materials. The team leader is also responsible for figuring out how and where the team is going to take its meals.

• Obtain all monetary advances, supplies, and equipment necessary for the team to complete its assigned interviews. Careful preparation by the team leader is important for facilitating the work of the team in the field, for maintaining enumerator morale, and for ensuring contact with the central office throughout the fieldwork.

• Ensure that the travel plan is discussed with all team members.

Materials required for Fieldwork

Before leaving for the field, the team leader is responsible for collecting adequate supplies from the Survey supervisor of all materials the team will need in the field. These items are listed below (Table E6):

Table E6: Field Materials and Supplies Fieldwork documents

Printed copies of the survey instruments, information sheet, consent forms, listing forms
Copy of Letter of Permission that was previously sent by the authorities to the training institution
Maps showing the location of all health training institutions to survey
The mission order from the ministry (Ordre de mission)
Badges for all team members
Field Manual (one for the team leader, three each for the enumerators)
Team leader's Tracking Sheets:
Supplies
Pens (Blue pens for enumerators; red pens for the team leader; Black pens for the respondents)
Projectors, Clipboards; notepads; blank paper; staplers, stapler remover and staple pins; plastic folders and rubber bands for completed questionnaires; carrying bags; backpacks and Drinks!!
Flashlight and batteries Cell-phone with charger and top-up cards
Other

Recruiting the student sample on-site

As shown in the Table of sampled schools and students, some of the schools have only one type of student (e.g. Université Gamal Abdel Nasser only have medical students), while others are training several types of students (e.g. Institution Professionnel de Formation Initiale is training nurses, midwives and ATS). In most of the schools we will sample students, but there are some places we will be selecting all (e.g. we will select all 13 medical students in Université la Source).

The students in each school will be sampled by simple random sampling and the teams will be provided a listing form and a sealed envelope with the random number pad for each school. Team leaders are asked to follow the steps for the sampling.

a. Fill out the listing tool: Use separate listing tool for each type of student and enter the name of the school, code, and the total student of that type. The first page of the listing tool has 25 rows. Please use additional listing paper if needed and enter the subsequent numbers in the first column. If you can obtain a list from the school that you can bring along or make a photocopy, you do not need to enter all the names – just fill out the first column. If you do not have a list from the school or if you cannot bring a copy of the list, please list all the students in alphabetic order in the listing tool.

b. ***Conduct the random sampling:*** Open the sealed envelope and you will find the instructions on how many students are likely to be there and how many you need to sample from the specific type. You will also see a random number pad as shown below as an example.

22	13	12	20	6	16	25	10	2	24
27	1	8	31	19	18	17	11	26	21
28	32	15	31	5	4	29	9	23	7
3	30	14	.	.	.	.	.	.	.

Find the sampled students from the random pad starting from left to right and from top to bottom. Indicate the sampled student number in the third column of the listing form. For example, using the above random pad, if you need to sample 10 nursing students from 30, you need to sample student number 22, 13, 12, 20, 6, 16, 25, 10, 2 and 24. Check if the students are available. If you need to draw additional sample because some of the students on the list are not present, for example, if you need 2 additional students for your sample, include 27 and 1 and follow the same procedure until you have 10 students.

c) Sorting sample into groups: For each session, the group size is maximum 30, but the constraint will often be that there is no room to accommodate all the students (as they have to be separate by one meter at least to avoid copying). When the students are selected (i.e. “ordre

de sortie" contains the required sample), they will be allocated into group: going down the "group" column and alternating the groups (i.e. if there are two groups, 1, then 2, then 1 then 2). Note that where possible, we ask to draw ONE extra student for each group: (s)h will be asked to participate if a student would refuse to sign Consent Form.

Exceptional circumstances

You will usually have to draw sample of students from each type in a school. In some cases, you will have to draw all the samples and it is possible that you may need to draw more sample, if there are more than anticipated number of students. For example, in Université la Source, you will need to sample all 13 medical students. If you see that there are more than 13 students, sample all up to 30 students. If you have more than 30 students, sample 30 using the random pad.

If you do not find sufficient number of patients, in a school on the day of the survey, please visit the school again until you sample the required students. For example, you need to sample 40 nursing students at Ecole Nationale de la Santé de Kindia. If you only find 20 students in the first day of the interview, visit another day to sample additional 20 nurses without repeating the same students.

If you don't have a sufficient sample even after the repeat visit, please replace the sample from another school of the same group as mentioned in the Table in Annex 1. For example, you are short of 5 nurses in a private school outside of Conakry, please replace 5 sampled students from another private school outside of Conakry in a subsequent visit.

Monitoring performance of Enumerators

The Team leaders are to monitor enumerator performance with the aim of improving and maintaining the quality of the data collected. Close supervision of the performance of the enumerators is essential to ensure that accurate and complete data are collected from the students. By checking the enumerators' work regularly the team leader can ensure that the quality of the data collection remains high throughout the survey.

It is necessary to observe the enumerators more frequently at the beginning of the survey and again toward the end. In the beginning, the enumerators may make errors due to lack of experience or lack of familiarity with the questionnaire; these can be corrected with additional training as the survey progresses. Toward the end of the survey, enumerators may become bored or tired; lack of attention to detail may result in carelessness in reading the questions or answering queries. To maintain the
quality of data, the team leader should check the performance of enumerators thoroughly at these times.

Motivation and maintaining morale

The team leader plays a vital role in creating and maintaining motivation and morale among the enumerators—two elements that are essential to good-quality work. To achieve this, Team leaders must ensure that the enumerators:

- Understand clearly what is expected of them
- Are properly guided and supervised in their work
- Receive recognition for good work
- Are stimulated to improve their work
- Work in tranquil and secure conditions

In working with the enumerators it may be useful to adhere to the following principles:

- Rather than giving direct orders, try to gain voluntary compliance before demanding it.
- Without losing a sense of authority, try to involve the enumerators in making decisions, and at the same time, see to it that the decision remains firm.
- When pointing out an error, do so in private, in a tactful and friendly manner. Listen to the enumerator's explanation, show him/her that you are trying to help him/her, examine the causes of the problem together and finally explain your plan for improvement and correction.
- When enumerators voice complaints, listen with patience and try to resolve them.
- Try to foster team spirit and group work.
- Under no circumstances show preference for one or another of the enumerators.
- Try to develop a friendly and informal atmosphere.

Finally, it is important to *demonstrate* punctuality, enthusiasm, and dedication in order to demand the same of other team members. An ill-prepared team leader will not be able to demand high-quality work from enumerators and will soon lose credibility and authority. The collective conduct, morale and motivation of enumerators depend directly on the personal conduct, morale and motivation of their team leader.

Observing the Enumerators during the survey administration

When observing Enumerators, the team leader should sit close enough to see how the enumerator is conducting the survey. This way, she/he can see whether the enumerator instructs the respondents correctly and reads the questions appropriately. It is important to note all problem areas and issues to be discussed later in review session with the enumerator. The team leader should not intervene during the course of the data collection and should try to conduct himself/herself in such a manner that prevents the enumerator from feeling nervous or uneasy.

After each observation, the team leader and enumerator should discuss the enumerator's performance in a review session. The questionnaires should be reviewed, and the team leader should mention things that the enumerator did correctly as well as any problems or mistakes. The team leader should also listen to any feedback that the enumerator has to offer. Always acknowledge good work done by Enumerators; positive feedback can help build morale.

Conducting team meetings

In addition, each team leader is responsible for arranging and conducting daily team meetings to discuss common errors and provide a forum to address any issues the teams may encounter during the day. These team meetings should be held daily. At team meetings, the team leader should point out mistakes discovered during the provision of interviews or noticed on the questionnaire of the students. She/he should discuss examples of actual mistakes, being careful not to embarrass individual enumerators. Re-reading relevant sections from the manual together with the team can help resolve problems. The team leader can also encourage the enumerators to talk about any situations they encountered in the field that were not covered in training. The group should discuss whether or not the situation was handled properly and how similar situations should be handled in the future. Team members can learn a lot from one another in these meetings and should feel free to discuss their own mistakes without fear of embarrassment. Review sessions are an opportunity to teach and improve performance. They are also an invaluable opportunity for the team leader to listen to and learn from Enumerators. The discussion points of team meetings should be summarized and submitted with the weekly progress reports to the survey supervisor.

Editing questionnaires

The Team leader must ensure that questionnaires are checked and corrected for completeness, legibility, and consistency. *Every* questionnaire must be completely checked in the field. This is necessary because even a small error can create much bigger problems after the information has been entered into the computer and tabulations have been run. Often, small errors can be corrected just by reviewing and discussing with the enumerator. For example, if an answer of '02 MONTHS' is inconsistent with another response, the team may discuss this and change to '2 years,' and the error can easily be corrected. In other cases, the enumerators may have to go back to the respondent to get the correct information. TIMELY EDITING PERMITS CORRECTION OF QUESTIONNAIRES IN THE FIELD.

If the errors are major ones, an entire questionnaire may be omitted from the analysis. As you are editing questionnaires in the field, it may help to try imagining how the questionnaire would look to a clerk in the office. Would he or she be able to read the responses? Are the answers consistent? Since editing is such an important task, we have prepared a set of instructions that describe the procedures for editing questionnaires.

Instructions for editing questionnaires

The following should be done before leaving the training institution surveyed. Whenever possible, the team leader should check and correct the questionnaires as soon as they have been completed by the enumerator:

• As the team leader reviews the questionnaires, if a response is missing (that is, there is no answer recorded because the question was not asked) or the response is inconsistent with other information in the questionnaire and they cannot determine the correct response, a question mark ('?') should be written next to the item WITH A RED OR GREEN PEN. The page number or

the question number can be written on the front or back of the questionnaire; this way, they can quickly remember later what problems they found. When the team leader has completed the editing, he/she should discuss with each enumerator, individually, the observations they found. Any errors that they find frequently should be discussed with the whole team.

• For every mistake or inconsistent answer found, the enumerator and/or team leader should go back to the respondent to have him or her clarify his or her response to the question.

• NOTE: UNDER NO CIRCUMSTANCES SHOULD THE ENUMERATORS OR TEAM LEADERS EVER MAKE UP AN ANSWER

• If it is not possible to return to the respondent to resolve inconsistencies or missing information, the team supervisor should make a note of this in the supervisor's log and in the comments section of the instrument. It is then up to the analysis team to decide how to use this data.

• In checking through each questionnaire, the team leader should be sure that the numbers entered in boxes are easily readable.

• In checking each questionnaire, the team leader should make sure that the respondent was asked all questions appropriate for him or her (check that the respondents followed the skip instructions). The team leader will need to look for: o Questions for which a response is recorded when it appears there should be no response (in this case, team leaders should cross out the response by drawing two lines through the code with their red/Greenpen)

o Questions for which no response is recorded when it appears there should be a response (in this case, try to find the correct response as described above or leave blank).

• A RED/GREEN PEN SHOULD ALWAYS BE USED TO MAKE CORRECTIONS

• The team leader should check the ranges for all variables that are not pre-coded and carry out the other consistency checks that are listed. Mark any inconsistencies with a red pen.

Once the team leader has checked and corrected the questionnaire, she/he should sign their name on the space provided on the front page.

SECTION C: INSTRUCTIONS FOR HANDING OUT THE PIS AND CONSENT FORMS.

Prior to filling out the questionnaire, the participant will be provided with a copy of a PIS and attached consent form, and each study participant will be asked to read through that and will be requested to give their consent by signing the form if they are happy with all the ethical aspects. The consent form must be read aloud for groups that have less ability to understand it (ATS). The consent form asks the participants to confirm a number of statements, including that the

information provided on the information sheet is fully understood, that there had been opportunities to ask questions, that participation is voluntary, that participants understand the stated anonymization and confidentiality of data, and ultimately that participants are fully willing to participate in the study. Should a recruited participant at the beginning of the working session decide not to sign his or her consent, they will be able to leave and be replaced by an alternative student who had expressed willingness to participate and is next on the sampling list. Further, the study enumerator will communicate to all study participants that they can withdraw or request their information not to be used up to 2 weeks after the working session.

While the students read / are read the Project Information Sheet and the consent form, the enumerators can start filling the section A of the questionnaires: All but the “code ID” and “Random numbers”

Annex F: Participant Information form and Consent Form (in French)

Le code | | | | | | |
Code école || Option ||
Code répondant

FICHES D'INFORMATION ET CONSENTEMENT
Etude Ressource Humaine pour la santé (RHS) en Guinée, Volet Etudiant.

A. Fiche d'information du projet: Etudiants et élèves de dernière année en médecine, soins infirmiers, sages-femmes et ATS.

Ressources humaines en santé en Guinée, les attentes du personnel de santé et la perception des bénéficiaires

Bonjour. Je m'appelle ……..……..……..……..…
Le Ministère de la santé et de la Banque mondiale avec le soutien de Lancaster University, Royaume-Uni at de Oxford Policy Management, Royaume-Uni mènent une étude sur les ressources humaines en santé en Guinée. J'appartiens à la Cellule de recherche en santé de la reproduction en Guinée (CERREGUI) qui est chargée de recueillir les informations requises.

Quel est l'objectif de cette enquête ?
Le but de cette enquête est de comprendre les attentes, les préoccupations et les préférences professionnelles des étudiants en dernière année de médecine, soins infirmiers, sages-femmes et ATS et de comprendre les différents facteurs qui les influencent. En fin de compte, ces informations peuvent être utilisées pour développer une meilleure formation et de meilleures politiques relatives au marché du travail dans le secteur de la santé en Guinée. En accord avec le directeur de votre établissement, des enquêteurs vont très prochainement venir se joindre à votre groupe pour une visite de terrain. En effet, une enquête sera menée dans une classe, auprès d'un échantillon d'étudiants de dernière année de médecine, soins infirmiers, sages-femmes et ATS.

Pourquoi avez-vous été choisi ?
Nous vous avons contacté car vous êtes actuellement étudiant/élève en dernière année de ……..…….. [*Option : médecine, soins infirmiers, sages-femmes, ATS]*. Vous êtes invité à partager vos attentes, vos préoccupations et vos plans de carrière concernant l'entrée sur le marché du travail avec les chercheurs de l'étude.

La participation à l'enquête est-elle obligatoire ?
Non. C'est entièrement à vous de décider si vous participez ou non. Il n'y a aucune répercussion négative si vous décidez de ne pas participer à l'enquête.

Que va-t-on me demander si vous décidez de participer ?
Vous avez été sélectionne pour ce questionnaire, selon la stratégie d'échantillonnage appliquée par les chercheurs. Vous êtes invité à participer à une séance de travail de 90-120 minutes dans le campus. Pas à pas, un enquêteur vous guidera à travers le questionnaire que vous aurez à remplir. Tout au long de celle-ci, vous pourrez poser des questions de clarification.

Mes données seront-elles identifiables ?
- Les informations que vous fournissez demeurent strictement confidentielles. Les données recueillies pour cette étude seront stockées en toute sécurité et seuls les chercheurs qui effectuent cette enquête auront accès à ces données :
- Les copies papier des enquêtes seront conservées dans un placard fermé à clé.

- Les fichiers sauvegardés sur l'ordinateur seront encodés (personne en-dehors de l'enquêteur ne pourra y accéder) et l'ordinateur sera lui-même protégé par un mot de passe. Les fichiers seront détruits dix ans après la soumission de l'étude.
- À la fin de l'étude, des copies papier des enquêtes seront conservées en toute sécurité pendant dix ans, dans un placard fermé à clé. À la fin de cette période, toutes les copies seront détruites.
- Les données recueillies dans les enquêtes seront rendues anonymes en supprimant toute information d'identification ainsi que votre nom.
- Toutes vos données personnelles seront confidentielles et seront conservées séparément de vos réponses à l'enquête.
- Les données anonymes nettoyées seront placées à la Banque mondiale dans un répertoire de données. Elles seront mises à disposition des enquêteurs pour une analyse complémentaire si besoin.

Il existe néanmoins certaines limites à la confidentialité : si des informations partagées au cours de l'entretien indiquent que vous, ou quelqu'un d'autre, courez un risque important, l'enquêteur est obligé de rompre la confidentialité et d'évoquer le sujet à un membre du personnel. Dans ce cas, et dans la mesure du possible, vous serez informé de la démarche.

Qu'adviendra-t-il des résultats ?
Le compte-rendu sera diffusé sous la forme d'un rapport de synthèse et de notes de politique générale pour le Client (Ministère de la Santé et Ministère de l'Éducation en Guinée), un rapport à l'université de Lancaster, et sous la forme de présentations dans des conférences nationales et internationales et par des publications dans les journaux. Les résultats vous seront communiqués au moment de l'atelier de restitution. Tous les documents seront disponibles en français et en anglais grâce à un service de traduction.

Existe-t-il des risques ?
Cette étude ne présente aucun risque prévisible. Toutefois, si vous rencontrez une difficulté pendant ou après votre participation, vous êtes encouragé à en informer l'enquêteur et à contacter les personnes dont les noms sont fournis à la fin de cette fiche.

Existe-t-il des avantages à participer ?
Bien qu'il n'y ait aucun bénéfice direct immédiat à participer, une réflexion personnelle sur les plans de carrière et les motivations qui suivent l'obtention du diplôme peut s'avérer utile pour les participants à l'étude. Cela permet d'avoir une vision plus claire de sa trajectoire professionnelle planifiée. De plus, l'étude vise à permettre au gouvernement d'élaborer et de mettre en oeuvre des interventions ciblées liées à la formation des professionnels de santé et au marché du travail de la santé, ce qui pourrait être bénéfique à moyen et à long terme pour les participants à l'étude, à la fois comme professionnels de santé mais également en tant que patients potentiels (Clients).

Qui a examiné le projet ?
Cette étude a été examinée et approuvée par le Ministère de la santé en Guinée et par le Comité d'éthique de la recherche en santé en Guinée. Elle a également été approuvée par le Comité d'éthique de la recherche universitaire de l'Université de Lancaster au Royaume-Uni (RU).

En cas de besoin, où puis-je obtenir d'autres informations sur l'étude ?
Si vous avez des questions sur l'étude, veuillez contacter l'enquêteur principal : Christopher H. Herbst, c.herbst@lancaster.ac.uk

Réclamations
Si vous souhaitez déposer une plainte ou soulever des questions concernant un aspect de cette étude sans en parler à l'enquêteur, adressez-vous au Prof Steve Jones, Lancaster University, Directeur du Centre Spectrum pour la recherche en santé mentale: s.jones7@lancaster.ac.uk.

Si vous vous sentez en difficulté pendant ou après avoir participé à l'étude, les ressources suivantes peuvent être utiles. En dehors de votre institution, vous pouvez contacter le Pr M. Diouldé Baldé Coordinateur CERREGUI. Il pourra vous fournir des conseils et des ressources supplémentaires si nécessaire (baldemddka@gmail.com)

Merci d'avoir pris le temps de lire cette fiche d'information

Le code | | | | | | |
Code école || Option ||
Code répondant

B Consentement

	Merci de bien vouloir cocher en face de chaque déclaration
1. Je confirme que j'ai lu la fiche d'information et que je comprends complètement ce qu'on attend de moi dans cette étude.	☐
2. Je confirme que j'ai eu l'occasion de poser des questions et d'obtenir une réponse à mes questions.	☐
3. Je comprends que les informations que je fournirai dans ce questionnaire n'incluent aucune information pouvant m'identifier et que chaque formulaire sera anonyme.	☐
4. Je comprends que ma participation est volontaire et que je suis libre de me retirer à tout moment sans donner de raison, et sans que mes soins ou mes droits juridiques ne soient compromis.	☐
5. Je comprends qu'une fois les données saisies dans une base de données sécurisées, il ne sera peut-être pas possible de les retirer, bien que tout sera tenté pour récupérer mes données jusqu'à deux semaines suivant la fin de la séance de travail.	☐
6. Je comprends que les informations de mon entretien seront regroupées avec les réponses des autres participants, anonymes et qu'elles pourront être publiées.	☐
7. Je comprends que toutes les informations fournies par moi resteront strictement confidentielles et anonymes à moins qu'elles soient considérées comme un risque de nuire à moi-même ou à d'autres personnes, auquel cas le chercheur principal devra peut-être communiquer ces informations à son directeur de recherche.	☐
8. Je consens à ce que la Banque Mondiale garde les questionnaires sous serrure pour une période de 10 ans à compter de la séance de travail.	☐
9. J'accepte que les chercheurs versent les données anonymes à un service d'archives afin de les mettre à la disposition d'autres chercheurs à l'avenir.	☐
10. J'accepte de faire partie de cette étude.	☐

Nom du participant _____ Signature _____ Date _____

Nom de l'enquêteur _____ Signature _____ Date _____

Annex G: The Data Collection Summary by Institution- (January 2018)

Team	Date collected	Institution	ID	Medical Students		Nurses		Midwives		ATS (Community Health Workers)	
A	Du 04 au 11.01.2018	**UNIVERSITE GAMMAL ABDEL NASSER DE CONAKRY**	**1**	Expected number	316	Expected number	-	Expected number	-	Expected number	-
				Actual Number	330	Actual Number	-	Actual Number	-	Actual Number	-
				Required Sample	120	Required Sample	-	Required Sample	-	Required Sample	-
				Number Sampled	120	Number Sampled	-	Number Sampled	-	Number Sampled	-
				Confirmed Absence	19	Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	-
				Refusals	0	Refusals	-	Refusals	-	Refusals	-
		Total Expected Sample		**120**		-		-		-	
		Total Sample Surveyed		**120**		-		-		-	
		Still to Survey		**0**		-		-		-	
		UNIVERSITE KOFFI ANAN DE GUINEE	**2**	Expected number	**75**	Expected number	-	Expected number	-	Expected number	-
				Actual Number	**80**	Actual Number	-	Actual Number	-	Actual Number	-
				Required Sample	**60**	Required Sample	-	Required Sample	-	Required Sample	-
				Number Sampled	**60**	Number Sampled	-	Number Sampled	-	Number Sampled	-
				Confirmed Absence	**0**	Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	-
				Refusals	**0**	Refusals	-	Refusals	-	Refusals	-
		Total Expected Sample		**60**		-		-		-	
		Total Sample Surveyed		**60**		-		-		-	
		Still to Survey		**0**		-		-		-	
B	04.01.2018	**CENTRE DE FORMATION ET DE PERFECTIONNEMENT**	**10**	Expected number	-	Expected number	36	Expected number	40	Expected number	-
				Actual Number	-	Actual Number	28	Actual Number	18	Actual Number	-

		EN SANTE (CFPS/ISIM)		Required Sample	-	Required Sample	30	Required Sample	30	Required Sample	-
				Number Sampled	-	Number Sampled	26	Number Sampled	16	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	2	Confirmed Absence	2	Confirmed Absence	-
				Refusals	-	Refusals	0	Refusals	0	Refusals	-
		Total Expected Sample		-		**30**		**30**		-	
		Total Sample Surveyed		-		**26**		**16**		-	
		Still to Survey		-		**4**		**14**		-	
	08.01.2018	**UNIVERSITE LA SOURCE**	**3**	Expected number	13	Expected number	-	Expected number	-	Expected number	-
				Actual Number	29	Actual Number	-	Actual Number	-	Actual Number	-
				Required Sample	13	Required Sample	-	Required Sample	-	Required Sample	-
				Number Sampled	13	Number Sampled	-	Number Sampled	-	Number Sampled	-
				Confirmed Absence	0	Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	-
				Refusals	0	Refusals	-	Refusals	-	Refusals	-
		Total Expected Sample		**13**		-		-		-	
		Total Sample Surveyed		**13**		-		-		-	
		Still to Survey		**0**		-		-		-	
	12.01.2018	**INSTITUTION RENE LEVESQUE**	**9**	Expected number	-	Expected number	17	Expected number	19	Expected number	-
				Actual Number	-	Actual Number	17	Actual Number	22	Actual Number	-
				Required Sample	-	Required Sample	17	Required Sample	19	Required Sample	-
				Number Sampled	-	Number Sampled	16	Number Sampled	19	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	1	Confirmed Absence	0	Confirmed Absence	-
				Refusals	-	Refusals	0	Refusals	0	Refusals	-
		Total Expected Sample		-		**17**		**19**		-	
		Total Sample Surveyed		-		**16**		**19**		-	
		Still to Survey		-		**1**		**0**		-	
	09.01.2018	**INSTITUT PROFESSIONNEL DE**	**7**	Expected number	-	Expected number	25	Expected number	35	Expected number	12

		FORMATION INITIALE (IPFI)		Actual Number	-	Actual Number	31	Actual Number	40	Actual Number	10
				Required Sample	-	Required Sample	10	Required Sample	10	Required Sample	10
				Number Sampled	-	Number Sampled	17	Number Sampled	10	Number Sampled	10
				Confirmed Absence	-	Confirmed Absence	2	Confirmed Absence	5	Confirmed Absence	-
				Refusals	-	Refusals	0	Refusals	0	Refusals	-
		Total Expected Sample		-		**10**		**10**		**10**	
		Total Sample Surveyed		-		**17**		**10**		**10**	
		Still to Survey		-		**0**		**0**		**0**	
	11.01.2018	**ECOLE SUPERIEUR DES SAGES-FEMMES DE GUINNE (ESSF)**	**8**	Expected number	-	Expected number	-	Expected number	65	Expected number	-
				Actual Number	-	Actual Number	-	Actual Number	73	Actual Number	-
				Required Sample	-	Required Sample	-	Required Sample	30	Required Sample	-
				Number Sampled	-	Number Sampled	-	Number Sampled	44	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	0	Confirmed Absence	-
				Refusals	-	Refusals	-	Refusals	0	Refusals	-
		Total Expected Sample		-		-		**30**		-	
		Total Sample Surveyed		-		-		**44**		-	
		Still to Survey		-		-		**0**		-	
C	06.01.2018	**DARA ETOILE LABE**	**12**	Expected number	-	Expected number	79	Expected number	48	Expected number	36
				Actual Number	-	Actual Number	82	Actual Number	46	Actual Number	36
				Required Sample	-	Required Sample	10	Required Sample	10	Required Sample	10
				Number Sampled	-	Number Sampled	10	Number Sampled	10	Number Sampled	10
				Confirmed Absence	-	Confirmed Absence	8	Confirmed Absence	8	Confirmed Absence	13
				Refusals	-	Refusals	0	Refusals	0	Refusals	0
		Total Expected Sample		-		**10**		**10**		**10**	
		Total Sample Surveyed		-		**10**		**10**		**10**	

		Still to Survey		-		**0**		**0**		**0**	
	08.01.2018	**SAUVEUR PLUS (LABE)**	**14**	Expected number	-	Expected number	91	Expected number	-	Expected number	-
				Actual Number	-	Actual Number	91	Actual Number	-	Actual Number	-
				Required Sample	-	Required Sample	30	Required Sample	-	Required Sample	-
				Number Sampled	-	Number Sampled	30	Number Sampled	-	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	14	Confirmed Absence	-	Confirmed Absence	-
				Refusals	-	Refusals	0	Refusals	-	Refusals	-
		Total Expected Sample		-		**30**		-		-	
		Total Sample Surveyed		-		**30**		-		-	
		Still to Survey		-		**0**		-		-	
	09.01.2018	**ECOLE SUPERIEURE DE SAGES-FEMMES Pr. MAMADOU KABA BAH LABE**	**15**	Expected number	-	Expected number	-	Expected number	49	Expected number	-
				Actual Number	-	Actual Number	-	Actual Number	46	Actual Number	-
				Required Sample	-	Required Sample	-	Required Sample	30	Required Sample	-
				Number Sampled	-	Number Sampled	-	Number Sampled	30	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	10	Confirmed Absence	-
				Refusals	-	Refusals	-	Refusals	0	Refusals	-
		Total Expected Sample		-		-		**30**		-	
		Total Sample Surveyed		-		-		**30**		-	
		Still to Survey		-		-		**0**		-	
	13.01.2018	**ECOLE AFRICAINDE DES SERVICES SOCIAUX ET DE SANTE DE KINDIA**	**18**	Expected number		Expected number	115	Expected number	40	Expected number	
				Actual Number		Actual Number	66	Actual Number	42	Actual Number	
				Required Sample		Required Sample	15	Required Sample	15	Required Sample	
				Number Sampled		Number Sampled	15	Number Sampled	15	Number Sampled	
				Confirmed Absence		Confirmed Absence	10	Confirmed Absence	3	Confirmed Absence	
				Refusals		Refusals	0	Refusals	0	Refusals	

		Total Expected Sample		-		**15**		**15**		-	
		Total Sample Surveyed		-		**15**		**15**		-	
		Still to Survey		-		**0**		**0**		-	
	14.01.2018	**INSITUT PRIVE DE FORMATION EN SANTE BEN SEKOU SYLLA (COYAH)**	**16**	Expected number	-	Expected number	23	Expected number	13	Expected number	-
				Actual Number	-	Actual Number	28	Actual Number	14	Actual Number	-
				Required Sample	-	Required Sample	15	Required Sample	13	Required Sample	-
				Number Sampled	-	Number Sampled	15	Number Sampled	8	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	2	Confirmed Absence	6	Confirmed Absence	-
				Refusals	-	Refusals	0	Refusals	0	Refusals	-
		Total Expected Sample		-		**15**		**13**		-	
		Total Sample Surveyed		-		**15**		**8**		-	
		Still to Survey		-		**0**		**5**		-	
		ECOLE NATIONALE DE LA SANTE DE KINDIA	**4**	Expected number	-	Expected number	142	Expected number	75	Expected number	-
				Actual Number	-	Actual Number	140	Actual Number	75	Actual Number	-
				Required Sample	-	Required Sample	40	Required Sample	20	Required Sample	-
				Number Sampled	-	Number Sampled	38	Number Sampled	25	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	10	Confirmed Absence	4	Confirmed Absence	-
				Refusals	-	Refusals	0	Refusals	0	Refusals	-
		Total Expected Sample		-		**40**		**20**		-	
		Total Sample Surveyed		-		**38**		**25**		-	
		Still to Survey		-		**2**		**0**		-	
D	06.01.2018	**INSTITUT DE FORMATION TECHNIQUE ET PROFESSIONNELLE BONI BANDJOUGOU DE SIGUIRI**	**13**	Expected number		Expected number		Expected number		Expected number	120
				Actual Number		Actual Number		Actual Number		Actual Number	117
				Required Sample		Required Sample		Required Sample		Required Sample	30
				Number Sampled		Number Sampled		Number Sampled		Number Sampled	30

				Confirmed Absence		Confirmed Absence		Confirmed Absence		Confirmed Absence	37
				Refusals		Refusals		Refusals		Refusals	0
		Total Expected Sample		-		-		-		**30**	
		Total Sample Surveyed		-		-		-		**30**	
		Still to Survey		-		-		-		**0**	
		Formation Technique et Professionnelle El Hadj M'Bemba TOURE Kankan	**17**	Expected number	-	Expected number	56	Expected number	41	Expected number	-
				Actual Number	-	Actual Number	57	Actual Number	51	Actual Number	-
				Required Sample	-	Required Sample	15	Required Sample	15	Required Sample	-
				Number Sampled	-	Number Sampled	15	Number Sampled	15	Number Sampled	-
				Confirmed Absence	-	Confirmed Absence	15	Confirmed Absence	21	Confirmed Absence	-
				Refusals	-	Refusals	0	Refusals	0	Refusals	-
		Total Expected Sample		-		**15**		**15**		-	
		Total Sample Surveyed		-		**15**		**15**		-	
		Still to Survey		-		**0**		**0**		-	
		École Nationale de la Santé Communautaire N'Zérékoré	**6**	Expected number	-	Expected number	-	Expected number	-	Expected number	506
				Actual Number	-	Actual Number	-	Actual Number	-	Actual Number	488
				Required Sample	-	Required Sample	-	Required Sample	-	Required Sample	60
				Number Sampled	-	Number Sampled	-	Number Sampled	-	Number Sampled	60
				Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	9
				Refusals	-	Refusals	-	Refusals	-	Refusals	0
		Total Expected Sample		-		-		-		**60**	
		Total Sample Surveyed		-		-		-	-	**60**	
		Still to Survey		-		-		-		**0**	
		INSTITUT PRIVE BEL AVENIR POUR TOUS	**11**	Expected number	-	Expected number	36	Expected number		Expected number	84

				Actual Number	-	Actual Number	36	Actual Number		Actual Number	83
				Required Sample	-	Required Sample	10	Required Sample		Required Sample	20
				Number Sampled	-	Number Sampled	10	Number Sampled		Number Sampled	20
				Confirmed Absence	-	Confirmed Absence	3	Confirmed Absence		Confirmed Absence	17
				Refusals	-	Refusals	0	Refusals		Refusals	0
		Total Expected Sample		-		**10**		-		**20**	
		Total Sample Surveyed		-		**10**		-		**20**	
		Still to Survey		-		**0**		-		**0**	
		École Nationale Santé Communautaire KANKAN	**5**	Expected number	-	Expected number	-	Expected number	-	Expected number	593
				Actual Number	-	Actual Number	-	Actual Number	-	Actual Number	513
				Required Sample	-	Required Sample	-	Required Sample	-	Required Sample	60
				Number Sampled	-	Number Sampled	-	Number Sampled	-	Number Sampled	62
				Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	-	Confirmed Absence	70
				Refusals	-	Refusals	-	Refusals	-	Refusals	0
		Total Expected Sample		-		-		-		**60**	
		Total Sample Surveyed		-		-		-		**62**	
		Still to Survey		-		-		-		**0**	

OVERALL SYNTHESIS				
STUDENT PROFILES	**MEDICAL STUDENTS**	**NURSES**	**MIDWIVES**	**ATS (COMMUNITY HEALTH WORKERS)**
NUMBERS SAMPLED	**193**	**192**	**192**	**192**

Annex H: Logistic Regression Models

The following provides details on the coding and Statistics of the logistic regression model carried out to determine predictors for 1) preference for outside Conakry 2) rural areas, 3) public sector, and 4) outmigration.

I. Outside Conakry Preference Model

Question: What factors predict the likelihood that respondents would report that they have locational preference outside of Conakry in the short term?

The following provides an overview of a) the coding of the variables in the model b) the statistical soundness of the model, and d) the actual regression results.

a) Coding of the variables

The dependent variable – Outside Conakry/Conakry Preference was coded as 1=Outside Conakry; 0=Conakry. The potential predictor variables were coded as 1 or 0, with 1 representing the side of the variable under observation. This is detailed in the Table below.

The respondent profile			Frequency
1 Medical Students	short term rural urban preference	0 rural	73
		1 urban	102
	when posted will have adequate housing	0 agree/agree strongly	165
		1 disagree/disagree strongly	10
	earning extra income during work hours is acceptable	0 agree/strongly agree	85
		1 disagree/strongly disagree	90
	bschool public private	0 private school	70
		1 public school	105
	satisfaction with training received	0 dissatisfied/highly dissatisfied	27
		1 satisfied/highly satisfied	148
	feeling ready to work in rural facility	0 disagree/disagree much	44
		1 agree/agree much	131
	father's education level	0 below university	112
		1 university and above	63
	satisfaction with monetary situation	0 dissatisfied/highly dissatisfied	99
		1 satisfied/highly satisfied	76
	St sector preference	0 public	74
		1 private	101

	short term level preference	0 hospital	167
		1 health center/health post	8
	parental socio econ status	0 upper middle/rich	52
		1 lower middle/poor	123
	Region born	0 Outside Conakry	102
		1 Conakry	73
	marriage status	0 not married or engaged	134
		1 married or engaged	41
	gender/sex	0 female	54
		1 male	121
	when posted, mostly on own recoded for log regression	0 disagree/strongly disagree	85
		1 agree/strongly agree	90
	main source of school funding	0 public	40
		1 private	135
	house grew up in urban/rural	0 rural	35
		1 urban	140
	working fewer hours than what contract states is acceptable	0 disagree/strongly disagree	135
		1 agree/strongly agree	40
	CHV are an integral part of the workforce team	0 agree/highly agree	148
		1 disagree/highly disagree	27
	when posted I will have opportunities for on job training	0 agree/highly agree	168
		1 disagree/highly disagree	7
	do you have children	0 yes	26
		1 no	149
	how satisfied with life in general	0 satisfied/highly satisfied	119
		1 dissatisfied/highly dissatisfied	56
2 Nursing Students	short term rural urban preference	0 rural	64
		1 urban	97
	when posted will have adequate housing	0 agree/agree strongly	130
		1 disagree/disagree strongly	31
	earning extra income during work hours is acceptable	0 agree/strongly agree	64
		1 disagree/strongly disagree	97
	school public private	0 private school	135
		1 public school	26
	feeling ready to work in rural facility	0 disagree/disagree much	12
		1 agree/agree much	149
	fathers education level	0 below university	133
		1 university and above	28
	satisfaction with monetary situation	0 dissatisfied/highly dissatisfied	53

		1 satisfied/highly satisfied	108
	St sector preference	0 public	78
		1 private	83
	short term level preference	0 hospital	128
		1 health center/health post	33
	parental socio econ status	0upper middle/rich	108
		1 lower middle/poor	53
	Region born	0 Outside Conakry	117
		1 Conakry	44
	marriage status	0 not married or engaged	67
		1 married or engaged	94
	gender/sex	0 female	122
		1 male	39
	when posted, mostly on own recoded for log regression	0 disagree/strongly disagree	99
		1 agree/strongly agree	62
	house grew up in urban/rural	0 rural	28
		1 urban	133
	working fewer hours than what contract states is acceptable	0 disagree/strongly disagree	126
		1 agree/strongly agree	35
	CHV are an integral part of the workforce team	0 agree/highly agree	123
		1 disagree/highly disagree	38
	when posted I will have opportunities for on job training	0 agree/highly agree	146
		1 disagree/highly disagree	15
	do you have children	0 yes	97
		1 no	64
	how satisfied with life in general	0 satisfied/highly satisfied	122
		1. dissatisfied/highly dissatisfied	39

b) Statistical Soundness of the regression model

The omnibus tests of model Coefficient shows that the models perform very well with a high level of significance. As explained by (Pallant, J. 2016), **"***the omnibus Test of Model coefficients is a goodness of fit test, automatically generated in SPSS, which tests how well the model performs. It uses the Chi-Square test to see if the model we built with all our predictors included, can explain better the variance in the outcome (the spread of numbers is from the mean) than a baseline model that is calculated by SPSS that doesn't include any predictors*" For the Medical student model, the chi-square is highly significant (*chi-square=48.541, df=22, p<.01*). For the nursing student model, the Chi-square is also highly significant (*chi-square=43.281, df=20, p<.05)*. This indicates that the new models, with a chi square value of 48 and 43, respectively, and 22 and 20 degrees of freedom, are explaining more the variance in the outcome and are an improvement.

Omnibus Tests of Model Coefficients			
The respondent profile	**Chi-square**	**df**	**Sig.**
1 Medical Students	48.541	22	.001
2 Nursing Students	43.218	20	.002

The results of the Hosmer and Lemeshow Goodness of fit test also shows that both models are worthwhile, with a significance value greater than .05, which is a positive result in this test. As explained by (Pallant, J. 2016): *"the test provides a chi square test to see whether or not the model is an adequate fit to the data. It assesses whether expected and observed event rates in subgroups (deciles) within each model is similar, and if so a model is considered well calibrated. The null hypothesis is that the model is a 'good enough' fit to the data and we will only reject this null hypothesis (i.e. decide it is a 'poor' fit) if there are sufficiently strong grounds to do so (conventionally if p<.05)".* The Chi-Square value for the test is 4.1 for medical students and 4.6 for nursing students with a significance value of .842 and .793, respectively. The value is greater than .05 therefore the models are a good fit.

Hosmer and Lemeshow Test			
The respondent profile	**Chi-square**	**df**	**Sig.**
1 Medical Students	4.167	8	.842
2 Nursing Students	4.666	8	.793

The Cox and Snell R square as well as the Nagelkerke R Square further provide indication of the goodness of fit and hence usefulness of both models. As is explained by (Pallant, J. 2016)**, "***the R^2 values tell us approximately how much variation in the outcome is explained by the model (like in linear regression analysis).* ***Cox and Snell's*** $R^{2\,1}$ *is based on the log likelihood for the model compared to the log likelihood for a baseline model. Nagelkerke's* $R^{2\,2}$ *is an* ***adjusted*** *version of* ***the Cox*** *&* ***Snell R-square*** *that adjusts the scale of the statistic to cover the full range from 0 to 1. In general thus, the higher the (pseudo) R-squared, the better the model fits your data".* The results from this test indicate that between 24.2 percent and 32.6 percent of the variability in the medical students model is explained by the chosen set of variables, and 23.5 percent and 33.7 percent by the chosen set of variables in the nursing model.

Model Summary			
The respondent profile	**-2 Log likelihood**	**Cox & Snell R Square**	**Nagelkerke R Square**
1 Medical Students	188.540	.242	.326
2 Nursing Students	149.425	.235	.337

c) Results of the models

The below Table provides information about the contribution or importance of each of the predictor variables (with Box H1 below providing a brief overview of how to interpret the columns). The variables highlighted in grey contribute significantly to the predictive ability of the model.

Box H1: interpreting the values in the results Table.

Wald and Sig. – As explained by (Pallant, J. 2016) "*this is the Wald chi-square test that tests the null hypothesis that the constant equals 0. This hypothesis is rejected when the p-value (listed in the column called "Sig.") is smaller than the critical p-value of .10 or .05 (or .01)".*

df – As explained by (Pallant, J. 2016), "*the df is the degrees of freedom for the Wald chi-square test. There is only one degree of freedom because there is only one predictor in the model, namely the constant".*

The "B" values, as explained by (Pallant, J. 2016), "*can be used in an equation to calculate the probability of a case falling into a specific category. Having a negative or positive B value provides information on the direction of the relationship. Negative values indicate that an increase in the independent variable score will result in a decreased probability of the case recording a score of 1 in the dependent variable"*. For example, the negative B value in attending a public school can be understood as the more students attends public school, the less likely they report a preference for Outside Conakry.

Exp(B) are the odds ratios In line with the instructions provided by Pallant, J. 2016, where the B values are positive, and the odds ratio is larger than one, it can be interpreted as follows (based on an example from the table below): students who are born in Conakry are 2.8 times more likely to have a preference for an out of Conakry job, than students not born in Conakry. Where the odds ratios are less than 1, and the B value is negative, the interpretation is different. In the table below for example, the more students attend a public school, the less likely it is that they have a preference for a job outside Conakry. For every- one student who attends a public school the odds of him or her having a preference for an outside Conakry job decrease by a factor of 0.433, all things being equal.

Confidence intervals: As explained by (Pallant, J. 2016), *"for each of the Odds ratios (ExpB) there is a 95% confidence interval displayed, giving the lower and upper value. This is the range of values that we can be 95 % confident encompasses the true values of the odds ratio"*. Small samples will result in wide confidence intervals, and large samples in more narrow intervals. In the example below, medical students who are born in Conakry are 2.8 times (odds ratio) more likely to have a preference for an out of Conakry post than those who are not born in Conakry, and we can be 95% confident that the actual value of the odds ratio in the population lies somewhere between 1.22 and 6.78.

Results of the regression

The respondent profile		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
1 Medical Students	Dissatisfied with life in general	.398	.455	.764	1	.382	1.489	.610	3.636
	Disagrees with statement that there will be adequate housing when posted	1.397	.904	2.390	1	.122	4.044	.688	23.770
	Disagreement that Earning extra income during work hours is acceptable	.741	.401	3.413	1	.065	2.098	.956	4.604
	Attending a Public School	-.837	.506	2.738	1	.098	.433	.161	1.167
	Satisfied with training received	-.861	.537	2.573	1	.109	.423	.148	1.210
	Agreement with Feeling ready to work in rural facility	-.228	.471	.234	1	.629	.796	.316	2.005
	Fathers education level: University and above	-.711	.414	2.947	1	.086	.491	.218	1.106
	Satisfied with monetary situation	.724	.478	2.297	1	.130	2.063	.809	5.266
	Having private sector preference	.342	.396	.743	1	.389	1.407	.647	3.061
	Having a health center/health post preference	1.426	.912	2.445	1	.118	4.161	.697	24.854
	Parental socio-economic status: poor/lower middle income	.087	.470	.034	1	.853	1.091	.434	2.739
	Born in Conakry	1.060	.437	5.895	1	.015	2.888	1.227	6.798
	Disagreement that CHW are integral to work team	-.499	.532	.880	1	.348	.607	.214	1.722
	Disagree with When posted, will have opportunities for on the job training	.247	1.041	.056	1	.813	1.280	.166	9.856
	Not having children	-.200	.620	.104	1	.747	.819	.243	2.762
	Agreement that working fewer hours than on contract is acceptable	.157	.448	.122	1	.727	1.169	.486	2.814
	House grew up in: urban	.220	.538	.168	1	.682	1.247	.434	3.580
	Main School funding source: private	1.260	.588	4.591	1	.032	3.525	1.113	11.160
	Agreement with: When posted, mostly on my own	-.287	.390	.541	1	.462	.751	.350	1.611
	Being Male	.982	.467	4.411	1	.036	2.669	1.068	6.671
	being married/engaged	.990	.515	3.692	1	.055	2.693	.980	7.395
	Having preference for work in urban area	1.765	.428	16.992	1	.000	5.843	2.524	13.527
	Constant	-4.946	1.846	7.181	1	.007	.007		
2 Nursing Students	Dissatisfied with life in general	-.118	.729	.026	1	.871	.888	.213	3.707
	Disagrees with statement that there will be adequate housing when posted	-1.041	.651	2.556	1	.110	.353	.099	1.265
	Disagreement that Earning extra income during work hours is acceptable	.994	.505	3.872	1	.049	2.701	1.004	7.265
	Attending a Public School	.821	.635	1.670	1	.196	2.272	.654	7.889
	Agreement with Feeling ready to work in rural facility	-.075	.736	.010	1	.919	.928	.219	3.928
	Fathers education level: University and above	.032	.587	.003	1	.956	1.033	.327	3.260
	Satisfied with monetary situation	.127	.671	.036	1	.850	1.135	.305	4.226

	Having private sector preference	.667	.445	2.248	1	.134	1.948	.815	4.656
	Having a health center/health post preference	-.396	.613	.418	1	.518	.673	.203	2.235
	Parental socio economic status: poor/lower middle income (check this one, code now corrected)	.546	.474	1.325	1	.250	1.726	.682	4.369
	Born in Conakry	-.033	.511	.004	1	.948	.967	.355	2.634
	Disagreement that CHW are integral to work team	1.209	.514	5.531	1	.019	3.350	1.223	9.174
	Disagree with When posted, will have opportunities for on the job training	.693	.745	.865	1	.352	1.999	.464	8.605
	Not having children	.431	.502	.740	1	.390	1.539	.576	4.115
	Agreement that working fewer hours than on contract is acceptable	.136	.543	.063	1	.802	1.146	.396	3.318
	House grew up in: urban	-.624	.591	1.117	1	.291	.536	.168	1.705
	Agreement with: When posted, mostly on my own	.448	.473	.896	1	.344	1.565	.619	3.955
	Being Male	-.774	.593	1.699	1	.192	.461	.144	1.476
	being married/engaged	.225	.526	.183	1	.669	1.252	.447	3.507
	Having preference for work in urban area	2.441	.581	17.620	1	.000	11.481	3.673	35.884
	Constant	-1.829	1.960	.870	1	.351	.161		

II. Rural Preference Model

Question: What factors predict the likelihood that respondents would report that they have locational preference in a rural area in the short term?

The following provides an overview of a) the coding of the variables in the model b) the statistical soundness of the model, and d) the actual regression results.

a) Coding of the variables

The dependent variable – Rural/Urban Preference was coded as 1=Rural; 0=Urban. The potential predictor variables were coded as 1 or 0, with 1 representing the dimension of the variable under observation. The exact coding is listed in the table below.

The respondent profile			**Frequency**
1 Medical Students	have you ever been outside of Africa	0 no	172
		1 yes	3
	parental socio-economic status	0 upper middle/rich	52
		1 lower middle/poor	123
	Region Born Conakry vs Non-Conakry	0 Outside Conakry	102
		1 Conakry	73
	marriage status	0 not married or engaged	134
		1 married or engaged	41
	House grew up in rural/urban	0 Urban	140
		1 Rural	35
	have you ever been to another country in Africa?	0 no	108

		1 yes	67
	gender/sex	0 female	54
		1 male	121
	main source of school funding	0 public	40
		1 private	135
	working fewer hours than what contract states is acceptable	0 disagree/strongly disagree	135
		1 agree/strongly agree	40
	feeling ready to work in urban facility	0 disagree/strongly disagree	10
		1 agree/strongly agree	165
	do you have children	0 no	149
		1 yes	26
	earning extra income during work hours is acceptable	0 agree/strongly agree	85
		1 disagree/strongly disagree	90
	when posted, I will have opportunity for on the job training	0 disagree/highly disagree	7
		1 agree/highly agree	168
	CHV are an integral part of the workforce team	0 agree/highly agree	148
		1 disagree/highly disagree	27
	Short term level preference	0 health center/post	8
		1 hospital	167
	regional preference Conakry vs non Conakry	0 Conakry	72
		1 outside Conakry	103
	satisfaction with monetary situation	0 dissatisfied/highly dissatisfied	99
		1 satisfied/highly satisfied	76
	Short term sector preference	0 public	74
		1 private	101
	Do you have friends of family living outside Africa	0 no	16
		1 yes	159
	do you have friends or family living in another country in Africa	0 no	13
		1 yes	162
	when posted, mostly on own recoded for log regression	0 disagree/strongly disagree	85
		1 agree/strongly agree	90
	when posted, will have adequate housing	0 disagree/strongly disagree	10
		1 agree/strongly agree	165
	motivation to become health worker financing vs non financing	0 other reason	163
		1 financial reason	12
	motivation to become HW help people vs other	0 other	26
		1 help people	149
	Number of years repeat study	0 never	141
		1 once or more	34
	fathers education level	0 below university	112
		1 university and above	63
	feeling ready to work in rural facility	0 disagree/disagree much	44
		1 agree/agree much	131
	satisfaction with training received	0 dissatisfied/highly dissatisfied	27
		1 satisfied/highly satisfied	148
	school public private	0 private school	70
		1 public school	105
	acceptable to earn income in other facilities?	0 disagree/strongly disagree	132
		1 agree/strongly agree	43
	how satisfied with life in general	0 dissatisfied/highly dissatisfied	56
		1 satisfied/highly satisfied	119
2 Nursing Students	have you ever been outside of Africa	0 no	154
		1 yes	3
	parental socio-economic status	0 upper middle/rich	106
		1 lower middle/poor	51
	Region Born Conakry vs Non Conakry	0 Outside Conakry	113
		1 Conakry	44
	marriage status	0 not married or engaged	64
		1 married or engaged	93
	House grew up in rural/urban	0 Urban	131
		1 Rural	26
	have you ever been to another country in africa?	0 no	106
		1 yes	51

	gender/sex	0 female	120
		1 male	37
	working fewer hours than what contract states is acceptable	0 disagree/strongly disagree	123
		1 agree/strongly agree	34
	feeling ready to work in urban facility	0 disagree/strongly disagree	7
		1 agree/strongly agree	150
	do you have children	0 no	60
		1 yes	97
	earning extra income during work hours is acceptable	0 agree/strongly agree	62
		1 disagree/strongly disagree	95
	when posted, I will have opportunity for on the job training	0 disagree/highly disagree	14
		1 agree/highly agree	143
	CHV are an integral part of the workforce team	0 agree/highly agree	119
		1 disagree/highly disagree	38
	St level preference	0 health center/post	32
		1 hospital	125
	regional preference conakry vs non conakry	0 Conakry	46
		1 outside Conakry	111
	satisfaction with monetary situation	0 dissatisfied/highly dissatisfied	52
		1 satisfied/highly satisfied	105
	Short term sector preference	0 public	76
		1 private	81
	Do you have friends of family living outside Africa	0 no	51
		1 yes	106
	Do you have friends or family living in another country in Africa	0 no	36
		1 yes	121
	when posted, mostly on own recoded for log regression	0 disagree/strongly disagree	95
		1 agree/strongly agree	62
	when posted, will have adequate housing	0 disagree/strongly disagree	29
		1 agree/strongly agree	128
	motivation to become health worker financing vs non financing	0 other reason	151
		1 financial reason	6
	motivation to become HW help people vs other	0 other	16
		1 help people	141
	years repeat study	0 never	152
		1 once or more	5
	fathers education level	0 below university	129
		1 university and above	28
	feeling ready to work in rural facility	0 disagree/disagree much	12
		1 agree/agree much	145
	school public private	0 private school	131
		1 public school	26
	acceptable to earn income in other facilities?	0 disagree/strongly disagree	139
		1 agree/strongly agree	18
	how satisfied with life in general	0 dissatisfied/highly dissatisfied	38
		1 satisfied/highly satisfied	119
	school location Conakry vs Outside	0 Outside Conakry	75
		1 Conakry	82

b) Statistical Soundness of model

The omnibus tests of model Coefficient shows that the models perform very well with a high level of significance. As explained by (Pallant, J. 2016), **"***the omnibus Test of Model coefficients is a good ness to fit test, automatically generated in SPSS, which tests how well the model performs. It uses the Chi-Square test to see if the model we built with all our predictors included, can explain better the variance in the outcome (the spread of numbers is from the mean) than a baseline model that is calculated by SPSS that doesn't include any predictors*". For the Medical student model, the chi-square is highly significant (*chi-square=65.331, df=31, p<.001*). For the

nursing student model, the Chi-square is also highly significant (*chi-square=77.929, df=30, p<.001)*. This indicates that the new models, with a chi square value of 65 and 77, respectively, and 31 and 30 degrees of freedom, are explaining more the variance in the outcome and are an improvement.

Omnibus Tests of Model Coefficients			
The respondent profile	**Chi-square**	**df**	**Sig.**
1 Medical Students	65.331	31	.000
2 Nursing Students	77.929	30	.000

The results of the Hosmer and Lemeshow Goodness of fit test shows that the medical student model is well calibrated with a significance value greater than .05. The nursing student model fits less well with a significance slightly below.05 (but not far). As explained by (Pallant, J. 2016), "*the test provides a chi square test to see whether or not the model is an adequate fit to the data. It assesses whether expected and observed event rates in subgroups (deciles) within each model is similar, and if so a model is considered well calibrated. The null hypothesis is that the model is a 'good enough' fit to the data and we will only reject this null hypothesis (i.e. decide it is a 'poor' fit) if there are sufficiently strong grounds to do so (conventionally if p<.05)*". The Chi-Square value for the test is 6.0 for medical students with a significance value of greater than .05 which considers the model well calibrated. For the nursing student model the chi-square value is 15.5 with a significance value slightly below .05, this suggests that it is less well calibrated.

We take note of the potential limitation in calibration of the nursing student mode but don't reject the model fully, as 1) this phd uses the same models for both medical students and nursing students and the medical student model was well calibrated, 2) the significance value is not far below the .05 threshold, and 3) all other goodness of fit tests suggests the model to be sound.

Hosmer and Lemeshow Test			
The respondent profile	**Chi-square**	**df**	**Sig.**
1 Medical Students	6.066	8	.640
2 Nursing Students	15.861	8	.044

The Cox and Snell R square as well as the Nagelkerke R Square further provide indication of the usefulness of the model (Pallant, J. 2016), indicating that between 31.2 percent and 41.9 percent of the variability in the medical student model is explained by the chosen set of variables, and 39.1 percent and 53.0 percent by the chosen set of variables in the nursing model.

Model Summary			
The respondent profile	**-2 Log likelihood**	**Cox & Snell R Square**	**Nagelkerke R Square**
1 Medical Students	172.443	.312	.419
2 Nursing Students	132.730	.391	.530

c) Results from the Logistic Regression

The respondent profile		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
1 Medical Students	satisfaction with life in general	-.901	.497	3.283	1	.070	.406	.153	1.076
	Disagreement with: CHWs are an integral part of workforce	.155	.594	.068	1	.794	1.168	.365	3.743
	Belief when posted, will have opportunity for additional training	-.755	1.057	.511	1	.475	.470	.059	3.729
	Disagreement with earning extra income during work hours is acceptable	1.117	.464	5.789	1	.016	3.056	1.230	7.593
	Having children	.833	.708	1.384	1	.239	2.300	.574	9.209
	feeling ready to work in an urban facility	1.688	.862	3.838	1	.050	5.411	.999	29.300
	Agreement with: working fewer hours than in the contract is acceptable	.026	.505	.003	1	.959	1.026	.381	2.761
	main source of education funding: private	.586	.633	.857	1	.355	1.797	.519	6.218
	Gender: Male	.713	.494	2.080	1	.149	2.039	.774	5.372
	having been to another country in Africa	-.185	.440	.177	1	.674	.831	.351	1.968
	house grown up in: rural area	-.076	.566	.018	1	.893	.927	.305	2.812
	married/Engaged	.385	.580	.440	1	.507	1.469	.471	4.580
	Born in Conakry	1.021	.503	4.122	1	.042	2.775	1.036	7.432
	parents socio-economic status: lower middle /poor	-.903	.536	2.833	1	.092	.405	.142	1.160
	preference for hospital post	-1.053	1.002	1.105	1	.293	.349	.049	2.486
	preference for work outside of Conakry	2.032	.478	18.044	1	.000	7.627	2.987	19.475
	satisfaction with monetary situation	.987	.510	3.749	1	.053	2.683	.988	7.289
	education level of father: university of above	-.427	.437	.953	1	.329	.653	.277	1.537
	agreement with: feeling ready to work in rural facility	.968	.540	3.219	1	.073	2.633	.914	7.583
	satisfaction with training received	.427	.686	.388	1	.533	1.533	.400	5.882
	public sector training institution	-.763	.561	1.851	1	.174	.466	.155	1.399
	disagreement with acceptability of earning extra income in other facilities during work hour	-.447	.519	.740	1	.390	.640	.231	1.770
	study years repeated (once or more)	.526	.540	.950	1	.330	1.693	.587	4.877
	main motivation to become health worker: to help people	1.825	.909	4.028	1	.045	6.201	1.044	36.834

	Main motivation to become health worker: Financial	2.409	1.249	3.723	1	.054	11.125	.963	128.575
	agreement with having adequate housing when posted	-.973	.930	1.095	1	.295	.378	.061	2.340
	agreement with then posted will be on my own	.445	.421	1.118	1	.290	1.561	.684	3.565
	having friends or family in another country in Africa	-1.007	.860	1.372	1	.241	.365	.068	1.970
	having friends or family outside of Africa	-.452	.807	.315	1	.575	.636	.131	3.091
	Private sector Preference	.969	.443	4.778	1	.029	2.636	1.105	6.284
	having been outside of Africa	-2.792	1.667	2.805	1	.094	.061	.002	1.609
	Constant	-3.575	2.399	2.220	1	.136	.028		
2 Nursing Students	satisfaction with life in general	1.237	.879	1.981	1	.159	3.444	.616	19.269
	Disagreement with: CHWs are an integral part of workforce	1.042	.608	2.933	1	.087	2.834	.860	9.338
	Belief when posted, will have opportunity for additional training	-.195	1.016	.037	1	.848	.823	.112	6.031
	Disagreement with earning extra income during work hours is acceptable	1.903	.567	11.245	1	.001	6.704	2.205	20.385
	Having children	-.752	.589	1.631	1	.202	.471	.149	1.495
	feeling ready to work in an urban facility	-1.600	1.503	1.133	1	.287	.202	.011	3.842
	Agreement with: working fewer hours than in the contract is acceptable	-.449	.669	.450	1	.502	.638	.172	2.368
	Gender: Male	.606	.626	.936	1	.333	1.833	.537	6.257
	having been to another country in Africa	-.267	.564	.224	1	.636	.766	.253	2.312
	house grown up in: rural area	.517	.717	.518	1	.471	1.676	.411	6.839
	married/Engaged	-.793	.617	1.652	1	.199	.452	.135	1.516
	Born in Conakry	.663	.544	1.486	1	.223	1.941	.668	5.641
	lower middle/poor	1.434	.541	7.031	1	.008	4.195	1.454	12.107
	preference for hospital post	-.358	.630	.323	1	.570	.699	.203	2.404
	preference for work outside of Conakry	2.884	.712	16.427	1	.000	17.883	4.434	72.126
	satisfaction with monetary situation	-.385	.812	.225	1	.636	.681	.139	3.340
	education level of father: university of above	.715	.640	1.249	1	.264	2.044	.583	7.163
	agreement with: feeling ready to work in rural facility	1.686	.946	3.179	1	.075	5.400	.846	34.474
	attending public sector training institution	-.739	.852	.753	1	.386	.478	.090	2.536
	disagreement with acceptability of earning extra income in other facilities during work hour	-.234	.736	.101	1	.750	.791	.187	3.350
	study years repeated (once or more)	-1.214	1.682	.520	1	.471	.297	.011	8.033

	main motivation to become health worker: to help people	-.374	1.171	.102	1	.750	.688	.069	6.826
	Main motivation to become health worker: Financial	-.745	1.895	.155	1	.694	.475	.012	19.475
	agreement with having adequate housing when posted	.268	.674	.159	1	.690	1.308	.349	4.897
	agreement with when posted will be on my own	1.573	.555	8.028	1	.005	4.820	1.624	14.305
	having friends or family in another country in Africa	.383	.719	.284	1	.594	1.467	.359	6.000
	having friends or family outside of Africa	1.925	.750	6.593	1	.010	6.853	1.577	29.784
	Private sector Preference	1.468	.535	7.538	1	.006	4.339	1.522	12.373
	having been outside of Africa	1.363	1.722	.627	1	.428	3.910	.134	114.181
	Constant	-6.831	2.220	9.467	1	.002	.001		
	school being in Conakry	-.463	.633	.535	1	.465	.630	.182	2.176

III. Public Sector Preference Model

Question: What factors predict the likelihood that respondents would report that they have preference for a job in the public sector in the short term?

The following provides an overview of a) the coding of the variables in the model b) the statistical soundness of the model, and d) the actual regression results.

a) Coding of the variables

The dependent variable – Public/Private Preference was coded as 1=Public; 0=Private. The potential predictor variables were coded as 1 or 0, with 1 representing the dimension of the variable under observation. This is detailed in the table below.

The respondent profile			Frequency
1 Medical Students	having friends or family in another country in Africa	0 yes	162
		1 no	13
	Region born	0 Outside Conakry	102
		1 Conakry	73
	parental socio econ status	0 upper middle/rich	52
		1 lower middle/poor	123
	st level preference	0 hospital	167
		1 health center/health post	8
	regional preference Conakry vs non Conakry	0 Conakry	72
		1 outside Conakry	103

	satisfaction with monetary situation	0 dissatisfied/highly dissatisfied	99
		1 satisfied/highly satisfied	76
	fathers education level	0 below university	112
		1 university and above	63
	feeling ready to work in rural facility	0 disagree/disagree much	44
		1 agree/agree much	131
	satisfaction with training received	0 dissatisfied/highly dissatisfied	27
		1 satisfied/highly satisfied	148
	acceptable to earn income in other facilities?	0 disagree/strongly disagree	132
		1 agree/strongly agree	43
	years repeat study log regr	0 never	141
		1 once or more	34
	motivation to become HW help people vs other	0 other	26
		1 help people	149
	motivation to become health worker financing vs non financing	0 other reason	163
		1 financial reason	12
	when posted, will have adequate housing	0 disagree/strongly disagree	10
		1 agree/strongly agree	165
	marriage status	0 not married or engaged	134
		1 married or engaged	41
	Have you ever been outside of Guinea in Africa?	0 no	108
		1 yes	67
	CHW integral to workforce team reverse coded	0 disagree/highly disagree	27
		1 agree/highly agree	148
	rural urban preference reverse coding	0 rural	73
		1 urban	102
	house grew up in - reverse coding	0 rural	35
		1 urban	140
	school public private reverse coded	0 public	105
		1 private	70
	Do you have friends of family living outside Africa	0 no	16
		1 yes	159
	how satisfied with life in general	0 dissatisfied/highly dissatisfied	56
		1.00 satisfied/highly satisfied	119
	when posted, I will have opportunity for on the job training	0 disagree/highly disagree	7
		1 agree/highly agree	168
	earning extra income during work hours is acceptable	0 agree/strongly agree	85
		1 disagree/strongly disagree	90
	gender/sex	0 female	54

		1 male	121
	main source of funding	0 private	135
		1 public	40
	working fewer hours than what contract states is acceptable	0 disagree/strongly disagree	135
		1 agree/strongly agree	40
	feeling ready to work in urban facility	0 disagree/strongly disagree	10
		1 agree/strongly agree	165
	do you have children	0 no	149
		1 yes	26
	when posted, mostly on own	0 disagree/strongly disagree	85
		1 agree/strongly agree	90
2 Nursing Students	having friends or family in another country in Africa reverse coded	0 yes	122
		1 no	36
	Region born	0 Outside Conakry	114
		1 Conakry	44
	parental socio econ status	0 upper middle/rich	107
		1 lower middle/poor	51
	short term level preference	0 hospital	126
		1 health center/health post	32
	regional preference Conakry vs non-Conakry	0 Conakry	46
		1 outside Conakry	112
	satisfaction with monetary situation	0 dissatisfied/highly dissatisfied	53
		1 satisfied/highly satisfied	105
	fathers education level	0 below university	130
		1 university and above	28
	feeling ready to work in rural facility	0 disagree/disagree much	12
		1 agree/agree much	146
	acceptable to earn income in other facilities?	0 disagree/strongly disagree	139
		1 agree/strongly agree	19
	years repeat study	0 never	153
		1 once or more	5
	motivation to become HW help people vs other	0 other	16
		1 help people	142
	motivation to become health worker financing vs non financing	0 other reason	152
		1 financial reason	6
	when posted, will have adequate housing	0 disagree/strongly disagree	29
		1 agree/strongly agree	129
	marriage status	0 not married or engaged	65
		1 married or engaged	93

	Have you ever been outside of Guinea in Africa?	0 no	106
		1 yes	52
	CHW integral to workforce team	0 disagree/highly disagree	38
		1 agree/highly agree	120
	rural urban preference	0 rural	63
		1 urban	95
	house grew up in	0 rural	27
		1 urban	131
	school public private	0 public	26
		1 private	132
	Do you have friends of family living outside Africa	0 no	52
		1 yes	106
	how satisfied with life in general	0 dissatisfied/highly dissatisfied	39
		1 satisfied/highly satisfied	119
	when posted, I will have opportunity for on the job training	0 disagree/highly disagree	14
		1 agree/highly agree	144
	earning extra income during work hours is acceptable	0 agree/strongly agree	63
		1 disagree/strongly disagree	95
	gender/sex	0 female	120
		1.00 male	38
	working fewer hours than what contract states is acceptable	0 disagree/strongly disagree	124
		1 agree/strongly agree	34
	feeling ready to work in urban facility	0 disagree/strongly disagree	7
		1 agree/strongly agree	151
	do you have children	0 no	61
		1 yes	97
	when posted, mostly on own recoded	0 disagree/strongly disagree	96
		1 agree/strongly agree	62
	School location Conakry vs outside	0 Conakry	83
		1 outside Conakry	75

b) Statistical Soundness of models

Once again, the omnibus tests of model Coefficient shows that both models perform very well with a high level of significance. As explained by (Pallant, J. 2016): "*the omnibus Test of Model coefficients is a good ness to fit test, automatically generated in SPSS, which tests how well the model performs. It uses the Chi-Square test to see if the model we built with all our predictors included, can explain better the variance in the outcome (the spread of numbers is from the mean) than a baseline model that is calculated by SPSS that doesn't include any predictors*". For the

Medical student model, the chi-square is significant (*chi-square=43.768, df=30, p=.05*). For the nursing student model, the Chi-square is highly significant (*chi-square=51.2227, df=29, p<.01)*. This indicates that the new models, with a chi square value of 43 and 51, and 30 and 29 degrees of freedom, respectively, are explaining more the variance in the outcome and are an improvement over the baseline model.

Omnibus Tests of Model Coefficients			
The respondent profile	**Chi-square**	**df**	**Sig.**
1 Medical Students	43.768	30	.050
2 Nursing Students	51.227	29	.007

The results of the Hosmer and Lemeshow Goodness of fit test also shows that both models are worthwhile, with a significance value greater than .05, which is a positive result in this test. As explained by (Pallant, J. 2016), *"the test provides a chi square test to see whether or not the model is an adequate fit to the data. It assesses whether expected and observed event rates in subgroups (deciles) within each model is similar, and if so a model is considered well calibrated. The null hypothesis is that the model is a 'good enough' fit to the data and we will only reject this null hypothesis (i.e. decide it is a 'poor' fit) if there are sufficiently strong grounds to do so (conventionally if p<.05)"*. The Chi-Square value for the test is 3.6 for medical students and 4.6 for nursing students with a significance value of .886 and .592, respectively. The value is greater than .05 therefore the models are a good fit.

Hosmer and Lemeshow Test			
The respondent profile	**Chi-square**	**df**	**Sig.**
1 Medical Students	3.671	8	.886
2 Nursing Students	6.491	8	.592

The Cox and Snell R square as well as the Nagelkerke R Square further provide indication of the usefulness of the model (Pallant, J. 2016), indicating that between 22.1 percent and 29.1 percent of the variability in the medical student's model is explained by the chosen set of variables, and 27.7 percent and 36.9 percent by the chosen set of variables in the nursing model.

Model Summary			
The respondent profile	**-2 Log likelihood**	**Cox & Snell R Square**	**Nagelkerke R Square**
1 Medical Students	194.651	.221	.297
2 Nursing Students	167.579	.277	.369

c) Regression Results

The respondent profile		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
1 Medical Students	agreement with when posted, will largely be on own	.268	.392	.467	1	.494	1.307	.606	2.818
	agreement with when posted, will have adequate housing	.685	.908	.570	1	.450	1.984	.335	11.752
	main motivation to become health worker: financial	-.503	1.034	.237	1	.626	.604	.080	4.583
	motivation to become health worker: to help people	-.401	.773	.269	1	.604	.670	.147	3.046
	study years repeated (once or more)	.518	.520	.993	1	.319	1.679	.606	4.650
	agreement with acceptability of earning extra income in other facilities during work hours	-.122	.466	.068	1	.794	.885	.355	2.208
	satisfaction with training received	-.322	.560	.330	1	.566	.725	.242	2.173
	agreement with: feeling ready to work in rural facility	1.263	.503	6.312	1	.012	3.534	1.320	9.464
	education level of father: university and above	-.152	.411	.136	1	.712	.859	.384	1.922
	satisfaction with monetary situation	-.782	.479	2.666	1	.103	.457	.179	1.170
	preference for work outside of Conakry	.286	.417	.471	1	.492	1.331	.588	3.012
	preference for health center/post	-.074	.918	.006	1	.936	.929	.154	5.609
	parents socio-economic status: lower middle/poor	-.696	.490	2.015	1	.156	.499	.191	1.303
	Born in Conakry	-.611	.464	1.735	1	.188	.543	.219	1.348
	married/engaged	.089	.557	.025	1	.873	1.093	.367	3.253
	having been to another country in Africa	.434	.391	1.235	1	.266	1.544	.718	3.321
	Being male	.491	.444	1.220	1	.269	1.634	.684	3.903
	main source of education funding: public	-.479	.569	.709	1	.400	.619	.203	1.889
	agreement with: working fewer hours than in contract is acceptable	.637	.471	1.828	1	.176	1.891	.751	4.761
	feeling ready to work in urban facility	.241	.843	.082	1	.775	1.273	.244	6.646
	having children	-.918	.674	1.857	1	.173	.399	.107	1.495
	disagreement with earning extra income during work hours is acceptable	.528	.423	1.559	1	.212	1.695	.740	3.882
	belief when posted, will have opportunities for training	-1.513	1.105	1.874	1	.171	.220	.025	1.922
	satisfaction with life in general	-.218	.459	.226	1	.635	.804	.327	1.976
	having friends of family outside of Africa	-.471	.781	.364	1	.546	.624	.135	2.888
	private sector training institution	.870	.511	2.896	1	.089	2.388	.876	6.505

	house grew up in Urban	1.145	.538	4.530	1	.033	3.144	1.095	9.027
	preference for urban post	.876	.422	4.315	1	.038	2.401	1.051	5.485
	Agreement that CHW are integral to workforce	1.277	.614	4.317	1	.038	3.585	1.075	11.953
	I5.1.1(1) Having friends or family in another country in Africa	-1.254	.849	2.181	1	.140	.285	.054	1.507
	Constant	-2.257	2.130	1.123	1	.289	.105		
2 Nursing Students	agreement with when posted, will largely be on own	.481	.461	1.090	1	.296	1.617	.656	3.989
	agreement with when posted, will have adequate housing	-.513	.546	.885	1	.347	.598	.205	1.745
	main motivation to become health worker:financial	39.109	17346.395	.000	1	.998	9657705 0874219 136.000	.000	.
	motivation to become health worker: to help people	-.335	.808	.171	1	.679	.716	.147	3.490
	study years repeated (once or more)	-19.698	11425.072	.000	1	.999	.000	.000	.
	agreement with acceptability of earning extra income in other facilities during work hours	1.069	.662	2.610	1	.106	2.912	.796	10.653
	agreement with: feeling ready to work in rural facility	-.213	.801	.071	1	.790	.808	.168	3.884
	education level of father: university and above	-.111	.528	.044	1	.834	.895	.318	2.521
	satisfaction with monetary situation	.039	.565	.005	1	.945	1.040	.344	3.146
	preference for work outside of Conakry	.738	.506	2.127	1	.145	2.092	.776	5.643
	preference for health center/post	-.505	.549	.844	1	.358	.604	.206	1.772
	parents socio-economic status: lower middle/poor	.420	.473	.789	1	.374	1.522	.603	3.843
	Born in Conakry	-.100	.493	.041	1	.840	.905	.344	2.378
	married/engaged	.526	.520	1.021	1	.312	1.691	.610	4.687
	having been to another country in Africa	.547	.449	1.483	1	.223	1.728	.717	4.164
	bring male	.711	.539	1.745	1	.186	2.037	.709	5.853
	agreement with: working fewer hours than in contract is acceptable	-.225	.526	.183	1	.669	.798	.285	2.237
	feeling ready to work in urban facility	-.666	1.186	.316	1	.574	.514	.050	5.248
	having children	.102	.511	.040	1	.842	1.107	.407	3.010
	disagreement with earning extra income during work hours is acceptable	.771	.488	2.499	1	.114	2.163	.831	5.629

	belief when posted, will have opportunities for training	.789	.740	1.136	1	.287	2.200	.516	9.382
	satisfaction with life in general	.628	.642	.954	1	.329	1.873	.532	6.597
	having friends of family outside of Africa	1.226	.553	4.913	1	.027	3.408	1.152	10.081
	private sector training institution	.088	.713	.015	1	.901	1.092	.270	4.414
	house grew up in Urban	.435	.585	.552	1	.457	1.545	.491	4.866
	preference for urban post	1.071	.479	4.988	1	.026	2.917	1.140	7.466
	Agreement that CHW are integral to workforce	.269	.523	.264	1	.607	1.308	.469	3.647
	Having friends or family in another country in Africa	1.183	.624	3.599	1	.058	3.265	.961	11.090
	Constant	-4.702	2.336	4.052	1	.044	.009		
	school location: Outside Conakry	1.127	.519	4.725	1	.030	3.088	1.117	8.534

IV. Migration Preference Model

Question: What factors predict the likelihood that respondents would report that they have preference for a job abroad in the short term?

The following provides an overview of a) the coding of the variables in the model b) the statistical soundness of the model, and d) the actual regression results.

d) Coding of the variables

The dependent variable – job Conakry vs job Abroad Preference was coded as 1=Abroad 0=Guinea. The potential predictor variables were coded as 1 or 0, with 1 representing the dimension of the variable under observation. This is detailed in the table below.

Categorical Variables Coding				
The respondent profile			Frequency	Parameter coding (1)
Medical Students	do you have children	yes	27	0
		no	150	1
	sector preference	public	75	0
		private	102	1
	St level preference	health center/post	8	0
		hospital	169	1
	parental socio econ status	upper middle/rich	53	0
		lower middle/poor	124	1
	Region Born Conakry vs Outside Conakry	Outside Conakry	104	0

		Conakry	73	1
	marriage status	not married or engaged	135	0
		married or engaged	42	1
	Location of house grew up in	rural	36	0
		urban	141	1
	have you ever been outside of Africa	no	174	0
		yes	3	1
	gender/sex	female	54	0
		male	123	1
	main source of school funding	public	40	0
		private	137	1
	feeling ready to work in urban facility	disagree/strongly disagree	10	0
		agree/strongly agree	167	1
	satisfaction with monetary situation	satisfied/highly satisfied	77	0
		dissatisfied/highly dissatisfied	100	1
	fathers education level	below university	114	0
		university and above	63	1
	feeling ready to work in rural facility	agree/agree much	132	0
		disagree/disagree much	45	1
	when posted I will have opportunities for on	agree/highly agree	170	0
	job training	disagree/highly disagree	7	1
	how satisified with life in general	satisfied/highly satisfied	120	0
		dissatisfied/highly dissatisfied	57	1
	Do you have friends of family living outside	no	17	0
	Africa	yes	160	1
	do you have friends or family living in	no	14	0
	another country in Africa	yes	163	1
	have you ever been to another country in	no	110	0
	Africa?	yes	67	1
	when posted, will have adequate housing	disagree/strongly disagree	10	0
		agree/strongly agree	167	1
	satisfaction with training received	dissatisfied/highly dissatisfied	27	0
		satisfied/highly satisfied	150	1
	m school private public	public	106	0
		private	71	1
	motivation to become HW: help people	other	28	0
		to help people	149	1
	Motivation to become HW: financial	other	164	0
		to make money	13	1

	st rural urban preference	rural	73	0
		urban	104	1
Nursing Students	do you have children	yes	97	0
		no	60	1
	sector preference	public	76	0
		private	81	1
	St level preference	health centre/post	32	0
		hospital	125	1
	regression: parental socio econ status	upper middle/rich	106	0
		lower middle/poor	51	1
	Region Born Conakry vs Outside Conakry	Outside Conakry	113	0
		Conakry	44	1
	marriage status	not married or engaged	64	0
		married or engaged	93	1
	Location of house grew up in	rural	26	0
		urban	131	1
	have you ever been outside of Africa	no	154	0
		yes	3	1
	gender/sex	female	120	0
		male	37	1
	feeling ready to work in urban facility	disagree/strongly disagree	7	0
		agree/strongly agree	150	1
	satisfaction with monetary situation	satisfied/highly satisfied	105	0
		dissatisfied/highly dissatisfied	52	1
	fathers education level	below university	129	0
		university and above	28	1
	feeling ready to work in rural facility	agree/agree much	145	0
		disagree/disagree much	12	1
	when posted I will have opportunities for on job training	agree/highly agree	143	0
		disagree/highly disagree	14	1
	how satisfied with life in general	satisfied/highly satisfied	119	0
		dissatisfied/highly dissatisfied	38	1
	Do you have friends of family living outside Africa	no	51	0
		yes	106	1
	do you have friends or family living in another country in Africa	no	36	0
		yes	121	1
	have you ever been to another country in Africa?	no	106	0
		yes	51	1
		disagree/strongly disagree	29	0

	regression: when posted, will have adequate housing	agree/strongly agree	128	1
	school private public	public	26	0
		private	131	1
	motivation to become HW: help people	other	16	0
		to help people	141	1
	motivation to become HW: financial	other	151	0
		to make money	6	1
	st rural urban preference	rural	62	0
		urban	95	1

a) Soundness of Model

Once again, the omnibus tests of model Coefficient shows that both models perform very well with a high level of significance. As explained by (Pallant, J. 2016), "*the omnibus Test of Model coefficients is a good ness to fit test, automatically generated in SPSS, which tests how well the model performs. It uses the Chi-Square test to see if the model we built with all our predictors included, can explain better the variance in the outcome (the spread of numbers from the mean) than a baseline model that is calculated by SPSS that doesn't include any predictors*". For the Medical student model, the chi-square is highly significant (*chi-square=39.614, df=25, p<.05*). For the nursing student model, the Chi-square is highly significant (*chi-square=41.353, df=23, p<.05)*. This indicates that the new models, with a chi square value of 39 and 41, and 25 and 23 degrees of freedom, respectively, are explaining more the variance in the outcome and are an improvement over the baseline model.

Omnibus Tests of Model Coefficients			
The respondent profile	**Chi-square**	**df**	**Sig.**
Medical Students	39.614	25	.032
Nursing Students	41.353	23	.011

The results of the Hosmer and Lemeshow Goodness of fit test also shows that both models are worthwhile, with a significance value greater than .05, which is a positive result in this test. As explained by (Pallant, J. 2016), *"the test provides a chi square test to see whether or not the model is an adequate fit to the data. It assesses whether expected and observed event rates in subgroups (deciles) within each model is similar, and if so a model is considered well calibrated. The null hypothesis is that the model is a 'good enough' fit to the data and we will only reject this null hypothesis (i.e. decide it is a 'poor' fit) if there are sufficiently strong grounds to do so (conventionally if p<.05)"*. The Chi-Square value for the test is 7.3 for medical students and 5.03 for nursing students with a significance value of .504 and .754, respectively. The value is greater than .05 therefore the models are a good fit.

Hosmer and Lemeshow Test

The respondent profile	Chi-square	df	Sig.
Medical Students	7.309	8	.504
Nursing Students	5.032	8	.754

The Cox and Snell R square as well as the Nagelkerke R Square further provide indication of the usefulness of the model (Pallant, J. 2016), indicating that between 20.1 percent and 30.5 percent of the variability in the medical student model is explained by the chosen set of variables, and 23.2 percent and 31.0 percent by the chosen set of variables in the nursing model.

Model Summary			
The respondent profile	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
Medical Students	149.557[a]	.201	.305
Nursing Students	175.524[b]	.232	.309

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found for split file The respondent profile = Medical Students.

b. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001 for split file The respondent profile = Nursing Students.

b) Regression results

Variables in the Equation									
								95% C.I.for EXP(B)	
The respondent profile		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Medical Students	Short Term Preference for Urban Post	.206	.450	.209	1	.647	1.229	.508	2.971
	Feeling Ready to work in an urban facility	.651	.998	.425	1	.514	1.918	.271	13.573
	Main Source of School Funding: Private	-.286	.642	.198	1	.657	.752	.213	2.647
	gender: Male	.508	.506	1.008	1	.315	1.662	.616	4.480
	having been outside of Africa: Yes	20.235	21119.996	.000	1	.999	61394161 4.166	.000	.
	House Grew up in: Urban	-1.195	.668	3.204	1	.073	.303	.082	1.120
	marriage status: married or engaged	.202	.585	.119	1	.730	1.224	.389	3.848
	Born in Conakry	.093	.516	.033	1	.857	1.098	.399	3.020
	Parental Socio-Economic class: lower middle income/poor	-1.523	.609	6.260	1	.012	.218	.066	.719
	Short term Level Preference: Hospital Level	-1.490	1.268	1.380	1	.240	.225	.019	2.708
	Short Term Sector Preference: Private	1.419	.487	8.499	1	.004	4.132	1.592	10.724
	Satisfaction with monetary Situation: Dissatisfied/Highly Dissatisfied	1.246	.552	5.088	1	.024	3.477	1.177	10.266

	Father's education level: University and Above	-.041	.481	.007	1	.933	.960	.374	2.463
	Feeling ready to work in a rural facility: Disagree/Strongly disagree	1.537	.672	5.237	1	.022	4.651	1.247	17.346
	Satisfied or highly satisfied with training received	.247	.680	.132	1	.717	1.280	.338	4.847
	Attending a Private School	-.393	.579	.461	1	.497	.675	.217	2.101
	Motivation to become a health worker: To Help People	-.539	1.011	.285	1	.594	.583	.080	4.227
	Motivation to become a health worker: Financial	.860	1.567	.302	1	.583	2.364	.110	50.954
	When posted, you will have adequate housing: Agree/Strongly Agree	.929	.908	1.048	1	.306	2.533	.427	15.005
	Having been to another country in Africa	.425	.460	.851	1	.356	1.529	.621	3.767
	Having Friends of Family Living in another country in Africa	-.755	1.265	.357	1	.550	.470	.039	5.603
	Having Friends or Family Living outside of Africa	-.722	.861	.704	1	.402	.486	.090	2.626
	Dissatisfied or highly dissatisfied with life in general	.332	.559	.353	1	.552	1.394	.466	4.168
	When posted, I will have opportunities for on the job training: disagree/strongly disagree	.091	1.162	.006	1	.938	1.095	.112	10.677
	Not having children	1.251	.774	2.610	1	.106	3.495	.766	15.943
	Constant	1.748	2.652	.434	1	.510	5.741		
Nursing Students	Short Term Preference for Urban Post	-.019	.420	.002	1	.964	.981	.431	2.234
	Feeling Ready to work in an urban facility	-1.604	1.185	1.832	1	.176	.201	.020	2.052
	gender: Male	.504	.502	1.006	1	.316	1.655	.618	4.432
	having been outside of Africa: Yes	.081	1.661	.002	1	.961	1.084	.042	28.090
	House Grew up in: Urban	.588	.555	1.121	1	.290	1.800	.606	5.347
	marriage status: married or engaged	.451	.496	.827	1	.363	1.570	.594	4.152
	Short term Level Preference: Hospital Level	-.104	.454	.053	1	.818	.901	.370	2.192
	Parental Socio-Economic class: lower middle income/poor	-.934	.452	4.271	1	.039	.393	.162	.953
	Short term Level Preference: Hospital Level	.436	.506	.740	1	.390	1.546	.573	4.172
	Short Term Sector Preference: Private	.295	.407	.523	1	.469	1.343	.604	2.984
	Satisfaction with monetary Situation: Dissatisfied/Highly Dissatisfied	.296	.587	.254	1	.615	1.344	.425	4.250
	Father's education level: University and Above	.575	.521	1.216	1	.270	1.776	.640	4.932
	Feeling ready to work in a rural facility: Disagree/Strongly disagree	-.568	.742	.586	1	.444	.567	.132	2.425
	Coming from a private nursing school	1.168	.570	4.197	1	.040	3.215	1.052	9.824
	Motivation to become a health worker: To Help People	.362	.802	.204	1	.651	1.436	.298	6.914
	Primary Motivation to become health worker: Financial	2.428	1.493	2.643	1	.104	11.334	.607	211.628
	When posted, you will have adequate housing: Agree/Strongly Agree	1.783	.545	10.695	1	.001	5.951	2.043	17.329
	Having been to another country in Africa	-.564	.429	1.730	1	.188	.569	.245	1.319
	Having Friends of Family Living in another country in Africa	-.395	.570	.481	1	.488	.674	.221	2.058
	Having Friends or Family Living outside of Africa	1.030	.529	3.798	1	.051	2.802	.994	7.897
	Dissatisfied or highly dissatisfied with life in general	1.033	.690	2.242	1	.134	2.809	.727	10.856

	When posted, I will have opportunities for on the job training: disagree/strongly disagree	-.611	.721	.718	1	.397	.543	.132	2.232
	Not having children	.519	.481	1.165	1	.280	1.681	.655	4.317
	Constant	-2.898	1.773	2.673	1	.102	.055		