Nursing Workforce Distribution in Kenya

By

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B.S., Alma College
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A thesis submitted to the Hubert Department of Global Health
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Background
A heavy concentration of health workers in urban sites is a problem all over the world, while attracting and retaining health workers in rural and marginalized communities remains a challenge. This study examined and compared characteristics of nurses in rural, peri-urban, and urban deployed in public health facilities in Kenya to assess rural nursing profiles and potential incentives to rectify maldistribution.

Methods
This study used a mixed methods approach with data from the Kenya Health Workforce Information System, the Regulatory Human Resources Information System, and data from key informant interviews with nurses deployed in public sector district hospitals for the quantitative and qualitative analyses, respectively. The counties were assigned rural, peri-urban or urban labels. The associations between deployment by county type and education cadre, duration of employment, age, county of origin and gender were analyzed, including their strength, using chi-square for categorical data and ANOVA for discrete data. In depth interviews were conducted to determine push and pull factors to rural sites and potential incentives for rural deployment.

Results
Of the 15,570 nurses, 21.1% were deployed to urban counties, 34.7% to peri-urban counties, and 44.2% of nurses are deployed in rural counties. The nurse to population ratio was higher in rural (.38/1000) and peri-urban (.42/1000) when compared with urban (.26/1000) ($p = 0.0001$.) However, nurses in rural facilities were more likely to be younger, less experienced, from a rural county and possess a certificate in nursing. Key factors identified by the nursing staff at district hospitals included poor remuneration and inadequate resources in health facilities. Potential incentives mentioned included improved pay, health facilities, and access to educational opportunities.

Conclusion
Making rural locations competitive with urban locations will be a challenge. However, the maldistribution of nurses hinders the development of the health system and its ability to provide accessible, quality health care. Recognizing the traits associated with rural nurse deployment should inform the design of incentive programs to recruit and reward nurses more likely to work in rural locations. To improve the image of rural deployment, policy makers will need to address issues such as adequate compensation and equipped health facilities.

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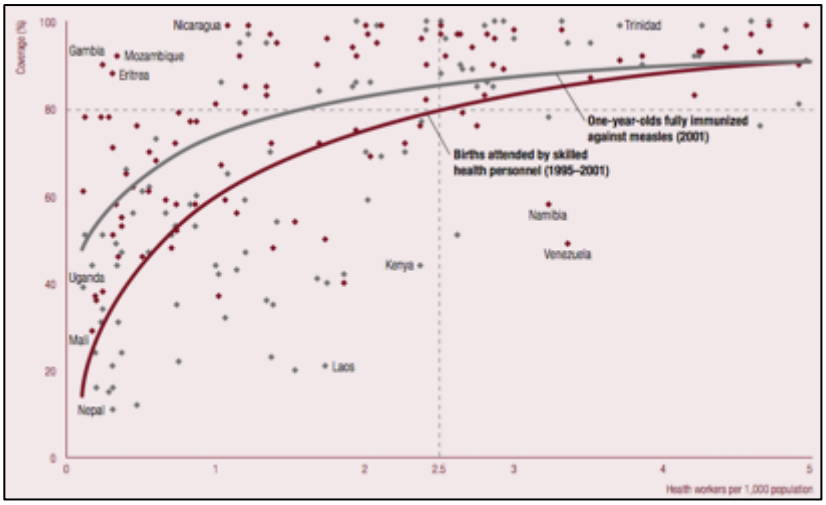
Literature Review

Overview of Health Workers World Wide

The World Health Report 2006 identified a global shortage of 43 million health care workers.[1] Concurrently, the migration of qualified health professionals has become more complex and concerning, especially to countries with a low ratio of human resources for health (HRH) to population. A heavy concentration of health workers in urban sites is a problem all over the world, while attracting and retaining health workers in rural and marginalized communities remains a challenge.[2] During the past few years, the shortage and maldistribution of health workers in low-income countries has been the focus of many debates and research papers, as the shortage of health workers has been cited as a threat to achieving the Millennium Development Goals (MDGs).[1] In order to achieve the goals of well-financed programs, such as the Presidents Emergency Plan for AIDS Relief and Global Alliance Vaccine Initiative, efficient, effective and equitable health services provided by competent staff is required, making health workers the determining factor in the progress of health programs.[3] Existing information on health worker densities and retention strategies usually comes from high-income countries, such as the United States and the United Kingdom. Information generated by these countries has found that where there is a high density of health workers, there are better health outcomes and workers report lower burnout and greater job satisfaction.[2] The Joint Learning Initiative (JLI) found the prospects for achieving 80% coverage of measles immunization and skilled birth attendance are significantly enhanced when worker density exceeds 2.5 health workers per 1,000 population.[2] In Figure 1.1, utilizing data compiled from UNDP 2003 and WHO 2004a, immunization and birth attendance coverage is compared to health worker density. The

regression analysis, based on worker density and health outputs around the world, suggests that a density of about 1.5 workers per 1,000 is associated with 80% coverage with measles immunization and 2.5 workers per 1,000 with 80% coverage of births with skilled attendance. While the regression did not control for other, potentially confounding factors, such as education and economics, these relationships suggest that 2.5 health workers per 1,000 is required to attain adequate coverage of some essential health interventions, such as vaccination programs, and that more demanding health services, such as anti-retroviral therapy (ART), may require a higher worker density.[2]

Figure 1.1 Health Service Coverage and Health Worker Density



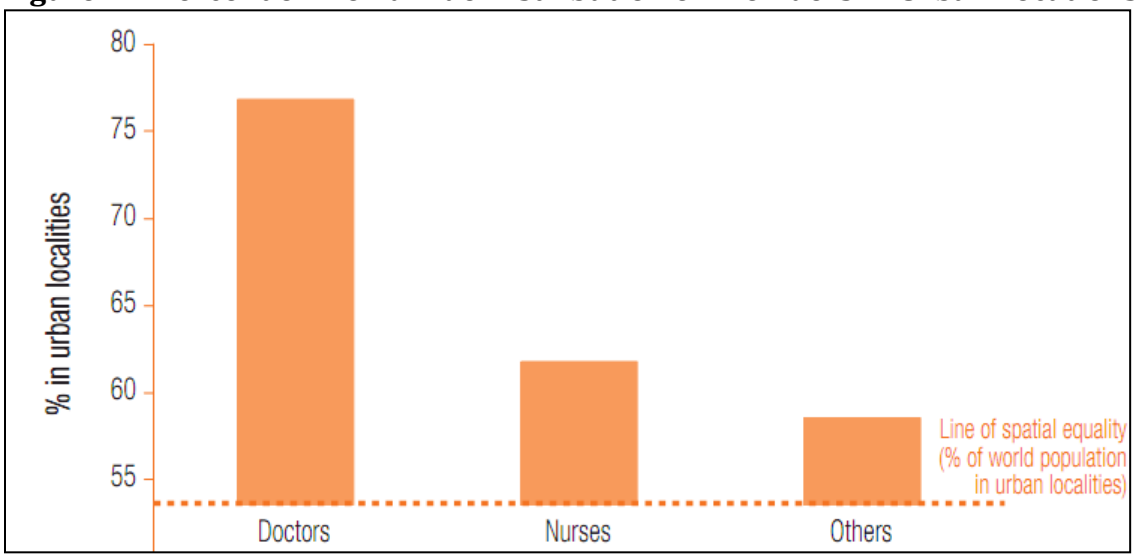
Source Joint Learning Initiative: Overcoming the Crisis

Compounding the shortage and maldistribution is the paradox of high unemployment of health professionals, which requires job creation in the public (financially permitting) and private sectors.[1] Currently, Africa spends the lowest proportion (29.5%) of governments' expenditures on health worker salaries.[1] Current spending patterns on health workers and capacity building are inefficient and poorly strategized. In order to achieve program goals policy makers must invest more strategically recognizing health workers as a

crucial investments required to achieve Millennium Development Goals, prevent epidemics, and build sustainable health systems.[2]

While poor distribution between countries is well documented, distribution within countries also reflects a similar condition. In Bangladesh, four metropolitan districts have 35% of all doctors but only 14.5% of the country's population.[3] In Ghana, the distribution of registered nurses in the Ghana Health Service favors the greater Accra region, which has 18.5% of the population and 30.9% of the country's professional nurses.[4] In 1997, 87.2% of general physicians in Ghana worked in urban areas even though 66% of the population lived in rural areas.[5] In sparsely populated areas, classified as remote or rural areas, access to healthcare can be limited because of the challenge of assigning health workers from a limited workforce pool to a low population area. According the WHO Health Report from 2006 75% of doctors and 60% of nurses are deployed to urban locations.

Figure 1.2 Percent of Worldwide Distribution of Providers in Urban Locations[1]



The unfortunate result of migration from rural to urban sites is added stress and workload on rurally practicing health workers who are not paid as well as their urban counterparts, poorly equipped, and have limited career opportunities.[3,6]

Factors Influencing Rural Deployment and Retention

There are several factors to consider in attracting and retaining health staff in rural and remote areas. The preferences of health workers to work in certain locations can be influenced by combination of individual and environmental factors. Individual preferences can include factors such as familial obligations, education opportunities for children, salary preferences, professional development opportunities, and availability of appropriate living conditions. Environmental factors such as familiarity with the area, facility upkeep and condition, personal safety concerns, community perceptions of health personnel, and availability of medical resources affect how health workers assimilate into a community and provide health services. Lastly, demand for health services drives the need for health workers, including specialists. While these factors are listed separately, they interact with each other, reducing the number of health care professionals in rural, remote and underserved areas.[3,5]

Influencing these factors are a variety of push, pull, and stick factors affecting health worker preferences.[7] While usually considered in the context of international migration, often these factors mirror the situation within countries.[8,9] Health worker movement within countries takes place between public and private health sectors, between rural and urban areas, from poor to rich districts, and between levels of care.[9]

Push Factors

Push factors are factors that lead a health worker to leave their position, including high workloads, health risks such as exposure to HIV/AIDS or TB, poor facility infrastructure, and poor work conditions. Work conditions that reduce job satisfaction act as push factors out of health facilities and health systems.[9] Push and pull factors can further be subdivided into endogenous (directly related to the health system) and exogenous

factors (outside the health system.)[9] Examples of exogenous push factors could be poor housing, general isolation from social networks and lack of quality education for children.[9]

Pull Factors

Pull factors are factors that attract a health worker to certain destinations like better pay, improved quality of life and professional development opportunities. For example, a nurse in Zimbabwe could expect to increase her salary by 40% if she joined the private sector.[10] Overstaffing in urban sites can lead to underuse of skilled professionals, while increasing total costs of the health system. Instead of encouraging the movement of health professionals from the urban to rural, excess numbers of health professionals in overstaffed areas can promote out migration (brain drain) to obtain employment in foreign countries.[11]

Stick and Stay Factors

Stick factors consist of reasons to remain where a health worker is employed despite push or pull factors to move or migrate from rural and remote health facilities. The World Health Organization developed a list of graded recommendations for interventions that identifies factors and policies which made health workers 'stick" in rural areas. The first recommendation acknowledged a compelling body of evidence from high-, middle- and low-income countries that a rural background increases the chance of health graduates returning to practice in rural communities. Observational studies also suggest that training schools in rural areas are likely to produce more physicians working in rural areas than schools located in urban areas; however the studies were confounded by the recruitment of rural students to those schools. Similarly training programs focused on or containing information on rural health topics were associated with rural work preferences; however as the programs are usually optional students from a rural background could be more likely to self select into those training opportunities. However, curriculum-containing competencies

that address the differences and challenges of diagnosing disease and providing rural health care do provide health professionals with the skills necessary to practice in those areas which can reduce frustration and challenges for rurally placed providers.

While direct evidence on improvement of rural health infrastructure and living conditions is limited, in supportive studies aimed at eliciting factors that influence decisions to work in remote or rural areas the availability of good living conditions is always mentioned as very important. Good living conditions can include roads, electricity, running water, schools for children and employment opportunities for spouses. Along a similar vein ensuring the workplace is up to standard is strongly recommended to improve health worker retention as evidence from satisfaction surveys indicate that health professionals are disinclined to apply for or accept assignments to practice in facilities that are in a state of disrepair and do not have basic supplies, such as running water, gloves, elementary basic drugs and rudimentary equipment.[9]

Demand

Demand for healthcare also effectively drives the demand for human resources. Demand for healthcare is influenced by incidence of illness, as well as socioeconomic, demographic, cultural and technological factors. In countries with widespread poverty, inadequate living conditions, poor nutrition, and increasing population growth, more and more people are seeking affordable and effective healthcare.[12] While the popular assumption is that health workforce needs should be based solely on estimates of health needs, relying only on the concept of need is difficult because the definition of need is unreliable. Need can be measured by health worker to population ratios, which is the most common type of need identified as a result of the WHO standards of 2.5 health workers per 1,000 people. However, it can also be measured by prevalence of disease, such as HIV/AIDS,

which not only requires a minimum number of health workers but also workers with specialty training. It can also be measured by the age of a population, as chronic conditions exhibited in older populations also require specialized providers. Need can be defined broadly or restrictively, resulting in either a perception of systematic shortage or surplus.[13] For example, the introduction of health insurance coverage is likely to influence the demand for health services.[13]

Location Preferences

Health workers often relocate from rural areas to urban areas and then transfer from public sector facilities to private sector facilities.[6,14] Preferences of location may also depend on the living conditions preferred by health personnel.[3] Nurses often prefer to migrate to urban areas where they have better career opportunities and more rewarding social and economic conditions.[4] Lack of housing and schools for children are quoted internationally as reasons why health workers choose to not apply for jobs in remote areas. Several authors have identified working conditions, including organizational arrangements, management support, high-risk work environments and availability of equipment as being a determining factor in deciding whether to leave or stay in remote areas.[11,13]

A study on the inequalities in health workers in Tanzania found a 40-fold difference per capita in health workers between districts at the high-income end of the distribution compared to the districts at the lower income end. While these differences were expected since tertiary and referral hospitals are expected to serve people from other districts, when these hospitals were removed from the analysis, the urban districts still had 30 % more health workers per capita compared to the rural districts. [15]

Despite the fact that factor analysis studies have consistently showed that financial incentives and awards are neither the first nor the most important factor in the decision to

leave or stay in a remote or rural area, many compensation packages still focus on financial remuneration without addressing the importance of non-financial incentives such as living conditions and work place conditions. There is an observed lack of coherence between what is proposed in retention strategies and the factors that matter for health workers in their choice for location, such as quality housing and educational opportunities, among other factors.[16]

Individual Factors

Individual factors may include a person's age, gender, and marital status, which affect decision making.[3] Growing up in a rural community has been associated with a higher probability of accepting and continuing in a rural position.[15,17-19] In a study conducted in Canada, medical students from a rural background were 2.5 times more likely to rurally practice than their urban raised peers.[18] Younger personnel with fewer family ties were also more likely to be prepared to move to rural areas. Altruistic motives also appear to motivate health workers, as a study in Ethiopia found that a desire to help the poor was suggestive of willingness to work rurally.[17] A study on non-financial incentives in Benin and Kenya found that health workers are guided by their professional consciences and their ability to fulfill their personal professional values, which directly impacts their motivation and workplace satisfaction.[20]

Women are less likely than men to accept rural posts. A study in Bangladesh found that female doctors rarely resided in the town of their assignment, which resulted in high absentee rates.[13] Studies also suggest that women will move to where their husbands' jobs are located. As the gender compositions change in the health profession, there is significant potential for reduction in supply of personnel willing to work in rural areas, or culturally or socially allowed to work in rural areas. In an analysis of gender equity in relation to access

of non-monetary incentives, female nursing and midwifery personnel were found less likely than their male counterparts to access in-service training, an important part of strengthening human capital and workforce quality.[21] This relationship could reflect a gender bias where female service providers' contributions are less valued and their opportunities for personal and professional growth beyond the basic healthcare tasks remain more limited. There also appears to be the perception that nurses, as mid-level service providers, require less investment than medical professionals and will tolerate low pay, poor living conditions, and subpar working conditions.[22]

A breakdown of sociodemographic characteristics offers insights into imbalances in the health workforce. Unequal distributions by geographic location and gender constitute the main areas of health policy concern for many countries. Also the distribution of vacancy rates, turnover rates and relative wage rates by location are helpful in assessing health workforce equity.[23]

Environment Factors

Environmental factors also affect health workers willingness to work in rural and remote areas. A study monitoring inequalities in health work force in Brazil found that inequalities increased between 2000 and 2005 and that nursing professionals and physicians are the most unequally distributed. The poorest states in Brazil experienced the highest shortage of health workers and had the highest inequalities in distribution of the physicians and nurses over three years. In poor areas, the staff was more likely to be unskilled health workers. Inequalities in distribution of health workers were related to poverty quintiles, inequalities in states, and rural urban stratum.[24]

Workload also is a problem, specifically impacting retention. Professional isolation and heavy workloads, often found in rural facilities, push health workers to seek improved

working conditions. Lack of resources, equipment, and appropriate facilities can also deter health workers from rural and remote health posts. Poor transparency in posting policies and promotions also deters health workers, as one is often 'forgotten' in remote areas. Risks associated with contracting diseases like HIV/AIDS due to lack of personal protective equipment is also associated with migration from rural facilities.[25] In a case study of South African medical specialists, qualitative interviews revealed that the perceived advantages of private sector work were strongly related to work environment: more money (in general); the ability to work in a relatively resource rich environment; more of a sense of career progression; fewer stresses with the 'administration (upper management); better social interactions with nurses and other health workers; and more working autonomy.[26]

In a study examining attrition in the health workforce in Kenya, attrition among registered nurses in the provincial hospitals, on average, was twice as high as the rate of attrition of enrolled nurses. Resignation accounted for about half of attrition among registered nurses at this level, while the loss of enrolled nurses was almost entirely due to retirement. In contrast, at lower facility levels, registered and enrolled nurses had similar rates of attrition mostly related to retirement. This difference in attrition cause may reflect the higher international mobility and more numerous employment opportunities available to registered nurses, particularly in urban areas where provincial hospitals are located.[27]

Measuring Maldistribution

Maldistribution is one of the most critical workforce challenges, not only for achieving universal coverage, but also for addressing linked workforce problems such as shortages and skill imbalances.[28] Frequently urban unemployment and rural vacancies coexist and amplify skill set imbalances. Maldistribution is considered a gap between need, or demand, and supply. However, differences in the number of health care providers based

on area, income or factors other than health need or planning imply distortions within health systems that may undermine the capacity to meet health needs.[9] Inequalities can be measured as provider to population or patient ratios, in economic terms (supply vs. demand), prevalence of specific diseases (provider to disease ratios), and morbidity and mortality (provider to mortality ratios). These types of measurement can be classified into two perspectives: economic and normative.[11]

From the economic perspective the distribution of health professionals is a function of the health care labor market. Imbalances can be measured by disequilibrium between supply and demand for labor in a certain geographical area. As real wages increase, more health professionals will be willing to work and more people will enter the health profession, resulting in an improved equilibrium.[29] [30] Incentives, such as hardship pay and rural allowances, apply this logic.

From a normative perspective, imbalances are defined in terms of comparison of a certain staff density with some standard or social norm, which leads to emphasizing the role of planning to achieve a balanced distribution of human resources for health. The norm of reference can be defined by professional organizations, by government policy, or by using a certain region as a comparator. Variations in professional density from the defined reference across a geographic area are considered an imbalance.[5]

In measuring inequalities in distribution of health workers in high-income countries, literature has suggested that crude death rates could serve as a measure of health needs because a high death rate is a sign of an aging population with significant health needs.[15] An equitable distribution of health workers may not necessarily be an equal number of health workers in each district but an appropriate number to meet the differences in need based on morbidity and mortality. Disease surveillance allows governments to determine workforce-

planning priorities, such as where specialized or primary care providers are needed. However, in low-income settings, crude death rates may be less suitable as a measure of health needs in the context of workforce planning because of the lack of consideration of the context of environmental and population factors, such as elderly concentration, livelihoods, and seasonal weather changes which change the transmission patterns of communicable diseases.[15]

There is some subjectivity in determining these standards and definitions of the scope of practice of health professionals and the appropriate methods to determine staffing needs. Though the normative and economic perspectives seem contradictory they actually complement each other. The normative view focuses on the supply side of the health labor market (i.e. sufficient production of health workers), while the economic view addresses the demand and financial incentives (i.e. market demand for health services).

Interventions

Strategies to increase the recruitment and retention of health workers often mirror the most common push factors, reflecting incentives such as loan forgiveness, educational opportunities and financial rewards for service in underserved or hardship areas. Strategies can be classified into four categories: regulatory and education interventions; compulsory service programs; financial and remuneration incentives; and non-financial incentives concerning management, support and environment. Regulatory and education interventions address the desire for further training, lack of skills, and influence of rural upbringing and training. Financial strategies address poor remuneration, lack of opportunity for secondary income, and moonlighting to supplement income. Nonfinancial incentives address working conditions, heavy workloads, poor management support, and living conditions. Regulatory and education interventions, along with non-financial incentives, often require financial

resources in order to be implemented; however, they do not explicitly give health workers money.

Education and Regulatory Interventions

It has consistently been observed that health workers from rural backgrounds are more likely to practice in rural areas.[16] Studies have shown that three factors are most strongly associated with rural practice: 1) a rural background, 2) a positive experience in a rural setting associated with undergraduate medical education, 3) targeted training for rural practice at the post graduate level.[31]

Training and professional development are important determinants of satisfaction as they nurture health workers' personal objectives and their value system. Interventions can include decentralization of the location of training institutions and the introduction of recruitment quotas to ensure that the most peripheral areas are represented among medical students and requiring rural field experience during medical training.[4] Requiring medical school and training facilities to actively recruit rural students or institute a quota for rural students could increase the number of professionals practice rurally.[18]

While training can prepare students to work in the field, it can also serve as a tool to enable health workers to cope better with the requirements of their job, allow them to take on more demanding duties, and achieve personal goals.[20] Studies investigating the effect of rural rotations and clerkships in underserved areas often find a 'change in student attitude towards rural practice' or 'intention to practice in rural areas,' although not predictive of rural practice.[32]

In Tanzania, the lack of primary interest in medicine, rural-related clinical curriculum, and preference for specialization not available in rural areas are cited as obstacles in building a motivated health workforce to address the inequalities in

distribution. Some suggest screening medical students in order recruit individuals predisposed to rural or remote practice.[33]

Promotions and professional training are also a source of concern.[14] It is logical to assume that highly trained health workers are found in urban areas where higher-level health facilities are located. The greater concern is the inequality in resource allocation to districts that leads to differences in distribution of health workers at the same level of care.[9] Continuous professional development can be defined as 'systematic, ongoing, self-directed learning for individuals.' This can include more than just training but also mentorship, feedback mechanisms, and distance learning programs.[1] Tuition support for full-time training degrees in Uganda was mentioned as preferable to short-term training, since full-time training degrees contributed to promotions and career development.[34] Direct entry to advanced training reduces the personnel attrition associated with educational leave, as workers often do not return to their public sector posts.[25]

Training, as a tool of human resources management, can serve several purposes. It helps health workers cope better with their job requirements, enables them to take on more demanding duties and positions, and achieves personal goals of professional advancement.[20] While improved training opportunities are thought to help with recruitment and retention, training people is not always the answer, as some recruited health workers will out-migrate or leave the workforce.

Compulsory Service Programs

The use of compulsory service in underserved areas has been used to alleviate maldistribution. This type of program can be called many different names including "mandatory," "requisite," "obligatory", "bonding," and "coercive" programs.[35] Compulsory programs are designed to address health equity, as they allow governments to redirect

resources to underserved communities, which are either not preferred by health professionals or favored by market forces.[17] Most countries that utilize compulsory practices highly subside health worker training (i.e. pay tuition and training fees.)

In a paper by Frehywot et al., compulsion programs were classified as 1) condition of service/state employment 2) compulsion with incentives and 3) compulsion without incentives. Conditions of service programs require health professionals to work for the government in assigned areas for a certain number of years. Examples of this type of program can be found in Cuba, where doctors serve the government domestically and internationally, and Australia, where international medical graduates are required to spend ten years working in 'districts of workforce shortage.'[35]

Programs classified as compulsion with incentive can include programs where students are required to complete a rural residency in order to graduate or to enter postgraduate or specialization programs. Also common is the requirement of one year of rural service after graduation in return for education financial support. There are employee linked compulsory programs, which require health professionals to work for the government before they can practice in the private sector (e.g. Peru) or enter postgraduate training. Indonesia employs a combination of compulsory service, financial incentives and preferential access to training for working in remote areas to address maldistribution. Doctors working in rural areas earned double the salary of doctors in urban areas (however this difference was eliminated by secondary income opportunities in urban areas) and received priority for civil service recruitment. This incentive was shown to increase preparedness to serve in a remote areas.[36]

Some countries have compulsion programs that have incentives related to family and resources that encourage providers to remain in underserved areas beyond the compulsory

time period. Some examples include lower car loan rates and children's scholarship in Zambia, which are designed to encourage professionals to remain in rural areas.[35,37] Another similar approach is to bundle incentives with compulsion, combining several incentives (e.g. education, living accommodations, and employment) with a certain number of years of service.

The last example of a compulsion program consists of compulsory service that lacks any incentives or benefits and does not account for the professional challenges created by working conditions, which can make it difficult to provide adequate service to patients or limit opportunities for health workers to network and pursue professional development. These programs usually require a health professional to work in a designated area for a year without incentives such as allowances, educational support, and professional advancement.[35]

In an inherent argument against compulsion is the need to respect the human rights of health professionals, which includes the right to migrate. However the argument can also be made that low-resource countries have the right to lay claims to the investments made in training those workers. One of the greatest weaknesses to this type of programming is high turnover as a result of health workers fulfilling their contracts and leaving, a characteristic that demands a closer examination of the needs and requirements of health professionals in those settings. However, policy-makers may prefer predictable turnover, which is a given in most countries, to no service at all.[35]

Bonding, or compulsion schemes, has been utilized to tie health workers to the public sector, including specific health facilities. As a requirement for graduation or receiving public loans, these strategies bond a health worker for a certain amount of time. These strategies are unpopular with health workers who protest these measures as a violation of

their human right to pursue employment of their choice. They also do not address the need for supervision in training. Observational studies from South Africa suggest that requiring doctors to perform 'community service' in rural areas without adequate guidance and support could alienate young doctors from considering rural practice by forcing them to practice outside their scope of competence, which could undermine their condition and leave them open to law suits.[38] Strategies that use coercion categories address short term recruitment needs, but there is limited evidence to support their long term impact.[38] Coercive policies are meant to address distribution but do not consider the cultural or religious beliefs of certain areas, which forbid physicians (especially women) and other medical staff from providing health services. Countries in sub-Saharan Africa that have implemented these policies have not been able to enforce them consistently. Most compulsory placed health workers return to the capital cities or other major urban centers.[30]

Financial/Remuneration Incentives

Financial strategies can be classified as bonuses, hardship allowances and loan forgiveness. Payment seems to be the most basic influence on retention of health professionals. Poor remuneration frequently pushes health workers to private practice (e.g. working simultaneously in public practice) to supplement income. The decision to undertake professional educational training should be considered an investment in a higher level of future earnings and greater job satisfaction.[13]

A study in Bihar, India found that 3 out of 4 doctors assigned to a health post were not present during the month of study but still withdrew their salary, as they worked in private facilities. In Angola, in the 1990's, doctors could earn the equivalent of their weekly salary in one hour of private work.

Health workers often command two-thirds of health budgets, making the workforce a significant investment in healthcare.[2] Wage freezes have shifted the allocation of resources to allowances and nonfinancial incentives.[2] Salaries for health workers have fallen significantly in the past few decades. In 1998, a civil servant's wage in Tanzania was 70% of that in 1969. In Jordan, allowances make up 70% of the base salary because of the wage freeze in 1988. Low wages can impact health workers employment decisions, forcing workers to choose between lucrative private positions in urban settings over public facilities in low resource areas or to consider posts in areas where secondary employment opportunities are available.[2,3,14]

A review determined that, in the short term, higher wages have at least two effects on the labor supply of qualified nurses: first, qualified nurses who are working in other occupations may return to nursing activities; second, nurses in practice now may respond by working more hours. In the long run, potentially, higher wages in nursing, relative to other occupations, make nursing an attractive profession resulting in more recruitment of people in to nursing training programs. [13] In the worst case scenario, low wages can drive health workers to illegal behavior, pilfering drugs, demanding illegal payments for services, or directing patients away from public facilities towards private facilities.[2,39]

Health workers should be reasonably paid for the work they do.[1] There are three aspects of remuneration that impact health worker behavior: the level and regularity of pay, the way people are paid and other incentives.[1,40] Delayed payment, in any form, for services rendered is demoralizing and can not only lead to dissatisfaction with the facility and patients but also to illegal behavior, such as raising prices of medication and seeking additional employment in private facilities. A 2008 study by EQUINET surveyed 12 health facilities, a mixture of private and public, health workers in Kenya found that the number

one reason health workers were unhappy was shortage of staff, followed by inadequate income.[41] When it comes to other incentives, workers in the public sector often feel that the process of professional advancement and personal opportunities are limited, which also impact level of payment.[20]

Harmonization of incentives policies across all priority health programs and inclusion of all staff at facility and other levels of the system can reduce demotivation and perceived unfairness. Many health programs receive funds to offer special incentives, such as additional pay; however, these payments can be demotivating for staff who work side by side with those receiving additional income, as is usually the case with nurses and doctors.[1] The incentives offered in Kenya from 2004-2007 encompassed financial incentives and non-financial incentives, but there was not harmonization across staffing. Non-practicing allowances and transport/commuter allowances were offered only to doctors and dentists.[42]

Financial incentives have several advantages. Unlike initiatives using non-financial incentives, financially based programs provide legally enforceable commitments to work in underserved areas and are well received by health professionals (unlike compulsory service.) Financial incentives alone have a limited impact in that they will not improve the working and living conditions in underserved areas (unlike non-financial incentives), which remain important factors in retention. Also, while the main reason health workers pursue dual practice in the health sector is to supplement their income, non-financial incentives such as status and recognition, strategic influence, control over work, and professional opportunities have also been identified as contributory factors.[39]

Financial incentives often attract workers that do not possess a long-term interest in rural health or remote employment. If nurses are recruited to rural positions by pay alone

and do not become invested in their host communities and facilities, this could lead to turn over as workers leave for more lucrative position.[43] However, it was noted in a study in Tanzania that non-financial motivators did not have an effect until financial motivators are satisfied, designating salary improvements as a perquisite for motivation.[19]

Non-Financial Incentives

Non financial incentives can be motivating, if not more motivating than financial incentives, and do not generate as much conflict, suspicion, or frustration.[25] Workplace incentives are often considered the infrastructure and resources necessary for a health worker to fulfill their responsibilities as providers. In facilities that lack clean water, lighting, vehicles, drugs and equipment, it is difficult to assess health worker performance and satisfaction when the tools required to successfully deliver health services are absent.[34,40] While the initial costs for facility upgrades will be incurred, the resulting benefit of health worker retention may be multiplicative, as many cadres interact and benefit from improved facilities[1-2] Many studies, including one in Uganda, report improvements in health facilities as a major incentive factor for retention, especially the availability of equipment and drugs.[34] Ill-equipped health facilities, which prevent health workers from performing their professional responsibilities and fulfilling their professional conscience, demotivate and frustrate health workers.[20] At Nairobi hospital, it is perceived that nurses are retained longer due to better working conditions than nurses in rural facilities.[42]

Professional isolation, heavy workloads, burnout, insufficient teamwork and occupational hazards can all serve to demotivate and demoralize health workers.[40] Health workers have responded to non-financial incentives that could be classified under good team management or leadership[44]. Top-down approaches, reproach for mistakes, and irregularity of supervision all contribute to poor motivation.[20] In Zambia, all categories of

health staff identified poor management of human resources as an issues, including dealing appropriately with issues of leave, accommodation, and communication.[25] In contrast, recognizing progress and good work, listening to staff, increasing staff participation in facility decision-making, creating opportunities for promotion and offering incentives that are fair and unbiased foster a motivating work environment.[1,20] In a study of health professionals in Kenya, respondents strongly referred to their personal professional values as a determinant of motivation in the workplace. Healing patients, professional satisfaction and recognition were considered important. These aspects nurture personal health workers' goals and values.[20] While health workers wanted better salaries and living conditions, what was most dominant in discussion was the need for resources and materials to carry out their work in a professional way.

Living conditions for family and children were also cited a source of concern. While health workers are concerned about 'being forgotten' professionally in a rural post, access to education for children and appropriate living standards (e.g. potable water) for their family remained important factors for health professionals.[3,17]

Development of New Policies

The development of new policies requires several actions. First is the engagement of multiple stakeholders, such as training institutions and universities, health and educational ministries, civil service, professional associations, nongovernmental organizations and others. The second is harmonizing multiple interests of employers and employees. Achieving good health may be one objective of workforce development; however, the needs of the health organizations and the workforce must be met in order to sustain action. This includes ensuring job creation for health workers in the public and private sectors; professionals can seek competitive compensation, good working conditions and career

development; regulatory and governmental organizations can advance national health goals, accreditation and certification functions of professional bodies. Third is the development of a long-term plan, as the health workforce cannot be developed in a short period of time. This requires sustained investment beyond electoral cycles and immediate political gains.[28]

A review of health worker retention strategies found that strategies are often not aligned with factors health workers' prioritize when choosing an employment location.[45] Interventions must respond to the factors that health workers care about in determining their location.[45] There is an emerging body of research that utilizes discrete choice experiments (DCEs) and qualitative interviews to elicit health worker preferences and inform policy makers. DCEs involve asking respondents to state their preference between hypothetical alternatives where each alternative is described as a combination of incentives. It is a quantitative method that determines the relative importance workers place on different employment incentives to predict health worker decision-making.[34]

In Uganda where 50% of public sector positions are vacant, a DCE was utilized to determine health worker preferences for posting. Ninety percent of nursing officers reported preferring a post with an increase of 122% in salary, improvements to health facility quality, and improved support from managers.[34] Most studies emphasize the need for improved, competitive salaries to promote health worker retention.[40] DCEs can be tailored to help policy makers choose more effective interventions that are appropriate to the implementing environment to address staff shortages and workforce maldistribution.[46] While DCEs can be useful, it is important to note that it is a measure of motivation or intent, not actual behavior, an important distinction. A key limitation to DCEs is that health worker intent, not health worker behavior, is actually measured. While ideally the DCE will produce an attractive package that will draw nurses to rural and underserved areas, it does not

measure whether the package will actually encourage recruitment and retention of nurses to these areas. In addition DCEs often have a forced choice design, with only two options to choose from, which may not be completely realistic because respondents cannot reject both options or propose alternatives.[47] A randomized control trial, where a comparison can be made between a group of nurses receiving incentives and a control group is needed to determine whether any incentive package actually produces a difference in retention.

Addressing dual, or multiple, practice should be a priority, as the practice of dual employment is not linked to an increased access to medical care.[14] Policies that prohibit dual practice are unlikely to work if salary scales remain insufficient. Where it is difficult to keep staff performing adequately, despite low wages and poor working conditions, those who are supposed to enforce public sector work are usually in the same situation as those seeking dual employment.[14] Governments need to recognize that individual coping strategies, such as dual practice, are symptoms of larger organizational problems.[14]

The potential benefits of combined incentive packages are strongly associated with improvements with health worker performance. Even with an increase in the number of health workers, the supply of workers will always be limited and policy makers will need to make the best of those limited resources. Improvements in health worker performance are likely to have an effect sooner than investments to expand the size of the health workforce. Improvements to health worker performance are associated with better motivation which could result in better retention of existing workers and increased recruitment of new workers.[1]

Examples of Novel Programs

Zambia instituted the Zambian Health Workers Retention Scheme for health professionals to improve retention of health workers in underserved areas. The program

provides doctors in underserved areas with a financial incentive (i.e. hardship allowance), school fees for children, loan opportunities for cars or a house, and assistance with post-graduate training at the end of the three-year contract. Funds for renovation of government housing are included. At the midterm review, some moderate progress was seen in recruitment of health professionals to rural areas, where 68 doctors were attracted to the scheme, which represents a significant increase. During the midterm review, 20 doctors participating in the scheme were interviewed and the majority of doctors indicated that without the incentives they would not have come to the district where they were working. However, this retention scheme targeted only doctors and currently expansion to other cadres is not feasible due to the larger numbers of health professionals in other cadres.[37]

While Zambia's program targeted only doctors, Kenya, in partnership with key stakeholders implemented a program targeting nurses. The Emergency Hire Program, enacted to address the inequitable distribution of nurses between urban and rural posts, hired about 1,800 nurses whose salaries were paid by donors during the contract period. Upon fulfillment of their contract, nurses had the opportunity to be absorbed into the civil service. Recruitment focused on geographic areas with staff shortages and aimed to deploy nurses in their home provinces with the expectation that nurses would be less likely to transfer.[48] The program benefitted several regions, notably Northeastern, where the nurse to population ratio increased by 37% and allowed the number of functioning health facilities to increase by 29%. As contract cohorts have been absorbed, follow up and evaluation will be needed to assess retention and sustainability.[49]

Limitations of Current Research

A review of recruitment and retention strategies by Carmen Dolea found that there were no randomized control studies analyzing the effect of retention interventions in rural

and remote areas.[45] Studies consisted of longitudinal, retrospective cohort, before and after and only found one study, which used a control group. Also while the majority of interventions were evaluated using quantitative and qualitative methods to describe the complexity of results, many studies relied on surveys and questions, which did not account for design, biases, and sampling. The reported outcomes had great variability with respect to retention with some studies considering retention rates as the number or proportion of health workers remaining in the area, while others provided more comprehensive measures that accounted for the number of health workers as well as the duration of their stay.[45]

Conclusion

Maldistribution of health workers will continue to result in workforce shortages in underserved and remote areas as the workforce migrates to more desirable positions in urban and resource rich communities. Attracting and retaining a workforce in these communities, by addressing concerns of financial pay, workplace resources and environment, and professional development, is essential to achieving a balanced workforce strategy. As populations increase and health systems advance, the demand for high quality of care and health professionals is likely to exceed the rate of supply of health professionals.[50]

The literature reviewed demonstrates that incentive packages need to be tailored to the context in which health workers are living. Individual characteristics, financial incentives, non-financial incentives, and compulsion practices are important to developing adequate incentive programs to recruit and retain health workers. Measuring health workers' motivation is especially important in terms of service delivery. There is a small but growing number of qualitative studies examining health workers motivation in developing

countries, which seem to indicate the limitations of financial incentives on motivation and emphasize the importance non-financial incentives.[20] A review of health worker motivation and retention in developing countries found that incentives needed to be country specific, including financial incentives and non-financial incentives, such as career development and management issues.[51] In addition to financial incentives, recognition of services, adequate resources and suitable infrastructure can motivate health workers and improve morale significantly.[51,17] The review also demonstrates that policy makers should consider bundling incentives to address multiple factors at once (e.g. living conditions, financial incentives, and promotion opportunities).[20]

There is no singular solution to the issue of recruitment and retention of healthcare workers in rural areas. It is only through identifying the multiple factors that influence health worker decisions, learning about what works in terms of fit between problem analysis and strategy and effective navigation of the politics of implementation that any headway will be made against the challenge of staffing health service in remote rural areas.

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Methods

This is a mixed methods study composed of secondary data analysis of a national nursing data set from a Kenyan human resources for health information system and qualitative analysis of in-depth interviews with nurses employed in district hospitals in Kenya. The Emory Institutional Review Board approved this study.

I. Quantitative Analysis

Dataset

The quantitative data used in this analysis consisted of deidentified nursing data from the Kenya Health Workforce Information System (KHWIS) and the Regulatory Human Resources Information System (rHRIS), developed through a collaboration between the Lillian Carter Center for Global Health and Social Responsibility at Emory University's Nell Hodgson Woodruff School of Nursing, the Centers for Disease Control and Prevention, the Nursing Council of Kenya (NCK) and the Department of Nursing, Ministry of Medical Services (MOMS). The nursing information system consists of a database housing regulatory information, the rHRIS, managed by the NCK, linked to a database housing deployment information, the KHWIS, managed by the Department of Nursing, MOMS.

While KHWIS has a goal of collecting data on all nurses working in Kenya, reporting of public sector nurses is mandatory and therefore more complete. Reporting on nurses in private, faith-based and non-government facilities is voluntary and many do not report. Due to the incomplete reporting, this analysis

only examines nursing data from the public sector, which provides an estimated 50% of healthcare in Kenya.[1]

The project data analyst, using STATA 10, conducted the data analysis in collaboration with the student and study team members. The overall description of the public sector nursing workforce was examined utilizing the de-identified data provided by the NCK and MOMS. The two data sets were merged using the index number assigned to nurses at the commencement of nursing education, which follows a nurse through their career and serves as a unique identifier for both data sets. Merging the two datasets allowed deployment data from MOMS to be linked to demographic and training data provided by NCK.

Study Population

To examine nurse distribution in the public sector, only nurses employed in the public sector in 2012 and assigned to health facilities that provide the bulk of direct patient care (i.e. dispensaries, health centers and hospitals) were included (Figure 1.1). Of the 48, 235 nurses registered with the NCK, the Ministry of Medical Services reported through the KHWIS that 20, 460 nurses were deployed. From this subset of deployed nurses, 1,842nurses were excluded that were deployed through NGOs, faith based organizations and private organizations. The remaining 18,612 nurses were deployed exclusively in the public sector. To further narrow the study population, nurses working in Kenya's two large tertiary care centers were also excluded (2,238), since this could skew the results of nurse distribution in those counties where these facilities are located. We excluded 641 public sector nurses who worked in facilities such as sub-district hospitals, health clinics, mobile units,

and voluntary counseling centers, as well as in MOH offices. This exclusion was due to the limited number of nurses deployed in these facilities and differences in roles and responsibilities due to program specialties or managerial duties. In the remaining study population, 169 observations were missing information on sector of deployment and excluded from the study as well. The final number of nurses in the study population was 15,570 (Figure 1.1).

Among nurses working in the public sector, there are three cadres of nurses: enrolled, registered, and Bachelor of Science in Nursing (BScN). This study included all three cadres. Nurses with a BScN represented the highest level of nursing education in the study population. Registered nurses receive a post-secondary diploma after completing clinical training and leadership courses. Enrolled nurses are certified entry-level nurses.

Age, gender, county of origin, and educational cadre data were provided by the NCK's HRIS. County of origin was the county of residence, as reported by nurses when they were first entered into the rHRIS at the NCK as students. Data on duration and county of employment was provided by the KHWIS from MOMS. Duration of employment was calculated by subtracting the date of first employment from the date of analysis. Age and duration of employment were reported as means and also categorized into 5-year intervals.

County Designation

The geographic monitoring area included all 47 counties. Previously, Kenya was divided into 8 recognized provinces. After the general election in March 2013, 47 county governments replaced provincial government administration systems.

The Kenya County Fact Sheets published by the Kenya Commission on Revenue Allocation (CRA) provided key information on the demographic, socioeconomic and administrative characteristics of each county.[2] These fact sheets provided information on the concentration of urban inhabitants, which allowed counties' health facilities to be defined as urban, peri-urban, and rural. Counties where more than 50% of the population lives in urban areas were defined as urban counties. Counties where 20%-50% of the population lives in urban areas were defined as peri-urban. Counties where less than 20% of the population lives in urban areas were defined as rural. Five counties were defined as urban, seventeen as peri-urban and twenty-five as rural.

The CRA was used to assign county classifications to each county. County classification data was entered into Microsoft Excel. Data from the STATA analysis on each county was also entered into Microsoft Excel and combined with the county classification data for comparative analysis.

Descriptive Analysis

Univariate descriptive statistics were conducted to summarize overall demographic characteristics of the study population, including the county of origin, county of deployment, educational cadre, gender, age, deployment by facility type and duration of employment.

Nurse to population ratios were calculated for each county to examine the main research question about equitable distribution of nurses in Kenya. The nurse to population county ratios were calculated by dividing the number of nurses in each county by the county population data provided by the CRA and then

multiplying the result by 1,000 to get the nurse to population ratio per 1,000. Differences among the nurse to county population ratios were used to determine and identify inequalities in distribution, which could then be examined during the comparative analysis.

Comparative Analysis

Based on the literature, we expected to find disparities in nurse distribution with rural and hard to reach areas being underserved. To better understand factors that might be associated with maldistribution, we sought to compare the characteristics between nurses serving in rural/remote areas with those in more urban areas. We performed two comparative analyses. Initial analysis compared nurses by deployment to hospitals, health centers, and dispensaries to examine possible differences in nurses being deployed by health facility type. In general, dispensaries serve a more rural population compared with health centers and hospitals. The associations between deployment by facility type and education cadre, duration of employment, age, county of origin and gender were analyzed using chi-square for categorical data and ANOVA for discrete data.

The second comparative analysis compared nurses by county classification (urban, peri-urban, and rural). The association between county classification and age, cadre, gender, county of origin and duration of employment was analyzed utilizing bivariate analyses such as chi-square and ANOVA to examine significance. The strength of the association was measured using effect size.

II. Qualitative Methods

Qualitative data were collected through in-depth interviews with a total of 17 deployed public sector nurses. The interview guide was structured to examine nurses' motivation to enter the profession, workplace satisfaction, and perceptions of retention incentive schemes. The in-depth interview guide was revised under the advisement of the project director who is a Kenyan nurse and former Chief Nursing Officer with a bachelor's degree in nursing, which allowed the questions to include nurse specific vocabulary and phrases.

After receiving approval from MOMS to conduct interviews in public sector health facilities, three district hospitals in three counties (Kisumu, Kakamega, and Kaijaido) were selected for interviews based on the feasibility of access and security for the interviewer. There were five interviews at each of two sites and four interviews completed at one site. An additional three interviews were conducted with nurses from Northeastern Province while they were attending a meeting in Nairobi. Access to healthcare is a particular problem within Northeastern province due to the lower number of providers and sparse and remotely located population. Travel to Northeastern Province was not feasible due to security concerns.

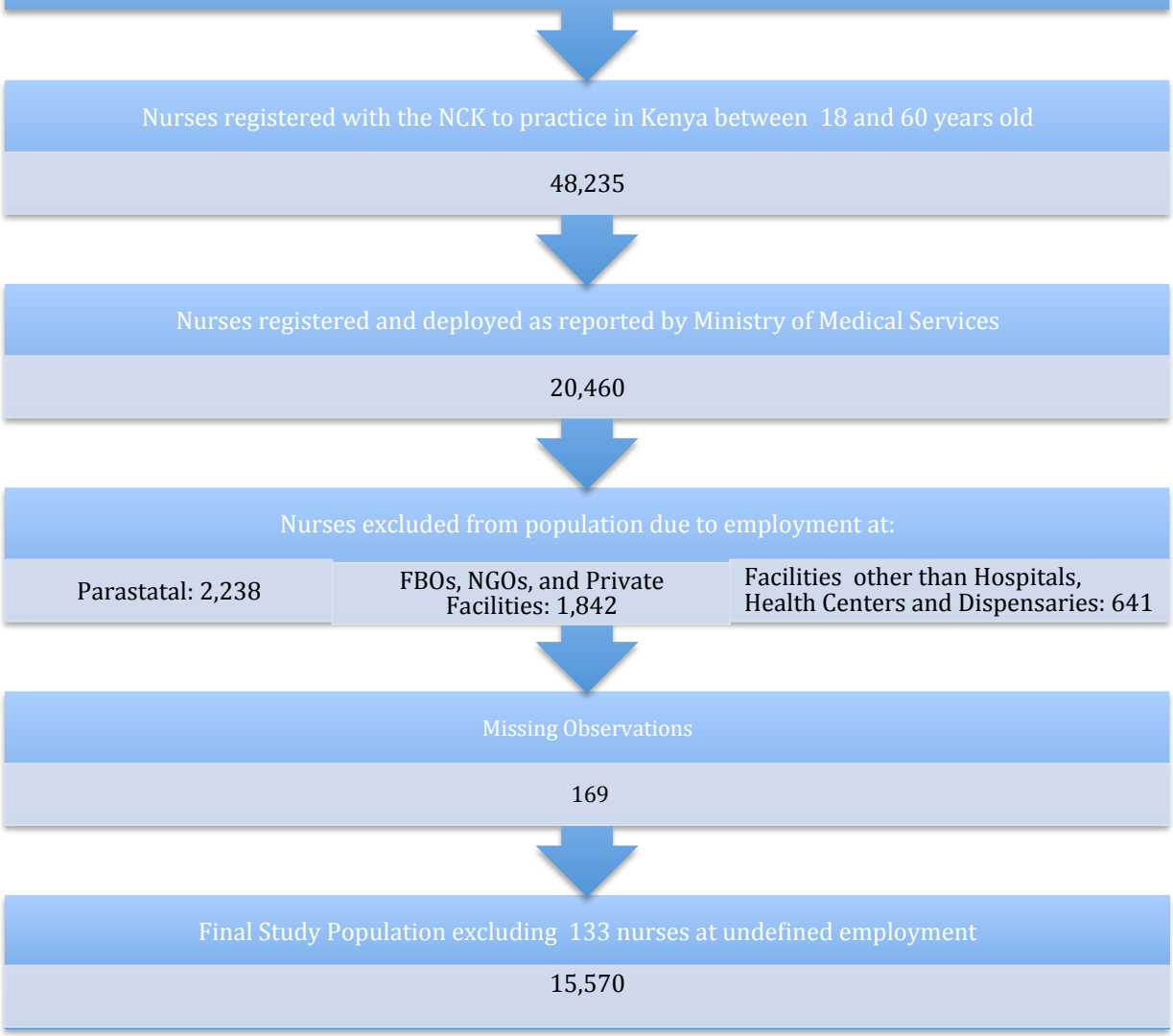
Before conducting interviews, the nurse in charge of each facility was informed of the study purpose and requirements. Following permission from the nurse in charge to conduct the interviews, the interviewer was given a private room to conduct interviews. The nurse in charge selected nurses to participate in the interview.

Prior to the recording of each interview, each nurse was given the consent form and verbally consented to participate in the study. Upon completion of

interviews, nurses were given a copy of the consent form, for their records. Only one nurse declined to be interviewed, which allowed for the sample size to be larger than expected at 17.

Completed interviews were transcribed using ExpressScribe2, a free software program for transcription. The transcriptions were coded using MAXqda 10, a qualitative analysis software tool, available through Emory University. Quotes described in the qualitative section are corrected for grammar and readability.

Figure 1.1. Final Study Population Exclusion Criteria



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Results

Public Sector Nursing Workforce

Overall, 21% of the 15,570 public sector nurses are deployed in dispensaries, 14% in health centers, and 65% in hospitals. Women and men compromise 77% and 23% of the workforce respectively. The age distribution of nurses is skewed, given that nurses between the ages of 46 and 60 years of age account for 45.96% of the study population (Figure 2.1). Less than 6% of nursing workforce is below the age of 30. The mean and median age of the nurses is 44 years old with a range of 23 to 60 years in age (Table 2.1), which is the age of government-mandated retirement. The mean duration of employment of nurses is 18years with a range of 1-40 years of service (Table 2.2). Over 58% of nurses in the public sector have between 16 and 35 years of service (Figure 2.2). In the study population, 52.0% are registered nurses (diploma), 47.0% are enrolled nurses (certificate) and 1% are nurses with a bachelors of science in nursing (BSN).

Geographic Distribution

Using county categorization provided by the Kenya Commission on Revenue Allocation, 25, 5, and 17 counties were designated as rural, urban and peri-urban respectively, totaling 47 counties (Figure 2.3). Of the 15,570 nurses, 21.1% are deployed to urban counties, 34.7% to peri-urban counties, and 44.2% of nurses are deployed in rural counties (Figure 2.4). Table 2.3 shows deployment distribution of nurses by county grouped by their county classification. Nairobi (urban), Kiambu (urban), Nakuru (peri-urban), Nyeri (peri-urban) and Meru (rural) counties contain the highest percentages of nurses with 25% of all public sector nurses. Marsabit

(peri-urban), Sambura (rural), Tana River (rural), Turkana (rural), Wajir (rural), Lamu (peri-urban) and Mandera (rural) contain the lowest percentage of public sector nurses at less than 1% each.

Nursing Workforce Characteristics by Type of Health Facility Deployment

Hospitals employ 64.4% of the nursing workforce while health centers and dispensaries have 13.9% and 21.8% respectively (Table 2.4). Among the 3 facility types, hospitals contain the greatest proportion of registered and bachelor degree nurses, representing 58.3% of all hospital nurses. The proportion of enrolled nurses in hospitals is 41.68%(Table 2.4). Comparatively, nurses at health centers are almost equally split between enrolled and registered nurses (49.44% RN, 50.00% EN, and 0.56% BSN). Dispensaries are heavily staffed with enrolled nurses (62.39% EN, 37.36%RN, and 0.24% BSN). There was a small to medium effect size in the cadre analysis (0.17). Nurses deployed at hospitals are somewhat older than those at HCs and dispensaries, with a mean age of 45 years compared with 43 years and 42 years respectively for health centers and dispensaries (p=0.0001.) Nurses working in hospitals also have a longer duration of employment (mean = 19.20 years) than those working in health centers (mean=16.81and dispensaries (mean=14.88) (p=<0.0001.) The effect size for duration of employment was small at 0.121. Regardless of facility type the majority of nurses in each facility are from rural counties, followed by nurses from peri-urban counties. Nurses from rural counties make up a greater proportion of nurses deployed to dispensaries compared to health centers and hospitals. Nurses from urban counties make up the

smallest proportion of nurses in all facilities (Table 2.4). There was a small to medium effect size in the county of origin analysis (0.194).

Characteristics of the Nursing Workforce by Urban, Peri-Urban, Rural Deployment

The overall public sector nurse to population ratio for Kenya was 0.36 per 1000 people (Table 2.5). Interestingly, the nurse to population ratio was higher in rural (0.38/1000) and peri-urban (0.42/1000) when compared with urban (0.26/1000) ($p = 0.0001$)(Table 2.5). The nurse to population ratio within rural counties varied widely from as low as 0.07 in Mandera County to as high as 0.93 in Embu county (Figure 2.5). The highest nurse to population ratio (1.14 per 1000) was not observed in urban counties or rural counties but in Isiolo, a peri-urban county. Similar wide variations were observed within the three county types (Figure 2.5).

Nurses deployed to rural counties are significantly younger (mean age = 43.63) than those deployed to urban counties (mean age = 44.31) and peri-urban (mean age =43.51) ($p<0001$) (Figure 2.6). Of all entry-level nurses between the ages of 21-25 years old, 60.98% of them work in rural counties. Nurses deployed to rural counties are more likely to be male (25.8%) compared with peri-urban (21.4%) and urban (14.7%) ($p=<0.0001$)(Table 2.6). The categorical age analysis had a very small effect size of 0.080.

Nurses deployed to rural counties are more likely to be enrolled nurses (501.7%) than registered nurses when compared with urban and peri-urban counties at 37.72% and 48.68%, respectively ($p<0.0001$)(Table 2.6). The effect size is small at 0.101.

Nurses deployed to rural counties have a significantly shorter duration of employment (mean =17.11) when compared to nurses deployed in urban (mean =18.97) and peri-urban counties (mean=18.37), (p= <0.0001) (Table 2.6). 34.61% of the rural workforce has 10 years or less of employment in the public sector compared to 24.61% of the urban workforce and 29.14% of the peri-urban workforce. Compared to urban counties, rural counties have a greater proportion of nurses employed for 1-5 and 6-10 years. A greater proportion of urban nurses have between 16 and 30 years of employment (54.35) compared to rural nurses (41.14). The difference in duration of employment was significant by county of classification. The effect size of this analysis was small at 0.105.

When deployment of nurses was examined by county of origin, 60% of nurses deployed to rural counties were from rural counties while only 28.8% of rural origin nurses were deployed to urban counties (p<0.0001). 51.1% of nurses deployed to urban counties and 12% of nurses deployed to rural counties were from urban counties (Table 2.6). Analysis of nurses by county of origin revealed that seven counties, Kiambu (urban), Machakos (urban), Nairobi (urban), Kisii (peri-urban), Nyeri (peri-urban), Kakamega (rural), and Meru (rural), collectively represented over 37% of the total public nursing workforce. Nineteen peri-urban and rural counties produced less than 1 percent of the total nursing population.

Qualitative Themes

The qualitative data provided information on nurses' motivation to enter the profession, as well as their perceptions associated with rural and urban posts.

Nurses provided information on the work environment and financial allowances related to rural and hardship deployment, as well as the design of future incentive packages to retain nurses in these areas.

Motivation

Overall nurses had one of three responses to explain their motivation to be a nurse: influence of family members or friends in the medical field, admiration of health providers and personal experiences with health care hardships. Within these three responses, the most common personal observations by participants were the healthcare needs in their communities and nurses 'ability to address those needs.

"There [were] a lot of problems in terms of managing medical conditions in the community in [a] nomadic setting…so in a sense, that gives me the encouragement to…take care of the community."

"I would go to the hospital and would see nurses in white hats helping people….I wanted to be like them, to wear a white cap and help."

"My family has many people in health…my brother and sister are nurses…"

Rural versus Urban Health Posts

There were common and distinct factors nurses associated with rural and urban posts. Urban posts were perceived as higher paying with the opportunity to pursue higher education and enhance professional development. Interviewees associated urban posts with the availability of universities, training centers and wireless Internet for online classes. In comparison, rural facilities were associated with low pay and poor opportunities for professional development due to lack of training centers, professional isolation and limited electricity for light and Internet.

Underlying this discussion of rural and urban posts was the perception of power over one's professional destiny. In urban centers, nurses felt that you could

"*plan yourself,*" as one put it. The characteristics of urban settings facilitated the pursuit of professional advancement given the convenience of amenities and available resources. In rural sites, nurses were perceived as being at a disadvantage because even though they possessed the desire for professional advancement, they were inhibited due to lack of transport, remoteness and workloads. One nurse commented that it was as if nurses in rural posts "*weren't even in Kenya*." The professional advancement opportunities tied to urban settings also became a source of validation and recognition that nurses thought was lacking in rural settings.

"Everybody is going to school if they are in [an] urban [area]. Whether you do it online or even in classes, at least you can professionally upgrade yourself. But if there is a nurse in another corner of Wajir, there's nothing. So it is, 'Go to the clinic, do work, go back home.' "

Interestingly nurses clearly identified differences between rural posts and remote or hardship posts. While a post could be rural, it might not be hardship. Remote and hardship posts were identified as lacking running water, roads for safe transportation, electricity, schools and food markets. Hardship posts were also identified for their social and professional isolation. A site that was rural may be isolated, but it might have better proximity to roads or have a large market from which to buy food. Hardship posts were affiliated with the idea that it would be a struggle to fulfill their basic needs for food, water and socializing.

The most common advantage attributed to working in a rural health post was the opportunity to develop leadership skills. Due to the limited number of health professionals, the expectations of nurses in rural health posts overall were considered to be much higher than in an urban facility. Rural posts were also thought to provide a more diverse experience and allow the nurse more opportunity

to gain and apply a broad spectrum of skills. In a rural facility, a nurse could be expected to deliver a baby, treat malaria or care for a wound. The requirements of nurses in rural health posts were considered to be more extensive than in urban posts, where responsibility could be delegated throughout the facility.

"When you work in a rural area health facility, you become more responsible because you are the only one or there are two of you and the whole community in that region sees you as the doctors, not the nurse, and whether there is a snake bite, whether [there] is [a] delivery, whether it is malaria, it is you alone…"

Control over their career and future was an important theme during the discussion of rural and urban settings. Even though nurses felt they had more control in an urban setting, they still felt there were opportunities for professional growth in rural posts. The concept of professional development in rural posts was not focused on schooling, but linked to extensive practical experience, while urban professional development was tied to formal classes and workshops. Nurses acknowledged that both were necessary to succeed; however, formal training was perceived as the more beneficial for professional advancement.

Work Environment and Challenges

The interview questions on the workplace and satisfaction were structured on the roles and responsibilities of nurses and the resources needed to accomplish those responsibilities. While a few of the nurses acceded that they were satisfied with their position and title within the facility, most found faults in their work environment. The most common theme that emerged related to the work environment was the lack of resources needed to provide care.

"I'm not satisfied because…when you go to attend the patient, there [are] some things you need…but they're not available..."

"With the help of partners and MOH, at least every 6 months you get supplies, but you know some of the areas where we live the water is too salty [and] so they are contaminating instruments…"

In every facility nurses commented that the operating theatre lacked key instruments, which prevented the utilization of the surgical services, which were supposed to be available in hospitals. In two health facilities, nurses also commented that the doctors assigned to the facilities left for long periods of time to work in other facilities due to the lack of working equipment in the operating theatres. This is likely a common problem throughout Kenya regardless of facility type, but in rural areas where there are less providers to fill the care gaps, the lack of surgical services could have more severe consequences. Nurses also noted the limited space within health facilities, which caused crowding. One nurse said that even if there was space available, the shortage of nurses confined patients to certain areas of the hospital so that nurses could adequately care for patients, reiterating the theme that lack of resources prevented nurses from fulfilling the requirements of their position, which damaged their credibility in the eyes of the public.

"In facilities, there are things you may want to have and you don't have them…the patient…[and] the community, they don't understand [why services and materials are lacking].

Hardships were also experienced as a result of the community perceptions. The lack of trust from the community, combined with poor understanding of treatments and the roles of doctors and nurses, also contributed to low morale of nurses who were saddled with the burden of providing care in the absence of doctors. Some nurses cited different cultural values or language challenges, which prevented them from communicating easily with patients. A few of the women

mentioned that they felt unwelcome in the community because of their gender and role in the workplace, which was not culturally acceptable in the eyes of the community. They also felt that their health facilities were sensitive to the machinations of local and national politics, which frequently made promises of health facilities and services for which nurses were later held responsible for upholding.

Hardship Allowances

In all 17 interviews, discussion on the available incentives seemed the most difficult to discuss. Kenya has instituted hardship allowances, but the criteria for receiving hardship allowances was unknown among nurses, suggesting that dissemination of information on hardship allowances was insufficient to create enough awareness and interest in hardship posts. One nurse recalled that during her current posting, she had received hardship allowances within the last five years, but the allowances had abruptly stopped without explanation and had not resumed. Nurses from the Northeastern Province commented on receiving hardship allowances, but firmly stated that the allowances were not enough to encourage nurses to work in hardship posts.

"*It's not even enough for one bus ticket. So if they make it something which is attractive, that would attract more nurses*."

The nurses noted allowances needed to be increased in order to attract nurses and address the challenges of working in hardship areas. Almost all the nurses initially confused the hardship allowance with the risk allowance, which is given to nurses in order to buy personal protective equipment, or the newly

instituted extraneous allowance, which gives the same amount of money to every nurse regardless of post. The extraneous allowance, while confused with the hardship allowance, appears to be a bonus for working as a nurse in government health facilities and is awarded on top of normal salaries.

The hardship allowance has not changed in the last 30 years, which supports the nurses' comments that it is no longer an effective incentive for attracting nurses to hardship posts because it does not address the new challenges and costs of remote living.[3] The hardship allowance, in the past, may have been enough because it reflected the market value for health workers and standard of living. However, the consensus among all the interviewees is that the current hardship allowance is not an incentive as it is currently designed.

Future Incentives

Overall, the most common theme in discussions on future incentives was pay. The literature also notes the importance of non-financial incentives, but highlights that health workers' monetary expectations must be met first.[2] Nurses commented multiple times on the differences in pay for nurses in urban areas and rural areas, resulting from the higher cost of living in urban areas. However the nursing salary was not the common point of discussion when it came to payment, it was the housing allowance. Nurses said that because the cost of living is higher in urban areas, the housing allowance was required to be significantly higher than housing allowances for rural areas (or at least that was the common perception). While the cost of living was lower in rural areas, nurses stated that the multitude of available affordable housing in urban areas allows nurses to pocket a portion of the housing

allowance, while nurses in rural areas were required to spend all the housing allowance in order to maintain a suitable standard of living. One nurse even commented that some nurses assigned to rural or hardship posts experience great difficulty finding housing.

"Some of them even live in the village with the villagers. Sometimes what they do is they use one of the three rooms [of the health facility], one room for use as their house..."

Assistance in pursuing professional development and promotions was second among recommendations for future incentives. Nurses cited difficulty in travel to apply for promotions, bureaucratic procedures, which could take months to years to process and limited communication about promotion opportunities. Some nurses said it had taken up three years to receive a promotion and one nurse who had achieved a Masters of Public Health, reported that she had yet to be promoted for it and was still being paid at the same level as a registered nurse.

"It's not…like the doctors where it's [promotion] automatic if they finish one year, but for nurses you have to come yourself to Afya House [Ministry of Health] for promotion."

As stated earlier, professional development was considered easier in urban settings by all nurses due to ease of access to training facilities and Internet. Nurses in rural areas, limited by electricity and transport, are often required to take time off in order to pursue professional development, which resulted in loss of pay. Nurses agreed that if the government could offer some form of sponsorship to partially cover the costs of class, transport, or loss of wages, nurses in remote and understaffed facilities would have an easier time pursuing the same opportunities as those in urban posts.

"So at least if they [the government] gave some sponsor [ship], even half or a little, it will be something to boost morale..."

During one of the final interviews, one nurse in particular gave an understanding and diplomatic answer, which recognized the challenges the government of Kenya faces, including increases in population, the number of health facilities and the need for health workers without an increased budget.

"Before…our hardship allowance was small but now there was that plan that all hardship will be 10,000 [KSh], but it has not been implemented so far. Now the extraneous allowance…is giving the nurses hope that the government is also willing to give but you know [the] magnitude [of] the numbers. You see, the facilities are increasing day by day, the [number of] nurses is increasing but the budget from the top…is not increasing.

The nurse recognized that the government had limited resources to work with and was trying to support health workers with their limited resources but also recognized that until monetary resources are allocated in the health budget, the changes will not be sustainable or permanent.

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Discussion

The shortage and maldistribution of healthcare providers are direct threats to the success of health programs aimed at improving immunization coverage and maternal and child health to meet the Millennium Development Goals.[2]The purpose of this study was to examine inequalities in distribution of nurses and nurse characteristics related to deployment in rural, peri-urban and urban counties and by facility type (hospitals, health centers, and dispensaries). Understanding the dynamics related to nurse distribution is useful in managing the nursing workforce and developing policies to support improved distribution of providers. As the Government of Kenya is in the process of decentralizing health facility management from provincial governments to county governments, this is especially important to help inform future policies concerning management and distribution of human resources.

Maldistribution

As with many African countries, the results from this study indicate there is a shortage of nurses. We found that Kenya has 0.36 public sector nurses per 1000 people. Even though this study only included nurses in the public sector and did not include other providers, the nurse to population ratio is low considering that they are the bulk of the health providers. **Error! Bookmark not defined.** Even when the total workforce is considered, a USAID health assessment from 2010 found that Kenya has a provider to population ratio of 1.69 per 1000.[1] . The Joint Learning Initiative suggests that countries with less than 2.5 providers per 1000 fail to achieve 80% coverage for birth-delivery assistance and measles vaccinations and WHO recommends a standard of 2.3 health workers per 1000 as the basic provider to population ratio.[2] Overall in Kenya the nurse to

population ratio is higher than the doctor to population, indicating that nurses are the most widespread and available health providers.[3]

The study expected to find lower nurse to population ratios in rural counties than in urban counties as suggested by studies from Ghana and Bangladesh, which demonstrated that urban areas contain the largest proportions of health workers to the population.[1,2] While we found wide variability in the nurse to population ratios among the counties, the overall ratio for rural counties combined was greater than that for urban counties. Twenty-five rural counties have nurse to population ratios greater than Nairobi (0.14), even though Nairobi has 5.43% of the total public sector nurses, the second highest percentage of nurses after Nakuru County. Isiolo County, a peri-urban county has the highest ratio at 1.14 nurses per 1000 people. However the lowest ratios were observed in rural counties, like Mandera County with 0.07 nurses per 1000 people. Since this study focused only on public sector nurses, this difference could be due to the high percentage of private facilities in Nairobi and other urban areas, which employ nurses that were not in the study population. For profit facilities make up 38 percent of the private sector dispensaries, health centers and hospitals[1]. The for-profit facilities are concentrated largely in Nairobi, Kisumu, and Mombasa.[1]

Although the overall nurse to population ratio in rural counties was not lower compared with urban counties, certain rural areas, especially those formerly within the provinces of Western and Northeastern have considerably lower nurse to population ratios. Turkana, Mandera, and Wajir had the lowest nurse to population ratios of all the counties, not exceeding 0.14 per 1000. Most of the ratios for counties located along

Kenya's borders were also lower than those in the interior (such as Migori, Narok, Kisii, and Garissa). Similar geographic inequalities have been observed in other countries as well. A district-level study in Tanzania found that health worker distribution favored wealthier urban districts over poor rural districts even after removal of higher-level facilities found in urban districts.[4] In Brazil in 1995, the number of physicians per 1000 population by region varied from 0.52 and 0.66 in the poorer regions of the north and the northeast to 1.75 and 2.05, in the richer southeastern states of São Paulo and Rio de Janeiro.[5] Bangladeshi metropolitan areas contain 35% of doctors and 30% of nurses in the public sector, as well as the majority of private sector providers since there a virtually no private sector facilities outside the metropolitan area.[6]

Nursing Characteristics

There were distinct individual differences between nurses deployed to rural, peri-urban, and urban counties. Nurses deployed to dispensaries and in rural counties are younger in comparison to nurses deployed in health centers, hospitals and peri-urban and urban counties. This age difference most likely accounts for the shorter duration of employment observed in those settings. Younger individuals typically have fewer family responsibilities and are more prepared to move or migrate, and may have been preferentially assigned to fill the less desired posts vacated by more senior personnel. [7]However, this practice also has the potential to place the youngest and least qualified nurses in the precarious position of being the primary care provider for rural areas with the least guidance. However in the interviews, the most common advantage attributed to rural areas was the opportunity to develop leadership skills and gain a wide spectrum of skills. With the limited staffing, rural facilities provide ample training ground for young

nurses to learn leadership, as well as gain the skills to provide care for a multitude of medical conditions, but they must be adequately supervised and mentored.

Our study found that rural nurses were more likely to be male compared with peri-urban and urban nurses. Fifty-one percent of male nurses are deployed to rural counties compared with 42% of female nurses. In rural settings men accounted for 25% of the rural nursing workforce, compared with 21.4% and 14.7 of peri-urban and urban workforces. Although our study did not examine reasons for this disparity in posting by gender, reasons might include factors such as safety and wanting to keep married women near their husbands who may work in urban areas. The hardships of living in rural or hardships posts could be considered a challenge appropriate for men. One study in Bangladesh suggests that married women doctors will likely live where their husband's jobs are. This is consistent with results from gender equity studies which suggest that women will move to where their husbands' jobs are located and are less willing to work in rural areas due to hardship and prohibitive culture and social values in communities.[8] This gender differential may have important policy implications especially in conservative areas like Mandera, where culture dictates that women are not allowed to be seen by male doctors, skewing the availability of health care services even more for rural women.

The level of health education of nurses also was an important factor in county deployment. Nurses deployed to rural counties and dispensaries were more likely to be enrolled (certificate) nurses rather than registered nurses or nurses with a bachelor's degree. This observation is likely related to the health services available in each facility. Dispensaries and health centers are intended to provide preventative health care and basic curative care. The available services are less specialized and can be provided by a nurse

with a more general and limited education. As a source of curative care intended for more serious illnesses or injuries, the services of a hospital require personnel with the skills necessary to treat these specific conditions. However training institutions in Kenya have been phasing out certificate programs. Between 1999 and 2010 enrollment in enrolled nursing programs decreased from 42.2% to 6.2%.[9] The decline of enrolled nursing programs would make registered nursing programs the new entry level of nursing. This would increase the qualification and experience of nurses in working in rural areas since the majority of nurses deployed in to these areas are enrolled nurses.

It is possible that rural counties contained a higher proportion of enrolled nurses because of limited ability to seek other employment. One study found that attrition among registered nurses in Kenya in the provincial hospitals, on average, was twice as high as the rate of attrition of enrolled nurses. Resignation accounted for about half of attrition among registered nurses at this level, while the loss of enrolled nurses was almost entirely due to retirement. In contrast, at lower facility levels, registered and enrolled nurses had similar rates of attrition mostly related to retirement.[10] This difference in attrition cause may reflect the higher international mobility and more numerous employment opportunities available to registered nurses, particularly in urban areas where provincial hospitals are located.[10] Urban deployed nurses in this study were found to be older and more likely to have a diploma. It is possible that the advanced qualification also allowed the nurses to better compete for deployment in urban counties. A study in Brazil found that in poor areas, the staff was more likely to be unskilled health workers and the poorest states in Brazil experienced the highest shortage of health workers and had the highest inequalities in distribution of the physicians and nurses.[11]

Nurses of rural origin were also more likely to be deployed to rural counties and dispensaries. Nurses from urban counties make up almost half of deployed nurses in urban counties. Conversely, about 60% of nurses from rural counties are deployed in rural counties. The presence of family members in rural and remote areas increases the probability that an individual will consider these areas for the establishment of his/her practice. Nurses from rural and hardship communities are familiar with community challenges, norms and behaviors, and as such better prepared to address them. In a list of graded recommendations developed by WHO for interventions that identifies factors and policies which made health workers 'stick" in rural areas, the first recommendation acknowledged a compelling body of evidence from high-, middle- and low-income countries that a rural background increases the chance of health graduates returning to practice in rural communities.[2]

Remuneration was a major concern for all nurses. Nurses interviewed in this study reported that rural posts had lower pay, limited opportunities to further professional education, and poor work facilities. This emphasis on remuneration, in particular, seems to constitute the most basic influence on retention of health professionals.[12] Kenya has a hardship allowance for nurses in sites considered hardship. However, nurses reported that it was inconsistent and did not adequately address the challenges of working in their sites. In this study, one nurse reported that nurses at the facility had been receiving hardship allowances 3 to 4 years ago but that it had abruptly stopped without explanation. Another nurse reported that the hardship allowance was not even enough to cover a bus ticket from her worksite to Nairobi to register at the NCK. In Africa, where there were once only a few countries with comprehensive human resource for health policies and plans, several

countries have developed policies.[13] However, even where there is one, funding does not always follow, and issues of retention and remuneration remain unaddressed.[13]

One study found there was a the perception that nurses, as mid-level service providers, require less investment than medical professionals and will tolerate low pay, poor living conditions, and subpar working conditions (conditions associated with rural locations).[18] This perception is completely at odds with the comments of nurses in this study where good pay, working conditions and living conditions were among the most common themes. One nurse said that it was unfair that incentives like dual employment in the public and private sector were offered to doctors but not to nurses, even though nurses are paid less and work in more facilities.

Another study found the main motivating factors for health workers in Vietnam were appreciation by managers, colleagues and the community, a stable job and income and training. The main discouraging factors were related to low salaries and difficult working conditions, making remuneration a possible push and pull factor for nurses.[14] If nurses are to be recruited to rural positions by pay alone, it needs to account for the challenges presented by transportation, communication and living standards in rural areas, or turn over will continue as workers leave for more lucrative position.[43] Nonfinancial incentives can be implemented to improve work conditions; however, it was noted in a study in Tanzania that non-financial motivators did not have an effect until financial motivators are satisfied, designating salary improvements as a perquisite for motivation.[19] Financial incentives should be integrated with other incentives, especially in regards to migration where it was concluded that financial incentives alone would not keep health workers from migrating.[15]

Lack of equipment, supplies and appropriate facilities can deter health professionals from accepting positions in rural and underserved areas. Nurses in this study were unanimous in citing limited resources and poor working conditions as push factors toward urban centers. Not only was it described as a limitation for providing care and fulfilling professional duties, it also served to build community resentment and frustration with health facility staff. One nurse noted, "In facilities, there are things you may want to have and you don't have them…the patient…[and] the community, they don't understand [why services and materials are lacking]." This comment is similar to health worker interviews in Tanzanian primary care units where workers felt like they were 'gambling' with patient health. One woman from the Tanzania study said, "People in the community nowadays know what quality of services they want. They usually ask, 'Why don't I go to the hospital where there are medical officers and working facilities instead of going to the dispensaries where there is no laboratory and facilities?' " This is consistent with responses from nurses in this study who described services that were supposed to be provided (e.g. basic surgery or C-sections), but could not because of missing or broken machines and equipment. In a different study at Nairobi hospital, it was perceived that nurses were retained longer due to better working conditions than nurses in rural facilities.[16] Ill-equipped health facilities, which prevent health workers from performing their professional responsibilities and fulfilling their professional conscience, demotivate and frustrate health workers.[17]

Limited resources not only frustrate health workers but also community members leading to conflict and mistrust between the community and health facilities. Particularly in this study, nurses felt they were held responsible for providing care promised by politicians who then did not deliver resources to fulfill their duties. They disliked being

used for political machinations and were frustrated when the communities did not trust them or blamed them for failings of the health system. Similar findings have been reported from Uganda, where professional identity and recognition by both employer and members of the community were found to be important motivating factors for health staff.[18] The quality of relations with patients and recognition by local community are all the more essential in rural practice since opportunities to develop alternative social networks are limited.[19] While not mentioned frequently in interviews, nurses in our study did comment on the challenges of gaining trust of the community when they felt like strangers.

In this study, nurses reported going several years without promotions or in one case not receiving higher pay despite achieving greater education standards as one nurse with an MPH reported. These concerns are consistent with the concern of "being professionally forgotten," a common theme in other studies.[35]The education and training of health professionals is an essential component for the development of human resources.[2021]Interestingly while respondents in one study perceived a staffing shortage and limited clinical skills, the principal solution proposed by respondents was not to employ the stipulated number of trained personnel in their facility but to give experienced and untrained personnel more formal training.[20] It is also possible that the perceived need for formal training could be confounded by the drive for higher salaries after the training. Health workers were reluctant to work in rural areas as opportunities for career development were typically less than in urban areas.[22] Health professionals practicing in remote areas often complain of the lack of opportunities for continuing education and career development, which is crucial in the context of health sector reforms and changing

national needs. The studies indicated that health workers take pride and are motivated when they feel they have the opportunity to progress.[23,24,25,26,27]

Adequate remuneration, the most common theme from the interviews, is neither the only problem nor the only solution. Nurses interviewed for this study commented especially on limited adequate housing in rural and hardship locations, as well as limited transportation, schools and access to clean water. Urban areas are more attractive to health care professionals not only for presumed higher pay but also for their comparative social, cultural and professional advantages.[28] The most common perception nurses described in our interviews of urban centers is that they have the opportunities needed to advance professionally and live well. Access to education for children and appropriate living standards (e.g. potable water) for their family remained important factors for health professionals, similar to the results of other studies.[29,30] Large metropolitan centers offer more opportunities for career and educational advancement, better employment prospects for health professionals and their family (i.e. spouse), easier access to private practice (an important factor in countries where public salaries are low) and lifestyle-related services and amenities, and better access to education opportunities for their children.[31]The implication of the interdependence of factors affecting job-related decisions is that the distribution of health professionals may not follow demand only, but also amenities. Ultimately, the inequitable socioeconomic development of rural compared to urban areas presents the main constraint for achieving a balanced distribution of HRH.[10]While direct evidence on improvement of rural health infrastructure and living conditions is limited, in supportive studies the availability of good living conditions is always mentioned as very important.

Incentives and Recommendations

The most common advantage attributed to rural areas in interviews was the opportunity to develop leadership skills and gain a wide spectrum of skills. With the limited staffing, rural facilities provide ample training ground for young nurses to learn leadership, as well as gain the skills to provide care for a multitude of medical conditions. In our study, nurses in rural facilities were more likely to be younger and have less training than their urban counterparts. While this is a disadvantage due to limited clinical experience, there may be opportunities to rectify and address the concerns voiced by nurses in interviews. It may be beneficial to develop curriculum and training programs that include clinical experience in rural areas for nursing students, given that this study found younger nurses deployed in rural areas. In Ghana, rural experience during training lengthened rural practice.[32] In a study from Thailand, data showed that two-thirds of the graduates continued their rural placements after compulsory training there.[33] Mechanisms underlying training effects on retention include increased self-confidence, self esteem as a rural doctor and a sense of belonging to a professional group sharing a common professional identity.[13]These were also the advantages nurses in our study attributed to rural deployment.

However, it has been suggested that the low numbers of providers in rural area has more to do with retention than with recruitment, as heavy workloads and professional isolation act as stimuli to look for better working conditions. [34] A similar study found that physicians who reported high workload stated a desire to move to an area where workload was lower, while physicians with fewer patients did not express a desire to move.[35] In rural counties, a nurse at a dispensary or health center could be the only provider for the

population. This was cited as an advantage for nurses in that it provided leadership and experience opportunities. However, it could also be a disadvantage if heavy workloads or lack of supervision are not addressed.

A strong case in the literature and this study has been made for investments in in-service training and continuing education to stimulate the retention of HRH in targeted areas. Training enables workers to take on more demanding duties and to achieve personal goals of professional advancement, as well as allow them to cope better with the requirements of their job. Training was found to be especially important for young health professionals.[36]These programs should aim to integrate formal education, subsequent continuing education and actual service provision, therefore ensuring that training has strong practical foundations while continually exposing rural service providers to the latest knowledge and technology.[37] Virtual universities, networks of institutions and professional associations, international standards of certification and distance learning are now possible avenues for improving a country's capacity to educate and train its health workforce, even when they practice in isolated areas.[38] New technologies, such as telehealth and telemedicine, have the potential to increase the supply of health professionals to rural and underserved areas. These technologies facilitate professional collaboration and development by supporting, for example, continuing education and access to some services (e.g. interpretation of x-rays, specialist opinions). Programs could also include mentorship, feedback mechanisms and distance learning programs.[1] Tuition support for full-time training degrees in Uganda was mentioned as preferable to short-term training, since full-time training degrees contributed to promotions and career development.[16]In our interviews nurses said that attempting to work and attend classes was a burden that they

were unable to avoid because of financial hardships. They commented that tuition support would be helpful to alleviate the burden and help them achieve professional success and job satisfaction.

Improving the work place standards is also recommended to improve retention. In satisfaction surveys, results indicated that health professionals are disinclined to apply for or accept assignments to practice in facilities that are in a state of disrepair and do not have basic supplies, such as running water, gloves, basic drugs and rudimentary equipment.[14]Poor work environments were a source of frustration for nurses interviewed for this study and improving working conditions would not only improve morale, but also improve community perceptions of health facilities. Non-financial incentives can be motivating, if not more motivating than financial incentives, and do not generate as much conflict, suspicion, or frustration between colleagues.[15] Workplace incentives often concern improvements in facility infrastructure and access to resources necessary for a health worker to fulfill their responsibilities as providers. Facilities that lack clean water, lighting, vehicles, drugs and equipment not only discourage workers, they also make it difficult to assess health worker performance and satisfaction when the tools required to successfully deliver health services are absent.[21] While the initial costs for facility upgrades will be incurred, the resulting benefit of health worker retention may be multiplicative, as many cadres interact and benefit from improved facilities. The best retention strategies combine both non-financial and financial incentives.[39,40]

In another qualitative study of health professionals in Kenya, respondents strongly referred to their personal professional values as a determinant of motivation in the workplace.[10] In this study's interviews, a number of nurses cited a desire to help their

communities, family or friend professionals, and admiration of health workers as motivation to become a nurse. Healing patients, professional satisfaction and recognition were considered important. These individual aspects nurture health workers' personal and professional goals and values.[13]Work conditions that reduce job satisfaction and ability to perform work responsibilities act as push factors out of health facilities and health systems.[14]

Recruiting students from rural areas has been cited as another possible recruitment and retention strategy to alleviate shortages in rural areas. Students from rural areas are more likely to return or work in similar locations. However, recruitment of these students also presents some problems. Rural students from poor families often have more difficulties in passing competitive examinations and in keeping up with the demands of nursing or professional education, and most rural students tend to come from the better-off local families.[41] Nurses interviewed for this study working in hardship areas noted that education opportunities were limited for students from these areas not just by access to higher education but the quality of education leading up to qualify for professional schools. They also said that regional schools, intended to improve availability of higher learning, fail to recruit and integrate students from rural areas and instead recruit competitive students from all over Kenya. Developing a quota system for nursing schools in rural areas may help address inaccessibility for local students but long-term improvements to school programs in rural areas are necessary to make students competitive.

Health System Implications

The maldistribution of the nursing workforce could present a challenge as Kenya's health system moves from a provincial to county management. Counties do not have equal

access to resources like roads, safe water sources and electricity, which directly impact standard of living. As management responsibilities shift from provinces to counties disparities in experience managing human resources will exist between counties. The resources necessary to manage human resources that were out of reach at the provincial level may especially be out of the reach of county officials. When the health system decentralized in Ghana, maldistribution and access to resources became more restricted for rural counties and the national government did not accept responsibility for the limited care and resources because the responsibility was at the county level. [24]

In Kenya, the distribution of nurses at the facility level also has implications for the health system. Ideally, a health system should be shaped like a triangle with a base of preventative care services, followed by curative care and topped with specialized care. In Kenya, more than 60% of public sector nurses (regardless of county classification) are deployed in hospitals, inverting the triangle of care for the health system with stronger curative and specialized sections than the preventative. Health centers and dispensaries are designed to provide preventative, basic health care and act as a funnel to send patients to more specialized care. However, less than half of the public sector nurses are deployed in these facilities. Only 20% and 13% of nurses in rural counties are deployed to dispensaries and health centers. The result of this unequal distribution by health facility could result in limited availability of preventative services, which are necessary to manage common injuries and illnesses. This could in turn lead to patients presenting with advanced conditions at hospitals and stressing limited resources.

Conclusion

The appropriate distribution of nurses in Kenya is a complex endeavor that must answer to the limited resources of the government and to the professional and personal demands of health workers. Recognizing the traits associated with rural deployments, specific incentive programs to target and reward nurses more likely to work in rural locations could be more successful than a broad-spectrum incentive program that targets all nurses. However targeting nurses with traits of youth, inexperience and rural origin will not be enough to incentivize and encourage nurses to stay in rural health facilities. Addressing the concerns nurses voiced in interviews like adequate compensation, improved housing and equipped health facilities will help improve the image of rural deployment. If the negative perceptions of poor pay, limited housing and inadequate resources are addressed, there are fewer arguments against deployment to a rural facility. Making rural locations competitive with urban locations will be a challenge, but the maldistribution of nurses will continue to hinder the development of the health system and its means of providing accessible quality care to the population.

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Appendix. Chapter 2 Results Graphics

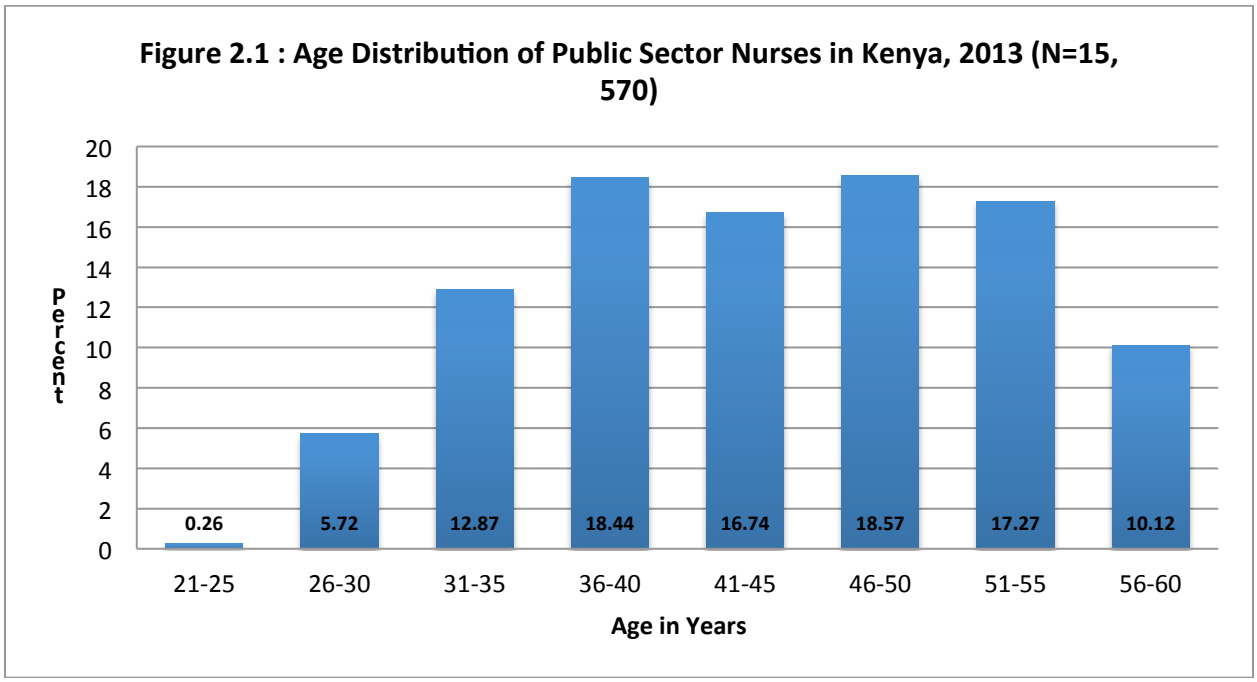


Table 2.1: Age Characteristics of Public Sector Nurses in Kenya	
Mean (years)	44.09
Standard Deviation	8.54
Median	44
Range	23-60 years

Table 2.2 Duration of Employment of Public Sector Nurses in Kenya	
Mean (years)	18.00
Standard Deviation	10.05
Range (years)	1-40

Figure 2.2: Distribution of Public Sector Nurses by Duration of Employment in Kenya 2013 (N=15, 195)

Figure 2.3

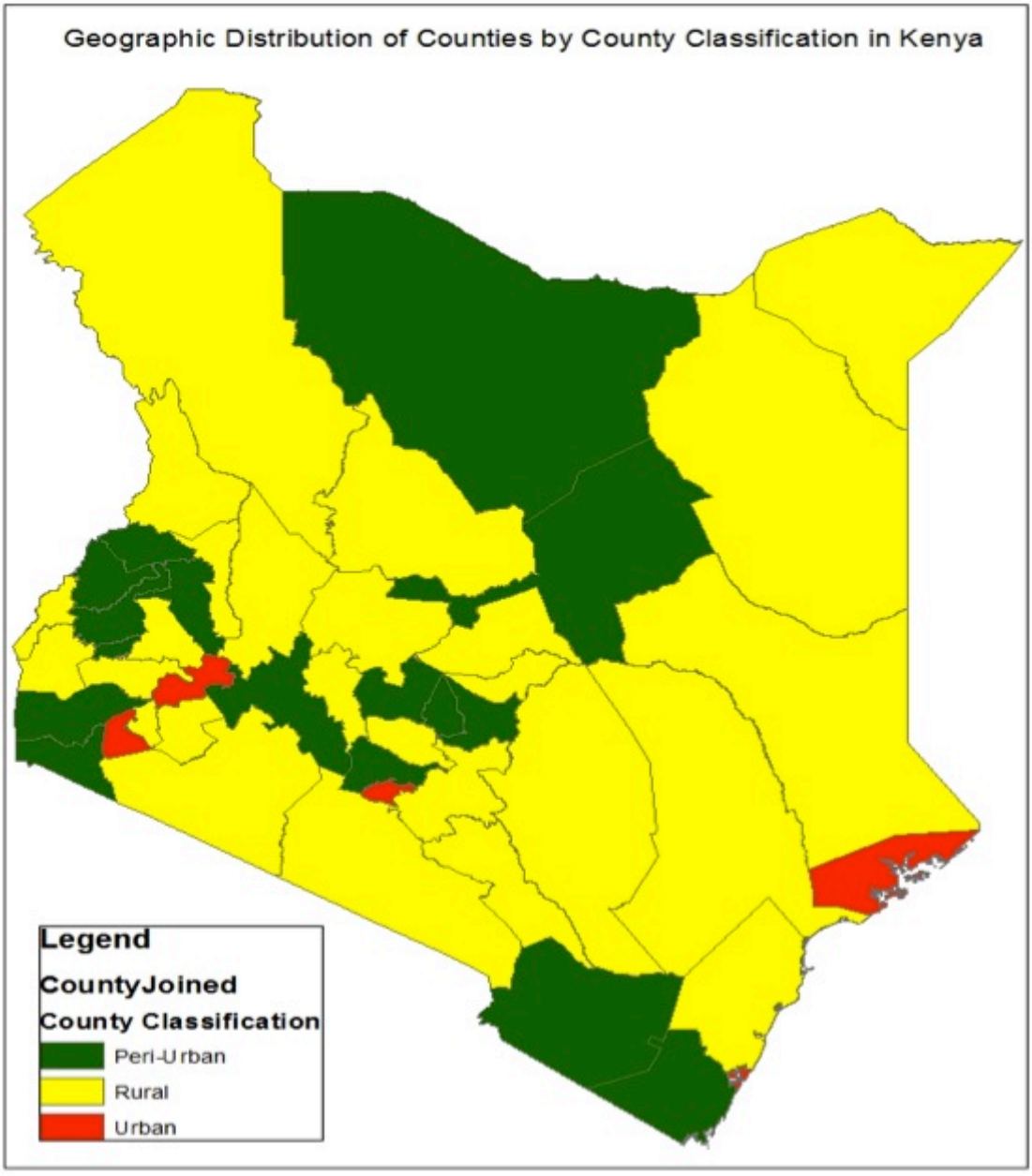
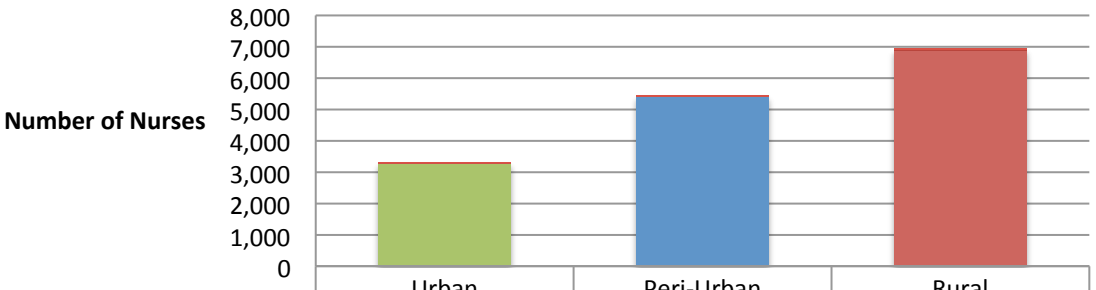

Geographic Distribution of Counties by County Classification in Kenya
Legend
CountyJoined
County Classification
Peri-Urban
Rural
Urban

Figure 2.4: Number of Nurses Distributed to Kenyan Counties by County Classification, 2013 (N=15,570)



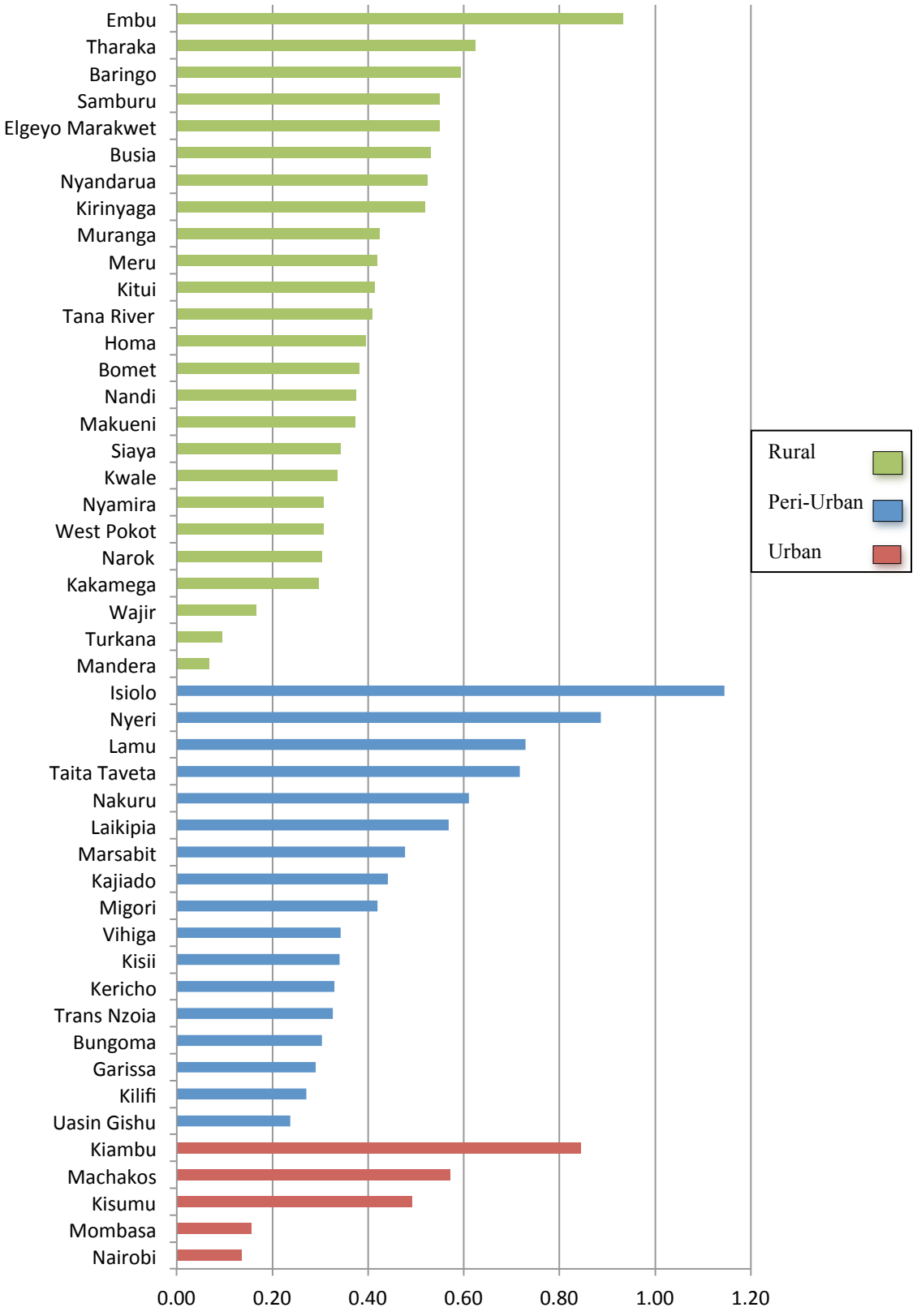
	Urban	Peri-Urban	Rural
Percent	21.05	34.71	44.24
Number of Nurses	3,278	5,404	6,888

Table 2.3 Percentage of Nurses in Counties by County Classification					
Rural Counties		**Peri-Urban Counties**		**Urban Counties**	
County	**Percent of Total Nurses**	**County**	**Percent of Total Nurses**	**County**	**Percent of Total Nurses**
Mandera	0.45	Lamu	0.48	Mombasa	3.26
Turkana	0.56	Marsabit	0.89	Machakos	3.48
Tana River	0.64	Isiolo	1.07	Kisumu	3.56
Wajir	0.71	Garissa	1.19	Kiambu	5.32
Samburu	0.80	Vihiga	1.23	Nairobi	5.43
West Pokot	1.01	Taita Taveta	1.33		
Nyamira	1.18	Uasin Gishu	1.39		
Elgeyo Marakwet	1.32	Laikipia	1.47		
Kwale	1.41	Migori	1.53		
Tharaka Nithi	1.47	Kericho	1.62		
Busia	1.68	Trans Nzoia	1.73		
Narok	1.70	Kilifi	1.95		
Kirinyaga	1.78	Kajiado	1.97		
Bomet	1.79	Bungoma	3.19		
Nandi	1.82	Kisii	3.32		
Siaya	1.87	Nyeri	3.99		
Nyandarua	2.00	Nakuru	6.36		
Makueni	2.13				
Baringo	2.16				
Homa Bay	2.46				
Muranga	2.58				
Kitui	2.72				
Embu	3.13				
Kakamega	3.20				
Meru	3.69				

Table 2.4 Nurse Characteristics by Health Facility of Deployment						
Variables	**Hospitals (N=10,072)**	**Health Centers (N=2,159)**	**Dispensaries (N=3,339)**	**Chi-Square**	**P-Value**	**Effect Size**
Total Nurses Deployed (%)	64.40	21.80	13.90	-	-	
Age (Mean Years)	44.84	43.35	42.27	209.66	<0.0001	
Cadre (%)				451.08	<0.0001	0.170
Enrolled	41.68	49.44	62.39			
Registered	57.05	50.00	37.36			
BSN	1.27	0.56	0.24			
Duration of Employment (Mean Years)	19.20	16.81	14.88	228.76	<0.0001	0.121
County of Origin (%)				587.19	<0.0001	0.194
Rural	42.70	42.90	46.72			
Peri-Urban	36.61	34.32	37.18			
Urban	20.72	22.68	16.46			

Table 2.5 Nurse to Population (per 1,000) Ratios by County Classification			
County Classification	**Number of Nurses**	**Population**	**Nurse to Population Ratio per 1000**
Urban	3213	12,290,464	0.26
Peri Urban	5349	12,668,159	0.42
Rural	6816	18,173,324	0.38
Total	15378	43,131,947	0.36

Figure 2.5: Nurse to County Population Ratio (per 1000)



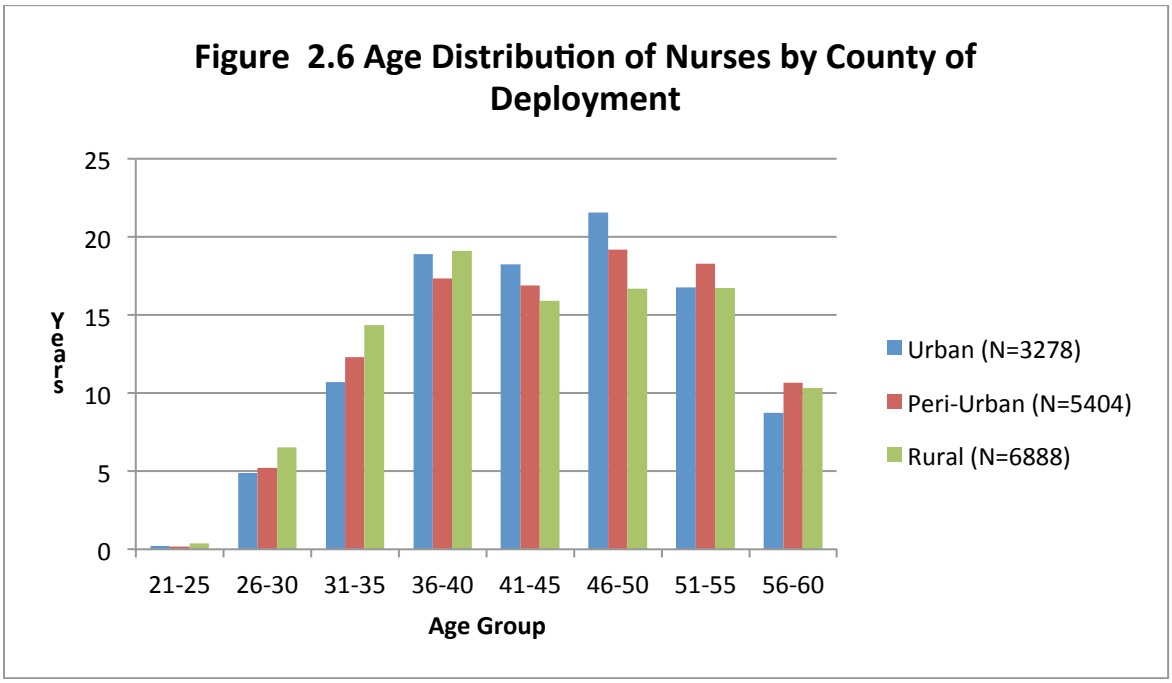


Figure 2.6 Age Distribution of Nurses by County of Deployment
25
20
15
10
5
0
Years
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
Age Group
Urban (N=3278)
Peri-Urban (N=5404)
Rural (N=6888)

Table 2.6 Public Sector Nurses Characteristics by County Classification						
Variables	**Urban Deployment (N=3278)**	**Peri-Urban Deployment (N=5404)**	**Rural Deployment (N=6888)**	**Chi-Square/ ANOVA F-Test**	**p-value**	**Effect Size**
Mean Age (SD)	44.31 (8.06)	44.51 (8.49)	43.63 (8.77)	31.4426	<0.0001	
Age Groups (%)				100.1332	<0.0001	0.080
21-25	0.21	0.17	0.36			
26-30	4.88	5.2	6.52			
31-35	10.71	12.29	14.36			
46-40	18.91	17.32	19.09			
41-45	18.24	16.89	15.91			
46-50	21.54	19.17	16.70			
51-55	16.78	18.28	16.71			
56-60	8.72	10.68	10.35			
Gender (%)				159.6100	<0.0001	0.101
Females	85.26	78.58	74.20			
Males	14.74	21.42	25.80			
Cadre (%)				156.7652	<0.0001	0.100
EN	37.72	48.68	50.57			
RN	61.28	50.42	48.24			
BSN	1.00	0.90	0.79			
Duration of Employment (%)				170.1017	<0.0001	0.105
1-5	10.76	14.53	18.58			
6-10	13.85	14.61	16.03			
11-15	9.71	9.03	9.4			
16-20	17.22	14.09	13.16			
21-25	21.3	19.5	17.09			
26-30	15.8	16.44	14.89			
31-35	9.89	9.53	9.68			
36-40	1.45	2.27	1.37			
Mean Duration of Employment (SD)	18.97 (9.34)	18.37(10.01)	17.11 (10.28)	39.1355	<0.0001	
County of Origin (%)				5.5e+03	<0.0001	
Rural	28.89	26.74	60.30			
Peri- Urban	19.94	61.79	24.16			
Urban	51.16	11.45	12.04			
Health Facility (%)						n/a
Hospital	71.27	65.69	60.12	n/a	-n/a	
Health Center	16.46	13.67	12.97			
Dispensary	12.26	20.24	26.91			

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