Attracting and retaining health workers in rural areas: investigating nurses views, career choices and potential policy interventions

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KEMRI Wellcome Trust Programme

Kenya

ABOUT CREHS

The Consortium for Research on Equitable Health Systems (CREHS) is a five year DFID funded Research Programme Consortium that is made up of eight organisations based in Kenya, India, Nigeria, South Africa, Tanzania, Thailand and the United Kingdom. It aims to generate knowledge about how to strengthen health systems, policies and interventions in ways which preferentially benefit the poorest. The research is organised in four themes: health sector reform, financial risk protection, health workforce performance and scaling up.

The consortium will achieve its aim by:

- working in partnership to develop research
- strengthening the capacity of partners to undertake relevant research and of policymakers to use research effectively
- communicating findings in a timely, accessible and appropriate manner so as to influence local and global policy development

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List of Acronyms

CREHS	Consortium for Research on Equitable Health Systems
DCE	Discrete Choice experiment
EEG	Experimental Economic Games
EN	Enrolled nurse
FGD	Focus group discussion
HR	Human resources
HRH	Human Resources for Health
JLI	Joint learning initiative
KKI	Key informant interviews
MOH	Ministry of Health
MTC	Medical Training College
NCK	Nursing Council of Kenya
RN	Registered Nurse
SAQ	Self administered questionnaire
WHO	World Health Organization

Executive summary

Introduction

Since the adoption in 2000 of the Millennium Development Goals to improve health outcomes in developing countries, several initiatives and reports have focused on the critical role played by human resources for health. The maldistribution of health workers within countries is a crucial problem felt most acutely in rural areas. Kenya is a case in point, where rural primary health care facilities are very understaffed. This is often attributed to the view of rural areas as less desirable, with poor infrastructure and services, high workloads and poorly aligned incentive systems that disadvantage rural staff. Moreover there is concern that as enrolled community nurses (ENs) are phased out in favour of more qualified registered nurses (RN), the workforce may be even less willing to work in rural areas.

The debate in Kenya over how to ensure there are adequate numbers of nurses in rural areas is poorly informed by evidence, with little known about the relative importance of pecuniary and non-pecuniary incentives. The research aimed to address these gaps in the literature and better understand the determinants of health workers' choices to help overcome rural-urban disparities.

The overall objective was to explore how current and possible future policy interventions might affect employment preferences and influence recruitment to and retention in rural areas for nurses in Kenya.

Specific objectives were:

- To investigate the characteristics of pre-service and upgrading registered nursing graduates from Medical Training Colleges in Kenya
- To analyze the preferences of graduating registered nurses and explore how type of training, changes in job attributes and / or individual characteristics might affect recruitment and retention of registered nurses in rural settings
- To investigate the career paths of recent graduates over a 12 month period and examine how these relate to their initial, stated employment preferences
- To identify strategies that may increase the attractiveness of rural postings for registered nursing graduates.

The study forms part of a 3 country study (including Thailand and South Africa) but this report focuses on results for Kenya only.

Methods

Multiple methods were used to evaluate individuals' attitudes, values, preferences and choices in relation to rural practice.

Data collection methods comprised:

- A self-administered questionnaire (SAQ) to provide information on individual characteristics and attitudes that might influence work decisions. The latter were investigated through response to sets of Likert scale statements to assess attitudes towards living and working in rural areas. Students were asked to respond to each statement on a 6 point scale of 1 (strongly disagree), 2 (moderately disagree), 3 (somewhat disagree), 4 (somewhat agree), 5 (moderately agree) and 6 (strongly agree). Principal components analysis was used to group the statements together under the broad constructs of 'perception of life in a rural area' and 'perception of working in rural areas', and the determinants of these constructs were explored using linear regressions.
- Focus Group Discussions (FGDs) with randomly selected graduates to understand their responses in more detail. Two FGDs were carried out in each MTC, one each for pre-service and upgrading students, each containing 6-8 participants. Transcripts were subjected to content analysis in NVivo7.
- A discrete choice experiment (DCE) to investigate health worker job preferences related to possible policy interventions. We utilised a labelled choice design offering a forced choice between a rural post and an urban post which could differ on 7 different attributes: type of facility; salary; opportunity for post-basic training; provision of subsidised housing; number of years of work before promotion; type of employment contract; and management style. A conditional logistic regression model was used to analyse the nursing students' choices of a rural or urban job as a function of the incentives offered by each job, and the personal characteristics of the respondent.
- Experimental economic games to reveal health workers' underlying values. The "dictator game" was used where subjects were free to choose how to allocate KSH200 between themselves and another recipient (anonymous fellow student, patient, poor person).
- Follow up of a cohort of graduating nurses for a year following registration to explore their employment choices. All cohort members were contacted quarterly using multiple methods (emails, phone calls and text messages).

Study participants were nursing students about to take their final exams in four medical training colleges (MTCs), approximately equally divided between pre-service trainees (enrolled into nursing college straight from high school) and upgrading trainees (in-service nurses enrolled into nursing college to upgrade from certificate level to RN level). A multi-stage cluster sampling strategy was used. MTCs were initially short-listed from the 27 MTCs within Kenya offering both the RN diploma and the EN upgrading course if they were scheduled to complete RN training in the second half of 2008, and if they had at least 30 students in each of the pre-service and upgrading classes. From the 8 short-listed MTCs, four were purposively selected for inclusion in the study (Nairobi, Murang'a, Meru and Kakamega). Nairobi MTC is located in the capital city, while Murang'a, Meru and Kakamega are 87 km, 238 km and 355 km from Nairobi respectively, representing a range of settings across four provinces. All students who intended to sit their final exams in the second half of 2008 were invited to participate.

Baseline data collection took place between August 2008 and January 2009, and cohort follow up from August 2009 until June 2010. A total of 345 students were enrolled for the baseline surveys, and 250 students were included in the cohort follow up.

Results

Characteristics of the study population

Most study members were female (75.4%) with approximately two-thirds coming from a rural or relatively rural area. Upgrading nurses were generally older than their pre-service counterparts (upgrading nurses mean age, 38 years; compared with 24 years for pre-service trainees.) Upgrading nurses were more likely to be married, to have children and have parents with lower levels of educational attainment when compared to pre-service trainees (77.7% and 72.3% of pre-service trainees' fathers and mothers, respectively had completed primary education, compared to 57.5% and 40.2% for upgrading nurses).

SAQ and FGD findings

Perceptions of life in rural areas

During FGDs students indicated that they generally perceived rural settings to be those with poor infrastructure, poor health services, limited variety of available housing and few recreational facilities. Upgrading students, who were mostly married, commented that they often get separated from their children when they took rural posts, as their children were schooled away from them in urban schools considered to be of higher quality. However, rural areas were more positively often associated with a lower cost of living, with lower housing rents, school fees, and food prices reported. When asked whether they were willing to work in any rural area in the country, both groups of students expressed fear of working in communities dominated by other tribes, which they attributed to the ethnic violence after the recent election.

Likert scale responses contrasting rural and urban areas did not elicit strong views from pre-service or upgrading students, though respondents gave some indication that they found rural housing and lifestyles unappealing. We modeled the influence on the index of "life in rural areas" using multivariable regression with the following independent variables: trainee type (upgrading or pre-service), age, sex, marital status, having children, being born in a rural area, and location of MTC. The only significant finding was that students attending Kakamega MTC had generally more positive perceptions of "life in rural areas".

Perceptions of nursing posts in rural areas

Likert scale responses indicated that nursing students had mixed perceptions of nursing posts in rural areas, which were associated with lower incomes, slow career advancement and workplace stress. As for attitudes to living in rural areas, we modelled the determinants of the index for "nursing posts in rural areas" and found that being an upgrading student had a significantly negative effect on preferences for working in rural areas, but being older had a positive effect.

During discussions upgrading students shared the view that poor communication channels in rural areas limited the flow of information on training opportunities, and that staff shortages denied them the opportunity to pursue their studies. Upgrading students held the view that positions in rural dispensaries or health centres allowed for more autonomy at work, but some pre-service students argued that higher workloads, poor staffing, infrequent support supervision and inadequate equipment and supplies, made it difficult to perform daily duties or limit them to managing minor cases. Others pointed out that some rural communities reject health workers and health care in general and prefer traditional medicine adding that such rural posts were not attractive to them.

Strategies to recruit and retain nurses in rural areas

In their SAQ responses, students generally felt compulsory rural service for government supported students was reasonable and that, for pre-service students, the greater responsibility in a rural area might be motivating. These positive work attributes could be enhanced by better housing and prospects for career advancement. Being able to choose the rural area to work in was also felt to be of some value while there was strong support for greater rural financial incentives.

During FGDs, nursing students argued that current rural hardship allowances were insufficient, and that if advertisements for public sector nursing jobs specified job location and facility type, potential applicants would be able to make more informed decisions when applying for posts. It was suggested that rural recruitment could be boosted by recruiting MTC students from rural areas, and perhaps training them in MTCs located in relatively remote areas, and that more supportive regular supervision would encourage nurses to practice in rural areas.

In the SAQ, about half the upgrading and pre-service students (49.4% and 52.5% respectively) felt that "a safe job with no risk of closing down or unemployment" was the most important factor when looking for a job, ranking this more highly than "a good income so that you do not have any worries about money", "doing an important job that gives you a feeling of accomplishment", or "working with people you like". This was reflected during FGDs, where the new short-term contracts for specific rural posts were generally unpopular, with permanent public contracts preferred by both pre-service and upgrading trainees. Those disliking short contracts feared the lack of pension plan and long-term job security.

Findings from Discrete Choice Experiments

The DCE results indicated a strong preference for urban jobs among both pre-service and upgrading students.

For the pre-service group, providing a 10% rural allowance, subsidised housing, preferential access to postgraduate training, a permanent contract, and supportive management all significantly increased the odds of choosing a rural job, whereas having to wait longer for promotion decreased the odds. Offering a permanent contract and preferential training opportunities had the largest impact on rural uptake, with higher odds ratios than a 10% rural allowance. Older, male, and married pre-service nurses had lower odds of choosing a rural job.

Upgrading ENs valued the incentives similarly to pre-service nurses except that housing was not important in urban postings, and supportive management was not statistically significant for either rural or urban jobs. Being offered a permanent contract was particularly attractive to the upgrading nurses. In this group, older nurses were more likely to choose a rural job but none of the other demographic characteristics were statistically significant.

To compare the quantitative impact of different policy incentives, the DCE model results were used to predict the probability of accepting a rural posting. Financial incentives were effective if sufficiently large, particularly for the pre-service group of students. A 10% salary increase to $250.80 would increase rural uptake by 9.8 percentage points for pre-service students and 6.1% points for upgrading students, but a 30% salary increase to $296.41 would result in an additional increase in rural job choice of 41.4% points for pre-service students and 26.5% of upgrading students. Another powerful incentive was being offered a permanent contract which increased rural uptake by 28.0% percentage points in pre-service nurses

(equivalent in impact to a salary increase of between 20 and 30%), and by 35.1% points for upgraders (more effective than a 30% rural allowance). Being given preferential access to postgraduate training was moderately effective followed by faster promotion and then better housing in rural postings.

Findings from Experimental Economic Games

The results of the dictator game indicated more altruistic behaviour when considering poor and patient recipients than for fellow students. Multivariable analysis indicated that people aged more than 40 years old were significantly more altruistic than the younger ones (aged less than 25 years old), but this was only true when the recipient is a patient. There was no difference in the measured generosity of both groups for the student and poor framings.

Findings from the Cohort Follow up

The proportion of pre-service respondents working as nurses increased from 70.3% 2 months post qualification to 92.5% 12 months post qualification of which 88.3% were working as bedside nurses. Of those working as nurses, 25.2% were working in the public sector compared to 3.3% at 2 months post qualification. 18.3% of pre-service nurses applied for public sector jobs between February 2010 and May 2010, which was a great reduction from 65.6% who applied between May 2009 and August 2009. The percentage of all pre-service respondents not working as nurses reduced from 29.7% to 7.5%. The most common reasons for not working as a nurse at 12 months post qualification were cited as having not found a nursing job and not wanting employment.

Both at baseline and throughout the follow up period, nearly all upgrading respondents were working as bedside nurses, and over three quarters were working in the public sector. By the end of follow up, 30.4% of respondents were working as nurses in rural areas. The proportion of those working in the private for profit sector increased slightly from 6.2% to 11.4% post qualification, while that of private not for profit sector reduced from 14.1% to 8.8% post qualification. Both at baseline and at the end of follow-up, more than half of public sector respondents were working in hospitals, with a slight increase in this from 51.8% to 59.8%.

Nurses, attending the furthest MTC from Nairobi were more likely to be working in rural areas, and among upgrading nurses were more likely to be in the public sector at the end of follow-up. In addition, being born in a rural area, and being older were significantly associated with working in the public sector.

Conclusions

This study has demonstrated that three relatively novel methods for investigating human resource questions, namely discrete choice experiments, experimental economic games and follow-up of a graduate cohort, can be used successfully in a low income setting and add additional insights when combined with more traditional research methods, use of SAQs and focus group discussions.

Key findings from this body of work were:

- Registered nurse graduates had generally more negative views of life and work in rural areas than in urban areas. While SAQs and FGDs indicated that concerns over career stagnation and loss of training opportunities compounded several perceived social disadvantages of rural areas (poor infrastructure and amenities such as schools), the DCE indicated that such adverse perceptions could be countered by policies to make rural postings more attractive, notably: preferential career development or

training schemes, provision of permanent contracts and financial compensation in the form of allowances or higher salaries.

- RN graduates demonstrate altruism consistent with vocational norms to help patients and the poor while also appreciating that rural service, while not preferred, may reasonably be requested of trained professionals using mechanisms such as bonding. Such findings suggest possible continued roles for non-financial incentives that appeal to professionalism to encourage rural postings while noting that basic needs for income and security must be met.

- While RNs may have preferences for the type of work they would like, the current labour market in Kenya, with a shortage of opportunities, may not permit such preferences to be fully expressed in the form of actual employment decisions. Thus many pre-service trainees employed after one year in the private sector continued to pursue public sector employment when opportunities arose

1. INTRODUCTION

International background

Since the adoption in 2000 of the Millennium Development Goals to improve health outcomes in developing countries, several initiatives and reports have focused on the critical role played by human resources for health (WHO 2000; Liese, Blanchet et al. 2003; WHO and World Bank 2003; Joint Learning Initiative 2004; WHO 2006). There is strong evidence of a positive correlation between the population density of health care providers and the levels of coverage attained with cost-effective health interventions such as immunization and skilled attendance at delivery (Anand and Barnighausen 2004; Speybroeck, Kinfu et al. 2006). In its 2006 World Health Report, WHO identified 57 countries, most of them (37) in sub-Saharan Africa, where there is a critical shortage of health care providers[1] (WHO 2006). Despite the emphasis put on international migrations (Dovlo and Martineau 2004; Dovlo 2005; Kirigia, Gbary et al. 2006), recent work has underlined that the maldistribution of health workers within countries is also a key problem (Clemens 2007).

In fact, shortage of health workers in rural areas is particularly acute in virtually all countries (Dussault and Franceschini 2006; Serneels, Lindelow et al. 2007). This contributes directly or indirectly to increased inequalities of access to basic health care and therefore health outcomes. This situation undermines the equity impact of public subsidies as indicated by estimates from the 2006 World Health Report which showed that health workers' salaries represented on average almost half of the general government expenditure on health (WHO 2006).

The Kenyan context

In Kenya understaffing in rural primary care facilities (dispensaries and health centres) is particularly acute. Staffing norms for dispensaries are 2 to 5 nurses, but 9% have no nurse at all and 48% only one. Similarly, health centres should have 8 to 12 nurses, with the larger health centres expected to offer short-term residential basic obstetric care, but 48% have less than three (Gondi 2006) (physicians are not an expected part of the workforce at either of these rural facility types). The most obvious solution to address the rural and general nursing workforce shortage is a major increase in recruitment, as there are many qualified and unemployed nurses in Kenya (Adano 2008). At the time our studies were performed and in an attempt to address staff shortages quickly, donor partners supported recruitment of just over 3000 nurses from 2005 to 2008, hired on short-term contracts of 2 to 3 years duration, and posted to public sector facilities in underserved rural areas with high HIV prevalence (Marsden 2008). However, major shortages remained.

Posts in rural areas are often considered less desirable. Urban settings have superior infrastructure and services (Chen, Evans et al. 2004; Oulton 2006; Fritzen 2007) while rural posts are often associated with high workloads and poorly aligned incentive systems (for example lower housing allowances) that disadvantage rural staff. Once they are posted in rural areas, some health workers make repeated demands to be reallocated to urban postings (Chief Nursing Officer, personal communication).

[1] Defined as countries where density of health care professionals (counting only doctors, nurses and midwives) is below 2.5 per 1000 population

There is also concern that recruitment and retention of nurses in rural areas will remain problematic even if the workforce expands because of increasing professionalization. There are two main cadres of nurses in Kenya: registered nurses (RNs) and enrolled community nurses (ECNs). RNs and ECNs undergo a 3.5 year and 2.5 year pre-service training respectively[2]. The upgrading course is a distance-based programme over two years, with approximately 20% of the time spent at college, and the remainder undertaken as supervised self-study and practical training in health care facilities. The majority of Kenya's nursing colleges now train predominantly RNs (90% of trainees) while previously the majority of trainees were ECNs. Rural posts in health centres and dispensaries are currently mainly filled by ECNs while posts in hospitals are mainly filled by RNs. As of 2008, entry-level RNs and ECNs received monthly basic salaries of KES[3] 22 519 (USD 289) and KES 11 518 (USD 148) respectively (MOH 2008). Salary differentials and a ceiling limiting career progression for ECNs exert considerable pressure on existing ECNs to upgrade to RN status either through a 1.5 year on-campus program or a 2 year distance learning program. The net result is an increasingly well-qualified workforce that many worry will be less willing to serve in rural areas.

Evidence gaps

The debate in Kenya over how to ensure there are adequate numbers of nurses in rural areas to provide and supervise essential community and primary care services is poorly informed by evidence. It often rests mainly on anecdotes or plausible intuition, due to a dearth of objective empirical data on health worker flows and behaviours, their determinants and their implications in terms of policies (Chopra, Munro et al. 2006).

In developed countries, retrospective studies have been conducted to document the career paths of health workers (Shields 2004), but information gathered has not been useful in understanding dynamics in developing countries with very different health labour markets or health systems.

To date, human resource policies in developing countries have relied on both intrinsic and extrinsic motivating factors. Intrinsic motivation (Deci 1971; Frey 1997) and altruism have been identified as important factors to explain some inclination for the public over the private sector (Dixit 1997; Dixit 2002; Bénabou and Tirole 2004), despite wage differences. Among the extrinsic determinants of staff decisions financial incentives have received the most attention. However, perversely, salaries in urban areas are often greater than those in rural areas, with additional opportunities in urban areas to complement public salaries (Ferrinho, Van Lerberghe et al. 2004). Non-financial factors associated with quality of life (such as availability of housing, proximity to schools and main infrastructures), training or career development prospects and work environment also play a role in health workers' decisions and motivation (Miller Franco, Bennett et al. 2004; Mathauer and Imhoff 2006). Yet, the relative importance of pecuniary and non-pecuniary factors when considering a rural posting is unclear, as very little empirical work has been carried out (Penn-Kekana, Blaauw et al. 2005; Serneels, Lindelow et al. 2007).

The research aimed to address these gaps in the literature and better understand the determinants of health workers' choices to help overcome rural-urban disparities

[2] A minority of RNs also have a bachelor's degree, but this group is not considered in this paper.

[3] KES = Kenya shillings; exchange rate USD 1 = KES 78 CBK. (2008). "Central Bank of Kenya." Retrieved April 2009, from http://www.centralbank.go.ke/forex/default.aspx.

The key research questions addressed in the study are:

- Amongst a range of possible policy initiatives to recruit / retain registered nurses in rural postings, which are preferred by RN trainees about to enter the job market?
- Do the preferences stated at entry to the job market predict job seeking behaviour and / or employment choices?
- What individual or contextual characteristics are associated with different preferences and job seeking behaviour and / or employment choices?

General Objectives.

To explore how current and possible future policy interventions might affect employment preferences and influence recruitment to and retention in rural areas for nurses in Kenya.

Specific Objectives

- To investigate the characteristics of pre-service and upgrading registered nursing graduates from Medical Training Colleges in Kenya
- To analyze the preferences of graduating registered nurses and explore how type of training, changes in job attributes and / or individual characteristics might affect recruitment and retention of registered nurses in rural settings
- To investigate the career paths of recent graduates over a 12 month period and examine how these relate to their initial, stated employment preferences
- To identify strategies that may increase the attractiveness of rural postings for registered nursing graduates.

This study forms part of a 3 country study (including Thailand and South Africa) to investigate how the likely effectiveness of policy interventions may differ in different county contexts. This report focuses on results for Kenya only.

2. METHODS

Overview of methods

Multiple methods were used to evaluate individuals' attitudes, values, preferences and choices in relation to rural practice.

Baseline survey instruments included:

- a self-administered questionnaire (SAQ) to provide information on individual characteristics and attitudes that might influence work decisions;
- a discrete choice experiment (DCE) to investigate health worker job preferences related to certain possible policy interventions;
- experimental economic games to reveal health workers' underlying values and their responsiveness to different types of incentives;
- Focus Group Discussions (FGDs) with selected graduates to understand their responses in more detail.

In addition, a cohort of graduating nurses was followed up for a year following registration to explore their employment choices. Cohort follow up began in August 2009 and continued until June 2010. All cohort members were contacted quarterly using multiple methods (emails, phone calls and text messages).

Tool development was informed by (1) an initial literature review; (2) key informant interviews (KIIs) with high level Ministry officials and other relevant stakeholders to identify strategies that have been or could be developed to improve recruitment and retention of nurses in rural areas, noting successes and/or failures in policies; and (3) FGDs with selected students and health workers. Prior to data collection all tools were pre-tested with 34 students from two Medical Training Colleges (MTCs) not included in the study.

Ethical considerations

The study was approved by the Ethical Review Committees of the Kenya Medical Research Institute and the London School of Hygiene and Tropical Medicine. Participation in the research was voluntary and informed consent was obtained from each student before all data collection.

Study participants

Study participants were nursing students about to take their final exams in four medical training colleges. The group constituted of approximately equal proportions of pre-service trainees (enrolled into nursing college straight from high school) and upgrading trainees (in-service nurses enrolled into nursing college to upgrade from certificate level to RN level). Including in-service trainees provided an opportunity to explore the preferences of individuals who have some prior experience of work as a nurse and who are already under contract to the Ministry of Health (MoH).

The choice of new student graduates as the population of interest in the study was dictated by several practical motives. Firstly, they provide a relatively clearly defined population and are relatively simple to access and sample. Secondly, utilising this population avoids a number of selection biases: e.g. a sample of health workers in rural areas would only include those who remain there and exclude individuals who never worked there or who have already left. Thirdly, this population provides a better baseline to begin a cohort study monitoring the determinants and evolution of job preferences over time. Finally, choosing students about to enter the labour market allows us to study their true career opportunities and choices.

Sampling

We intended to recruit at least 250 nursing students. This sample size was primarily based on the requirements for the discrete choice experiment and the anticipated attrition of the cohort. Sample size considerations in DCE analysis have generally been based on empirical experience rather than mathematical calculation (Louviere, Hensher, & Swait 2000). The usual requirements are in the range of 100-150 respondents per sub-group of interest (Scott 2001). Sample size requirements for the experimental economic games and for comparative analysis of the SAQs were expected to be much smaller than this. An initial sample size of 250 was selected to provide an adequate number of respondents for any subsequent DCE assuming that we would be able to maintain at least 60% of the cohort in long-term follow up. A larger sample size would obviously have been advantageous but could not be considered due to logistic and budget constraints.

A multi-stage cluster sampling strategy was used. MTCs were initially short-listed from the 27 MTCs within Kenya offering both the RN diploma and the EN upgrading course if they were scheduled to complete RN training in the second half of 2008, and if they had at least 30 students in each of the pre-service and upgrading classes. From the 8 short-listed MTCs, four were purposively selected for inclusion in the study (Nairobi, Murang'a, Meru and Kakamega). Nairobi MTC is located in the capital city, while Murang'a, Meru and Kakamega are 87 km, 238 km and 355 km from Nairobi respectively, representing a range of settings across four provinces. All students who intended to sit their final exams in the second half of 2008 were invited to participate.

Data Collection and Analysis

Baseline data collection took place between August 2008 and January 2009. Each MTC was visited twice as shown in Table 1.

Table 1: Overview of baseline data collection dates

MTC	Student type	Date (day-month-year)
Nairobi	Pre-service	03-09-2008
	Upgrading	09-09-2008
Meru	Pre-service	14-10-2008
	Upgrading	11-09-2008
Murang'a	Pre-service	16-09-2008
	Upgrading	23-09-2008
Kakamega	Pre-service	05-11-2008
	Upgrading	21-01-2009

Fieldwork was conducted at each MTC in a classroom setting with a group facilitator.

Baseline Self-administered Questionnaires (SAQs)

At baseline a SAQ was administered covering respondents' backgrounds and training, plus sets of Likert scale statements, designed to assess their attitudes towards living and working in rural areas. The terms "rural" and "urban" are open to varied interpretation (Wilson, Couper et al. 2009). We advised students completing the SAQ to consider rural areas as those in remote places, far from major cities and towns

and with poor infrastructure and limited recreational facilities, though they may also have incorporated their own individual views of these terms. Their interpretations were explored further in the FGDs. The development of the Likert scale statements drew on those reported in the literature (Adams, Dollard et al. 2005), adapted to improve applicability to the local context through discussions with locally qualified nursing staff and researchers. Statements were adapted to ensure that they covered all key issues raised by local stakeholders, that all issues were relevant to the Kenyan nursing profession, and that the language was easily understandable in the local context. Students were asked to respond to each statement on a 6 point scale of 1 (strongly disagree), 2 (moderately disagree), 3 (somewhat disagree), 4 (somewhat agree), 5 (moderately agree) and 6 (strongly agree). To reduce response bias, 18% of the statements were phrased negatively, and randomly distributed within question sets. The SAQ tool was pre-tested with students from two MTCs not included in the study, including a group discussion of the meanings of the questions and statements. All quantitative data collected were double entered and verified.

Analysis

Simple descriptive analysis was used to compare the characteristics of pre-service and upgrading students, and to calculate the mean response (and 95% confidence interval) for each Likert scale statement. As each Likert scale statement was rated on a scale from 1 to 6 we considered an upper confidence interval less than 3.5 as an indication of general disagreement with the statement, and a lower confidence interval above 3.5 as an indication of general agreement. Principal components analysis (PCA), a data reduction technique that enables one to identify from a large set of variables those that contain information common to all, was performed across all statements on rural/urban perceptions to determine how the statements grouped together under the broad constructs of 'perception of life in a rural area' and 'perception of working in rural areas'. Additional PCAs were then run within these two constructs, the first component for each construct was retained and PCA derived scores calculated for each construct. These scores were used as dependant variables in separate linear regressions to assess the influence of a range of trainee characteristics on attitudes to rural life and work. All analyses were conducted in STATA version 10.1 (Stata, http://www.stata.com).

Discrete Choice Experiment (DCE)

A stated preference discrete choice experiment (DCE) was used to explore the preferences of registered nurses for different financial and non-financial incentives that could be used to attract them to work in rural areas. We endeavoured to follow best practice in the design, implementation and analysis of the DCE (Lancsar and Louviere 2008). DCE is a form of conjoint analysis. The latter has become the most widely used methodology to evaluate stated preferences because it provides a quantitative assessment of the relative importance of the different characteristics that influence choice behaviour. A limitation of DCE is that it is limited to stated preferences which may not reflect what subjects actually do in practice.

DCE design

We utilised a labelled choice design offering a forced choice between a rural post and an urban post with different attributes. Labelled designs are uncommon in the health economics literature (Lagarde and Blaauw 2009), but are appropriate when the interest is in the preferences for distinct alternatives rather than in how attributes may be combined within a single alternative (Hensher, Rose et al. 2005). We suspected that nurses would value the attributes of rural and urban jobs differently, and a labelled

design allowed more flexibility to explore this. The introduction of the DCE vignette included brief descriptions of the expected rural and urban areas.

The selection of attributes to include in the design was based on qualitative research. A review of the literature from developed and developing countries suggested possible policy options for promoting rural recruitment or retention (Zurn, Dal Poz et al. 2004; Hayes, O'Brien-Pallas et al. 2006; Dambisya 2007; Chopra, Munro et al. 2008; Lehmann, Dieleman et al. 2008). Key informant interviews with Kenyan policy makers helped identify and prioritise feasible local strategies. Focus group discussions with nursing students and nurses currently working in rural areas were used to ensure that the selected attributes and levels were relevant and realistic. Finally, the DCE tool was piloted with a sample of 34 nursing students to refine wording of the attributes and levels.

Seven job attributes and incentives were included in the final design: the type of facility where the post was being offered; the salary provided with additional allowances for rural positions; the opportunity of getting post-basic training; the provision of subsidised housing; the number of years of work before being promoted; the type of employment contract offered; and the management style prevalent in the facility.

Table 2: Attributes and levels for the DCE

Attribute	Levels	
	Rural Post	**Urban Post**
Type of facility	▪ Dispensary ▪ Hospital	▪ Dispensary ▪ Hospital
Monthly salary	▪ Gross monthly salary (includes all allowances) = KSH18,500	▪ Gross monthly salary (includes all allowances) = KSH18,500
Rural allowance	▪ Additional KSH 1,850 ▪ Additional KSH 3,700 ▪ Additional KSH 5,550	▪ None
Opportunity for study leave	▪ No guaranteed study leave ▪ 1-year guaranteed study leave after 4 years of service	▪ No guaranteed study leave ▪ 1-year guaranteed study leave after 4 years of service
Provision of subsidised housing	▪ Single room with a shared kitchen and shared toilet. ▪ House just for you and your family.	▪ None ▪ Single room with a shared kitchen and shared toilet.
Number of years till promotion	▪ 2 years ▪ 4 years	▪ 2 years ▪ 4 years
Type of employment offered	▪ Short-term contract (3 years) ▪ Permanent government contract	▪ Permanent government contract
Supervision style	▪ The supervision is formal and structured ▪ The supervision is personal and supportive	▪ The supervision is formal and structured ▪ The supervision is personal and supportive

The final DCE design had 2^{11} x 4^1 = 8,192 possible combinations of attribute levels. Macros available for the SAS statistical programme (Kuhfeld 2005), were used to generate an optimally efficient design in 16 choice sets. The 16 choice sets were randomly ordered into four different versions of the questionnaire to control for ordering effects.

DCE administration

The DCE was completed by the same sample of Kenyan nursing students that completed the SAQ. It was administered in the form of a self-administered questionnaire.

DCE analysis

Data were double-entered, cleaned and then analysed using Stata version 10. A conditional logistic regression model was used to analyse the nursing students' choices of a rural or urban job as a function of the incentives offered by each job, and the personal characteristics of the respondent. Separate regressions were performed for the pre-service and the upgrading students. In keeping with the labelled design, alternative-specific attributes were included in the model as interaction terms between attribute variables and a binary variable indicating the rural or urban alternative. An alternative-specific constant term (for the rural alternative) was also included in the model and reflects the mean utility of the rural label relative to the urban alternative. The impact of different personal characteristics on the choice of a rural job was modelled by adding interaction terms between the demographic variables and the rural variable.

Model fit was evaluated by comparing log likelihoods, McFadden's pseudo R^2 and model prediction (Hensher, Rose et al. 2005). The sign, significance and magnitude of regression coefficients were used to evaluate the relative importance of job characteristics and interactions. Odds ratios and confidence intervals were calculated to aid interpretation of logistic functions. The relative magnitude of coefficients is influenced by differences in variable coding and scaling (Lancsar, Louviere et al. 2007). Therefore, to evaluate the impact of different policy packages we used the model coefficients to calculate the predicted probabilities of taking up a rural post for different incentives relative to a base scenario without any incentives (Hensher, Rose et al. 2005). Willingness-to-pay (WTP) estimates were calculated by dividing each attribute coefficient by the cost (salary) coefficient (Ryan, Gerard et al. 2008), indicating the average amount of income that nurses would be prepared to forgo (or need to be compensated) in order to accept other incentives in rural or urban posts.

Experimental Economic Games

Principles of experimental economics

Experimental economics is the use of controlled, 'scientifically 'designed experiments (also called games) to investigate decision processes under 'laboratory' conditions, where the experimenter defines the set of prices, budget sets, information set, and actions available to participants, thereby measuring the influence of these factors on individual behaviour. One of the key features of experimental economic games is the use of real monetary incentives to elicit decisions. Reporting the differences between the behaviours of individuals playing for tokens or real money, Smith suggested that hypothetical rewards were "more erratic, unreliable and easily satiated" than money (Smith 1962; Smith 1976). Subsequently, paying subjects has become the norm in experimental economics, as opposed to experimental psychology for instance.

Economic games have long been used to test the basic assumptions about the preferences of economic agents, on which hinges most economic theories (Fehr and Fischbacher 2002). The veracity of these assumptions is not observable empirically, as only the resulting choices made by agents are observed. Therefore experimental economists have designed simple games to identify and measure preferences in a controlled environment, very similar to that of a laboratory (Ensminger 2001; Charness and Rabin 2002). For example, the dictator game is one of a series of experiments that has been developed to test whether individuals behave as utility-maximisers (i.e. choosing options that maximise payoffs). This experiment involves two players. The first, "the proposer" (or dictator), determines an allocation of some endowment (determined by the experimenter). The second, the "recipient", simply receives the remainder of the endowment not kept by the proposer for himself.

Applications of experimental economics

Economic experiments have mainly been used for three purposes.

First, economists have used lab experiments to "test" existing or new theories, testing conclusions and/or assumptions. By comparing the predicted outcomes of the theory to the experimental observations, one can test the predictive power of competing theories. Alternatively, experiments allow researchers to test the extent to which the assumptions on which a theory is built are adequate. For example, the dictator game has been used to test one of the basic assumptions made by the homo economicus model of individual behaviour – utility-maximisation. If individuals were only concerned with their own economic well being, proposers (acting as "dictators") would keep the entire endowment to themselves and give nothing to the other player. In the same spirit, economists have used experiments to assess the impact of different environments or institutions on the predictive power of a theory or assumption, in order to refine theories. The literature on social preferences and the various forms of other-regarding preferences is one example of such use (Rabin 1993; Andreoni and Miller 2002; Charness and Haruvy 2002; Charness and Rabin 2002; Charness 2004).

Second, experimental games have been used extensively to assess the relative advantages and effects of regulatory mechanisms. When applied to policy issues, games are usually tailored (and designed) to fit real-world situations, so they can provide simplified models of an economic environment where participants are invited to make decisions based on real monetary incentives that mimic the ones faced in reality. Therefore they allow the measurement of the relative effectiveness of various regulation mechanisms on different outcomes. Interesting examples include an experiment in the field investigating the embezzlement behaviour of health workers and potential regulatory mechanisms (Barr, Lindelow et al. 2003); or a game designed to measure the relative effects of different determinants of corruption (Abbink, Irlenbusch et al. 2002).

Finally, experimental economics has recently been used as a measurement tool for values such as altruism (Eckel and Grossman 1996; Bettinger and Slonim 2005; Fowler 2006; Andreoni, Harbaugh et al. 2007), trust (Glaeser, Laibson et al. 2000; Carpenter, Daniere et al. 2003; Haile, Sadrieh et al. 2004; Holm and Danielson 2005) or preference for equity or fairness (Visser 2002; Gowdy, Iorgulescu et al. 2003). Altruism has typically been measured as the proportion of money sent by the decider in the dictator game. Trust has been measured by the proportion of money the first player in a trust game agrees to send to the second player, in the prospect that this second player will return a proportion. When experimental games have been used as measurement tools of social preferences, the constructed measurements have usually been used in association with other data, to test whether the social

preferences measured constituted predictive variables of actual behaviours. In Peru, Karlan (2005) examined whether behaviour in trust games predicts repayment of loans to a group lending micro-finance programme.

Experimental design

In this research, economic experiments were used to measure different facets of nurses' altruism. Tools and instructions were pre-tested in South Africa in November 2007, and later adapted to the context of Kenya. This section presents the rationale and details of the experiments implemented.

To construct simple measures of nurses' altruism, the dictator game was chosen, with respondents playing the role of allocators (or dictators). This game is supposed to elicit the preference for altruism of allocators, as the neo-classical utility-maximizing move is not to share. As the game is free from strategic considerations or reciprocity (recipients ignore the identity of their potential generous donors), the allocators' only motive for sharing the initial endowment is the propensity to value positively others' well being. In this setting, subjects were free to choose one of eleven possible ways to split KSH200 (Figure 1). This payoff was chosen with reference to the daily wage of a recently graduated nurse.

Figure 1: Tools used to capture respondents' altruism

STUDY NUMBER: **TASK 1**

For each question (A, B and C), circle the number of the option you choose

		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11
A	You get	*100%* Ksh 200	*90%* Ksh 180	*80%* Ksh 160	*70%* Ksh 140	*60%* Ksh 120	*50%* Ksh 100	*40%* Ksh 80	*30%* Ksh 60	*20%* Ksh 40	*10%* Ksh 20	*0%* Ksh 0
	Another student gets	*0%* Ksh 0	*10%* Ksh 20	*20%* Ksh 40	*30%* Ksh 60	*40%* Ksh 80	*50%* Ksh 100	*60%* Ksh 120	*70%* Ksh 140	*80%* Ksh 160	*90%* Ksh 180	*100%* Ksh 200
	YOU CHOOSE:	1	2	3	4	5	6	7	8	9	10	11

		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11
B	You get	*100%* Ksh 200	*90%* Ksh 180	*80%* Ksh 160	*70%* Ksh 140	*60%* Ksh 120	*50%* Ksh 100	*40%* Ksh 80	*30%* Ksh 60	*20%* Ksh 40	*10%* Ksh 20	*0%* Ksh 0
	A patient gets	*0%* Ksh 0	*10%* Ksh 20	*20%* Ksh 40	*30%* Ksh 60	*40%* Ksh 80	*50%* Ksh 100	*60%* Ksh 120	*70%* Ksh 140	*80%* Ksh 160	*90%* Ksh 180	*100%* Ksh 200
	YOU CHOOSE:	1	2	3	4	5	6	7	8	9	10	11

		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11
C	You get	*100%* Ksh 200	*90%* Ksh 180	*80%* Ksh 160	*70%* Ksh 140	*60%* Ksh 120	*50%* Ksh 100	*40%* Ksh 80	*30%* Ksh 60	*20%* Ksh 40	*10%* Ksh 20	*0%* Ksh 0
	A poor person gets	*0%* Ksh 0	*10%* Ksh 20	*20%* Ksh 40	*30%* Ksh 60	*40%* Ksh 80	*50%* Ksh 100	*60%* Ksh 120	*70%* Ksh 140	*80%* Ksh 160	*90%* Ksh 180	*100%* Ksh 200
	YOU CHOOSE:	1	2	3	4	5	6	7	8	9	10	11

Adopting a similar approach as Branas-Garza (2006), three framings of recipients were used, to differentiate nurses' altruism towards different identities of recipients, described by a few general characteristics: anonymous students, patients and poor persons. The objective was to measure the strength of nurses' commitment towards their patients. Framing is also desirable here to improve the external validity of these measures.

Patients and "poor people" were identified as recipients. A third recipient, which conforms to the traditional anonymous beneficiary of most dictator game experiments, was added to control for variability in results as a consequence of the manipulation of key factors (Camerer 2003); in particular here the observation that donations to recipients increase with a sense of usefulness (Eckel and Grossman 1996) or the understanding that recipients need it (Branas-Garza 2006). It is highly likely that nurses will see 'patients' in low socio-economic groups as especially 'needy'. These three framings were chosen to test the following two hypotheses:

- Other things being equal, the patient identity triggers more altruism than the traditional fellow student;
- Donations in the dictator games are linked to an element of financial need – the "poor" framing will generate more gifts than the other two.

To produce individual measures, minimize the cost and length of the experimental session[4], as well as the risk of contamination that could occur with several rounds and several payoffs, the procedural design used response functions (Barr, Lindelow et al. 2005; Brandts, Fatás et al. 2006). Each participant had to decide *a priori* the allocation they would make, if they were paired with each of three different recipients. Following Brands et al. (2006), at the end of the game only one of the recipient identities was then randomly selected. Participants knew in advance that their payoffs would be determined by the choices they had made for any one of the recipients. This was particularly emphasised in the instructions given to the participants.

Analysis

Constructing experimental measures of altruism

The dominant interpretation of the dictator game in the literature on experimental economics is that the money relinquished by respondents playing the role of dictators in a dictator game can be interpreted as a measure of their altruism. The section below presents the measures of altruism that were derived from the two sets of data: the first game and the first set of the second game.

The first game consisted of a dictator game where respondents had to choose one division of a given amount of money (KSH200), out of the 11 possible splits that were proposed to them.

Three different framing of the recipients were included, so that for each individual, three measures of altruism (A_1, A_2 and A_3) were computed, with

[4] Given that experimental games were administered at the same time as all the other baseline tools, it was judged important to find ways to neutralize as much as possible any "fatigue" effect of participants.

$$A_j = q_j$$

Where q_j is the proportion of money given up to the recipient *j*, with *j*=1 when the recipient was the fellow student, *j*=2 when the recipient was the patient and *j*=3 when the recipient was the poor person.

The first step in the analysis of a dictator game usually involves a descriptive presentation of the results through two aspects:

- The average proportion of the initial endowments relinquished by the dictators
- The distribution of choices over all the possibilities given to players

These basic results are presented for all three frames and for the different types of participants, and appropriate statistical tests are performed to assess the significance of differences found. Basic linear regressions with framing dummies are used to test the significance of the framing, and a Mann-Whitney test is used to compare the whole distributions.

Multivariate analysis

To investigate the determinants of altruism, regression techniques were used. The empirical approach can be summarised as follows:

$$A_{ij} = \beta X_i + \delta Z_i + \mu_i$$

where the dependent variable A_{ij} denotes the measure of individual i's altruism for framing *j*, as presented earlier. Explanatory variables are made up of vectors of socio-demographic characteristics (X_i) and measures of individual values (Z_i), while μ_i is a vector of residuals. The analysis involved estimating a unique random-effects Tobit regression model, for three reasons. First, it allowed the simultaneous analysis of all three decisions in the same model, thereby testing the influence of the framing effect. Second, it provided a rigorous test to examine the difference between the determinants of altruism across the three framings. Finally, the combined model accounted for serial correlation between the three consecutive choices made by respondents.

For all model specifications, the approach was to estimate a full model first, which included the whole set of variables. Then reduced forms were estimated, and a parsimonious form was retained based on goodness-of-fit measures (Chi^2). Only the restricted models are presented in the results section[5].

Focus Group Discussions

Two FGDs were carried out in each MTC, one each for pre-service and upgrading students. 6-8 participants were randomly selected for each group from all those completing the SAQ. Each group included both male and female students. The discussions covered trainees' experiences, attitudes towards rural areas, rural postings, and nursing in general, and potential interventions to improve health worker distribution. Discussions lasted between 45 and 90 minutes, and were digitally recorded, supplemented by note taking.

[5] Full model estimates were consistent with restricted model estimates.

Analysis

FGD recordings and field notes were reviewed for clarity, transcribed, uploaded into the qualitative analysis software, *NVivo7*, and subjected to content analysis. This involved development of a coding "tree" or thematic framework. A draft coding tree was developed from the FGD topic guide, tested by two researchers separately on about 30% of all data collected, and refined using themes emerging from transcripts. Information under each code was then compiled and tabulated to obtain a clearer picture of the issues arising from the data, and to compare views across different groups of participants.

Cohort Follow-up and Maintenance

The choice of a prospective cohort study design was justified by a need to limit potential biases inherent in cross-sectional or retrospective study designs. For example, recall bias is less of a problem when events, choices and justifications are much more recent. Cross-sectional studies may be biased if current health worker populations over-represent health workers that have chosen to remain in public sector service or those that have been unable to find jobs elsewhere. Retrospective designs are limited by follow-up and recall biases and raise ethical questions when participants have not given prior consent to be followed-up. Cohort designs enable a better investigation of the dynamics of individual choices and their determinants as they occur. Of course, the concern in prospective cohort studies is that cohort members may also be lost to follow-up. However, active cohort management over time means that this is less of a problem than in retrospective cohort study designs and the clear advantages over cross-sectional surveys justify the additional effort required.

Participants were eligible for the follow-up if they had sat for Nursing Council of Kenya (NCK) exams in March 2009 and had been declared qualified registered nurses by the NCK in exam results released in June 2009. We intended to contact all eligible cohort members quarterly and follow-up began in August 2009. Follow up was completed in June 2010. Multiple communication methods were used to maximise chances of reaching a participant. A cohort secretary was employed for a period of one month every three months to facilitate the follow-up. Mobile phone calls, electronic text messages and emails were the primary means of keeping contact.

Detailed information was collected from each cohort member at baseline to facilitate subsequent follow-up including:

- All possible addresses and contact numbers including at least one mobile phone number; and
- Addresses and contact details of participant's spouse, other family members and friends.

All personal and workplace contact information was checked and updated at each quarterly communication. Participants were also encouraged to contact the research team if any of the contacts changed. A website co-hosted between Kenya, Thailand and South Africa (members of the cross-country study) was used to enhance a sense of community and to create a platform for the research team and study participants to interact through blog messages and updates.

Analysis

Simple descriptive analysis was used to compare the characteristics of pre-service and upgrading students. Simple proportions were used to describe employment characteristics and job seeking behaviour for each group of respondents. Demographic characteristics of respondents and their training area were cross tabulated with; first, location of employment and secondly with sector of work to determine probability of working in rural areas and in the public sector respectively. Preliminary results are presented in this report.

3. RESULTS

Self-administered questionnaire and focus group discussion results

Results are presented on respondent characteristics, their perceptions of life and posts in rural areas, and their perceptions of strategies to improve rural recruitment and retention, drawing from both the SAQ and FGD data.

Characteristics of respondents

Of the 462 students invited, 345 agreed to participate, giving a response rate of 92% for pre-service students and 63% for upgrading students. The lower rate amongst the latter was attributed to difficulties in communicating the invitations, long travel distances from work stations to data collection points, and students' work commitments. Respondents were divided approximately equally between pre-service and upgrading students (48.1% and 51.9% respectively), and 34.5% were from the most urban MTC in Nairobi (Table 3). Two thirds described themselves as having been born in a rural or relatively rural area.

Table 3: Characteristics of respondents

	Pre-service n=166	Upgrading n=179	Total n=345
MTC (%): Nairobi	55 (33.1)	64 (35.8)	119 (34.5)
Murang'a	48 (28.9)	31 (17.3)	79 (22.9)
Meru	29 (17.5)	29 (16.2)	58 (16.8)
Kakamega	34 (20.5)	55 (30.7)	89 (25.8)
Sex: female (%)	113 (68.1)	147 (82.1)	260 (75.4)
Mean age in years (sd)	23.96 (2.3)	37.53 (6.4)	31 (8.4)
Marital status: married (%)	18 (10.8)	138 (77.1)	156 (45.2)
Any children (%)	25 (15.1)	159 (88.8)	184 (53.3)
Educated father* (%)	129 (77.7)	103 (57.5)	232 (67.3)
Educated mother* (%)	120 (72.3)	72 (40.2)	192 (55.7)
Born in a rural area (%)	95 (57.2)	133 (74.3)	228 (66.1)
Scholarship recipient for current course (%)	24 (14.5)	10 (5.6)	34 (9.9)

*a parent was considered educated if they had at least completed primary education

Most students were female (75.4%). The upgraders formed an older group, with a mean age of 38 years (range 24-52) compared with 24 years (range 20-40) for pre-service students. Upgraders were also more likely to be married and to have children. Level of education of parents was higher for pre-service students than for upgraders (77.7% and 72.3% of pre-service students' fathers and mothers, respectively, had completed primary education, compared to 57.5% and 40.2% for upgraders). For most students, parents and family members paid for their studies, with only a small proportion (9.9%) obtaining scholarships for their training, of which the majority (7%) received government scholarships. All pre-service interviewees were full-time on-campus students, while all upgrading interviewees were studying on a distance learning basis, reporting to the college for a few weeks to attend introduction to modules or to sit exams.

More upgrading trainees had chosen nursing as their first career choice (77.7%) compared to pre-service trainees (61.5%). In FGDs, some pre-service students stated that they had agreed to pursue nursing in response to parental pressure, or that nursing only became an option because they failed to get accepted into their preferred training programmes such as clinical medicine and pharmacy.

> *"…actually I applied for pharmacy…. but they took me for nursing and I had no choice because I had already applied three times, I was not going to lose the chance" Pre-service nursing student*

Experience of working in rural areas was very different between the two groups. 68.7% of upgrading trainees had already held posts in rural areas, in contrast to pre-service students who had no rural (or urban) job experience.

When asked in FGDs which sector they would target upon graduation, upgrading students did not appear to have a strong preference for any particular sector but a minority of pre-service students favored private hospitals and non-governmental organizations (NGOs) which are mainly located in urban areas. These facilities were associated with higher salaries.

> *"I would prefer after college to go maybe to private sector because there (for) one, I'm assured of a good salary…" Pre-service nursing student*

Perceptions of rural areas

As described above, the SAQ included a set of Likert scale statements, on attitudes to living and working in rural areas. Table 4 shows the mean results for these statements based on a 6 point scale of 1 (strongly disagree), 2 (moderately disagree), 3 (somewhat disagree), 4 (somewhat agree), 5 (moderately agree) and 6 (strongly agree). An upper confidence interval less than 3.5 was considered as an indication of general disagreement with the statement, and a lower confidence interval above 3.5 as an indication of general agreement.

Table 4: Mean Likert scale scores for attitudes towards life and work in rural areas (minimum score 1, maximum 6)*

		Pre-service	**Upgrading**	**Total**
		mean (CI)	mean (CI)	mean (CI)
1	Housing is good in rural areas	2.8 (2.6-3.1)	3.2 (2.9-3.5)	3.0 (2.8-3.2)
2	Quality of life in rural areas is very good	3.4 (3.2-3.7)	3.4 (3.1-3.7)	3.4 (3.2-3.6)
3	The lifestyle you have in rural areas appeals to me	3.2 (2.9-3.4)	3.3 (3.0-3.5)	3.2 (3.0-3.4)
4	The social life in rural areas in enjoyable	3.3 (3.0-3.6)	3.7 (3.5-4.0)	3.5 (3.3-3.7)
5	Being posted in a rural area would appeal to me	3.7 (3.5-3.9)	3.3 (3.1-3.5)	3.5 (3.3-3.7)
6	I would feel scared if I had to work in a rural area	2.0 (1.8-2.2)	2.5 (2.2-2.7)	2.2 (2.1-2.4)
7	Bringing up children in rural areas is difficult	2.5 (2.2-2.7)	2.7 (2.5-3.0)	2.6 (2.4-2.8)
8	Working in rural areas means you are without support from colleagues/supervisors	1.8 (1.6-2.0)	1.7 (1.5-1.9)	1.7 (1.6-1.9)
9	You can earn more money when you work in a rural area	3.3 (3.0-3.6)	2.7 (2.4-3.0)	3.0 (2.8-3.2)
10	You can obtain advancement in your career quickly if you choose a rural position	2.9 (2.7-3.2)	2.6 (2.3-2.8)	2.8 (2.6-2.9)
11	Working in rural areas is not stressful at all	2.7 (2.4-2.9)	2.9 (2.6-3.1)	2.8 (2.6-3.0)
12	Living in a city is stressful	3.7 (3.4-3.9)	3.9 (3.7-4.2)	3.8 (3.6-4.0)

*All the questions were rated on a scale from 1= strongly disagree 2= moderately disagree 3= somewhat disagree 4= somewhat agree 5= moderately agree to 6= strongly agree

A preliminary PCA was conducted of the statements in Table 4, which indicated that they could be broadly grouped into two domains. The first group of variables included statements 1-4 (Cronbach's alpha of 0.66) which all described life in rural areas. The second construct pooled together statements 5-11 (Cronbach's alpha of 0.51) which pertained to work in rural areas. One statement (number 12) did not fit within either domain.

Life in rural areas

Students' responses in FGDs suggested they generally understood rural areas to be those which are fairly remote with poor infrastructure (bad roads, limited transport services, no electricity, poor mobile phone network, and low water supply), poor health services, limited variety of available housing and hardly any recreational facilities.

> *"…you know our country how it is, infrastructure is bad, if you take me to a remote area, there is no accessibility, there is no infrastructure, there are no telephones, and there are no*

roads, it rains…I stay there for months without talking to my people in the urban…" Upgrading nursing student

Comparatively, urban areas were perceived to be more accessible with stronger infrastructure, better health services and educational institutions, and a variety of recreational facilities. Upgrading students, who were mostly married, commented that they often get separated from their children when they took rural posts, as their children were schooled away from them in urban areas as rural schools were considered to be of substandard quality.

However, during FGDs, rural areas were more positively often associated with a lower cost of living, with lower housing rents, school fees, and food prices reported.

"…the nurses who are out there, me I don't hear them complain, they can afford. They eat food from the shambas (farms); things are not as expensive…" Pre-service nursing student

"Like in Nairobi to get a one bed-roomed house you need around KES 8000 (USD 102.5) but like where I went for my district experience, you could get a house for KES 1500 (USD 19.2) per month" Pre-service nursing student

When asked whether they were willing to work in any rural area in the country, both groups of students expressed fear of working in communities dominated by other tribes. They attributed their fear to post election violence that cut across the country in late 2007 and early 2008, mainly affecting rural areas.

"…I was on my marks just in case something happens I run away, and in fact one of the facilities that I personally initiated, I never went there for a long time because of fear of the post election violence, so but once you know that there is that security you feel good" Upgrading nursing student

Students cited examples of colleagues and family members who were forcefully evicted from their homes or working areas because of ethnic differences.

"Like myself if am told I go to Mount Elgon that place called Ekopsiro, I would not go for one there are two colleagues whose lives went, so you could not admire going to that particular place" Upgrading nursing student

Likert scale responses contrasting life in rural and urban areas did not elicit strong views from pre-service or upgrading students (Table 4), though respondents gave some indication that they found rural housing and lifestyles unappealing.

The PCA conducted for this construct (based on statements 1, 2, 3 & 4), produced a first principal component that accounted for 50.3% of the total variance, which was retained and used to produce a score reporting individuals' perceptions of life in rural areas (a higher PCA score indicated stronger preference for rural areas) (Table 5).

Table 5: Principal components analysis on attitudes towards lifestyle in rural areas

.

		Component			
		1	2	3	4
1	Housing is good in rural areas	0.415	0.767	0.305	0.383
2	Quality of life in rural areas is very good	0.557	0.211	-0.467	-0.654
3	The lifestyle you have in rural areas appeals to me	0.526	-0.424	-0.416	0.608
4	The social life in rural areas is enjoyable	0.49	-0.433	0.719	-0.236
Proportion of variance explained		0.503	0.224	0.156	0.117

We modeled the determinants of this index using multivariable regression with the following independent variables: trainee type (upgrading or pre-service), age, sex, marital status, having children, being born in a rural area, and location of MTC (Table 6). The only significant finding was that students attending Kakamega MTC had generally more positive perceptions of "life in rural areas".

Table 6: Multivariable regression results

Independent Variables	**Regression Coefficients**	
	Attitudes towards lifestyle in rural areas Overall p value = <0.001 R squared = 0.0872 n= 343	Attitude towards working in rural areas Overall p value = 0.001 R squared = 0.0779 n= 340
Upgrading student	-0.32	-1.03***
Age (yrs)	0.01	0.03*
Male	0.14	0.21
Single	0.27	0.02
Any children	0.65	0.23
Born in a rural area	0.07	0.25
Meru MTC[1]	-0.09	-0.18
Kakamega MTC[1]	0.52**	0.28
Murang'a MTC[1]	-0.40	-0.07
Constant	-0.79	-0.67

*p=0.05 *** p<0.001

[1] Compared to Nairobi MTC as the base case

Nursing posts in rural areas

Likert scale responses indicated that nursing students (both pre-service and upgraders) had mixed perceptions of nursing posts in rural areas (see statements 5-11 in Table 4). On the one hand they associated them with lower incomes, slow career advancement and workplace stress, but on the

other hand they did not feel that they would be frightened to work there, that it would be difficult to bring up children or that they would be without support from colleagues and supervisors.

PCA on the 7 variables in this domain (statements 5-11 in Table 4) produced a first component which accounted for 26% of the total variance (Table 7). This was retained and used to produce a score reporting individuals' perceptions of nursing posts in rural areas

Table 7: Principal components analysis on attitudes towards working in rural areas

		Component						
		1	2	3	4	5	6	7
5	Working in rural areas means you are without support from colleagues/supervisors	0.294	-0.342	-0.621	0.257	0.538	0.208	-0.116
6	You can earn more money when you work in a rural area	0.37	0.418	-0.269	-0.323	0.159	-0.693	-0.075
7	You can obtain advancement in your career quickly if you choose a rural position	0.384	0.372	-0.089	-0.489	-0.112	0.672	-0.050
8	Working in rural areas is not stressful at all	0.266	0.378	0.575	0.386	0.546	0.089	0.022
9	Being posted in a rural area would appeal to me	0.462	0.127	-0.172	0.532	-0.521	-0.024	0.431
10	I would feel scared if I had to work in a rural area	0.477	-0.37	0.30	0.041	-0.279	-0.094	-0.676
11	Bringing up children in rural areas is difficult	0.344	-0.523	0.29	-0.396	0.160	-0.086	0.579
Proportion of variance explained		0.260	0.180	0.143	0.131	0.104	0.101	0.081

As for attitudes to living in rural areas, we modeled the determinants of this index using multivariable regression. Being an upgrading student had a significantly negative effect on preferences for working in rural areas, but being older had a positive effect (Table 6).

During discussions upgrading students shared the view that poor communication channels in rural areas limited the flow of information on training opportunities such as workshops and seminars. In addition, they revealed that staff shortages denied them the opportunity to pursue their studies because a replacement was not always available.

"…when you stay in rural community as a health worker, you might end up missing some of the privileges that people in town do enjoy like maybe there are some seminars and you are not aware…like someone working here at PGH [Provincial General Hospital] you may be coming to further your studies here at MTC unlike when you are in rural area, you just stagnate there, there is no advancement" Pre-service nursing student

When discussing provision of allowances for nursing posts, participants acknowledged the fact that rural posts attract lower housing allowances compared to those offered in urban posts. Upgrading students were however quick to point out that the higher allowances paid in urban posts were used to cater for higher living expenses in these areas.

Upgrading students held the view that positions in rural dispensaries or health centers allowed for more autonomy at work, reflecting the low number of staff per facility, and better coordination of activities. They alluded to the fact that division of work and assignment of duties is much easier with fewer staff.

"The work is there but, because in the rural we have three people, we know now it is the end of the month, we know we have ten reports to be written …. We know it is our responsibility so we know how to do division of work" Upgrading nursing student

However, some pre-service students held more negative opinions of working in rural facilities, stating that unfavorable work conditions, such as higher workloads, poor staffing, infrequent support supervision and inadequate equipment and supplies, would make it difficult to perform daily duties or limit them to managing minor cases.

"You know when you are working in the rural areas, it's like you are just working with the community, and you don't grow. You just deal with the most common ailments….of course in the rural area you'll never enter in a theatre like in the urban area" Pre-service nursing student

Others pointed out that some rural communities reject health workers and health care in general and prefer traditional medicine adding that such rural posts were not attractive to them.

"The real rural area is Nyadhuna... the patients have a poor attitude toward the nurses, and they prefer the TBAs [Traditional birth attendants]" Pre-service nursing student

"I think even before they post you, they should consider the community where they are taking you, because if I am taken to a community where I know I will be rejected, I cannot accept that one" Pre-service nursing student

Faith-based organizations (FBOs) which contribute approximately 40% of national healthcare mainly in rural and underserved areas were thought to pay the lowest salaries. This particular sentiment was shared amongst upgrading students who also felt that workloads in FBOs were often too high.

"when you go to some of the private hospitals especially the mission hospitals, I tell you that place is horrible because you see somebody with an experience of ten years in the same institution and cannot even afford a salary of KES 14,000 (USD 179.48) so what I mean is especially the mission hospitals, some of the mission hospitals the pay is very poor and the work load is too much…" Upgrading nursing student

Despite individual preferences both groups of trainees were of the opinion that all cadres of nurses (including ECNs and RNs) are adequately trained to work in any health facility, and that they should therefore be ready to work in lower level facilities in rural areas.

"what I think, like now there should be a channel of everybody having an opportunity to pass through the rural and the hospital because we are trained for all this" Upgrading nursing student

Strategies to recruit and retain nurses in rural areas

Varied perceptions of strategies to recruit and retain nurses were reported in the SAQ (see results for Likert statements in Table 8). Students generally felt compulsory rural service for government supported students was reasonable and that, for pre-service students, the greater responsibility in a rural area might be motivating. These positive work attributes could be enhanced by better housing and prospects for career advancement. Being able to choose the rural area to work in was also felt to be of some value while there was strong support for greater rural financial incentives as a means to attract people to such posts, with the majority of students suggesting that this should be up to 50% of basic salary. Pre-service students were significantly more likely than in-service students to agree with the statements on the motivating impact of greater responsibility and the importance of decent housing.

Table 8: SAQ strategies/interventions

		Pre-service	**Upgrading**	**Total**
		Mean (CI)	Mean (CI)	Mean (CI)
Perceptions of strategies to recruit and retain nurses in rural areas				
13	Making it compulsory for graduates from Gok funded colleges to spend time in a rural health facility is a good thing	3.7 (3.4-4.0)	3.9 (3.6-4.2)	3.8 (3.6-4.0)
14	Paying more to nurses who work in disadvantaged or very remote areas is fine	5.6 (5.4-5.8)	5.7 (5.5-5.8)	5.6 (5.5-5.7)
15	Giving more responsibilities to nurses is a good way to motivate them	4.4 (4.1-4.7)	3.5 (3.2-3.8)	3.9 (3.7-4.1)
16	If I have work in a rural area it is important to me to be able to chose which rural area	4.5 (4.2-4.8)	4.7 (4.5-5.0)	4.6 (4.5-4.8)
17	If decent housing was provided with posts in rural areas I would be happy to go	4.5 (4.3-4.8)	3.9 (3.6-4.1)	4.2 (4.0-4.4)
18	For your career advancement, each year spent as a nurse in a remote or disadvantaged area should count twice as much as anywhere else	4.5 (4.3-4.8)	4.2 (4.0-4.5)	4.4 (4.2-4.6)

During FGDs, nursing students in both groups were mostly unaware of any interventions introduced in Kenya to recruit and retain health workers in rural areas. Some upgrading students were aware that rural hardship allowances ranging from KES 600 (USD 7.7) to KES 1300 (USD 16.6) per month were currently offered as a means to retain some cadres in remote areas, though they were felt to be insufficient to influence decisions on whether to work in the more remote provinces.

> *"… in government … sometimes you are in a … place … so remote, and you don't get risk allowance … those who get hardship allowance get a maximum of KES 1300 (US$16.6) and something, that KES 1000 (USD 12.8) can it allow me to work in North Eastern? No." Upgrading nursing student*

Students also felt that if advertisements for public sector nursing jobs specified job location and facility type, potential applicants would be able to make more informed decisions when applying for posts. Students reported that such details are not provided for standard government posts, but have been included in advertisements for the recent short-term government contracts. Recruitment procedures for the private sector and FBOs were reported to be clearer than in the public sector, allowing potential applicants to know what role they are applying for and where they will be posted.

> *"Most of the NGOs' adverts are more elaborate because they have job descriptions, qualifications and all that. And you realize that hospitals [Public] give you very little information about the job you intend to apply for, maybe they just say a KRHN nurse with a diploma and a working experience of this [number of] years but I find NGOs and CBOs (community-based organizations) more elaborate on what they want when they advertise their jobs." Pre-service nursing student*

In FGDs upgrading students supported the view that rural postings in health centers and dispensaries offered nurses a valuable opportunity to carry out managerial duties as in-charges (managers) of the facilities.

> *"… in the villages you will be performing your managerial functions, you will manage yourself, the drugs…" Upgrading nursing student*

It was suggested that rural recruitment could be boosted by recruiting MTC students from rural areas, and perhaps training them in MTCs located in relatively remote areas. Many students favored the idea, and one upgrader argued that rural MTCs should implement a 'quota system' and restrict three quarters of their students to be recruited locally. However, others thought this strategy would be unlikely to have a major impact on rural recruitment in the face of persistent infrastructural problems. Moreover, high illiteracy levels in some marginalized communities where very few people attain the qualifications necessary for college education were cited as a major challenge meaning that the most marginalized would be unlikely to benefit fully.

Although likert scale responses indicated that students felt support from colleagues and supervisors was adequate in rural areas, during FGDs students argued that supervision was often focused on fault-finding, and that more supportive regular supervision would encourage nurses to practice in rural areas since they would feel less neglected.

"…I have been working in a rural set up where they do not come, but the moment they will hear that facility has a problem, they will come every month hunting you, stopping your salary, yeah…that is their idea. They do not give you support…supportive supervision" Upgrading nursing student

In the SAQ, about half the upgrading and pre-service students (49.4% and 52.5% respectively) felt that "a safe job with no risk of closing down or unemployment" was the most important factor when looking for a job, ranking this more highly than "a good income so that you do not have any worries about money", "doing an important job that gives you a feeling of accomplishment", or "working with people you like". This was reflected during FGDs, where the new short-term contracts for specific rural posts were generally unpopular, with permanent public contracts preferred by both pre-service and upgrading trainees. Those disliking short contracts feared the lack of pension plan and long-term job security.

"Short term contracts, you can get a lot of money at a go but going to get another job is difficult, that money you may stay with it at home and spend it completely, what will you do?" Upgrading nursing student

In addition, delayed salary payments experienced by short-term hires came out as an issue of contention.

"…they just pay for one month then they carry forward the rest of the months, you see when a person is permanently employed at the end of each month at least…[they get their salary]" Upgrading nursing student

Discrete Choice Experiment Results

The results of the DCE, for pre-service and upgrading students separately, are shown in Table 9. The results are for the final models used, including interactions with socio-demographic variables. The final models were statistically significant with reasonable fit – a pseudo R^2 of 0.19 for the conditional logit would be equivalent to an R^2 of approximately 0.47 in linear regression (Hensher, Rose et al. 2005). All odds ratios were in the expected direction. The low statistically significant odds ratios for the rural constant indicate a strong preference for urban jobs in both groups.

For the pre-service group, most job characteristics were statistically significant. The type of facility was not a significant determinant in the choice of either a rural and urban job, and supportive management was not important for urban posts. Providing a 10% rural allowance, subsidised housing, preferential access to postgraduate training, a permanent contract, and supportive management all increased the odds of choosing a rural job, whereas having to wait longer for promotion decreased the odds. Offering a permanent contract and preferential training opportunities had the largest impact on rural uptake, with higher odds ratios than a 10% rural allowance.

Older, male, and married pre-service nurses had lower odds of choosing a rural job. Students from the Nairobi MTC were also less likely to accept a rural posting but this was not statistically significant. Interestingly, pre-service nursing students who indicated in the demographic

questionnaire that nursing was their first career choice had statistically lower odds of choosing a rural job, while those who answered that they would be happy to accept a rural post were 1.9 times more likely to do so in the DCE.

Upgrading ENs valued the incentives similarly to pre-service nurses except that housing was not important in urban postings, and supportive management was not statistically significant for either rural or urban jobs. Being offered a permanent contract was particularly attractive to the upgrading nurses. In this group, older nurses were more likely to choose a rural job and none of the other demographic characteristics were statistically significant. Again respondents who indicated that they would be happy to accept a rural post in the questionnaire had higher odds of choosing the rural option in the DCE, after adjusting for all other variables in the model.

Table 9: Results of the DCE

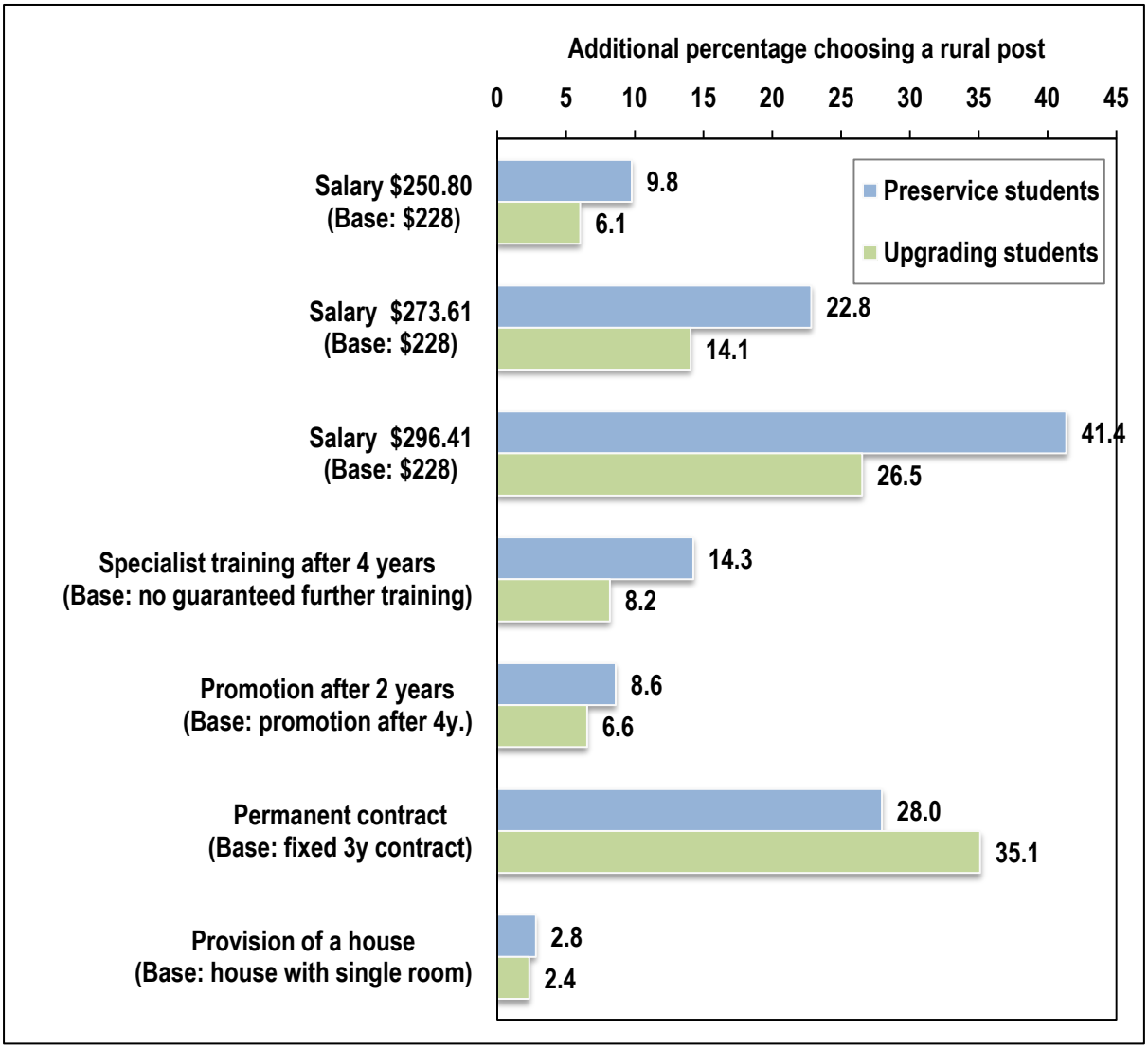
Attribute	Pre-Service Students					Upgrading Students				
	OR	95% CI		SE	p value	OR	95% CI		SE	p value
Rural constant	0.006	0.001	0.053	0.007	**<0.001**	0.001	0.000	0.003	0.000	**<0.001**
Rural*Facility type	1.080	0.925	1.261	0.085	0.330	0.954	0.833	1.092	0.066	0.496
Rural*10% Rural allowance	1.388	1.316	1.464	0.038	**<0.001**	1.279	1.219	1.342	0.031	**<0.001**
Rural*Subsidised housing	1.233	1.053	1.445	0.100	**0.009**	1.205	1.029	1.411	0.097	**0.021**
Rural*Preferential training	2.294	1.949	2.700	0.191	**<0.001**	1.795	1.530	2.107	0.147	**<0.001**
Rural*Time to promotion	0.758	0.699	0.821	0.031	**<0.001**	0.789	0.726	0.857	0.033	**<0.001**
Rural*Permanent contract	4.165	3.263	5.315	0.518	**<0.001**	6.239	4.845	8.035	0.805	**<0.001**
Rural*Supportive management	1.241	1.041	1.478	0.111	**0.016**	1.062	0.925	1.220	0.075	0.391
Urban*Facility type	0.984	0.850	1.140	0.074	0.831	1.012	0.872	1.173	0.076	0.879
Urban*Subsidised housing	1.287	1.083	1.529	0.113	**0.004**	1.064	0.924	1.226	0.077	0.386
Urban*Preferential training	2.653	2.226	3.161	0.237	**<0.001**	2.033	1.713	2.412	0.177	**<0.001**
Urban*Time to promotion	0.879	0.807	0.957	0.038	**0.003**	0.883	0.815	0.956	0.036	**0.002**
Urban*Supportive management	0.980	0.832	1.156	0.082	0.814	0.972	0.843	1.120	0.071	0.693
Rural*Age[1]	0.933	0.875	0.995	0.031	**0.034**	1.033	1.006	1.062	0.014	**0.018**
Rural*Sex	0.649	0.468	0.899	0.108	**0.009**	0.890	0.589	1.347	0.188	0.583
Rural*Single[2]	0.597	0.381	0.936	0.137	**0.024**	1.101	0.791	1.534	0.186	0.567
Rural*Nairobi MTC	0.797	0.579	1.096	0.130	0.163	0.900	0.660	1.226	0.142	0.503
Rural*Educated mother	1.020	0.720	1.444	0.181	0.913	0.986	0.720	1.351	0.159	0.931
Rural*Nursing 1st career choice	0.707	0.520	0.963	0.111	**0.028**	0.835	0.551	1.267	0.177	0.397
Rural*Happy to accept rural posting	1.881	1.392	2.541	0.289	**<0.001**	1.797	1.330	2.429	0.276	**<0.001**
Number of observations	*5312*					*5312*				
Log likelihood	*-1499.43*					*-1599.44*				
Chi-squared p-value	*<0.001*					*<0.001*				
Pseudo-R^2	*0.186*					*0.194*				

[1] Age in years, [2] Single includes all single, widowed and divorced respondents

Predicted probability of rural uptake

To compare the quantitative impact of different policy incentives, the DCE model results were used to predict the probability of accepting a rural posting as shown in Figure 2. The base scenario was considered to be a job in a rural hospital, with a monthly salary of US$ 228.00, on a fixed 3-year contract, with housing in a single room, no guaranteed further training opportunities, a formal management style, and having to wait 4 years for promotion. Figure 2 shows the additional rural uptake in absolute percentage points, above the base scenario, for each of the possible policy incentives.

Figure 2: Predicted probability of choosing a rural posting



The base scenario is described in the text. Each bar represents the additional percentage of respondents that would choose the rural post if offered a particular incentive (and keeping everything else constant).

Financial incentives were effective if sufficiently large, particularly for the pre-service group of students. A 10% salary increase to $250.80 would increase rural uptake by 9.8 percentage points for pre-service students and 6.1% points for upgrading students, but a 30% salary increase to $296.41 would result in an additional increase in rural job choice of 41.4% points for pre-service students and 26.5% of upgrading students. Another powerful incentive was being offered a permanent contract which increased rural uptake by 28.0% percentage points in pre-service nurses (equivalent in impact to a salary increase of between 20 and 30%), and by 35.1% points for upgraders (more effective than a 30% rural allowance). Being given preferential access to postgraduate training was moderately effective followed by faster promotion and then better housing in rural postings (Figure 2).

Willingness to pay (WTP) for non-financial incentives

The WTP for each incentive in US$ is shown in Table 9 for the two groups of students. On average, you would need to pay pre-service students an additional $187 per month, and upgrading students an extra $380 per month, to accept a rural job over the same urban job. Of the available incentives, students expressed the highest WTP for a permanent contract; pre-service students were prepared to pay $53.59 a month compared to $91.42 a month for upgraders in order to change from a 3-year contract to a permanent contract. Both groups were prepared to pay approximately $30 per month for postgraduate training opportunities. WTP for housing and supportive management was much lower and of the same order of magnitude as that required to compensate students to wait longer for promotion.

Table 9: Willingness to pay for non-financial incentives

	WTP in US$ [95%CI]			
	Pre-service		Upgrading	
Rural Constant	**- 186.52**	[-138.04; -235.01]	**- 380.18**	[-340.18; -419.66]
Rural*Subsidised housing	**+ 7.47**	[0.07; 14.25]	**+ 9.73**	[1.17; 18.29]
Rural*Preferential training	**+ 31.23**	[23.96: 38.50]	**+ 29.52**	[20.20; 38.84]
Rural*Promotion	**- 10.23**	[-6.64; -13.82	**- 12.20**	[-7.54; -16.85]
Rural*Permanent contract	**+ 53.59**	[44.70; 62.49]	**+ 91.42**	[74.33; 108.51]
Rural*Supportive management	**+ 7.89**	[1.21; 14.56]	***NS***	
Urban*Housing	**+ 9.80**	[2.89; 16.72]	***NS***	
Urban*Training	**+ 36.56**	[28.67; 44.45]	**+ 35.56**	[24.92; 46.20]
Urban*Promotion	**- 4.83**	[-1.46; 8.19]	**- 6.21**	[-1.81; -10.62]

Units are in US$. The figures indicate the financial equivalent of an incentive based on the marginal rate of substitution between the incentive variable and a salary increase.

Experimental Economic Games Results

Descriptive results

Several key descriptive findings emerged from the results of the dictator game. First, average donations made by nursing students presented in Figure 4 indicate that the size of gifts made by dictators to recipients increases with the poor and patient framing (compared to the student framing). However there was no statistical difference between the donations made to the poor and the patient.

Second, looking at the whole distribution of decisions made (see Figure 3), there is a marked difference between decisions taken for the student frame and those relating to the other two recipients. While the 'student' distribution is left-skewed - which denotes that nurses have kept most of the money for themselves- there is a clear slip toward more altruistic behaviours (giving away 50% or more) with the student and poor frames.

Finally, despite the observed differences in the three frames, they all present the same mode – at the equal split for all three frames. This is an unusual finding, which highlights a concern for fairness in the dictator game, and contradicts the utility-maximising assumption.

Figure 3: Distribution of choices in the dictator game

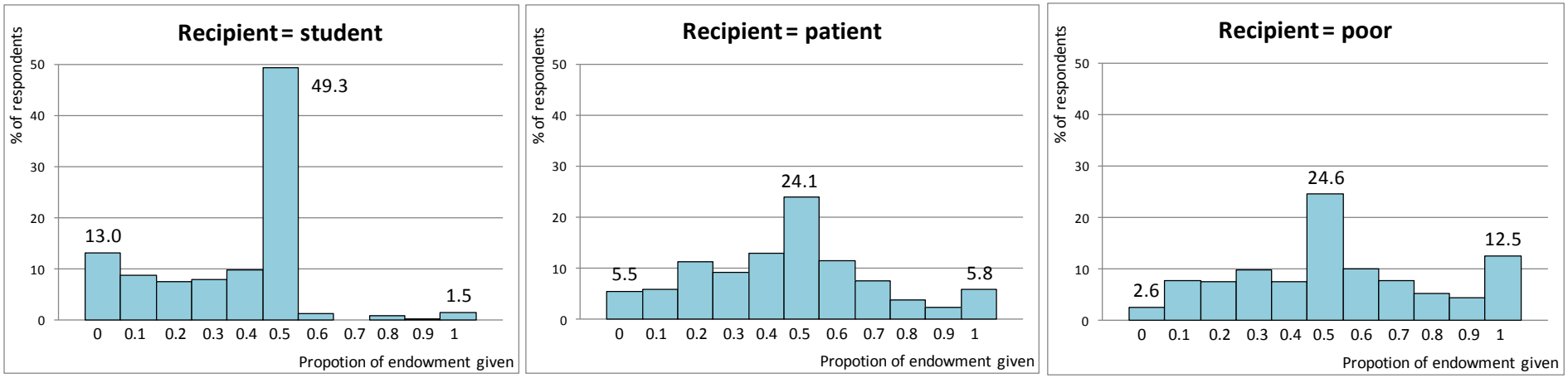


Figure 4: Average share of the initial endowment given by nurses (with 95% CI) for each type of recipient in the dictator game

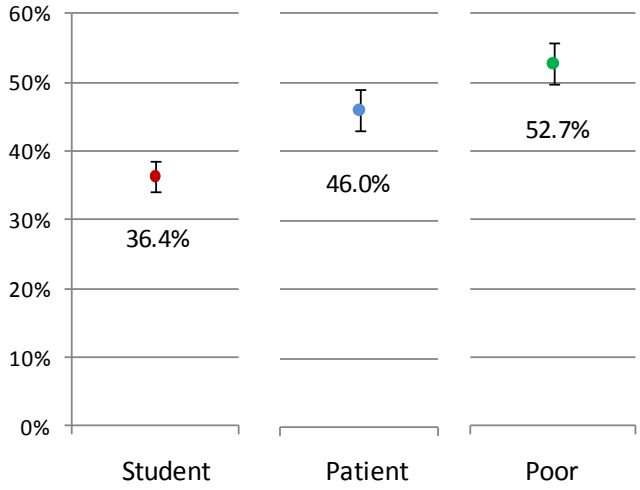


Table 11 below indicate the results of some basic descriptive breakdown of the decisions made in the dictator games by different groups of nursing students. It shows that pre-service students were markedly less generous than distance learners. However this effect might be also linked to the age of the nursing students, and a multivariate analysis provides more information on the relative importance of the difference socio-demographic characteristics.

Table 11: Donations in the dictator game

	Proportion of money sent to a student			**Proportion of money sent to a patient**			**Proportion of money sent to a poor**		
	Mean	***SD***	***Signif.***	***Mean***	***SD***	***Signif.***	***Mean***	***SD***	***Signif.***
All (n=345)	0.364	0.210	-	0.46	0.25	-	0.527	0.277	-
Gender									
Male (n=85)	0.359	0.248		0.466	0.273		0.484	0.277	
Female (n=260)	0.366	0.197		0.458	0.243		0.541	0.277	
Student category									
Pre-service (n=166)	0.346	0.215		0.412	0.240	***	0.474	0.277	***
Distance learners (n=179)	0.380	0.204		0.504	0.252		0.576	0.269	
Has at least one child									
No (n=161)	0.338	0.216	*	0.412	0.237	***	0.469	0.281	***
Yes (n=184)	0.387	0.202		0.502	0.254		0.578	0.265	
MTCs									
Kakamega (n=89)	0.340	0.235		0.451	0.265		0.528	0.306	
Meru (n=58)	0.331	0.233		0.438	0.240		0.500	0.273	
Muranga (n=79)	0.380	0.173		0.472	0.225		0.557	0.253	
Nairobi (n=119)	0.387	0.199		0.470	0.261		0.519	0.274	
Total (n=345)	0.364	0.210		0.460	0.250		0.527	0.277	
Age categories									
20-24 (n=121)	0.345	0.190		0.388	0.211	***	0.456	0.258	**
25-39 (n=150)	0.355	0.229		0.480	0.273		0.551	0.291	
40+ (n=74)	0.412	0.195		0.536	0.234		0.593	0.259	
Marital status									
1 (n=189)	0.337	0.214	*	0.424	0.244	*	0.485	0.280	*
2 (n=144)	0.394	0.205		0.505	0.252		0.578	0.267	
3 (n=5)	0.480	0.045		0.460	0.207		0.620	0.342	
4 (n=7)	0.400	0.153		0.500	0.306		0.543	0.215	

Note: Statistical difference across categories tested with a t test for binary variables and a Bonferroni test for variables with more than 2 categories. *** p<0.001 ** p<0.01 * p<0.05

Results of the multivariate analysis

Responses from the three games were pooled to allow the analysis of the framing effects.

A random-effects linear model was used to analyse the determinants of the measure of altruism constructed (Table 12). Dummy variables "patient" and "poor" capture the effects of this framing (compared to the "student" framing). Model (1) assesses the strength of the relationship between some socio-economic variables and underlying opinions and the three measures of altruism. Model (2) includes come additional interaction terms with the framing dummies, thereby testing the relative strength (and significance) of the determinants for each of the three framings.

Table 12. Multivariate analysis of results from dictator game

MODELS	**(1)**	**(2)**
Patient as recipient	0.096***	0.028
	(0.012)	(0.029)
Poor as recipient	0.163***	0.091***
	(0.012)	(0.029)
Male	-0.005	
	(0.026)	
Student x male		0.003
		(0.031)
Patient x male		0.024
		(0.031)
Poor x male		-0.041
		(0.031)
Distance learners	-0.007	
	(0.040)	
Student x dist. learn		-0.024
		(0.048)
Patient x dist. learn		-0.001
		(0.048)
Poor x dist. learn		0.002
		(0.048)
Meru	-0.023	
	(0.033)	
Muranga	0.034	
	(0.031)	
Kakamega	-0.033	
	(0.029)	
Student x meru		-0.043
		(0.039)
Student x muranga		0.011
		(0.036)
Student x kakamega		-0.051

		(0.035)
Patient x meru		-0.021
		(0.039)
Patient x muranga		0.025
		(0.036)
Patient x kakamega		-0.040
Poor x meru		-0.004
		(0.039)
Poor x muranga		0.064*
		(0.036)
Poor x kakamega		-0.007
		(0.035)
Married	0.030	
	(0.038)	
Student x married		0.061
		(0.045)
Patient x married		0.007
		(0.045)
Poor x married		0.021
		(0.045)
Aged 25-39 y.	0.053	
	(0.036)	
Aged more than 40y.	0.093*	
	(0.048)	
student x Aged 25-39 y.		0.003
		(0.042)
Student x Aged more than 40y.		0.048
		(0.057)
patient x Aged 25-39 y.		**0.087****
		(0.042)
patient x Aged more than 40y.		**0.138****
		(0.057)
poor x Aged 25-39 y.		**0.070***
		(0.042)
poor x Aged more than 40y.		0.092
		(0.057)
Has at least one kid	0.023	
	(0.042)	
Student x at least one kid		0.005
		(0.050)
Patient x x at least one kid		0.022
		(0.050)

Poor x at least one kid		0.040
		(0.050)
Constant	0.305***	0.352***
	(0.027)	(0.031)
Number of respondents	345	345
R^2 within	0.204	0.233
R^2 between	0.0641	0.0641
R^2 overall	0.111	0.121
chi2	198.7	227.0
Degrees of freedom	11	29
rho	0.558	0.562
sigma	0.244	0.244
sigma_e	0.162	0.161
sigma_u	0.182	0.182

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The specification with interaction terms underlines the importance of the framing effects in the altruistic behaviours and its determinants. For example, although model (1) suggests that people aged more than 40 years old are significantly more altruistic than the younger ones (aged less than 25 years old), model (2) shows that this is only true when the recipient is a patient. There is no difference in the measured generosity of both groups for the student and poor framings.

Overall the results confirm the greater generosity of respondents towards the poor and patients. It also confirms that in Kenya, older nurses are more altruistic than younger ones, in particular towards the patient recipient. However, whether a respondent was a pre-service or upgrading trainee no longer has a significant impact on generosity once other factors are controlled for.

Results from the cohort follow-up

Respondents followed up

Of the 345 baseline participants, 250 met the inclusion criteria for follow-up, as they were employable as registered nurses. 95 participants were excluded from follow-up either because they had not done the NCK exams (54), had failed them (32) or their registration status could not be determined by the research team (9). The greatest losses of participants were noted amongst the upgraders in Meru where 11 of them failed NCK exams and in Kakamega where 17 did not sit NCK exams (Table 13). The research team experienced difficulties in obtaining Meru MTC's NCK examination results, perhaps explaining the high number of participants in Meru whose eligibility for follow-up is not known.

At each follow-up call, an attempt to reach all the 250 eligible nurses was made. The response rate varied between 92.8% and 96.8%. The average loss to follow-up was 5.6%, attributed to participants who could not be reached.

Mobile phones were very instrumental in the success of follow-up. All participants had access to a cell phone and the majority maintained their contact numbers throughout the follow-up period or provided updates whenever there were changes. It was therefore easy for the research team to reach them. Where there were network problems or disconnections, numerous attempts to reach participants were made through voice calls, text messages and emails. At least 57% of respondents interviewed at the end of follow-up (72.5% pre-service and 40.9% upgrading) had ever visited the cohort blog (www.cohort08.blogspot.com) where photos, comments and important information from the cross country study were regularly shared. This sense of community heightened members' enthusiasm to continue participating in the study and subsequently led to the high response rates described below. All content published on the blog was moderated by the research team to ensure adherence to research and ethical standards.

A few challenges were experienced; first, some respondents used the interview opportunity to ask for employment, but the research team reiterated to them that the purpose of the interview was to document their job seeking and work experiences and to update their contact details, not to help them find employment. Secondly, a few felt that some of the questions asked, for cultural or traditional reasons, were intrusive to their privacy, for example some could not disclose the number of children they had.

Table 103: Flow of participants since baseline

MTC	Student type	Baseline	Eligible[a] for follow-up	Not eligible for follow-up		Eligibility not known	1st Follow-up	2nd Follow-up	3rd Follow-up	4th Follow-up	Follow-up Survey
				Failed NCK	Not Done NCK						
Nairobi	Pre-service	55	42	2	9	1	41	38	39	38	20
	Upgrading	64	50	1	12	0	50	49	48	47	32
Meru	Pre-service	29	18	7	3	1	18	18	18	18	15
	Upgrading	29	15	11	1	4	12	13	13	14	7
Murang'a	Pre-service	48	41	2	4	1	39	37	40	37	33
	Upgrading	31	22	3	5	2	21	19	20	20	13
Kakamega	Pre-service	34	28	3	3	0	28	25	26	27	26
	Upgrading	55	34	3	17	0	33	33	34	34	31
Total		**345**	**250**	**32**	**54**	**9**	**242**	**232**	**238**	**235**	**177**

[a] Eligible participants include those who sat for NCK examinations in March 2009 and were declared qualified nurses in NCK results released in June 2009

Profile of the cohort 12 months post qualification

Table 14 describes the profile of the cohort at the end of follow-up in May 2010. The baseline and the May 2010 cohorts were largely similar; most respondents were trained in Nairobi MTC (36.2%) with the least having been trained in Meru MTC (13.6%). More than three quarters were female (76.6%). Upgrading nurses were older with a mean age of 37.8 years and more likely to be married and to have children as opposed to pre-service nurses who were almost always between the age of 20 and 29 with only 28.3% having children. In addition, similar to the baseline cohort, majority of respondents were born in rural areas and fathers to respondents were more educated than mothers, particularly in the upgrading group.

Table 14: Profile of the cohort in May 2010

Characteristic	Pre-service (n=120)	Upgrading (n=115)	Total (n=235)
MTC %			
Kakamega	22.5	29.6	26.0
Meru	15.0	12.2	13.6
Murang'a	30.8	17.4	24.3
Nairobi	31.7	40.9	36.2
Sex: Female %	71.7	81.7	76.6
Mean Age in years (sd)	24.9 (2)	37.8 (6.1)	32.0 (8.4)
Age groups in years %			
20-29	96.7	12.2	55.3
30-39	3.3	45.2	23.8
40-45	0	27.8	13.6
Above 45	0	14.8	7.2
Marital status: married %	10.8	73.9	41.7
Any children %	28.3	91.3	59.2
Educated mother* %	73.3	37.4	55.7
Educated father* %	79.2	61.7	70.6
Born in a rural area %	57.5	73.9	65.5
Scholarship recipient for RN course %	14.2	6.1	10.2

**a parent was considered educated if they had at least completed primary education

Employment status of the cohort

For the pre-service nurses, employment status at 2 months and 12 months post qualification are presented because at baseline none of the pre-service nurses were working, while for the upgraders, who were already working at baseline, results of their employment status at baseline and 12 months post qualification are compared.

Pre-service nurses' employment status 2 and 12 months post qualification

The proportion of pre-service respondents working as nurses increased from 70.3% 2 months post qualification to 92.5% 12 months post qualification of which 88.3% were working as bedside nurses. Of those working as nurses, 25.2% were working in the public sector compared to 3.3% at 2 months

post qualification. 18.3% of pre-service nurses applied for public sector jobs between February 2010 and May 2010, which was a great reduction from 65.6% who applied between May 2009 and August 2009. Of the 28 working in the public sector at the end of follow-up, nearly all, 26 (92.9%) were working on contract basis, 12 were working in dispensaries, 9 in health centres and 6 in hospitals. Nurses working on contract basis were hired by the GoK for 2 to 3 year periods through programmes supported by development partners. It is expected that at the end of their contracts, they will be absorbed into permanent positions in the public sector. The percentage of all pre-service respondents not working as nurses reduced from 29.7% to 7.5%. The most common reasons for not working as a nurse at 12 months post qualification were cited as having not found a nursing job and not wanting employment (Table 15).

Table 15: Pre-service nurses' employment status 2 and 12 months post qualification

	2 months post qualification	12 months post qualification
Number of respondents interviewed	**N=128**	**N=120**
Working as nurses	90/128 (70.3%)	111/120 (92.5%)
Working as nurses in rural[a] areas	36/128 (28.1%)	51/120 (42.5%)
Applied for public sector jobs within the last 3 months	84/128 (65.6%)	22/120 (18.3%)
Of those working as nurses	**N=90**	**N=111**
Job titles		
Administrative nurse	2/90 (2.2%)	12/111 (10.8%)
Bed side nurse	85/90 (94.4%)	98/111 (88.3%)
Other job titles	3/90 (3.3%)	1/111 (0.9%)
Sectors		
Public sector	3/90 (3.3%)	28/111 (25.2%)
Private for profit sector	54/90 (60.0%)	43/111 (38.7%)
Private not for profit sector	33/90 (36.7%)	38/111 (34.2%)
Other sectors	0	2/111 (1.8%)
Of those working as nurses in the public sector	**N=3**	**N=28**
Facility types		
Dispensary	1/3	12/28 (42.9%)
Health centre	0	9/28 (32.1%)
Hospital	2/3	6/28 (21.4%)
Other facility types	0	1/28 (3.6%)
Employment basis		
Contract basis	-[b]	26/28 (92.9%)
Of those not working as nurses	**N=38**	**N=9**
Not found a nursing job	33/38 (86.8%)	4/9 (44.4%)
Want to change career	0	1/9 (11.1%)
Doesn't want employment	0	4/9 (44.4%)
Waiting to report or relocate	5 /38 (13.2%)	0

[a]Rural areas as defined by respondents

[b]Data were not collected 2 months post qualification

Upgrading nurses' employment status at baseline and 12 months post qualification

Both at baseline and throughout the follow up period, nearly all upgrading respondents were working as bedside nurses, and over three quarters were working in the public sector (Table 16). By the end of follow up, 30.4% of respondents were working as nurses in rural areas with only 6.1%

working on contract basis in the public sector. The proportion of those working in the private for profit sector increased slightly from 6.2% to 11.4% post qualification, while that of private not for profit sector reduced from 14.1% to 8.8% post qualification. Both at baseline and at the end of follow-up, more than half of public sector respondents were working in hospitals, with a slight increase in this from 51.8% to 59.8%. On the other hand, at both points in time less than 25% and 10%) were working in health centres and dispensaries respectively.

Table 16: Upgrading nurses' employment status at baseline and 12 months post qualification

	Baseline	12 months post qualification
Number of respondents interviewed	**N=179**	**N=115**
Working as nurses	177/179 (98.9%)	114/115 (99.1%)
Working as nurses in rural[a] areas	-	35/115 (30.4%)
Applied for public sector jobs	-	22/115 (19.1%)
Of those working as nurses	**N=177**	**N=114**
Job titles		
Administrative nurse	-	9/114 (7.9%)
Bed side nurse	-	104/114 (91.2%)
Other job titles	-	1/114 (0.9%)
Sectors		
Public sector	141/177 (79.7%)	87/114 (76.3%)
Private for profit sector	11/177 (6.2%)	13/114 (11.4%)
Private not for profit sector	25/177 (14.1%)	10/114 (8.8%))
Other sectors	0	4/114 (3.5%)
Of those working as nurses in the public sector	**N=141**	**N=87**
Facility types		
Dispensary	12/141 (8.5%)	6/87 (6.9%)
Health center	33/141 (23.4%)	19/87 (21.8%)
Hospital	73/141 (51.8%)	52/87 (59.8%)
Other facility types	23/141 (16.3%)	10/87 (11.5%)
Employment basis		
Contract basis	-[b]	7/87 (8.0%)

[a] Rural areas as defined by respondent

[b] Questions were not asked at baseline

Movements between sectors

During follow-up, some respondents remained in one particular sector while others moved between sectors. Of 43 pre-service nurses in the private for profit sector at the end of follow-up, just over half were working in the same sector 2 months post qualification, while most of those moving into the public sector and private not for profit sector were coming mainly from the private for profit sector or from being unemployed. However, those previously unemployed secured jobs mainly in the private for profit sector (Table 17).

Table 17: Movements between sectors by pre-service nurses (between 2 months post qualification and 12 months post-qualification

	12 months post qualification						
2 months post qualification	Public sector	Private for profit sector	Private not for profit sector	Other sectors	Unemployed	Lost to follow up	**Total**
Public sector	2	1	0	0	0	0	**3**
Private for profit sector	12	23	16	0	3	0	**54**
Private not for profit sector	7	7	13	1	2	3	**33**
Unemployed	7	12	9	1	4	5	**38**
Total	**28**	**43**	**38**	**2**	**9**	**8**	**128**

Upgrading nurses on the other hand were less mobile; majority, 80 (92%) of those working in the public sector at the end of follow-up had stayed in the same sector since baseline. Any movements were mainly out of the private not for profit sector to the public sector. These inter-sectoral movements are described in Table 18.

Table 18: Movements between sectors by upgrading nurses (between baseline and 12 months post qualification)

	12 months post qualification (18 months post baseline)						
Baseline	Public sector	Private for profit sector	Private not for profit sector	Other sectors	Unemployed	Lost to follow up	Total
Public sector	80	3	3	0	0	6	92
Private for profit sector	0	8	1	0	1	0	10
Private not for profit sector	7	2	6	4	0	0	19
Total	**87**	**13**	**10**	**4**	**1**	**6**	**121**

Movements between urban and rural areas

As of May 2010 (12 months post qualification), 31 (51.7%) of pre-service nurses working in urban areas had remained within urban areas throughout the follow-up period, 28.3% were previously unemployed and only 18.3% had moved from rural areas. Of the 51 pre-service nurses working in rural areas at follow up, 39.2% had remained in rural areas, 37.3% had moved from urban areas while 21.6% were previously unemployed. Previous work location of 2 pre-service nurses could not be determined (Table 19).

Table 19: Movements between urban and rural areas (Pre-service nurses)

	12 months post qualification				
2 months post qualification	Urban	Rural	Unemployed	Not interviewed	Total
Urban	31	19	3	0	53
Rural	11	20	2	3	36
Unemployed	17	11	4	6	38
Not interviewed	1	1	0	0	2
Total	**60**	**51**	**9**	**9**	**129**

Minimal urban-rural movements were noted among the upgrading nurses as most stayed within their work locations. Of the 79 upgrading nurses working in urban areas at the end of the follow-up period, majority (88.6%) had stayed within urban areas with only 6.3% moving from rural areas. On the other hand, 22 (62.9%) stayed within rural areas throughout the follow-up period (Table 20).

Table 20: Movements between urban and rural areas (Upgrading nurses)

	12 months post qualification				
2 months post qualification	Urban	Rural	Unemployed	Not interviewed	**Total**
Urban	70	11	0	5	**86**
Rural	5	22	0	0	**27**
Unemployed	0	2	1	0	**3**
Not interviewed	4	0	0	1	**5**
Total	**79**	**35**	**1**	**6**	**121**

Probability of working in rural areas and in the public sector

Among the pre-service nurses, results indicated that gender, marital status, having children, being born in a rural area and age group did not have any significant association with working in rural areas or in the public sector at follow up. However, MTC attended showed some association ($p<0.05$), with those attending the furthest MTC from Nairobi being more likely to work in rural areas. Similarly, for the upgrading nurses, training in the furthest MTC from Nairobi was significantly associated with working in rural areas ($p<0.001$) and in the public sector ($p<0.05$) at the end of follow-up. In addition, being born in a rural area ($p<0.05$), and being older ($p<0.01$) were significantly associated with working in the public sector (Table 21).

Table 21: Probability of working in rural areas and in the public sector in May 2010

	Probability of working in rural areas		**Probability of working in the public sector**	
	Pre-service 51 n=120	Upgrading 35 n=115	Pre-service 28 n=120	Upgrading 87 n=115
Gender:				
Male	17/34 (50.0%)	6/21 (28.6%)	11/34 (32.4%)	17/21 (81.0%)
Female	34/86 (39.5%)	29/94 (30.9%)	17/86 (19.8%)	70/94 (74.5%)
Marital status:				
Married	8/13 (61.5%)	25/85 (29.4%)	6/13 (46.2%)	64/85 (75.3%)
Not married	43/107 (40.2%)	10/30 (33.3%)	22/107 (20.6%)	23/30 (76.7%)
Having children:				
Yes	16/34 (47.1%)	29/105 (27.6%)	9/34 (26.5%)	81/105 (77.1%)
No	35/86 (40.7%)	6/10 (60.0%)	19/86 (22.1%)	6/10 (60.0%)
MTC attended:	*	***		*
Nairobi	8/38 (21.1%)	3/47 (6.4%)	4/38 (10.5%)	32/47 (68.1%)
Meru	8/18 (44.4%)	6/14 (42.9%)	3/18 (16.7%)	8/14 (57.1%)
Murang'a	19/37 (51.4%)	7/20 (35.0%)	12/37 (32.4%)	16/20 (80.0%)
Kakamega	16/27 (59.3%)	19/34 (55.9%)	9/27 (33.3%)	31/34 (91.2%)
Born in a rural area:				*
Yes	30/69 (43.5%)	27/85 (31.8%)	15/69 (21.7%)	69/85 (81.2%)
No	21/51 (41.2%)	8/30 (26.7%)	13/51 (25.5%)	18/30 (60.0%)
Age groups in years		*		**
20-29	49/116 (42.2%)	9/14 (64.3%)	28/116 (24.1%)	6/14 (42.9%)
30-39	2/4 (50.0%)	14/52 (26.9%)	0	38/52 (73.1%)
40-45	0	7/32 (21.9%)	0	29/32 (90.6%)
Above 45	0	5/17 (29.4%)	0	14/17 (82.4%)

Note: Statistical difference tested by Fishers exact test (for cells with a count of less than 5). *** p<0.001 ** p<0.01 * p<0.05

4. DISCUSSION

Introduction

Inadequate human resources have been identified as a key constraint to scale up of health interventions (Hanson 2003; Mangham and Hanson 2010). Mal-distribution of health workers continues to be a global challenge with high concentration of health workers in urban areas while rural areas are understaffed (Willis-Shattuck, Bidwell et al. 2008). This situation threatens equitable delivery of health services to people living in rural areas who are often less educated, poorer and with a higher disease burden. There has been a general neglect of health policies which focus on strengthening human resources for health, reflected in poor budget allocations and limited time within the national health agenda devoted to this topic in both developed and developing countries (Beaglehole 2003; Wilson, Couper et al. 2009). This report provides evidence from Kenya about the challenges of recruiting and retaining nurses in rural posts. The shortages of nurses in rural areas in Kenya is well documented (Ministry of Health 2006) and there are clear policy intentions to address the problem (Ministry of Health 2005). However, specific policy interventions to improve rural recruitment and retention have not yet been decided or implemented (Ministry of Health 2007; Luoma, Doherty et al. 2010).

Limitations

A number of limitations should be highlighted. First for logistical reasons it was not possible to select a nationally representative sample of trainees. In addition, data were collected within a year of the post election violence which may have modified nurse's perceptions of rural postings. Thirdly, the term "rural" is difficult to define (Wilson, Couper et al. 2009) and its interpretation is likely to have varied across interviewees. For example, some may have considered district towns as urban, while others may have classified them as rural. However, the characteristics students identified for rural areas during FGDs were similar to those that we proposed during quantitative data collection.

As with all DCE studies, there were constraints in the design of DCE. We could only include a limited number of attributes and levels and some relevant incentives may have been excluded. Also, the DCE was part of a multi-country study and some attributes that were included may have been less important for Kenya. In addition the decision to use a forced choice design, with only two options, may not be completely realistic,because respondents cannot reject both options (opt out). Moreover, this was not a cost-effectiveness study. Although we have compared the likely impact of different possible policy interventions, the costs of these strategies are also very different.

The list of potential interventions assessed was not comprehensive; others identified as potentially useful in other studies include conducting training placements in rural settings, providing scholarships with an enforceable rural service agreement, and increased recognition by the employer or community (Munga and Mbilinyi 2008; Willis-Shattuck, Bidwell et al. 2008; Wilson, Couper et al. 2009).

Finally, the findings from the SAQ, FGDs, DCE and EEGs are based on the stated opinions of trainees and may not translate into actual career decisions. While the cohort follow up provides some information about actual choices, follow up data were only collected for the first year post-

registration. It is notable that while many strategies to improve recruitment and retention have been proposed in the literature (Dussault and Dubois C. 2003), few studies have investigated their effectiveness. Further research is therefore necessary to investigate the extent to which the intentions of qualifying nurse graduates translate into career moves, and the effectiveness of interventions to influence recruitment and retention patterns over time.

Synthesising findings across studies and implications for policy and research

We have demonstrated that three relatively novel methods for investigating human resource questions can be used in a low-income setting, namely discrete choice experiments, experimental economic games and follow-up of a graduate cohort. While the challenges of the former two techniques are largely conceptual and analytical, the main challenge posed by the last was logistic, i.e. could cohort follow up be sustained through mobile phone contacts. In all three cases the methods were used successfully and further combined with more traditional research methods, use of SAQs and focus group discussions.

Key findings from this body of work were:

1. Registered nurse graduates, at the end of both pre-service and in-service training, had generally more negative views of life and work in rural areas than in urban areas according to data from SAQs, FGDs and particularly the DCE. While SAQs and FGDs indicated that concerns over career stagnation and loss of training opportunities compounded several perceived social disadvantages of rural areas (poor infrastructure and amenities such as schools), the DCE indicated that such adverse perceptions could be countered by policies to make rural postings more attractive, notably: preferential career development or training schemes, provision of permanent contracts and financial compensation in the form of allowances or higher salaries.
2. RN graduates demonstrate altruism consistent with vocational norms to help patients and the poor (from EEG results) while also appreciating that rural service, while not preferred, may reasonably be requested of trained professionals using mechanisms such as bonding. Such findings also suggest possible continued roles for non-financial incentives that appeal to professionalism to encourage rural postings while noting that basic needs for income and security must be met.
3. While RNs may have preferences for the type of work they would like, the current labour market in Kenya, with a shortage of opportunities, may not permit such preferences to be fully expressed in the form of actual employment decisions. Thus many pre-service trainees were within one year employed as nurses in a variety of non-public sectors but many continued to pursue public sector employment when opportunities arose, even if such opportunities were linked to short-term contracts that were generally not preferred. Similarly, while in-service trainees appeared likely, based on stated preferences, to seek urban rather than rural work the net movement 12 months after graduation from rural to urban employment was limited. However, if employment opportunities improve, particularly if there is growth in any sector in urban areas, this would be expected to result in rural to urban migration perhaps especially amongst older, more experienced nurses.
4. In addition to the evidence outlined above (point 1) that there is scope for policy levers to improve rural recruitment and retention we found weak evidence that being trained in a

more rural area may increase the likelihood of subsequent rural work. However, the studies conducted were not well designed to address this specific question and we note that having grown up in a rural area did not appear to be a positive influence on perceptions around rural employment.

Conclusion

Kenyan registered nurses in general express preferences for urban employment. The current labour market limits the expression of such preferences but there would be concern that those now in rural employment are not satisfied with their positions, something that may affect performance. Public sector employment in general is valued for its associated job security and our findings suggest rural positions could be made more attractive if they were associated with this job security and one or a mix of preferential career development or training schemes, and financial compensation in the form of allowances or higher salaries.

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