Health workers' preferences and policy interventions to improve retention in rural areas in Thailand

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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.

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• 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

DCE	Discrete Choice Experiment
EEG	Experimental Economic Games
FGD	Focus Group Discussions
KII	Key Informant Interviews
MDG	Millennium Development Goals
MOH	Ministry of Health
SAQ	Self Administered Questionnaires

Executive Summary

Background: Because the health workforce is a crucial component of the health system, a shortage of health workers could negatively affect health outcomes. The shortage of doctors and nurses in rural areas is a recurring concern in Thailand. While the demand for health care services has grown, public sector doctors and nurses have been lost to the private sector and, at the same time, the number of those working in rural health facilities has declined.. Significant attention has been focused on strategies to address the problem, but it is not clear which policy interventions would be most effective. This study set out to examine the job preferences of newly graduated doctors and nurses to identify effective policy interventions that could improve the recruitment and retention of doctors and nurses in rural areas.

Methods: The study employed a prospective cohort study design. It included255 doctors serving in years one to three from nine provinces and 342 newly graduated nurses from four nursing colleges. Job preferences were assessed using a Discrete Choice Experiment (DCE). This consisted of asking doctors and nurses to indicate their preferences between 2hypothetical jobs, one in a rural and one in an urban area. For doctors, each job was characterized by seven attributes: hospital size, location, salary, overtime work, specialty training opportunities, presence of consultants and career promotion. For nurses, each job was made up of seven characteristics: facility type, salary, type of housing provided, medical benefit package, training opportunities, career promotion and workplace management style. A self-administered questionnaire was also used to collect socio-demographic information. Experimental economic games were used to assess the altruism of health workers. Lastly, interviews and focus group discussions were conducted with selected students, nurses and doctors to provide a more detailed understanding of the responses.

Results: Of the 211 doctors who responded, female doctors (53%) participated slightly more than men. The majority of doctors were from urban backgrounds (83%), and graduated from regional universities63%). There were 24% of doctors under the rural recruitment project. Although the majority of doctors valued living and working in rural areas, only a small number thought that being posted in a rural area would be appealing. In relation to their job preference, all attributes were found to be statistically significant in the decision to choose a job in a rural area. The results show that high salary, workplace close to hometown, small hospital size, less overtime work, opportunity for specialty training opportunities and faster career promotion were important for young doctors to choose rural posts.

Of the 342 nurses who responded, there was a bigger group from the nursing college located in the North-eastern region (34.2%). Approximately 95.3% of study participants were female and 83.6% were born in a rural area. The majority received financial support from their parents, and only 26.3% of them benefitted from scholarships from some hospitals. Nurses seemed to be more optimistic about working in rural areas than their doctor counterparts; however, they hesitated to choose to work in rural areas. We found that nurses were particularly sensitive to the type of facility where they would be posted in rural areas, with a very strong preference for hospitals versus health centres. In addition, we identified several policy levers that could potentially be used by policy-makers to make rural posts more attractive. In particular, more nursing graduates would choose

rural jobs if an extended medical coverage was offered that included their family members. Nurses from rural origins were found to be more likely to choose rural posts, while the location of training centres in the North-eastern region was also found to be important.

A few months after the baseline survey, the government provided financial incentives to doctors working in rural areas. As the majority of doctors still fell under the three year compulsory service in the public sector, 91% of doctors still worked at rural hospitals at one year after the baseline survey. In contrast, only half of the nurses (49%) had done so.

Conclusions: The results suggest that a range of interventions, including financial and non-financial incentives that would attract doctors and nurses to rural areas, are available and are important. In addition, recruiting students from rural backgrounds, as a strategy in combination with financial and non-financial incentives, seems to be good policy option.

1. INTRODUCTION

Since the adoption in 2000 of the ambitious Millennium Development Goals (MDGs) to improve health outcomes in developing countries, several initiatives and reports have focused on the critical role played by human resources for health in improving health system performance (WHO 2000; Liese et al. 2003; WHO and World Bank 2003; Joint Learning Initiative 2004; WHO 2006). The importance of human resources is further underlined by ecological evidence of a positive correlation between the coverage achieved for cost-effective health interventions such as immunization and skilled attendance at delivery, and the population density of health care providers in a country (Anand and Barnighausen 2004; Speybroeck et al. 2006).

Developing countries have employed a number of strategies to address the unequal distribution of health workers. Some have chosen coercive strategies, such as mandatory placements in rural areas, random allocation of graduates to rural areas (Lindelow and Serneels 2006) or scholarships conditional on rural postings (Wibulpolprasert and Pengpaiboon 2003). Other interventions have been designed to use financial rewards (Adams and Hicks 2000) or non-financial incentives (Dambisya 2007) to attract workers to underserved areas. Finally, in recognition of the limitations of reward systems and based on the experience of certain developed countries (Rabinowitz et al. 2000; Brooks et al. 2002), some developing countries have tried to encourage the selection of medical and nursing students that seem more likely to remain in rural areas. For example, Thailand and Indonesia have promoted the selection of medical students who express a stronger commitment to rural areas and also ensure that students are exposed to working in rural areas during their training (Chomitz et al. 1998; Wibulpolprasert and Pengpaiboon 2003). There have been very few rigorous evaluations of these strategies. The available studies have shown mixed results (Chopra et al. 2006), and suggest that a better understanding of the preferences of health workers is required to inform the development of HR policies and interventions.

To date, human resource policies in developing countries have been based on limited evidence on the various intrinsic and extrinsic motivating factors that may be important in attracting workers to work in rural areas. Intrinsic motivation (Deci 1971; Frey 1997) and altruism have been identified as important factors to explain some preferences for the public over the private sector (Dixit 1997; Dixit 2002; Bénabou and Tirole 2004), despite the lower wages in the public sector. Among the extrinsic determinants of staff decisions, most attention has been given to financial incentives. Indeed, not only are salaries in urban areas often more important than those in rural areas, but opportunities to complement public salaries in rural areas are also scarcer (Ferrinho et al. 2004). However, non-financial factors associated with quality of life (such as general infrastructure, availability of housing, and proximity to schools), training or career prospects, social status and work environment also play a role regarding health workers decisions and motivation (Miller et al. 2004; Mathauer and Imhoff 2006). Yet the relative importance of pecuniary and non-pecuniary factors in influencing health workers job choices is unclear, as very little empirical work has been carried out (Chomitz et al., 1998; Penn-Kekana et al. 2005; Serneels et al. 2007). Such information is critical in the design of effective policy interventions. Overall, the existing body of work pointed to the importance of key intrinsic and extrinsic motivation for health workforce to opt to work in rural areas. In relation to intrinsic, altruism was found to be an important factor for selecting public jobs. Both financial and non-financial factors (such as infrastructure, housing, career advancement, proximity to school, social status and working environment) affected health workers´ decisions.

Over three decades, the Thai Ministry of Public Health has implemented health workforce planning and development strategies. However, health workforce problems still exist and need proper solutions. The shortage of health personnel, particularly in rural areas, persists. Furthermore, the problem of inequitable distribution of health personnel, particularly geographically, has added to the magnitude of the problem. The situation has been aggravated by two main factors: the increase in healthcare demands and an inadequate workforce supply. Government policy in relation to promoting Thailand as the medical hub of the region and the universal coverage scheme have resulted in increasing demand for care by foreign and Thai patients. In addition, the expansion of private health facilities, resulting from Thailand's economic growth and government policy, has drawn the health workforce from rural public facilities to private facilities. Furthermore, the ageing of the population accompanied with the increase of chronic illnesses has led to increasing demand for health services (HRU 2005). Even though efforts have been made to increase the supply of the health workforce, there has been difficulty in attracting and keeping them in rural areas. Doctors and nurses are the two main professions that those health workforce problems have mostly affected. Evidence shows that health personnel per 10,000 population ratio of doctors and nurses in Bangkok are ten and two times higher than those of the North-eastern region, respectively (Wibulpolprasert 2008). At the same time, the Ministry of Public Health (MOH) has failed to retain doctors and nurses in the public sector.

For the case of doctors, over the past 10 years, the number of doctors moving out of the MOH (the main public care providers) has increased from 12.3% in relation to new graduated doctors in 1995 to 32.2% in 2002 (Thammarangsi 2005). Resulting from the expansion of private health facilities, migration of doctors from public to private health facilities has increased. The survey showed that the proportion of doctors in the private sector increased from 11.4% in 1987 to 22% in 2005 (Wibulpolprasert 2008). Thamarangsri (2005) found that of all the doctors moving from public to rural, 52.3% moved to the private sector and when focusing particularly at specialist migration from rural, 83% moved to private sector. As for the case of nurses, shortage of nurses becomes a chronic problem at all levels of care: primary, secondary and tertiary care of the public sector. Though the number of nurses moving from public to private was small in proportion, the proportion of nurses in private sector increased from 9 % in 1987 to 12 % in 2002. However the increase in demand for care has increased the nursing requirement to keep up with care provision, and the reduction of nursing production over the last five years added to the problem of shortage of nurses (Sawaengdee 2007). Moreover, the study has observed the trend to increase nursing loss rate which increased from 2.2 % in 2000 to 3.3% in 2004. Due to the fact that nursing average year in services is limited comparing to other professional, approximately 22 years in services, thus minimal loss rate could affect dramatic shortage of nurses.

Over two decades, the Thai government has implemented several strategies to redress the retention and motivation problem of rural health workforces. The strategies have been targeted at educational strategies, motivation strategies, as well as compulsory strategies. However, anecdotal evidence suggests that these strategies were implemented as reactionary strategies in respond to immediate critical problem on a professional basis. Therefore, they are fragmented, ad hoc, and sometimes even conflicting. Evidence also indicates that high turnover rate or work satisfaction of health workforce can be attributed to a range of factors. Therefore, effective retention and motivation strategies need evidence-based information to support.

The aim of this research project is to support the identification of more effective policy interventions that will improve the recruitment and retention of both nurses and doctors in rural areas.

The specific research objectives of the study were:

1. To determine the attitudes of health graduates with respect to working in rural areas and to evaluate their preferences regarding various policy interventions that may be used to recruit health professionals to rural areas;

2. To investigate the underlying values that influence these attitudes and preferences;

3. To describe the early career choices of the cohort of health graduates and to investigate the discrepancies between actual career paths and initial stated preferences;

4. To assess the likely effectiveness of current and future government interventions to improve the recruitment and retention of health professionals in rural areas.

Ethical approval was sought and obtained from the London School of Hygiene and Troipcal Medicine as well as from the Ministry of Public Health in Thailand, where it was approved by the Ethical Review Committee on Human Subjects (Ref. No 55/2551).

2. METHODOLOGY

Study population

With the two groups of heath workers, the sample size requirements were based on the DCE. The sample had to be big enough to allow a sub-group analysis if needed. Therefore, the objective was to obtain a sample size of about 300 nursing students (Scott 2001; Hensher et al. 2005).

Doctors

A stratified sampling was used to recruit study participants. The 75 provinces in Thailand were classified into three strata, poor (25 provinces); medium (25 provinces); and rich provinces (25 provinces), using the average household consumption expenditure from the 2007 national household socio-economic survey (SES) (National Statistical Office 2007) as a proxy of economic status. It was thought that this provincial SES status partly reflects the availability of private sector providers, who tend to be located in wealthier areas. In turn, this might provide more choices to doctors in private hospitals and clinics in the province, which might have an impact on their actual choices and retention in rural services. From each three strata, three provinces were randomly selected and the 282 physicians who had been working for less than one year, less than two years or less than three years after medical graduation in a district and provincial hospitals in that province were invited to participate in the study.

Nurses

We used a stratified sampling strategy, in order to select nursing students from the capital and regional training institutions. In Thailand, there are 25 nursing colleges controlled by the Ministry of Public Health which are located in four regions: Northeastern, Central, Southern and Northern region. We decided to purposefully select one nursing college from each region, based on their size and central location within each region. All 389 final year nursing students from these four colleges were invited to join the study.

Methods used

This protocol included both quantitative and qualitative data collection and analyses. Data collection included: self-administered questionnaires, a discrete choice experiment, experimental economic games, and qualitative research methods.

Self-administered questionnaires (SAQs)

At baseline, a self-administered questionnaire (SAQ) was administered to each cohort member to collect basic individual characteristics (age, sex, parents' education, religion, etc.). Questions related to educational background, attitudes towards living and working in rural areas, and reasons for the choice of nursing/medical career were also be asked.

The SAQ in the follow-up survey was designed to capture the actual choices and decisions made by nurses and doctors. It included a description of current job characteristics and job satisfaction (using classic instruments developed in the organizational literature and already applied to health workers) (University of Minnesota 1977). An example of SAQ is in appendix A.

Discrete Choice Experiment (DCE)

The discrete choice experiment (DCE) was used to explore the responsiveness of doctors and nurses to possible interventions that could attract them to rural posts. DCEs have increasingly been used to assess patient preferences for health care service delivery (Ryan et al, 2008). Studies analysing the work preferences of health care workers have increasingly used this technique (Lagarde and Blaauw, 2009). The present case is suitable for this quantitative stated preference method as preferences cannot be observed for policies that are not yet offered to doctors and nurses.

The construction of the DCE followed recommended steps, described in greater detail elsewhere (Ryan et al, 2008 and Mangham and Hanson, 2009). We decided to develop a labelled discrete choice experiment where respondents would have to choose between a job in a rural area and another job in an urban area. The use of labels, relatively uncommon in the health economics literature (Lagarde and Blaauw, 2009), is justified by the fact that we wanted to define policies and job characteristics that would be different in urban and rural areas (i.e. alternative-specific attributes).
The first step in the DCE development was to decide which job characteristics (termed attributes in the DCE literature) to include, and to define the appropriate levels for each characteristic. The focus of our DCE was on doctors and nurses preferences for different financial and non-financial incentives that could be used to attract them to rural areas. Therefore, the selection of job characteristics was driven by a list of potential policy options. Multiple methods were used to narrow down a list of appropriate interventions.

First, we reviewed all the documents from the Ministry of Public Health that were related to human resources strategy and policies to address the shortages of staff in the public sector and in rural areas (National Human Resources for Health Commission, 2007).

Second, we reviewed the literature of Thai studies exploring the pull and push factors influencing job satisfaction and doctors´ intention to leave rural areas(Sumaman 1992, NaRanong 1992, Putasen 1996, Preuksananond et al 2003, Thamarangsri 2003) and nurses (Wongsunoparat, 1997, Pengmesri 1998, and Prapaipanich 2007).

Third, literature reviews of the interventions that have been tried in other developed and developing countries were used (Scott, 2001; Wordsworth et al, 2004; Hanson and Jack, 2008; Wilson et al. 2009, Lagarde and Blaauw; 2009; Gosden et al 2000; Gu¨nther et al, 2010 and Kolstad, 2010).

Fourth, in depth interviews with ten policy makers were carried out to propose a list of potential measures to improve the recruitment and retention of doctors and nurses in rural areas.

Finally, focus group discussions (FDG) were organized to obtain suggestions for desired job characteristics. Two FDGs were carried out with doctors already working in rural areas and final year medical students about to graduate, to explore their views about the possible feasibility and likely effects of interventions. Final year nursing students and nurses currently working in rural areas were also invited for the FDG to make suggestions on attributes likely to attract nurses to rural areas and retain them.

The entire process allowed us to narrow down a list of relevant interventions and define the key DCE attributes. Seven attributes were eventually selected that were all found to be important in determining the choice of rural posts:

- hospital size – whether the hospital is big or not
- hospital location – whether the hospital is located close to their own province or not
- salary - whether they earn their current salary or a better one
- the number of night shifts they have to do (per month)
- whether there is a senior doctor in the hospital to support them if needed
- whether the hospital has a reserved quota allocated to its doctors for specializing
- the number of years doctors have to wait in the hospital until they are promoted to the next rank.

We decided to use a labelled design where respondents would have to choose between a job in a rural area and one in an urban area (Table 1).

To define the attribute levels, we used as a base level what corresponded to the current situation, and better levels were defined as improvements from that defined base level following discussions with policy-makers and doctors in FGDs. The DCE tool was piloted with a sample of ten doctors working in community hospitals. The pilot was used to improve the wording and definition of the attributes and levels.

Table 1: Attributes and levels of discrete choice experiment (DCE) of doctors

Attributes	**Levels**	
	Rural facility	**Urban facility**
Hospital size	▪ Small (10-60 beds) ▪ Large (>60 beds)	▪ Small (10-60 beds) ▪ Large (>60 beds)
Hospital location	▪ Your Hometown province ▪ A province that is not your hometown province	▪ Home province ▪ Different province
Total monthly income	▪ Current salary ▪ Current salary + 15% ▪ Current salary + 30% ▪ Current salary + 45%	Current salary
Overtime work per month	▪ 7 night shifts per month ▪ 14 night shifts per month	▪ 7 night shifts per month ▪ 14 night shifts per month
Presence of a consultant	▪ No ▪ Yes	▪ No ▪ Yes
Reserved Quota for specialist training	▪ No ▪ Yes	▪ No ▪ Yes
Number of years you will have to wait to be promoted	▪ 1 years ▪ 2 years	▪ 2 years

For nurses, seven attributes were eventually selected covering: facility type, monthly salary, housing provision, medical benefit package, number of weeks of training per year, number of years nurses have to work before being promoted and management culture style (see Table 2). For attribute levels, we chose as the base level those corresponding to the current situation offered to graduate nurses. The other levels in rural job attributes were defined as improvements from the current conditions. For attributes of urban jobs, the levels were either similar to the rural ones, or less advantageous, reflecting the willingness of offering better job packages in under-served areas.

The DCE tool was piloted with a sample of 30 nursing students in a nursing college in the vicinity of Bangkok. The pilot was used to improve the wording and definition of the attributes and levels.

Table 2: Attributes and levels of the Discrete Choice Experiment (DCE) of the nurses

Attributes	**Levels**	
	Rural facility	**Urban facility**
Facility type	- health centre - hospital	- health centre - hospital
Monthly salary	- B 10,000 - B 11,000 - B 12,000 - B 13,000	- B 10,000
Housing provision	- Basic - Superior	- None - Basic
Medical benefit package	- cover oneself - cover oneself and family members	- cover oneself
Number of weeks off for training per year	- 2 weeks - 4 weeks	- No - 2 weeks
The number of years you have to work before being promoted	- 2 years - 1 year	- 2 years - 1 year
Management culture style	- Hierarchical: this facility is formal and structured. The managers emphasise stability, following rules, and keeping things running smoothly - Relational: this facility is personal and supportive. The managers emphasise teamwork, loyalty, and developing the full potential of staff.	- Hierarchical: this facility is formal and structured. The managers emphasise stability, following rules, and keeping things running smoothly - Relational: this facility is personal and supportive. The managers emphasise teamwork, loyalty, and developing the full potential of staff.

For both tools, with 11 two-level attributes and one four-level attribute, there was a maximum of 8,192 scenarios (The full factorial design produced 2^{11}x 4x 1 = 8,192 scenarios) that could be constructed with

these two job descriptions. To reduce this list to a manageable number for study respondents, we produced an orthogonal fractional factorial design of 16 job pairs, using the SAS Program Macros to optimise the result (Kuhfeld 2009). An example of a question composed of an urban and a rural job is presented in Figure 1 (doctor) and Figure 2 (nurse).

Fieldwork coordinators visited all the hospitals in the province and distributed the DCE questionnaire to all doctors included in the study sample. The doctors were then instructed to complete the questionnaire on their own, and send it back to the researchers by mail.

Figure 1: Example of a doctor choice scenario

Which of these two public sector facilities would you choose to work in?

Facility Characteristics	RURAL Facility	URBAN Facility
Hospital size	Small (10-60 beds)	Large (>60 beds)
Hospital location	Home province	Home province
Total monthly income	Increase 15%	Same
Overtime work per month (night and weekend)	14 times per month	7 times per month
Provision of case consultation	No	Yes
Opportunity for specialist training	Yes	Yes
Year in service for promotion	1	2

Which facility would you choose?	Rural Facility		Urban Facility	

In the four nursing colleges, the data collection was organised in a large classroom. The study was presented, participants signed a study consent form, and each questionnaire was presented to the group and the difficult points were explained. For the DCE, an example of a question (not included in the 16 survey choices) was presented at the end of the instructions (example showed in Figure 2).

Figure 2: Example of a nurse choice scenario

Facility Characteristics	RURAL Facility	URBAN Facility
Type of facility	Hospital	Health Centre
Monthly salary	Baths 11,000	Baths 10,000
Medical benefit package	5% contribution, benefit for oneself and family	5% contribution, benefit for oneself
The subsidised government housing provided at this facility	A bedroom in a flat share with somebody else	None
The number of weeks off work for training each year at this facility	2 weeks	0 week
The number of years you have to work before being promoted	1 year	2 years
The workplace culture and style of management at this facility	This facility is personal and supportive. The managers emphasise teamwork, loyalty, and developing the full potential of staff.	This facility is formal and structured. The managers emphasise stability, following rules, and keeping things running smoothly.

Which facility would you choose?	Rural Facility		Urban Facility	

In addition to the DCE, a questionnaire was developed to collect basic individual characteristics that were thought to have an influence on the choice of rural posts: gender, marital status, number of children, location of the medical/ nursing school they attended, and rural background.

Experimental Economic Games (EEGs)

Recently, economic experiments have been increasingly 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 program.

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 Thailand.

To construct simple measures of nurses' altruism, **the dictator game** was chosen, with nurses 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), 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 B200 (see Figure 3 below). This payoff was chosen with reference to the daily wage of a beginning nurse.

Figure 3: Tool used to capture respondents' altruism

ID NUMBER: **TASK 1 QUESTION SHEET**

For each question (A, B and C), <u>circle</u> 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%* B200	*90%* B180	*80%* B160	*70%* B140	*60%* B120	*50%* B100	*40%* B80	*30%* B60	*20%* B40	*10%* B20	*0%* B0
	Another student gets	*0%* B0	*10%* B20	*20%* B40	*30%* B60	*40%* B80	*50%* B100	*60%* B120	*70%* B140	*80%* B160	*90%* B180	*100%* B200
	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%* B200	*90%* B180	*80%* B160	*70%* B140	*60%* B120	*50%* B100	*40%* B80	*30%* B60	*20%* B40	*10%* B20	*0%* B0
	A patient gets	*0%* B0	*10%* B20	*20%* B40	*30%* B60	*40%* B80	*50%* B100	*60%* B120	*70%* B140	*80%* B160	*90%* B180	*100%* B200
	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%* B200	*90%* B180	*80%* B160	*70%* B140	*60%* B120	*50%* B100	*40%* B80	*30%* B60	*20%* B40	*10%* B20	*0%* B0
	A poor person gets	*0%* B0	*10%* B20	*20%* B40	*30%* B60	*40%* B80	*50%* B100	*60%* B120	*70%* B140	*80%* B160	*90%* B180	*100%* B200
	YOU CHOOSE:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**

Adopting a similar approach to 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 DG 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:

- *Ceteris paribus*, 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[1], 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 specifically emphasised in the instructions given to the participants.

Qualitative Research Methods

Pre-baseline, key informant interviews (KIIs) were held with higher level Ministry officials and other relevant stakeholders to identify strategies that have been implemented or could be developed to improve recruitment and retention of nurses and doctors in rural areas, noting successes and/or failures in policies. Following the key informant interviews, focus group discussions (FGDs) with approximately 6-10 registered nursing graduates and doctors were conducted to inform certain aspects of the DCE tool. Group interviews at this stage were mainly focused on opinions, perceptions and attitudes towards the specified interventions. Participants in this particular exercise were recruited from sites other than those specified for inclusion in the study.

At baseline, focus group discussions were also conducted to gather information on job preferences and factors that may have influenced choice of nursing jobs sought by nursing graduates. At the last stage of the cohort study, select participants were invited for additional focus group discussions and/or key informant interviews to assess various responses elicited in the SAQ and DCE and to corroborate information collected over the one year follow-up period.

[1] 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.

Analysis of the data

A. Analysis of the SAQ

Data from the SAQs was entered into STATA and analysed using standard statistical methods.
Attitudes towards working in rural areas were measured by a set of 11 statements on the conditions of life and work. For attitude scores, respondents had to use a 6-point Likert scale to describe how much they agreed with the statement, where 1= strongly disagree and 6= strongly agree).

B. Analysis of the Discrete Choice Experiment

The DCE data that presented alternative-specific attributes was analysed by using a conditional logit model. Clustering at the individual level was carried out to account for individual level correlation over the 16 responses. The dependent variable was the alternative chosen by the respondent. Job characteristics were interacted with each label to analyse the differential impact of job characteristics in the urban and rural jobs. The odd ratios of a job characteristic in a rural post can be interpreted as the effect of that job characteristic on the likelihood of choosing a rural position. In order to assess the extent to which individual characteristics influence preferences for rural jobs, socio-demographic characteristics were also included in the model. The impact of nurses' backgrounds and training location on the preference for rural posts in particular was tested as these have proven to be important factors in the literature.

Finally, the potential effects of the policy interventions were modeled by predicting the uptake of rural and urban posts under different policy scenarios (Hensher et al. 2005). The intent was to model the effect of single measures as well as a combination of several incentives.

C. Analysis of EEGs

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 in 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 identities of the recipients were included, so that for each individual, three measures of altruism (A_1, A_2 and A_3) were computed, with $A_j = q_j$

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. These measures were computed for nursing and economic students in South Africa.
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.

To investigate the determinants of altruism, regression techniques were used.

D. Analysis of interviews and FGDs

Where permission was obtained, interviews and FGDs were recorded and transcribed for analysis. Study data, in the form of notes and transcripts from the KII and FGDs, were analysed by standard qualitative approaches, including content and thematic analysis (Miles and Huberman 1994).

Cohort follow-up: Actual workplace

One year following the baseline survey, a short questionnaire was sent to all cohort members in order to assess their actual workplace and keep them in touch. A few months after the baseline survey, government implemented a financial incentive in the form of hardship and experience allowance to doctors working in rural areas in order to retain them. The income of newly graduated doctors added up to 10,000-30,000[2] Baht a month, where fourth year doctors received 30,000 – 50,000 Baht in addition, depending on the degree of hardship area. The results of the short questionnaire are as follows.

[2] 1 USD = 31 Bahts

3. RESULTS

Description of study population

Of all 282 doctors in the sampling frame, 211 (75%) agreed to participate in data collection. The majority were first year doctors (56%) who have only experienced working in rural areas. There was a slightly higher proportion of female doctors compared to male doctors. The majority of participants graduated from regional universities (62%). Of all respondents, 83% spent their childhood in urban areas. The majority of doctors were recruited by entrance examinations to enter their medical school (76%). Only 24% were recruited through the local recruitment system of recruiting students from rural areas by local mechanisms (Table 3).

Table 3: Characteristics of doctors

Characteristics		**Percentages (N=211)**
Time spent practicing	- Less than 1 year	55.7
	- Between 1 and 2 years	15.7
	- Between 2 and 3 years	28.6
Sex	- Male	42.2
	- Female	57.8
University locations	- Bangkok	37.9
	- Regional	62.1
Hometown background	- Urban	83.4
	- Rural	16.6
Type of recruitment	- Entrance exam	76.3
	- Local recruitment	23.7

Of the 389 nursing students invited, 342 (87.9%) came on data collection day and agreed to participate in the study. The study population was relatively equally distributed among the four nursing colleges, although there was a bigger group from the nursing college located in the North-eastern region (34.2%). A total of 95.3% of study participants were female and 83.6% were born in a rural area. The majority of respondents were from the North-eastern region (68.4%) and very few were from the Central region (1.2%). Since students no longer automatically benefit from government scholarships, sources of financial support varied a lot and included both parents' support (98%) and student loans (64.9%).

However, some students did receive financial support in the form of scholarships from some hospitals (26.3%). See Table 4.

Table 4: Characteristics of nursing graduates

Variable		**Percentage (N=342)**
Nursing college location	- South province	22.8
	- Central province	24.0
	- Northern province	19.0
	- Northeastern province	34.2
Sex	- Male	4.7
	- Female	95.3
Area where was born	- Rural	83.6
	- Urban	16.4
Students' hometown	- South	20.2
	- Central	1.2
	- North	10.2
	- Northeast	68.4
Source of financial support*	- Parents	98.0
	- Student loans	64.9
	- Scholarship	26.3

***** More than one response was possible

Attitudes towards working and living in rural areas

Table 5: Attitude of doctors and nurses towards working and living in rural areas

Aspects	Agreement %	
	Doctors (N=211)	**Nurses (N=342)**
Working in rural areas means you are without support from colleagues/supervisors	42.4	17
You can earn more money when you work in a rural area	64.1	40.5
You can obtain advancement in your career quickly if you choose a rural position	46.4	72.1
Working in rural areas is not stressful at all.	84.7	96.8
Quality of life in rural areas is very good.	63.6	87.7
The lifestyle in rural areas appeals to me	63.2	78.4
The social life in rural areas is enjoyable.	65.6	80.1
Living in a city is stressful.	71.8	84.8
Bringing up children in rural areas is difficult.	71.8	81.6
Being posted in a rural area would appeal to me	33.5	75.7
I would feel scared if I had to work in a rural area	72.7	74.9

A high proportion of doctors indicated that working in rural is not stressful while living in city is more stressful. However, a small proportion of them (34%) agreed that being posted in a rural area would appeal to them, although this was echoed by the result that 73% of them would be scared if they had to work in rural areas. For working and living in rural areas, most of their concerns are that bringing up children in rural areas is difficult. However, nurses seem to be more optimistic about working in rural areas. Almost all participants agreed that working in rural is not stressful (97%). A very high proportion of nurses agreed that 'quality of life in rural areas is good', 'living in city is stressful', and 'social life in rural areas is enjoyable'. Only 17% of them think that 'working in rural areas means you are without support from colleagues/supervisors'. Similar to doctors, nurses worried that 'bringing up children in rural areas is difficult'. Results from nurses seem to be ambiguous, because although 76% of them stated that 'being post in a rural area would appeal to them, a similar proportion (75%) agreed that they would feel scared if they had to work in a rural areas (Table 5).

Discrete choice experiment (DCE)

Doctor

The doctor DCE results are shown in Table 6. All job attributes included in the DCE were found to have a significant impact on job choices. The policy lever that would increase the odds of respondents choosing a rural job the most consists of offering a 45% salary increase to rural doctors. The next two influential policy levers would be a strategy giving privileged access to specialist training for doctors in rural

facilities, or the possibility of choosing a post in a facility located not far from their hometown. As expected, the odds of choosing a job would decrease with an additional night on call.

It is also interesting to note the non-linear effect of salary increases. In particular, a 45% increase in salary doubles the odds of choosing a rural job, compared to a 30% increase. Finally, young Thai doctors do not positively value being posted in large hospitals, either in rural or in urban posts.

The analysis also provides some information on the extent to which preferences for rural posts vary with individual characteristics. Unlike what was hypothesised, being located in a wealthier province has no impact on the probability of choosing rural jobs over urban ones. More surprisingly, doctors recruited through the special "rural track" do not seem to value rural jobs more those who were recruited through the national standard exam. However, this result might be due to the small proportion of doctors who were recruited through this track. Interestingly, doctors who were in their first year of compulsory rural service are less likely than doctors who were in their 3rd year to prefer a rural job compared to an urban one. In line with the literature in this field, a rural upbringing increases one's valuation of rural jobs, while doctors who had trained in Bangkok valued rural jobs less than those who had trained in regional medical schools.

Table 6: Determinants of job preferences of young Thai doctors

	Odds-Ratios	OR St. errors
Rural job characteristics		
Alternative-specific constant	0.633	0.197
Hospital with > 60 beds [hospital with < 60 beds]	0.769**	0.074
Near your hometown [not near hometown]	3.391***	0.338
Has specialist quota [does not have specialist quota]	2.975***	0.292
Promoted after 1 year [promoted after 2 years]	1.322**	0.129
Consultant present [no consultant]	1.386***	0.136
Per night on call/month	0.894***	0.013
15% rural allowance	1.651***	0.222
30% rural allowance	2.097***	0.293
45% rural allowance	4.082***	0.612
Urban job characteristics		
Hospital with > 60 beds [hospital with < 60 beds]	0.658***	0.065
Near your hometown [not near hometown]	2.955***	0.294
Has specialist quota [does not have specialist quota]	2.716***	0.270
Consultant present [no consultant]	1.641***	0.159
Per night on call/month	0.864***	0.012
Interaction with rural label		
Work in low-income province [high-income province]	1.103	0.150
Work in medium-income province [high-income province]	1.025	0.102
Entered medicine by "rural track" [normal national entrance]	1.093	0.166
Male	1.001	0.089
Studied in Bangkok	0.821*	0.077
Has rural background	1.405**	0.172
In 1st year of rural practice [more than 3 years of rural practice]	0.719**	0.079
In 2nd year of rural practice [more than 3 years of rural practice]	1.273	0.190
N	6298	

*** p<0.001, ** p<0.01, * p<0.05

Pseudo R2: 0.2797 Log-likelihood: -2183 Chi2 (23)=1122 p<0.000

Nurse DCE results

Table 7 shows that all attributes -except better training opportunities in rural jobs-were found to have a significant influence on the choice of job, the type of facility was the most important job characteristic in the choice of rural posts for nurses. More specifically, nurses were 2.8 times more likely to choose a rural job if they were offered a position in a hospital compared to a health centre. This strong preference for hospitals was also found for urban posts. Benefiting from an extended medical coverage (for oneself and one's family), appeared to be the most strongly valued policy lever, as nurses would be 1.9 times more likely to choose a rural post if it offered medical coverage for their family in addition to themselves. In particular, expanding medical benefits would have a stronger effect on rural job preferences than any of the salary increases. A quicker promotion (waiting one year instead of two

years to be promoted) was found to be the next best incentive to increase the odds of taking up a rural post. Finally, a supportive management culture (instead of a formal and hierarchical one), a house instead of a shared flat and a small 10% salary increase were the next best policy levers.

As far as individual characteristics were concerned, rural upbringing was positively associated with a preference for rural posts. Nurses who trained in nursing colleges in the Northeastern region were found to be more likely to choose rural posts than nurses who trained in Bangkok. However, there was no significant difference among having trained in Bangkok in the Southern colleges or in the Northern colleges.

Table 7: Conditional logit regression results

Variables	Odds-Ratios	95% confidence interval	p-value
Rural job characteristics			
Alternative-specific constant	2.931	(1.602 - 5.364)	0.000
Hospital (health centre)	2.777	(2.264 - 3.405)	0.000
10% salary increase	1.356	(1.101 - 1.669)	0.004
20% salary increase	1.740	(1.379 - 2.195)	0.000
30% salary increase	1.573	(1.224 - 2.022)	0.000
Provision of house (shared flat)	1.577	(1.367 - 1.819)	0.000
Extended medical coverage (normal medical coverage)	1.887	(1.606 - 2.217)	0.000
4 weeks of training/ year (2 weeks)	0.947	(0.796 - 1.126)	0.538
Faster promotion (normal promotion)	1.534	(1.338 - 1.759)	0.000
Relational (supportive) type of management	1.719	(1.446 - 2.043)	0.000
Urban job characteristics			
Hospital (health centre)	2.608	(2.087 - 3.260)	0.000
Shared flat (no housing)	1.738	(1.481 - 2.040)	0.000
2 weeks of training/ year (0 week)	1.824	(1.506 - 2.209)	0.000
Faster promotion (normal promotion)	1.881	(1.605 - 2.205)	0.000
Relational (supportive) type of management	1.336	(1.121 - 1.592)	0.001
Urban job characteristics			
Rural upbringing (urban upbringing)	1.768	(1.188 - 2.631)	0.005
South college (Bangkok college)	1.243	(0.813 - 1.901)	0.315
North college (Bangkok college)	1.302	(0.866 - 1.958)	0.205
Northeast college (Bangkok college)	0.655	(0.444 - 0.967)	0.033

Note: reference categories are indicated in parenthesis

Prediction of rural job uptake

Doctors

Using the results from the multivariate analysis, we were able to simulate the uptake of rural jobs under a number of scenarios representing various policy options.

To provide some 'baseline' comparison, we simulated the distribution of doctors between urban and rural jobs under what was closer to the current situation. In this base scenario, doctors in rural posts work in small hospitals that typically cannot guarantee a space to specialise; they earn 15% more than the base salary but are usually on call 14 nights per month. In contrast, in urban jobs, doctors work in bigger hospitals (more than 60 beds) where specialty quotas are offered, earn the base salary, and are on call seven nights per month. In both jobs, consultants would be present to help, doctors would not be near their hometown (since they cannot choose) and it would take them two years to be promoted. Under these circumstances, which reflects the current situation offered to graduate doctors, our model predicts that only 20% of doctors would willingly choose a rural post (See Table 8).

A series of single incentive policies could be implemented to increase the uptake of rural jobs (see Table 8). The most efficient single incentive would be to allow doctors in rural areas to work near their home province. This would more than double the uptake of rural jobs (nearly up to 46%). The next best incentive, guaranteeing a place to specialise, would convince 42.6% of doctors to take up a rural position. The highest rural allowance proposed, corresponding to 45% more money than what doctors earn in urban areas, would be the third most efficient policy lever, attracting 38.2% of graduate doctors to rural posts.

Table 8: Prediction of the uptake of rural jobs under different policy simulations for doctors

Policy intervention	% rural	% urban
Current working conditions*	20.00	80.00
Single incentives		
30% rural incentive	24.09	75.91
45% rural incentive	38.20	61.80
Specialty training quota	42.65	57.35
Workplace close to hometown	45.88	54.12
Only 7 on-call nights/ month	35.40	64.60
Faster promotion	24.84	75.16
Education incentives + working environment		
Specialty training quota + faster promotion + 15% salary increase	49.58	50.42
Specialty training quota + only 7 on-call nights	63.30	36.70
Specialty training quota + closer to hometown	76.93	23.07
Specialty training quota + only 7 on-call nights + close to hometown	87.96	12.04
Financial and career incentives		
30% salary increase + Faster promotion	29.55	70.45
45% salary increase + Faster promotion	44.95	55.05
45% salary increase + only 7 nights a months on call	57.52	42.48
30% salary increase + Faster promotion + Specialty training quota	47.90	52.10
30% salary increase + workplace close to hometown	51.84	48.16
30% salary increase + workplace close to hometown + faster promotion	58.73	41.27
Financial and education incentives		
30% salary increase + Specialty training quota	48.57	51.43
45% salary increase + Specialty training quota	64.77	35.23

* see description in the text

Nurses

Table 9 reports the effects of various policy scenarios on the probability of choosing a rural job.

The base scenario is meant to mimic the current situation, where rural positions are predominantly in health centres while urban jobs are in hospitals, the salary offered in rural areas is 10% higher than in urban areas and the rest of the work conditions are the same in both areas (hierarchical management style, no housing in urban areas and a shared flat provided in rural posts, two weeks of training in both areas). Under these conditions, 45% of nurses choose a rural job while 55% choose an urban post.

The following five scenarios (scenario two to six) represent the effect of introducing one new incentive to attract nurses to rural posts, while the job offer in urban posts remained the same as in the base scenario. If nurses were offered a 20% increase in salary in rural posts (all other conditions remaining the same as in the base scenario), 51.2% of nurses would choose rural posts. Offering an expanded medical coverage (scenario three) would be the most powerful single incentive, as it would increase the proportion of newly graduated nurses choosing rural posts to 60.7%. Finally, offering faster promotion,

better housing and introducing a supportive management style brought the uptake of rural posts to 55.7%, 56.3% and 58.5%, respectively.

The last five scenarios (scenarios 7 to 11) present possible packages of incentives. Scenario 7, which combines the 20% salary increase and better housing, would lead to 64.5% of nurses choosing rural jobs. Combining a 20% salary increase and the expanded medical benefit package would increase the uptake of rural jobs to 66.5%. Finally, in scenario 11 where four interventions are combined, the uptake of rural posts is predicted to be as high as 84.0%.

Table 9: Results of policy simulations of nurses

Scenario number	Description	% rural	% urban
Base scenario	Current working conditions	45.02	54.98
Scenario 2	20% rural incentive	51.24	48.76
Scenario 3	Medical benefit package	60.71	39.29
Scenario 4	Faster promotion	55.68	44.32
Scenario 5	Better housing	56.36	43.64
Scenario 6	Relational (supportive) management style	58.46	41.54
Scenario 7	20% salary increase + Better housing	62.37	37.63
Scenario 8	20% + medical package	66.48	33.52
Scenario 9	Relational management style + faster promotion	68.35	31.65
Scenario 10	20% + medical package + management	77.32	22.68
Scenario 11	20% + medical package + management + promotion	83.95	16.05

EEG Results

Descriptive results

First, average donations made by nursing students presented in Figure 4 indicate that the size of gifts made by dictators to recipients increases if the recipient is a poor person.

Second, looking at the whole distribution of decisions made (see Figure 3 above), there is a marked difference between decisions taken for the student recipient 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 patient and poor recipients.

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

Comparing the results obtained in Thailand to the ones obtained in the other two countries (see Figure 4), there is a surprising similarity of results. Except for the patient recipient, to whom South African nurses give less than their Thai and Kenyan colleagues, there is no statistical difference in the three countries in the average amount of money sent to the recipients. In each of the three groups, the proportions of students who give nothing, half of their endowment and all of it are equally close. For example, in the student group, 8.5% of the Thai nursing students kept all for themselves (13% in Kenya and 13.5% in South Africa), 49.1% split equally (49.3% in Kenya and 42.7% in South Africa) and 0.6% gave away everything (against 1.5% in Kenya and 0.8% in South Africa).

Figure 4: distribution of choices in the dictator game

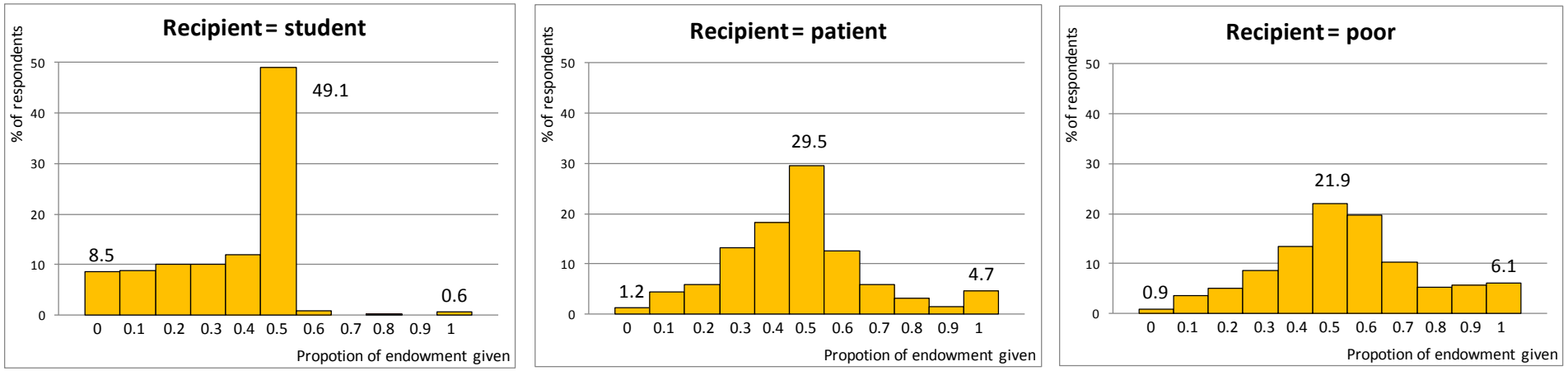

Figure 5: Average share of the initial endowment given by nurses to recipients (with 95% CI), by country, for each type of recipient

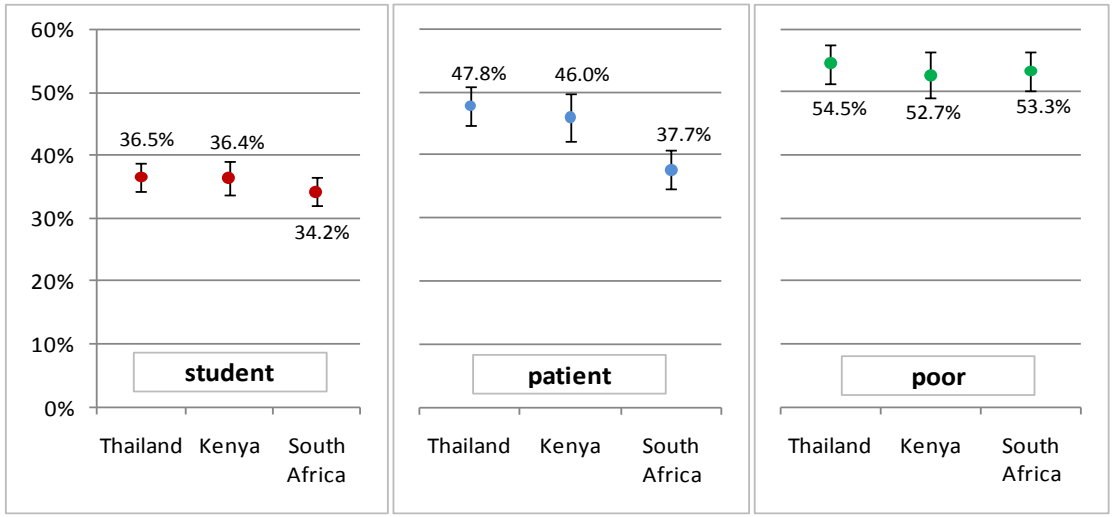

Table 10 below indicates the results of some basic descriptive breakdown of the decisions made in the dictator games by different groups of nursing students. It shows that Pre-service students were markedly less generous than distance learners. However this effect might also be linked to the age of the nursing students, and a multivariate analysis provides more information on the relative importance of the difference socio-demographic characteristics.

Table 10: 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.***
College attended									
Songkla (n=78)	0.399	0.183	***	0.519	0.224		0.597	0.217	*
Bangkok (n=82)	0.274	0.197		0.448	0.218		0.498	0.226	
Chiang Mai (n=65)	0.372	0.162		0.454	0.192		0.572	0.255	
Ubon (n=117)	0.403	0.160		0.485	0.189		0.528	0.201	
Region where was born									
South (n=69)	0.393	0.189		0.516	0.217		0.600	0.215	*
Central (n=1)	0.500	-		0.500	-		0.500	-	
North (n=35)	0.354	0.177		0.457	0.193		0.563	0.277	
Northeast (n=234)	0.361	0.180		0.471	0.201		0.530	0.214	
Bangkok (n=3)	0.200	0.200		0.367	0.462		0.233	0.231	
Gender									
Male (n=16)	0.331	0.215		0.381	0.204		0.413	0.245	
Female (n=326)	0.367	0.181		0.483	0.205		0.552	0.221	
Religion									
Buddhist (n=311)	0.365	0.185		0.477	0.207		0.539	0.228	
Muslim (n=28)	0.371	0.154		0.496	0.203		0.614	0.176	
Christian (n=3)	0.333	0.153		0.433	0.058		0.500	0.100	
First thing that is important to take into account in a job									
Good income (n=57)	0.296	0.192	*	0.405	0.183	*	0.475	0.185	*
Safe job (n=171)	0.379	0.176		0.489	0.192		0.549	0.215	
Working with people (n=53)	0.391	0.190		0.521	0.255		0.585	0.265	
Feeling of accomplishment (n=60)	0.372	0.173		0.480	0.207		0.568	0.236	
Born in a rural district									
Yes (n=284)	0.369	0.181		0.488	0.207	*	0.550	0.221	
No (n=58)	0.350	0.190		0.426	0.195		0.522	0.237	

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 multivariable 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. Dummy variables "patient" and "poor" capture the effects of those 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 some additional interaction terms with the framing dummies, thereby testing the relative strength (and significance) of the determinants for each of the three framings.

Table 11: Determinants of nursing students' altruism

MODELS	**(1)**	**(2)**
patient	0.113***	0.061
	(0.011)	(0.038)
poor	0.180***	0.216***
	(0.011)	(0.038)
male	-0.103**	
	(0.042)	
student_male		-0.053
		(0.051)
patient_male		-0.111**
		(0.051)
poor_male		-0.147***
		(0.051)
Bangkok	-0.056**	
	(0.028)	
Ubon	0.008	
	(0.025)	
Songkla	0.033	
	(0.028)	
student_bkk		-0.096***
		(0.034)
student_ubon		0.032
		(0.031)
student_songkla		0.020
		(0.034)
patient_bkk		-0.004
		(0.034)
patient_ubon		0.032
		(0.031)
patient_songkla		0.056
		(0.034)
poor_bkk		-0.070**
		(0.034)
poor_ubon		-0.039
		(0.031)

MODELS	**(1)**	**(2)**
poor_songkla		0.022
		(0.034)
income	-0.076**	
	(0.031)	
safety	-0.011	
	(0.025)	
people	0.002	
	(0.031)	
student_income		-0.060
		(0.038)
student_safety		-0.000
		(0.030)
student_people		0.001
		(0.038)
patient_income		-0.081**
		(0.038)
patient_safety		-0.005
		(0.030)
patient_people		0.014
		(0.038)
poor_income		-0.085**
		(0.038)
poor_safety		-0.027
		(0.030)
poor_people		-0.009
		(0.038)
bornrur	0.052**	
	(0.024)	
student_bornrur		0.039
		(0.029)
patient_bornrur		0.073**
		(0.029)
poor_bornrur		0.045
		(0.029)
Constant	0.348***	0.353***
	(0.032)	(0.038)
Number of respondents	341	341
R^2 within	0.293	0.323
R^2 between	0.0924	0.0924
R^2 overall	0.172	0.184
Degrees of freedom	10	26
Rho	0.499	0.506

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

The interaction model underlines the fact that the determinants of altruistic behaviour in game one are different from one framing to another. For example, although “being born in a rural district” is positively correlated with an altruistic behaviour in model (1), the second specification highlights that this altruistic behaviour is only significant when the recipient is a patient. For the other two framings, there is no difference in the answers provided by individuals born in rural or urban areas.
Overall, the results confirm the greater generosity of respondents towards the poor and patients. It also confirms that in Thailand, male nurses are less altruistic than female ones, in particular towards patients.

Cohort follow-up: Actual workplace

Doctors
Of 211 cohort members, only 117 doctors (63%) could be followed up. The majority of them (91%) still worked at rural hospitals. Only 4.5% and 4% of them moved to urban hospitals and went for specialty training, respectively. There was only 1 doctor who resigned from the public hospital. However, due to the fact that these young doctors were compelled to provide public services for three years, their choices to move were limited.

However, of 117 responses, only 73 questionnaires were completed for analysis. The analysis showed that the majority of doctors worked at small size hospitals (79%), and approximately half of them worked in their home provinces. In relation to their income, the majority have an income in the range of 40,000 – 60,000 Baht a month, and the average income was 65,895 Baht (SD = 17,369) a month. Almost 90% of doctors have their overtime duty at more than eight days per month, and 82% stated that there was no opportunity for specialist training at their designated hospitals. In addition, the majority (59%) stated the case consultant was not presented at their hospitals. Asked about their intention to stay before the financial incentive implemented in 2008, only 15% of them intended to stay at the same hospital, and 74% of them would go for specialist training. Of participating doctors, 3% would move to urban areas, while 8% would resign from government. However, although the financial incentive could delay their plan to stay longer in rural areas, the majority will end up leaving. Their intention for the next two years confirmed this claim. The majority of them (74%) will go for specialist training, while only 17% will stay at rural hospitals in the next two years (Table 12).

Table 12: Workplace characteristics of doctors

Workplace Characteristics		Number % (n=73)
Hospital size	▪ Small (10-60 beds) ▪ Large (>60 beds)	58 (79.5) 15 (20.5)
Hospital location	▪ Home province ▪ Different province	38 (52.1) 35 (47.9)
Total monthly income	▪ 40,001 – 60,000* ▪ 60,001 – 80,000 ▪ 80,001 – 100,000	37 (50.7) 29 (39.7) 7 (9.6)
Overtime work per month	▪ Less than 8 times ▪ 8-13 times ▪ 14 times and above	8 (11.0) 41 (56.2) 24 (32.9)
Case consultant provision	▪ No ▪ Yes	43 (58.9) 30 (41.1)
Opportunity for specialist training	▪ No ▪ Yes	60 (82.2) 13 (17.8)
Intention to stay before 2009 (financial increase)	▪ Stay at rural ▪ Leave to urban ▪ Go for specialist training ▪ Resign from government	11 (15.1) 2 (2.7) 54 (73.9) 6 (4.1)
Intention to stay in the next 2 years	▪ Stay at rural ▪ Leave to urban ▪ Go for specialist training ▪ Resign from government	13 (17.8) 4 (5.5) 54 (74.0) 2 (2.7)

* 1 USD = 31 Bahts

Nurses

The baseline data from the self-administered questionnaire revealed that 50.9% of 342 graduated nurses had intended to work in a rural setting, whereas 49.1% intended to work in an urban area. One year following their graduation, they were asked about their actual workplace. Of 340 responses, 49% worked in rural settings and 51% worked in urban settings. Among the 51% who worked in urban settings, 38% worked in public hospitals, 9% worked in private hospitals, and 4% were not in direct nursing services. The analysis showed that there was a significant association between intention to work in a rural area and actual job of choice (Pearson Chi-square = 60.16, $p < 0.001$), see Table 13.

Table 13: Relationship between intention to choose workplace and actual workplace of newly graduated nurses

Workplace settings	Actual choice	
	Urban setting	Rural setting
Intention to choose		
Urban setting	116 (35.6%)	48 (14.7%)
Rural setting	45 (13.8%)	117 (35.9%)

* Pearson Chi-square = 60.16, p<0.001

Table 14 illustrates that nurses who graduated from regional colleges have chosen to work in rural areas more than those graduated from the capital, Bangkok (58.1% compared to 20.7%). In relation to hometown background, nurses who had a rural upbringing chose a rural setting as a job of choice more than those who had an urban upbringing (52.7% compared to 22.0%). Those who had good impressions about working in rural areas had preferentially chosen rural settings (54.4% compared to 32.5%) and nurses who obtained scholarships during their student years tended to work in rural settings more than those without scholarships (60.0% compared to 45.2%). The logistic regression showed that college location, hometown background, and positive attitude towards working in a rural area were significantly associated with rural workplace choice. However, those obtaining scholarships tended to choose rural areas, although it was not significantly associated (p = 0.092).

Table 14: Logistic regression of actual job choices and individual characteristics of nurses

Characteristics	B (SE)	Beta	t	Sig
(Constant)	0.301 (.110)		2.736	.007
Bangkok College (Regional Colleges)	0.301 (.110)	-.312	-6.247	.000
Rural hometown (Urban hometown)	0.239(.071)	.169	3.389	.001
Practice at rural more than 1 month (less than 1 month)	-0.054 (.050)	-.054	-1.082	.280
Obtain scholarship (no scholarship)	0.096 (.057)	.085	1.690	.092
Prefer working in rural (not prefer working in rural)	0.175 (.059)	.150	2.984	.003

R= 0.416, R Square = 0.173

Those who chose a rural setting as their workplace placed importance on the closeness of their workplaces to their hometown or their parents' hometown (56%). The scholarship during their student years that required them to provide services was the second most important reason (30%). The other reasons were satisfaction with their workplace environment, the appeal of working in a rural area, and intention to be civil servants, respectively. However, a workplace close to their hometown was among the main reasons for nurses to choose to work in an urban area (25%). The other reasons that were different from those that chose rural settings were high income and the need to enhance their

experience. Scholarship requirement and satisfaction with the workplace environment were among the reasons drove them to choose to work in urban settings (Table 15).

Table 15: Reasons to choose rural and urban workplaces

Rural workplace n= 168		**Urban workplace n = 172**	
Reasons	N (%)	Reasons	N (%)
Close to hometown	94 (56)	Close to hometown	37 (21.5)
Scholarship requirement	49 (29.9)	High income	32 (18.6)
Satisfied with workplace environment	18 (10.7)	Enhancing experience	30 (17.4)
Working in rural is appealing	17 (10.1)	Scholarship requirement	29 (16.9)
Want to be a civil servant	12 (7.1)	Satisfied with workplace environment	22 (12.8)

4. CONCLUSION

This paper presents the results of a study that was designed to determine the attitudes of health graduates towards working in rural areas and to evaluate their preferences for various policy interventions that may be used to recruit health professionals to rural areas as well as to describe the early career choices of doctors and nurses. The results provide some valuable information to help policy-makers design some possible incentives to attract more nursing graduates to rural areas. The study utilised a prospective cohort design, and several tools were used, including: DCE; self-administered questionnaire; focus group discussions; interviews; and literature review.

A number of limitations have been highlighted concerning the results of DCEs. As the design has limited the number of attributes included in the DCE, therefore the results are limited by the scope of attributes included. Moreover, some more subjective attributes, such as social recognition, work autonomy, etc, have not been included in the attributes. This could effect the direction of the study. In addition, the results of the DCE have provided evidence only on the likely impact of possible strategies for attracting doctors or nurses but have not taken into consideration the costs associated with implementing the alternative policy options. Finally, there is some debate over the validity of the DCE to elicit individual preferences (Lloyd 2003, Ryan and Ameya-Ameya 2005). However, DCEs have shown to be in compliance with theoretical validity (Ryan and Ameya-Ameya 2005) and in some cases, confirmed by revealed preferences (Hensher et al 2005). Theoretical validity was confirmed here, as all coefficients were of the expected sign. Comparing stated and revealed preferences here would only be possible if some of the policy levers of the DCE were introduced.

Doctors

Although the majority of doctors valued living and working in rural areas, only a few of them thought that being posted in a rural area would appeal to them. This might reflect the fact that the majority of doctors were from urban backgrounds and they may not be familiar with the rural context.

The results from the DCE provide interesting information to determine the relative importance of employment characteristics. In particular, doctors seem to value financial attributes the most. However, non-financial incentives were also found to be important measures to attract doctors to rural areas, particularly hospitals located close to hometowns and opportunities for specialist training. Small size hospitals, fast-track promotion, case consultant provision and less overtime work were non-financial measures that could attract doctors to rural areas. The results suggest that doctors would be more likely to choose a job in a rural area that provides a better salary, is located close to their hometown, offers specialist training, provides opportunities for promotion faster than in an urban job, includes small hospitals, provides case consultants and has less over time work. As far as individual characteristics are concerned, females are likely to choose rural posts more than males and those with rural upbringings tend to choose rural posts. The results support the systematic review conducted by Lagarde and Blaauw (2009) that non-pecuniary incentives are significant determinants, and are sometimes more powerful than financial ones. The evidence that financial incentive led to the largest utility change compared with changes in other attributes echoed the study carried out by Hanson and Jack (2008); Gu¨nther et al (2010) and Kolstad (2010). Yet, non-financial attributes such as less overtimes work were found as attractive characteristics by other studies (Scot, 2001; Hanson and Jack,

2008 and Gosden et al, 2000, Wordsworth et al, 2004), Gu¨nther et al (2010). The attraction of small hospital size has echoed the study of Scott (2001) and Gosden et al (2000) and professional development was found attractive in the Wordsworth et al (2004) and Kolstad (2010) studies.

The follow up has supported the findings that financial incentives played an important role in retention of doctors to rural areas. The majority of doctors have postponed their plan to go for specialist training after the financial incentive implemented by the government in 2008, and the majority of the cohort still work in rural hospitals. However, their plans to leave these rural areas are persistent.

Nurses

Unlike the doctors, the majority of nurses were from rural areas, and that they had a good perception about working and living in rural areas. However, they hesitated to choose to work in these areas.

In particular, more nursing graduates would choose rural jobs if an extended medical coverage that included their family members was offered. In contrast, more weeks of training had no significant impact, and a faster promotion or a 20% salary increase had little impact. Nurses from rural origins were found to be more likely to choose rural posts, while the location of training centres in the Northeastern region seems to matter as well.

The results provide interesting information to determine the relative importance that nurses place on potential incentives. In particular, nursing graduates seem to value some non-financial attributes more than financial attributes. Receiving better medical coverage, being provided with better housing, being offered a faster promotion or working in a rural facility with a supportive style of management were all more valued by nurses than the most effective financial incentive (a 20% rural allowance). These results contradict previous DCE studies carried out in South Africa (Penn-Kekana et al 2005), Malawi (Mangham and Hanson 2008) and Ethiopia (Hanson and Jack 2008), where nurses valued salary increases more than other job characteristics. This might be due to the fact that nurses in Thailand are more satisfied with their salaries than in these other countries, and therefore they value other aspects more. In fact, these results from the DCE concur with those of previous studies on job satisfaction (Wongsunoparat et al 1997, Pengmeesri 1998, and Prapaipanich et al 2007), which found that nurses cared about non-financial measures, such as career advancement or supportive management. Furthermore, the most valued policy incentive in Thailand is considered an extended medical package, which is likely to be considered similar to that of a civil servant position. This might be due to the fact that all nurses could not enter civil servant positions and a medical benefit package could partly compensate this.

Finally, the fact that supportive management style is an important determinant of rural job choice echoes the study of rural retention that participative and relational management was a key factor to retain nurses (Wongsunoparat et al 1997, Pengmeesri 1998, and Prapaipanich et al 2007).

The follow up survey showed that the attitudes of nurses towards working in rural areas as well as the intention of newly graduated nurses to work in rural areas were associated with the actual choice of work place. This suggests that the educational system has the potential of encouraging newly graduated nurses to work in rural areas. Student nurses who were recruited from rural areas, or obtained scholarships tended to have a good attitude towards working in rural areas. Different approaches to field practice are likely to contribute to the different attitudes of the nurses. The fact that nurses who

are trained in regional or local colleges, who have rural backgrounds, and who have good attitudes towards working in rural areas tend to chose to work in these areas, could suggest some measures for policy makers to attract and retain nurses in rural areas.

Policy implications

Although Thailand has implemented a range of interventions, including compulsory public service, special allowance increases, career advancement, etc, large numbers of doctors could not be attracted to rural areas. The study suggests that the range of interventions should be improved. Working close to their hometown is attractive for doctors; therefore, medical students recruited locally, and allowed to provide their services close to their hometown after graduation should be preferable. The opportunity for specialist training could be an attractive strategy offered to them after serving in rural areas for a certain period. Career progression in rural areas could also be attractive if made different from those who serve in urban posts. To attract doctors to rural hospitals, policy-makers should make rural jobs more attractive than urban jobs in many respects. A number of measures, and the combination of financial and non-financial incentives, are likely to be effective in order to attract doctors to rural areas.

To attract newly graduated nurses to rural areas, there is no effective single measure, but, instead, a package of measures is needed. The **"**rural recruitment, local training and hometown placement" approach is of importance to tie nurses with 'return services'. In order to scale up nursing production, a plan to establish or strengthen academic institutes at regional areas is recommended as it has been proved to attract nurses to rural settings. However, measures to attract nurses to rural areas do not guarantee their retention in these areas. The study showed that there are certain job characteristics that could attract and retain nurses in rural areas, such as, type of facilities, a medical benefit package, housing provision, career advancement, salary increases and supportive management culture. Therefore, retention strategies are needed to be developed in order for nurses to stay in rural settings. This suggests potential areas that would further inform policy-makers on possible future interventions.

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6. APPENDIX

Appendix A : Self-administered Questionnaire (SAQ)

ID NUMBER ……

1. Your gender
   - ○ Male
   - ○ Female

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2. How old are you? _____ years

---

3. Are you ……?
   - ○ Single
   - ○ Married
     (or with long-term partner)
   - ○ Divorced/separated
   - ○ Widowed

4. What does your spouse/partner do?
   - ○ s-he studies
   - ○ s-he works
   - ○ s-he does not work (unemployed)

---

5. How many children do you have?

   _____ child(ren)

   If > 0

6. How old are they?
   1) …… years old
   2) …… years old
   3) …… years old
   4) …… years old
   5) …… years old
   6) …… years old
   7) …… years old

---

7. For statistical purposes only, how would you describe yourself in relation to population group
   - ○ Kikuyu
   - ○ XX
   - ○ XX
   - ○ XX
   - ○ XX……
   - ○ Do not want to answer

---

8. Where were you born?
   Town ……
   District ……
   Province……

---

9. Where did you spend most of your childhood (answer if different from question 8) ?

Town ……
District ……
Province……..……

---

10. Where is your spouse/partner from?

Town ……
District ……
Province……..……
Not applicable: (not married or in couple)

---

11. For each of the following organization, can you circle the corresponding number if you are an **active member (2)**, an **inactive member (1)** or **not a member (0)** of that type of organization?

	Active member	Inactive member	Do not belong
Church or religious organization	2	1	0
Sport or recreational organization	2	1	0
Art, music or educational organization	2	1	0
Labour Union	2	1	0
Political party	2	1	0
Environmental organization	2	1	0
Professional association	2	1	0
Humanitarian or charitable organization	2	1	0
Consumer organization	2	1	0
Any other (write in):_____	2	1	0

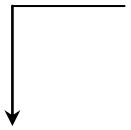
12. What is your father's level of education?

- ○ Less than 5 years of schooling
- ○ Primary education (6 years of schooling)
- ○ Secondary education (6-12 years of schooling)
- ○ Vocational education
- ○ Tertiary education

---

13. Is your father working ?

- ○ Yes
- ○ No



14. What is his profession?
_____

15. Does he work in the public sector?
- ○ Yes
- ○ No

16. What is your mother's level of education
- ○ Less than 5 years of schooling
- ○ Primary education (6 years of schooling)
- ○ Secondary education (6-12 years of schooling)
- ○ Vocational education
- ○ Tertiary education

17. Is your mother working ?
- ○ Yes
- ○ No

18. What is her profession?
_____

19. Does she work in the public sector?
- ○ Yes
- ○ No

Your studies in the Nursing College

20. During the course of your studies, did you follow a course on "community health" or "public health"?
- ○ Yes
- ○ No

21. Did you spend any time in a rural hospital/facility during your training?
- ○ Yes
- ○ No

22. Where was it? →
Town ……
District ……
Province……..……

23. How much time did you spend there?
- ○ < 1 month
- ○ 1-3 months
- ○ 3-6 months
- ○ > 6 months

24. How did you pay for your nursing training (can be more than one answer)

- ○ My parents or other members of my family supported me
- ○ I obtained a scholarship
- ○ I took a loan
- ○ I've worked
- ○ Other, specify: _____

25. What is the current outstanding amount on your loan? _____

Your future

26. Do you already know where you are going to work?

○ Yes
○ No

27. Where is it?

Town ……
District ……
Province……

28. To which sector does the facility belong?

○ public sector
○ private for-profit sector
○ private not-for-profit sector

29. What type of health facility?

○ GP practice
○ Clinic
○ Hospital
○ Other, specify:_____

30. How do you know where you are going to work?

○ have already signed a contract with that facility
○ persuaded by that facility
○ suggestion from other (specify) ……..
○ Other, specify:……..

If you do not have a job yet, what kind of position would you like to have?

30. Location:

Town ……
District ……
Province……

31. Type of sector

○ public sector
○ private for-profit sector
○ private not-for-profit sector

32. Type of health facility?

○ GP practice
○ Clinic
○ Hospital
○ Other, specify:_____

Your opinions

33. For each of the following statements, say how you feel: from strongly disagree (1) to strongly agree (6)

		Strongly ← disagree					**Strongly agree →**
		1	2	3	4	5	6
A.	Criminals should receive help rather than punishment.	○	○	○	○	○	○
B.	The government should help the poorest.	○	○	○	○	○	○
C.	Helping others with my time or money is very important to me	○	○	○	○	○	○
D.	Those in need have to learn to take care of themselves and not depend on others	○	○	○	○	○	○
E.	These days, people need to look after themselves and not overly worry about others	○	○	○	○	○	○
F.	Personally assisting people in trouble is very important to me	○	○	○	○	○	○

34. Here are some of the things many people take into account in relation to their work. Which one would you, personally, place first if you were looking for a job (tick ONE only):
    - ○ A good income so that you do not have any worries about money
    - ○ A safe job with no risk of closing down or unemployment
    - ○ Working with people you like
    - ○ Doing an important job that gives you a feeling of accomplishment

35. And what would be your second choice (tick ONE only):
    - ○ A good income so that you do not have any worries about money
    - ○ A safe job with no risk of closing down or unemployment
    - ○ Working with people you like
    - ○ Doing an important job that gives you a feeling of accomplishment

36. For each of the following statements, say how you feel: from strongly disagree (1) to strongly agree (6)

		Strongly ← disagree					**Strongly agree →**
		1	2	3	4	5	6
A.	I chose my profession to help others	○	○	○	○	○	○
B.	I chose my profession because I can earn money	○	○	○	○	○	○
C.	I chose my profession because other people value it	○	○	○	○	○	○
D.	I chose my profession because I can always find a job	○	○	○	○	○	○

37. For each of the following statements, say how you feel: from strongly disagree (1) to strongly agree (6)

		Strongly ← disagree					**Strongly agree →**
		1	2	3	4	5	6
A.	Working in rural areas means you are without support from colleagues/supervisors	○	○	○	○	○	○
B.	You can earn more money when you work in a rural area	○	○	○	○	○	○
C.	You can obtain advancement in your career quickly if you choose a rural position	○	○	○	○	○	○
D.	Working in rural areas is not stressful at all.	○	○	○	○	○	○
E.	Quality of life in rural areas is very good.	○	○	○	○	○	○

		Strongly ← disagree					**Strongly agree →**
		1	2	3	4	5	6
A.	The lifestyle you have in rural areas appeals to me	○	○	○	○	○	○
B.	The social life in rural areas is enjoyable.	○	○	○	○	○	○
C.	Living in a city is stressful.	○	○	○	○	○	○
D.	Bringing up children in rural areas is difficult.	○	○	○	○	○	○

	Strongly ← disagree					**Strongly agree →**
	1	2	3	4	5	6

A.	Work in rural areas is not stressful	○	○	○	○	○	○
B.	Being posted in a rural area would appeal to me	○	○	○	○	○	○
C.	I would feel scared if I had to work in a rural area	○	○	○	○	○	○

		Strongly ← disagree					**Strongly agree →**
		1	2	3	4	5	6
A.	Community service (compulsory time in one facility chosen by the MOH) is a good thing.	○	○	○	○	○	○
B.	Paying more the nurses who work in disadvantaged or remote areas is normal.	○	○	○	○	○	○
C.	Giving more responsibilities to nurses is a good way to motivate them.	○	○	○	○	○	○
D.	Being able to choose the rural area of my choice if I need to do a few years there is important	○	○	○	○	○	○
E.	If decent housing was provided with posts in rural areas you would be happy to go.	○	○	○	○	○	○
F.	For your career advancement, 2 years spent as a nurse in a remote or disadvantaged area should count twice as much as 2 years anywhere else	○	○	○	○	○	○