Addressing the Human Resource Crisis in Malawi's Health Sector: Employment preferences of public sector registered nurses

Lindsay Mangham
ESAU Economic and Statistical Analysis Unit

March 2007

ESAU Working Paper 18

Overseas Development Institute
London

The Economics and Statistics Analysis Unit has been established by DFID to undertake research, analysis and synthesis, mainly by seconded DFID economists, statisticians and other professionals, which advances understanding of the processes of poverty reduction and pro-poor growth in the contemporary global context, and of the design and implementation of policies that promote these objectives. ESAU's mission is to make research conclusions available to DFID, and to diffuse them in the wider development community.

ISBN: 978-0-85003-845-3

Economics and Statistics Analysis Unit
Overseas Development Institute
111 Westminster Bridge Road
London SE1 7JD

Contents

List of Figures

List of Tables

Acknowledgements

Many thanks to the Malawian Ministry of Health, and in particular to all the registered nurses who participated in the research. I am also grateful to the staff of the Centre for Social Research at the University of Malawi for their valuable assistance in conducting the fieldwork. Many thanks also for the support and advice of Dr Kara Hanson, a Senior Lecturer working with the Health Economics and Financing Programme at the London School of Hygiene and Tropical Medicine. The study was funded by the Economic and Statistical Analysis Unit, which is based at the Overseas Development Institute and is financed by the UK Department for International Development.

Acronyms

CHAM	Christian Health Association of Malawi
CMS	Central Medical Stores
DFID	Department for International Development, UK
DHO	District Health Office
EHRP	Emergency Human Resource Programme
GoM	Government of Malawi
KCH	Kamuzu Central Hospital, Lilongwe
KCN	Kamuzu College of Nursing
MoH	Ministry of Health
NHSRC	National Health Science Research Committee
NMC	Nurses and Midwives Council
QECH	Queen Elizabeth Central Hospital, Blantyre
RN	Registered Nurse
SWAp	Sector-Wide Approach

Executive Summary

This paper examines the employment preferences of public sector registered nurses working in Malawi and identifies the range and relative importance of the factors that affect their motivation. The research was designed in the light of the Malawi government's programme to address the shortage of health workers, which is based on salary top-ups as a means of increasing employee motivation and reducing high rates of attrition. This policy has been adopted despite relatively little quantitative exploration into the employment preferences of health workers in developing countries. This study aims to provide a clearer picture of the preferences of registered nurses about different aspects of their employment, and the factors that might persuade them to continue in the profession within their home country.

In many developing countries, efforts to improve health outcomes are constrained by the critical shortages of health workers. The provision of health care is labour-intensive, and health workers play a central role in the diagnosis, treatment and care of patients. Although there is a global shortage of health workers, the most critical shortfalls occur in sub-Saharan Africa. This reflects a legacy of underinvestment in human resources, the devastating impact of communicable diseases including HIV/AIDS on health workers, and the migration of health personnel seeking alternative employment overseas. The extent of the health worker shortage is widely recognised and there is an emerging body of literature on human resources for health (Joint Learning Initiative, 2004; World Health Organization, 2006), which provides a good overview of the global situation and identifies a range of generic reasons for the shortage of health workers, including poor remuneration and difficult working conditions.

The shortage of health workers in Malawi is severe even by African standards, with fewer than 4000 doctors, nurses and midwives serving a population of approximately 12 million in 2003 (Joint Learning Initiative, 2004). The coverage and quality of health services are adversely affected by the low density of professional health workers. With support from international donors, in 2004 the Malawi government designed a comprehensive programme to alleviate the human resource crisis in the health sector. The implementation of the six-year programme, known as the Emergency Human Resources Programme, began in April 2005 and contained three key components: a salary increase for health professionals; measures to enhance the capacity of training institutions; and, in the short term, additional recruitment of expatriate volunteer doctors and nursing tutors (Palmer, 2006). Of the three components, the salary top-up scheme is designed to improve the working conditions for existing staff, and aims to increase retention of health workers in the public service. In addition, some factors affecting the motivation and retention of health workers, such as the availability of drugs and other supplies, are undergoing reform as part of the Malawi government's sector-wide programme to improve the health of the population and the provision of health care.

This paper presents the results of a discrete choice experiment designed to elicit the employment preferences of public sector registered nurses in Malawi. For practical and financial reasons, it was necessary to limit the research to a single cadre: registered nurses were chosen as this cadre faces acute shortages and particular difficulties in retaining staff.

Techniques for eliciting preferences have primarily emerged from a desire to understand consumer preferences for different goods and services. In the absence of revealed preference data on choices that individuals have actually made, it is possible to ask individuals to state their preferences about hypothetical alternatives. Stated preference techniques are founded in random utility theory, and although utility cannot be directly observed it is assumed that individuals choose the alternative that yields the highest utility. Discrete choice experiments involve asking respondents to indicate their preference between hypothetical alternatives, where each alternative is described by a bundle of attributes. In this application registered nurses were asked to state their preference about hypothetical job descriptions, where each job was characterized by six job attributes: place of work, net monthly salary, the availability of material resources, the amount of work, housing provision and opportunities for further education.

Qualitative methods were used to identify the range of job attributes to include in the design of the discrete choice experiment. The attributes and attribute levels were established using information collected from twenty in-depth interviews with public sector registered nurses working in three districts. The discussion topics included their current working conditions, preferences and priority areas for reform. Manual content analysis was used to identify the issues raised by respondents and determine the frequency with which an issue was raised. Base levels were established for each attribute that reflected the prevailing working conditions for public sector registered nurses. Additional levels were then determined, and were intended to represent a reasonable improvement from the base level.

A total of 107 registered nurses working in 15 of Malawi's 27 districts completed the discrete choice experiment questionnaire. Each nurse considered 15 pairs of job descriptions and answered two questions: first, which of the two jobs shown they considered the best job, and second, taking into account their circumstances, which job they would choose. The significance of the selected job attributes was analysed using a random-effects probit estimator. The regression model specifies the likelihood of choosing one job rather than the other, given the differences in the attribute levels. The estimated parameter indicates the extent to which the difference in the attribute levels impacts on the probability of choosing one job over the other. The marginal rate of substitution between the different attributes was estimated to indicate their relative importance.

The preliminary qualitative research provided a good description of the working conditions and environment of registered nurses employed by the Malawi government and some indication of their employment preferences. When asked what changes they felt would improve the retention of registered nurses in the public service, the overwhelming response was that salaries should be increased, though other factors such as improved resource availability and access to further education were also highlighted.

The discrete choice experiment provided a useful mechanism for assessing the significance and relative importance of the alternative employment attributes. All of the six attributes used in the discrete choice experiment were found to have a statistically significant effect on the utility associated with the employment alternatives. In other words, in stating preferences and making choices about different hypothetical jobs, registered nurses were not only taking into account the level of net monthly pay, but also other employment attributes: the availability of material resources, the typical workload, the place of work, the provision of government housing and the time before having the opportunity to upgrade their

qualifications. This implies, therefore, that the Malawi government has a range of interventions available that would improve the way registered nurses value their employment in the public service.

The finding that net monthly pay had a statistically significant impact on the utility associated with the alternative hypothetical job descriptions is important and suggests that the Malawi government's strategy of increasing remuneration is likely to have a positive impact on how registered nurses value their employment. Moreover, in the relative ranking of attributes pay was found to be the most important attribute, followed by opportunities for further education and the provision of basic housing. However, in using the results of this study to inform policy decisions it should be noted that the study focuses on the benefits associated with alternative strategies, without reference to their implementation costs. Moreover, although the study concluded that pay was the most important attribute, further research would be required to establish the relationship between an increase in the level of pay and an improvement in the retention of registered nurses in the public sector.

Chapter 1: Introduction

There is a global shortage of health workers, with some of the most serious shortfalls occurring in sub-Saharan Africa, where the situation reflects the devastating impact of HIV/AIDS on health workers, accelerating labour migration and the legacy of underinvestment in human resources (Joint Learning Initiative, 2004). Even by African standards the human resource shortage in Malawi's health sector is severe, as Malawi was estimated in 2003 to have fewer than 4,000 doctors, nurses and midwives serving a population of approximately 12 million (ibid.) With such a low density of professional workers the coverage and quality of health services are inevitably constrained (Anand and Barnighausen, 2004). There are shortages in all cadres, but the situation is particularly acute in nursing, with the vacancy rate for registered nurses reported to be almost 80% in 2003 (Ministry of Health Malawi, 2004).

The Malawi government has worked with international donors to design and implement a comprehensive programme to address the human resource shortages in the health sector (Ministry of Health Malawi, 2004; Palmer, 2006). The implementation of the six-year programme, known as the Emergency Human Resources Programme, began in April 2005 and contained three key components: a taxable 52% salary increase for health workers in eleven professional cadres, measures to enhance the capacity of training institutions, and the recruitment of additional expatriate volunteer doctors and nursing tutors to fill key posts in the short term (Palmer, 2006). Of the three elements, the salary top-up scheme was designed to improve the working conditions of the existing staff, and aims to increase the retention of health workers in the public service. In addition, certain factors that affect the motivation and retention of health workers, such as the availability of drugs and other supplies, are undergoing reform as part of the government's sector-wide programme to improve the health of the population and the provision of health care. The health Secto-Wide Approach (SWAp) also receives substantial financial support from international donors.

The present study was designed to examine the human resource shortage in Malawi's health sector and focuses on the factors affecting the motivation and retention of one cadre of health workers: registered nurses. At the time the research was conducted it was too early to evaluate the impact of the salary top-up scheme as it was only one year into implementation. However, the research should provide an insight into what motivates registered nurses. The objective of the research was to determine the range of factors that affect the employment preferences of public-sector registered nurses and to assess the extent to which remuneration is a motivating factor.

The paper is organized in eight chapters. The next chapter sets out the context for the research, with Section 2.1 discussing the role of human resources in efforts to improve health and provide health services. Sections 2.2 and 2.3 provide more detail on the Malawian context and discuss some of the factors affecting the retention of health workers, as set out in the existing literature. Section 2.4 outlines the response of the GoM to the human resource crisis facing its health sector and summarizes the Emergency Human Resource Programme (EHRP).

Chapter 3 spells out the objective of the research and Chapter 4 outlines the theoretical foundations of stated preference techniques. A key advantage of discrete choice experiments is that they combine qualitative and quantitative research

methods. Although qualitative research is primarily undertaken to provide a thorough understanding of the context for the design of the discrete choice experiment, the findings can also be used to augment the discussion of the quantitative discrete choice results. Chapter 5 describes the stages that were completed in applying the discrete choice methodology and the different steps involved in analysing discrete choice data.

The results of the data analysis are reported in Chapter 6. Section 6.1 provides a summary of the qualitative findings, Section 6.2 presents the results of the probit regressions models and Section 6.3 outlines the marginal substitution of the employment attributes.

Chapter 7 contains a discussion of the results. A short conclusion, in Chapter 8, completes the paper.

Chapter 2: Background and Policy Context

2.1 Importance of Human Resources for Providing Health Care and Improving Health Outcomes

In recent years, there has been a growing recognition of the critical importance of human resources as an input in the provision of health care and in efforts to improve health outcomes (Martinez and Martineau, 2002; Huddart and Picazo, 2003; Anand and Barnighausen, 2004; Buchan and Sochalski, 2004; Joint Learning Initiative, 2004; World Health Organization, 2006). Traditionally health interventions were designed to target specific health needs, such as malaria or immunization. These interventions would often ignore the system-wide constraints that prevent the effective provision of health care and fail to address the needs of the sector as a whole. In the worst examples, scarce health care resources, including health personnel, were diverted to a new health project, creating gaps elsewhere in the system. For example, health professionals might leave government employment to take up better paid positions in a vertical programme intended to complement the existing national health system.

A more balanced approach to public health began to emerge as international donors sought to provide their support through government systems, in line with national strategies for poverty reduction and as part of Sector-Wide Approaches (SWAps) (Green, 1999; Commission on Macroeconomics and Health, 2001; OECD, 2001). This approach encourages a more holistic assessment of the health sector, which often includes recommendations for strengthening health systems or enhancing the capacity of health personnel. Improving mechanisms for the overall delivery of health services is particularly important as donors scale-up their resources for improving health and addressing HIV/AIDS in developing countries (Commission on Macroeconomics and Health, 2001). Efforts to improve the co-ordination and alignment of donor practices are also critical for improving the overall system of providing health care.

The effective delivery of health services requires a balancing of the supply and demand for human resources, as well as other inputs. The demand for health workers is effectively derived from the demand for health care, which in turn is influenced by the incidence of illness as well as socio-economic, demographic, cultural and technological factors. In countries with widespread poverty, inadequate living conditions and poor nutrition, there are inevitably many people with health problems seeking affordable and effective health care. In addition, high levels of population growth in developing countries have led to increasing demands for health care. The emergence of the HIV/AIDS epidemic over the past decade or so has also put health services in many countries under considerable pressure. As the demand for health services has increased, so too has the demand for health workers.

Human resources are a critical input in the provision of health services, because of the labour-intensive nature of health care. The efficient combination of inputs depends on their relative prices and degree of substitutability, as well as specific health needs and policy priorities. Many countries fail to achieve the optimal combination of inputs because of an inadequate supply of health workers. This is a global problem, affecting not only affecting developing countries but also wealthier nations in Europe and North

America. Moreover, the human resource shortage in the developed world is exacerbating the situation in developing countries, as qualified health professionals emigrate to obtain better salaries and working conditions.

The 2004 report by the Joint Learning Initiative, *Human Resources for Health: Overcoming the Crisis*, provides a comprehensive review of the global situation. The report highlights the essential role of health workers in the provision of health care and identifies three key challenges: the devastating impact of HIV/AIDS on health workers, accelerating labour migration, and the legacy of chronic underinvestment in human resources.

The scale of the HIV/AIDS epidemic in sub-Saharan Africa has an enormous impact on health workers. It significantly increases the workload as staff are required to provide preventative health programmes, counselling and testing and curative care. As well having to learn new skills, they are also working in conditions that increase their exposure to the disease. Health workers endure stress from caring for dying patients and many are themselves falling ill and dying.

As opportunities to work in developed countries have increased, many health professionals are moving abroad, attracted by higher salaries as well as the potential for greater job satisfaction, career development and an improved working environment. International migration is, however, only part of the problem, as many health workers seek alternative employment in other sectors or office-based positions in public health and administration. Within the health sector, the public service tends to find it most difficult to retain staff, as fiscal constraints often mean that governments are unable to provide salaries and working conditions that compare favourably with those of NGOs and the private sector.

The persistent poor economic performance experienced by many countries in Africa has limited the financial resources available for the provision of public services, including health care. Programmes of economic and structural reform often involved freezing civi-service recruitment and salaries, and restricting budgets for the provision of essential supplies, such as medicines and basic equipment, and maintenance of health facilities. This has caused the salaries of health workers to fall in real terms and led to a deterioration of working conditions and the infrastructure for health service delivery. International aid is intended to make up the shortfall; however, its use is often restricted to financing programme activities rather than supporting overhead costs.

The human resource crisis, as the situation has now become known, has several dimensions that merit further consideration. At the heart of the problem is the insufficient number of health workers, though there are also problems with their distribution, range of skills, motivation and individual performance. Many of the problems are also associated with a weak capacity for planning and managing human resources in the health sector. This paper does not attempt to outline comprehensively all aspects of the human resources crisis, but focuses on the need to improve the retention of existing health personnel. Focusing on the employment preferences of registered nurses working in the Malawian public sector, it provides an insight into the factors affecting their motivation and should prove useful for those designing strategies to improve recruitment and retention.

2.2 Health and Human Resource Shortages in Malawi

Malawi is one of the world's poorest countries, with more than half of the population living in poverty (National Statistical Office Malawi, 2005a). Health indicators reflect the depth and severity of poverty. Life expectancy has fallen over the past decade to 41 years, and this has been largely attributed to the emergence of HIV/AIDS (World Bank, 2004; World Health Organization 2006a). The prevalence of HIV is relatively high, and is estimated to be in the region of 14% among those 15-49 years (National Statistical Office Malawi 2005). With most of the population highly dependent on rain-fed subsistence farming, there is widespread food insecurity. Despite improvements in the infant and under-five mortality rates, child health remains a concern. Recent anthropometric data found that 43% of children under the age of five were stunted and 22% were underweight, Demographic and health survey data show a significant increase in the maternal mortality rate in recent years: from 620 per 100,000 live births in 1992 to 984 per 100,000 live births in 2004 (National Statistical Office Malawi, 2005b). This trend in maternal mortality rates is a reasonably good indicator of the overall deterioration of the health-care system during the past decade, as maternal health services are provided as part of an integrated health care package rather than as a stand-alone intervention or vertical programme.

The Ministry of Health (MoH) is the main supplier of health services in Malawi, and accounts for 64% of all formal and allopathic health facilities (World Bank, 2004a). The other main supplier of health services is the Christian Health Association of Malawi (CHAM), which manages approximately 26% of the facilities, operates on a not-for-profit basis and receives a subsidy from the government. There is a relatively small formal private sector offering a limited range of health services primarily in urban areas, and the use of traditional healers and traditional birth attendants continues. Total health expenditure in Malawi was K19.3 billion in 2004 (approximately US$193 million at 2004 prices), of which 36% came from general government expenditure and the remaining 63% was privately funded (World Health Organization, 2006b).

Access to health facilities in Malawi is good by African standards, with 84% of people (or 54% of the rural population) living within a 5 km radius of a health facility (Ministry of Health Malawi, 2004). The government provides core health services, defined as the Essential Health Package (EHP), to all citizens free of charge, though the use of CHAM facilities incurs a small fee.[1] Despite the good geographical coverage and absence of user charges in government health facilities, access to health care is limited by an inadequacy of critical inputs. Front-line health services operate with extremely limited numbers of staff, equipment, drugs and other supplies: a study of 617 health facilities in 2003 estimated that only 10% of these facilities were able to deliver the Essential Health Package of services (Hozumi, 2003).[2]

There is considerable variation in the geographical coverage of health services, with health professionals concentrated in the urban areas: only 20% of Malawi's population

[1] The MoH may charge for services that fall outside the EHP, though in practice the EHP covers a large proportion of the services available. Net out-of-pocket spending on health was estimated to represent 43% of total health expenditure. (World Health Organization, 2006b).

[2] The criteria applied were whether the facility was able to provide the following services: outpatient care, family planning, maternity services and immunisation, and was staffed by 1 clinical officer or medical assistant and 2 nurses or midwives.

live in urban areas, though almost all doctors and a large proportion of nurses are located there (World Bank, 2004a). A review of Malawi's health facilities in 2003 found that 10 of Malawi's 27 districts had no government doctor and four districts had no doctor at all (Department for International Development, 2004). The distribution of CHAM staff is, however, slightly better, as most of their facilities are located in rural areas (World Bank, 2004b). In the absence of skilled medical staff, some of the clinical and technical work is being done by less skilled workers, and more responsibility has been transferred to community-based health surveillance assistants.

The overall supply of health workers depends on the number of new recruits and the retention of existing personnel. The number of newly qualified health workers entering the public service is currently insufficient to meet the human resource requirements. This reflects the capacity of the training institutions, but also the limited appeal of employment in the public (including NGO) health sector. The increasing rate of attrition is a widely reported problem, and, although death is reported to be the main cause, there appear to be increasing numbers opting for voluntary resignation (United Nations Development Programme, 2002; Ministry of Health Malawi, 2004).

The retention of registered nurses has been highlighted as a particular problem. Unlike those working as enrolled nurses and other junior grades, the professional qualifications of registered nurses are recognised internationally. Data on the number of registered nurses that have left Malawi and subsequently sought validation of their qualifications are shown in Table 2.1. This indicator has been used as a proxy for the number of nurses leaving the service, though the exact number is thought to be higher as many leave to pursue careers other than nursing. The majority of Malawian nurses emigrate to the UK. Although the UK National Health Service (NHS) Code of Practice on International Recruitment was changed in 2001 to prevent active recruitment from developing countries, it does not appear to have stemmed the flow of Malawian nurses leaving for the UK.

Table 2.1 Malawian registered nurses who sought validation of their qualifications, 2002–5

Stated destination	2002	2003	2004	2005	Total 2002–2005
Australia	0	4	0	0	**4**
Botswana	3	1	1	0	**5**
Canada	1	0	0	0	**1**
New Zealand	5	1	1	0	**7**
South Africa	7	2	1	5	**15**
Uganda	0	0	1	0	**1**
UK	83	90	64	85	**322**
USA	3	10	9	6	**28**
Zimbabwe	1	0	2	0	**3**
Total	**103**	**108**	**79**	**96**	**386**

Source: Nurses and Midwives Council of Malawi, 2006

2.3 Factors Affecting the Retention of Health Workers

There is an emerging body of literature on human resources for health, identifying a range of generic reasons for the shortage of health workers (Chomitz, et al., 1997; Joint Learning Initiative, 2004; Dovlo, 2005; Penn-Kekana, et al., 2005; World Health Organization, 2006e). Many of the issues identified are pertinent to Malawi. The following discussion draws on the general literature and reports on the situation in Malawi, and is structured around five themes: monetary benefits, non-monetary benefits, the working environment, the impact of HIV/AIDS on health workers and human resource management.

2.3.1 Monetary benefits

Poor remuneration is frequently cited as the primary cause of the shortage of human resources. Low levels of pay and allowances have a demotivating effect on existing staff, as well as discouraging individuals from seeking employment in the public health service. Remuneration in the Malawian civil service is low, even by regional standards, though the GoM recognises that wages have been significantly eroded in real terms and recently developed a strategy for increasing the remuneration of civil servants over the medium term (Valentine 2003).[3] This strategy includes the consolidation of salaries and regular allowances, and plans to simplify the grading and pay structure. In addition, the government has inititated a donor-financed programme for supplementing the salaries of public health professionals (Martin-Staple, 2004 a and b; Palmer, 2006).[4]

The Malawi government employs approximately 70% of all health workers, and also contributes to the salaries of those working in CHAM facilities (World Bank, 2004a). Employees of the MoH receive the lowest remuneration in the health sector. Although salaries at CHAM health facilities are supported by the GoM, CHAM tops up basic salaries by around 10–15% using revenue drawn from user fees, (ibid.). Remuneration in the private not-for-profit sector is significantly higher and (including allowances) may be more than double the salary of a government nurse (ibid.).

Although net salary and any regular allowances usually constitute the main source of monetary benefits, there may be additional sources of current and future income. For example, GoM recently introduced a locum scheme in hospitals offering pay between K600 and K900 (between US$5 and $7.5) per shift for those willing to work on their days off. Attending in-service training also offers supplementary income in the form of daily subsistence allowances. Moreover, public service employment usually includes the provision of a pension, which in Malawi is provided after twenty years of service.

2.3.2 Non-monetary benefits

Non-monetary benefits can also play an important role in the motivation and retention of health workers. Access to training is often an important non-monetary benefit. Once qualified, most nurses in Malawi will attend short refresher courses,

[3] With the exception of about 500 senior civil servants at grades P1-P5 who qualify for a performance contract scheme. Valentine (2003) provides comparable figures for the remuneration (salaries and allowances) of staff at low, medium and senior grades in the civil service in several African countries.

[4] More details on the donor support for supplementary health salaries is provided in section 2.4.

often financed by donors, and also have the opportunity to apply to the government for long-term training to obtain additional qualifications. For example, an enrolled nurse with a certificate in nursing has the opportunity to apply to study for a diploma, while for registered nurses with a diploma, further education will usually mean a degree in nursing, possibly specialising in nursing education or community nursing. Obtaining a higher qualification is the main route for moving to a higher grade and pay scale in Malawi.

The provision of government housing, which is often offered on subsidised terms, can also act as an important incentive to work in the public sector. Subsidised government housing is available for some health workers in Malawi, though the stock is limited and only about a third of registered nurses currently live in a government house. There is also considerable variation in the quality of the housing and the availability of local amenities, including shops, schools and transport connections.

2.3.3 Working environment

The recruitment and retention of health workers not only relates to individual benefits and conditions of service, but also to the working environment. The working environment is a broad term, often used to encompass the many influences on an individual's job satisfaction and motivation. These factors tend to be closely related to the effectiveness of the health care provided. For example, the availability of material and human resources, the volume and variety of work and the general management of the health facility all contribute to the overall working environment.

One of the tangible elements of the working environment is the physical infrastructure. In Malawi the conditions vary by health facility, and many hospitals and health centres are antiquated and of inadequate size to cater for current demand. As a result, many facilities are operating beyond their capacity and patients often have to wait in corridors or the hospital grounds.

The quality and availability of equipment, drugs and other supplies have been identified as critical for the provision of effective health care. However, their availability also has an impact on the working environment and the motivation of the health worker. The availability of supplies reflects, to some extent, the management and allocation of resources within the health facility. The administration of central agencies can also play a role. This is the case in Malawi where the Central Medical Stores (CMS) procures and distributes all medical equipment, drugs and other supplies for the government. This organisation has a reputation for poor management and inefficiency, and has in the past been tarnished by corruption.

Staff shortages have an impact not only on the quality of health care, but also on the workload and motivation of existing employees. The extent of the human resource shortage in Malawi puts considerable pressure on health workers and makes it difficult for nurses to complete their duties within a normal eight-hour shift. Accordingly, staff may have to forgo lunch or tea breaks and work extra hours because of a heavy workload. Another consequence of staff shortages is that junior workers may take on additional responsibilities and substitute for more senior or skilled staff whilst receiving little supervision, support or recognition (World Bank, 2004a). Working in these conditions can have an adverse impact on job satisfaction and motivation.

The management and organisation of the health facility can also affect the working environment. The adverse effect of poor management on morale may be exhibited in various ways. A misallocation of resources or responsibilities may make some individuals feel that they are being treated unfairly. For example, there may be a perceived unfairness in the allocation of opportunities to attend in-service training. Poor stock management can result in shortages of drugs and other basic supplies. Alternatively, there may be delays in administering facility-level benefits such as locum pay.

2.3.4 Impact of HIV/AIDS on health workers

Much has been written about the impact of HIV and AIDS in Africa. The spread of the epidemic has undoubtedly placed additional pressures on the health sector and increased the demand for health care: for counselling and testing, the provision of anti-retrovirals, and the treatment of HIV-related illnesses such as tuberculosis. In Malawi it is estimated that HIV-related conditions account for 40% of all in-patient admissions, and reported cases of tuberculosis rose from 95 per 100,000 in 1987 to 275 per 100,000 population in 2001 (Aitken and Kemp, 2003). As the workload escalates, there is an increased demand for health workers; however, given the limited supply of personnel, the impact of HIV and AIDS has been to intensify pressure on the existing workforce.

The epidemic also impacts on the supply of health workers. Given the nature of the work, health workers are one of the groups most at risk, and working under this risk may affect motivation. Their exposure to illnesses (or 'risk of contracting illness'), including HIV/AIDS is often compounded by a lack of basic supplies, such as surgical gloves or soap. Although there are no reliable records in Malawi, the relatively high (and increasing) proportion of deaths amongst health workers is thought to be related to HIV/AIDS, particularly since the majority of deaths occur in the 30-44 age range (World Bank, 2004a). In addition, absences due to illness and attendance at funerals have increased and involve time away from work.

2.3.5 Human resource management

Policies and systems for human resource management in the public sector can also have an impact on health worker motivation. The Malawian MoH maintains a close involvement in the management of its human resources in conjunction with the Health Service Commission. However, the Ministry lacks the capacity for strategic planning and management, and there are no effective policies for career development, deployment and promotion of health workers. The absence of overarching policies can lead to frustration and feelings of unfair treatment when, for example, different approaches are applied to deployment or promotion. The administrative systems for human resource planning and management are also weak. For example, lengthy delays have been reported in adding new staff to the payroll and systems for tracking the distribution of nurses are cumbersome, (World Bank 2004a).

2.4 Strategies for Addressing the Shortage of Health Workers in Malawi

2.4.1 Overview of the Emergency Human Resource Programme

The Malawi government has recognised the extent of the human resource crisis in the health sector, and the number of additional workers required to effectively roll out anti-retroviral treatment without further undermining an already over-stretched public health service. Its assessment of the situation was documented in a 2004 report titled: *Human Resources in the Health Sector: Towards a Solution* (Ministry of Health Malawi, 2004b). It was, however, a joint visit to Malawi by the Permanent Secretary of the UK Department for International Development (DFID) and the Head of UNAIDS in February 2004 that provided the impetus for donors to support the development of a comprehensive approach to the crisis in the health sector (Palmer, 2006). The outcome was a 'Proposed 6-Year Human Resource Relief Programme for the Malawi Health Sector', known as the Emergency Human Resource Programme (EHRP). Programme implementation began in April 2005, with financial support from the Malawi government, DFID, the Global Fund for AIDS, Tuberculosis and Malaria and other donors.

The objective of the EHRP is to significantly increase the density of health workers. Ten-year staffing targets have been set for each of the eleven professional cadres employed by both the MoH and CHAM.[5] The targets are thought to represent realistic and affordable initial objectives, though they remain short of the desired outcome.

2.4.2 Components of the EHRP

There are three main components of the EHRP (Martin-Staple, 2004 a and b; Palmer 2006). First, the GoM will improve the monetary incentives for the recruitment and retention of health workers. Second, it will increase the capacity of pre-service training. Third, it will undertake the external recruitment of physicians and nursing tutors through volunteer agencies as a short-term measure to increase the supply of health workers. In addition, technical assistance will be provided to enhance the capacity for human resource management in the MoH and to establish more robust monitoring and evaluation of the human resource situation. The following paragraphs summarise the original intentions of the EHRP, as outlined in the programme documents (Martin-Staple 2004a and b). It is likely that aspects of the programme will be adapted and modified during implementation.

Improving incentives for retention and recruitment

The primary strategy for improving the retention and recruitment of health workers is to improve their monetary benefits. In April 2005, with financial assistance from donors, the GoM increased gross remuneration (salary and allowances) by 52% for eleven professional and technical cadres in grades lower than P4 (i.e. Director) (Palmer 2006). Efforts will also be made to ensure that health workers are paid punctually.

[5] The eleven professional cadres are: doctors, nurses, clinical officers, medical assistants, pharmacists, laboratory technicians, radiographers, physiotherapists, dentists, environmental health officers and medical engineers.

In addition to the monetary enhancements, the GoM hopes to increase the supply of workers by requiring newly qualified health workers to remain in the public service for a minimum of three years. It also intends to improve the living conditions for those health workers posted to rural and underserved districts, for example, by upgrading the housing provided and ensuring access to utilities such as water and electricity, or by offering scholarships for their children's education (Martin-Staple, 2004a).

Finally, with the improved remuneration the GoM hopes to re-engage 100 Malawian nurses and 80 clinical officers a year who have left the health service (ibid.). For example, it is estimated that there are approximately 800 registered nurses who are living in Malawi but are not currently working in the health sector (ibid.).

Increasing capacity of pre-service training

In addition to improving the retention and re-engagement of existing health workers, the government intends to increase the number of new workers entering the public service each year by enhancing the capacity of pre-service training. The programme includes support for capital investment as well as recurrent expenditure over the 6-year period. The capital investment will expand the facilities of the four training institutions and includes student and staff accommodation, lecture halls and classrooms, laboratories, offices and equipment. There are also resources earmarked to support general operating costs, which are expected to rise in line with the expanded enrolment of students, and the salaries of new staff hired by the four institutions. Finally, staff development in the Kamuzu College of Nursing and the Malawi College of Health Sciences will be supported, enabling selected teaching staff to obtain further qualifications (Martin-Staple, 2004a).

External recruitment of physicians and nurse tutors

The final component of the EHRP is the recruitment, through volunteer organisations, of up to 100 physicians and nursing tutors for the first three years of the programme (Martin-Staple, 2004b). This is intended to be a short-term intervention to increase the supply of health workers, until the expansion of domestic training capacity produces sufficient numbers of new health graduates to replace expatriate staff in the public service. The recruitment, processing and provision of housing will be managed by volunteer agencies.

Additional elements

Although it is not explicitly identified as a core component of the EHRP, the MoH recognises the importance of improving human resource management and some of the non-financial factors affecting staff retention. There is no overarching strategy outlined, though the EHRP documents refer to developing the capacity for human resource planning and management. Some priorities highlighted are: the introduction of performance-orientated management; review of deployment policies; development of opportunities for career development and promotion; and improved technical and allocative efficiency related to staff productivity, reviewing the staffing mix and skills development.

Chapter 3: Research Objectives

The objective of the research is to determine the range and relative importance of alternative factors that affect the motivation of public sector registered nurses in Malawi, and the extent to which remuneration is a motivating factor.

The GoM's primary strategy for retaining health workers rests on the assumption that improving monetary benefits will have a positive effect on worker motivation and their retention in the public service. As part of the EHRP, financial resources from donors are being used to increase remuneration substantially by a taxable 52% salary top-up for professional staff in the health sector. The decision to prioritise monetary benefits over other motivating factors suggests that the GoM believes that the low level of remuneration is the main reason for the shortage of human resources in Malawi's health sector.

Although the MoH has chosen to focus its initial efforts on increasing remuneration, it accepts that non-monetary factors can also be important influences on the retention and motivation of health workers. Accordingly, there is some work under way to review human resource management policies, including consideration of the likely impact of improved provision of government subsidised housing on the deployment and retention of health workers in rural and remote areas.

Chapter 4: Theoretical Objectives

4.1 Underlying Assumptions on Employment Preferences

The research involved a two-stage process. First, it was necessary to determine the range of factors that influence the employment preferences of public sector registered nurses. Second, it was necessary to identify a method for eliciting the weights of the alternative factors to determine their relative importance.

Economic analysis of health worker behaviour has traditionally tended to focus on the role of financial incentives (Scott, 2001). This is based on the neo-classical assumption that a worker's utility function includes leisure and the consumption of other goods and services, and that income from work is important only in so far as it meets these objectives. It is also usual to assume that workers experience disutility from work and that income and earnings-related incentives influence both the utility of workers and their labour-leisure trade-offs.

Over time the importance of non-monetary factors in relation to job satisfaction and job choice has received more attention. For instance, a job characteristics approach has been used in the context of testing the theory of compensating wage differentials and in estimating the value associated with risk of death or injury at work (Scott, 2001). There has, however, been a relatively limited quantitative exploration of the importance of job attributes for health worker motivation (Chomitz, 1997; Scott, 2001; Ubach et al., 2003; Wordsworth et al., 2004; Penn-Kekana et al., 2005) and in a developing-country context I know of only two previous studies that have applied a discrete choice experiment: a study to develop incentives for doctors to work in rural parts of Indonesia (Chomitz et al., 1997) and a review of nursing staff dynamics in South African maternal services (Penn-Kekana et al., 2005).

The research is based on the assumption that individuals have *preferences* with regard to their employment, which are determined, both consciously and sub-consciously, by a range of influencing factors. It was also assumed that, from the available range of employment alternatives, an individual would seek to obtain his/her most preferred alternative, though there were likely to be a number of *constraints* that prevent the full achievement of the most preferred alternative.

In other words, it was assumed that individuals have a choice about whether they work, and if so where and what they do. The employment alternatives available to an individual vary, and depend on both an individual's characteristics and structural features of the labour market. For example, an individual's nationality, age, gender, religion or physical attributes may limit the range of available employment choices. In addition, skills and competencies, academic and professional qualifications, and length and breadth of work experience may also represent eligibility criteria for some employment. Structural features of the labour market may also limit the employment choices available, and may reflect the degree of economic development in a country or an organisation's recruitment and deployment policies.

From the range of employment opportunities available, an individual was assumed to have preferences. For example, an individual may have preferences regarding the

content of the work, or aspects of the working conditions, such as geographic location, remuneration, hours of work, or number of days leave. Other relevant factors could include distance between home and work, ease of travel, amount of training provided, and prospects for promotion. An individual may also be constrained in their choice. For example, their employment choice may be limited to a particular city because of family commitments, such as a partner's employment or children's education.

4.2 Eliciting Preferences: Revealed and Stated Preference Techniques

Techniques for estimating individual preferences have primarily emerged from a desire to understand consumer preferences for different goods and services and are founded in utility theory (Ryan et al., 2001; Merino-Castello, 2003; Bryan and Dolan 2004; Hanson et al., 2005; Hensher et al., 2005). Although utility cannot be directly observed, it is possible to observe the choices of individuals, or to ask individuals to state their preferences between alternatives, and in both cases it is assumed that individuals choose the option that yields the highest utility. In some situations data will be available from the choices that individuals have actually made in real market situations, known as revealed preference data. There are, however, many situations when it will not be possible to use revealed preference data, and this has led to the development of stated preference techniques. For example, revealed preference data cannot, by definition, be used to consider consumer preferences for goods and services that are not yet available on the market. There are also situations where there is not a fully functioning market from which to gather data and estimate preferences.

The data available on the employment of registered nurses in Malawi are extremely limited and are insufficient to reveal their employment preferences adequately. Very little detail is known about the registered nurses currently employed or those leaving the public sector. For example, although the Nurses and Midwives Council records the number of nurses who have emigrated and applied to have their qualifications validated, additional data on those leaving the public sector are not readily available and there is no information on their socio-demographic characteristics. Moreover, Malawian nurses are appointed by the MoH to a particular district and individuals have relatively little choice about where they work in the public health service. Personal circumstances are taken into consideration to some extent and it is possible to appeal to the MoH to be redeployed, though movement between facilities only occurs on a case-by-case basis. There is no reason, therefore, to assume that the current distribution is representative of employment preferences.

The present research used a stated preference technique to analyse the factors influencing the decisions of public sector registered nurses in Malawi. There are several stated preference techniques to choose from, including contingent valuation, conjoint analysis and choice analysis. Although they each involve administering a survey and asking respondents to consider one or more hypothetical alternatives and express their preference, there are significant analytical differences between them. Contingent valuation is rooted in welfare economics and seeks to determine the economic value that an individual places on a good or service. It does this by asking individuals to express their maximum willingness to pay for, or their minimum willingness to accept, a hypothetical change in the level of provision. However, as a technique for assessing the relative importance of different influencing factors in an individual's preferences it is limited, as respondents are required to value each

attribute separately. In contrast, conjoint analysis and choice analysis are multi-attribute methods, and can study several attributes simultaneously. Their approach is based on Lancaster's characteristics theory of value, which assumes that consumer utilities for goods or services can be decomposed into utilities for composing characteristics (Lancaster, 1966). Respondents are presented with different descriptions of a good or service and asked to rank the various alternatives, to rate them, or to choose the one they most prefer.

The stated preference technique that was used in this research is known as a discrete choice experiment. In discrete choice experiments respondents are asked to choose between hypothetical alternatives, where each alternative is described by a bundle of attributes. It is the most widely used stated preference approach in health economics. The theoretical foundation for discrete choice experiments is random utility theory. Individuals are asked to state their preferences between hypothetical alternatives and are assumed to choose the alternative that provides the highest indirect utility. The utility yielded by an alternative is assumed to depend on its choice-specific attributes.

The utility is measured by a latent index expressed as a function of explanatory variables (i.e. attributes), plus an error term, ε_{iq}:

$$U_{iq} = X_i \beta_i + \varepsilon_{iq}$$

where U_{iq} is the utility of individual *q* for the *i*th alternative, and X_i is a vector of attributes for the *i*th alternative, and is accompanied by a set of weights, β_i, that establish the relative contribution of each attribute to the utility associated with the *i*th alternative.

In its simplest form, the observed sources of utility can be defined as a linear expression in which each attribute is weighted by a unique weight (or parameter) to account for that attribute's marginal utility:

$$U_i = \beta_{0i} + \beta_{1i} X_{1i} + \beta_{2i} X_{2i} + \beta_{3i} X_{3i} + \ldots + \beta_{Ki} X_{Ki} + \varepsilon_i$$

where β_{ki} is the weight (or parameter) associated with attribute X_k and alternative i, and there are k = 1…K attributes; and β_{0i} is a parameter not associated with any of the observed and measured attributes, called the alternative-specific constant, which represents on average the contribution of all unobserved sources of utility. ε_i, the residual, captures the unobserved variation in the characteristics of the different options, any errors in specification and measurement and human idiosyncrasies.

In most discrete choice experiments, respondents are asked to consider multiple choice pairs in which the attribute levels of one option remain fixed, thereby providing a constant comparator from which to analyse the respondents' choices. It is therefore not possible to assume that the error terms are independent, and panel data estimation techniques are required.

It is usual to specify the regression model in terms of differences in attributes between the two choices being analysed:

$$\Delta U = \beta_0 + \beta_1 (X_{1i} - X_{1j}) + \beta_2 (X_{2i} - X_{2j}) + \ldots + \beta_K (X_{Ki} - X_{Kj}) + (\varepsilon_i - \varepsilon_j)$$

Either a probit or logit model can be used for the analysis, depending on the specific assumption about the distribution of the error term.[6] The estimated parameters represent the marginal utility associated with a change in the attribute level in moving from one alternative to the other. The marginal rate of substitution between two attributes is given by the ratio of their respective parameters.

4.3 Steps in Undertaking a Discrete Choice Experiment

As outlined above, discrete choice experiments involve asking respondents to state their preference over pairs of hypothetical alternatives, where each alternative is described by a bundle of attributes. Each alternative contains the same attributes; however, the levels at which they are specified will vary. For example, an alternative may consist of two attributes, size and colour, and the corresponding attribute levels may be small, medium or large and red or blue. In choosing between two alternatives there will not usually be a rationally superior alternative, and an individual must trade the advantages of one or more of the attributes off against the disadvantages of others.

The design of the hypothetical alternatives is a critical stage in the application of a discrete choice experiment. In particular, the choice of attributes and attribute levels can affect the validity of the research findings (Coast and Horrocks, 2007). In establishing the attributes and levels, it is important that they are relevant to the research question and avoid ambiguous definitions. The selected attributes should also be conceptually independent.[7] Secondary literature can be useful in ascertaining attributes and levels, though it is usually necessary to conduct qualitative research to ensure that they are defined appropriately.

The number of attributes and attribute levels determines the total number of possible alternatives. For example, five attributes each with 3 levels would produce 243 (3^5) possible alternatives. In the majority of cases it will not be practical to include all alternatives in the questionnaire, and instead a fractional factorial design is used to consider a selection of the possible alternatives. In taking a selection it is important that the experimental design remains orthogonal, such that the attributes are statistically independent of each other. A simple main effects orthogonal design can be generated using several computer software programmes.

Of the generated alternatives, one may be chosen as the constant comparator and then paired with each of the remaining options to form a set of discrete choices.[8] To allow for more detailed analysis the final questionnaire usually contains both the discrete choice experiment and a relevant selection of socio-demographic indicators. Before administering to the full sample, the questionnaire should be pre-tested on a sample

[6] A probit model uses a cumulative normal function for the error term, while in a logit model the error term has a logistic function.

[7] Note, it is possible to design discrete choice experiments that overcome some degree of inter-attribute correlation by using nested designs. However, the discrete choice experiment used in this research was a main effects design, which requires that the effect of each attribute on the response variable is independent of all other attribute effects. Accordingly, the discussion in this paper on discrete choice experiments refers only to a main effect design.

[8] There are alternative methods for developing choice sets, such as allocating the alternatives into pairs.

of respondents, which provides an opportunity to make minor modifications to its design.

Chapter 5: Research Methods

5.1 Design of the Discrete Choice Experiment

5.1.1 Overview

In this application of a discrete choice experiment, respondents were asked to choose between pairs of hypothetical job descriptions. The attributes contained in each job description were considered to be the main factors influencing the employment preferences of a public sector registered nurse: net monthly pay, place of work, typical workload, availability of resources, provision of housing and time before being eligible to upgrade qualifications. A key advantage of using this approach over other research methods, such as using qualitative research, is that it requires nurses to trade-off the different aspects of the working environment, thereby identifying priority areas for reform.

5.1.2 Approval and ethical Considerations

Permission was obtained from the GoM to conduct the research. The research was discussed with the MoH at an early stage, and full details of the proposed research were submitted to the National Health Science Research Committee. Authorisation was given, which included approval to survey public sector employees.

Ethical issues associated with the research were taken into consideration. Participation in the research was voluntary and individuals were able to withdraw at any time. All participants were provided with an Information Sheet outlining the purpose of the research and details of what was expected of them, before being asked to sign a consent form. The data from each stage of the research were treated confidentially and reported in a format that does not allow identification of the participants. No compensation was given to the participants.

5.1.3 Undertaking qualitative research

The attributes and levels were established using information collected from twenty in-depth interviews conducted with registered nurses on their current working conditions, employment preferences and priority areas for change. Although some information was available in the secondary literature, the qualitative data were valuable for identifying a wide range of issues and an indication of their importance to respondents. The qualitative data also provided the detail required to select attributes and establish attribute levels.

In-depth interviews were conducted with twenty registered nurses employed by the Malawi government in three districts: Lilongwe, Ntchisi and Nkhotakota, over four days in February 2006.[9] The locations were purposively chosen to include both urban

[9] Lilongwe is the capital of Malawi, and as one of the two largest cities it is an urban area. In Lilongwe registered nurses were sampled from Kamuzu Central Hospital (KCH), Bottom Hospital (a maternity hospital affiliated to KCH) and three District Health Centres: Area 25, Kawale and Nathenje. Outside Lilongwe, Blantyre, Mzuzu and Zomba, registered nurses are only based in the district hospitals. Although based in the main town in each district, a posting to a district hospital tends to be considered a rural or semi-rural posting. Ntchisi is one of the more remote districts, as

and rural settings, though within those locations the nurses were selected at random. The sample included registered nurses working at three grades (I, J and K) in a central hospital, a maternity hospital, two district hospitals and three urban health centres. There is no rule about the appropriate number of interviews to conduct, though twenty appeared to be appropriate, providing a variety of views while also sufficient repetition and depth to determine attributes and attribute levels.

The interviews were completed by four research assistants employed by the Centre for Social Research of the University of Malawi.[10] The researchers worked in mixed pairs, with one researcher taking a lead role in the interview and the second making detailed notes. Additional interviews were conducted with senior officials in the Ministry of Health to gain their perceptions of the employment preferences of registered nurses and detail on the government's response to the nursing shortages. Remuneration data for each grade of registered nurses were collected. These interviews were led by a Senior Research Fellow from the Centre for Social Research.[11] The author attended a selection of the interviews, primarily as an observer. At the end of each day there was an opportunity for the research assistants to feed back their findings. This proved useful for gauging the range and detail of the information collected, and whether any adjustments were necessary to the interview topics.

All the researchers were highly experienced in conducting qualitative research. To familiarise them with this study they were provided with written guidance and training. This preparation ensured that they understood the objective of the research and had an overview of the research methodology, such that they knew how the qualitative findings would be used in the design of the discrete choice experiment. The guidance also contained practical steps and advice in undertaking in-depth interviews and a selection of questions to be used in conducting the semi-structured discussions.

The interview guides provided a range of questions about the working conditions of registered nurses. The interview was structured around two themes. First, registered nurses were asked to describe their conditions of employment, with questions encouraging them to elaborate on whether they enjoyed their work and why, their preferences about different positions and locations as a registered nurse in the public sector, and their perceptions of the differences between government, CHAM and private health facilities. Second, nurses were asked what aspects of their working conditions they would want to change and what would be their priorities for reform. It had been envisaged that the interviews would take no more an hour each; however, many lasted longer as the registered nurses were very willing to share their views.

With the individuals' consent, the interviews were tape recorded and then transcribed. No-one refused to be interviewed, though one nurse did not want the discussion to be tape-recorded and instead detailed notes were taken. For the most part discussions were held in English, though where local languages were used the text was transcribed and translated into English. As English is widely spoken amongst educated Malawians,

---

although it is only 2-hours drive from Lilongwe it is only accessible by a dirt road and there are few minibuses serving the community. Nkhotakota can be reached by a tarmac road, is at most a 3-hour drive from Lilongwe and is located along the lakeshore. A map of Malawi is provided in Annex 1.

[10] The four research assistants were: Mr James Mwera, Ms Elizabeth Kawale, Mr McDonald Chitkwe and Ms Nozgechi Phiri.

[11] Mr Maxton Tsoka.

and all the training of nurses is undertaken in English, using English was not considered a limiting factor.

5.1.4 Determining attributes and attribute levels

The material collected during the in-depth interviews formed the basis for determining the attributes and attribute levels (Coast and Horrocks, 2007). The main criterion for choosing the attributes was the frequency with which the issue was mentioned, though inter-attribute correlation was also an important consideration.[12] For instance, it was not appropriate to include both the 'opportunity to gain further qualifications' and 'promotion prospects' since they were closely associated.

Three factors were mentioned by all interviewees and all were chosen as attributes: *net monthly pay*, *typical workload*, and the *availability of material resources*. The inclusion of net monthly pay as an attribute meant that it was possible to determine the comparative importance of remuneration, as outlined in the research objective.

Of the six factors frequently mentioned three were selected as attributes: *opportunity to upgrade qualifications*, *place of work* and *provision of government housing*. It was interesting to include the provision of government housing as an attribute, since the MoH was considering whether improved housing would be an incentive for staff to work in more remote areas. The place of work was also an interesting attribute. The MoH often reports difficulties in filling posts in rural areas, though several registered nurses identified advantages associated with working in a district hospital, such as greater variety of work and more involvement in hospital management.

Once the attributes were decided, it was then necessary to determine the appropriate attribute levels. These were established using information collected during the in-depth interviews and supplementary material, such as MoH salary structures and pay scales. For example, the levels for the attribute *net monthly pay* were based on information from the MoH about net monthly pay for registered nurses working at grades I, J and K. The basic level of pay (K30,000) represents average net monthly pay for nurses working at these three grades. It should be noted, however, that at the time of the interviews the majority of registered nurses were receiving net monthly pay of less than or close to this amount.[13] The two other levels, K40,000 and K50,000, represent a pay increase of 33% and 67% respectively. These pay levels are more reflective of salaries offered in the private sector and are in line with what nurses indicated during the in-depth interviews they would consider as a reasonable salary.

The material collected during the in-depth interviews was the primary basis for establishing the levels for the other attributes. Nurses were asked to describe their current working conditions, and they provided a reasonably consistent picture. The majority said they had a heavy workload, and spoke of the high patient-to-nurse ratios, having to work longer hours and missing lunch and tea breaks. From the qualitative data, it seemed appropriate to establish three levels for the *typical workload* attribute:

---

[12] Hensher et al. (2005: 106) define inter-attribute correlation as ''the cognitive perceptions decision makers bind to the attribute descriptions provided''.

[13] This partially reflects the fact that the majority of nurses receive pay at the lower end of the pay scale, but also that an announced pay increase for all civil servants had not yet been implemented. The majority of RNs interviewed in February indicated that their pay was either around K21,000 (grade K) or K28,000 (grade I).

light, medium and heavy, and for each an additional description was included to avoid ambiguity. Initially the description used referred to the time available to care for patients and the number of extra hours worked each day. A minor modification was made following the pre-testing to refer to the time available to complete duties, as this broader description was felt to be a better reflection of the responsibilities of a registered nurse.

The inadequate supply of equipment, drugs and other items such as gloves or cleaning materials was another strong theme in the interviews with the registered nurses. Almost all spoke of their frustration at not having adequate resources to complete their work and its impact on the quality of care. They gave a wide range of examples highlighting shortages of beds, linen, uniforms, medical equipment, drugs, and other supplies, such as blood, surgical gloves or detergent. The attribute *availability of material resources* refers to the full range of supplies and two levels, 'usually adequate' and 'usually inadequate', were chosen.

The majority of the nurses interviewed indicated that they wanted to upgrade their nursing qualification, primarily reporting that they wanted to maintain their professional knowledge. However, qualifications are also important for career progression, as the grading and salary structures correspond to the level of education. In addition, one of the perceived advantages of working for the government, rather than in the private sector, was the opportunity to study for further qualifications. The chosen attribute levels refer to the length of time before having the *opportunity to upgrade qualifications*, as this was their main concern, though other possibilities included the type of course or location. Initially three levels were set: after 2, 4 and 6 years, though, following pre-testing, this was reduced to 3 and 5 years because some nurses indicated that they felt that a 6-year wait was unrealistic and the difference between 2 and 6 years was too large.

Three levels were established for the *provision of government housing*: no housing, basic and superior housing. In this case both 'no housing' and 'basic housing' represent base cases, depending on whether the individual nurse was currently provided with a house. 'Superior government housing' was also included as an option because the MoH was considering whether improved availability and quality of housing in rural and remote areas would provide sufficient incentive for health workers to accept and remain in posts that were hard to fill.

The levels for the attribute *place of work* were originally defined as 'central hospital' and 'district hospital', which would capture differences in geographical location as well as differences in the nature of the work or the role of a registered nurse. However, during pre-testing it was apparent that some nurses conceptually linked the type of hospital to *typical workload* and the *availability of resources*. The levels were subsequently modified to indicate only geographical location: 'city' or 'district town'.

The attributes and attribute levels as used in the full survey are presented in Table 5.1.[14]

[14] As mentioned in the discussion modifications were made to the attribute levels during the pre-testing. In summary, there were three differences between the original and modified levels: from 'central hospital' and 'district hospital' to 'city' and 'district town'; from 'after 2, 4 and 6 years' to 'after 3 and 5 years'; and from '... enough time to care for patients and works ... extra hours each day' to '... enough time to complete duties and works ... extra hours each day'.

Table 5.1 Attributes and Attribute Levels used for full survey

Attribute	Attribute levels		
Net monthly Pay	K30,000	K40,000	K50,000
Typical workload	Light: More than enough time to complete duties, works no extra hours each day	Medium: Enough time to complete duties, works one hour extra each day	Heavy: Barely enough time to complete duties, works two hours extra each day
Availability of material resources (equipment, drugs and other supplies)	Usually adequate	Usually inadequate	
Opportunity to upgrade qualifications	After 3 years	After 5 years	
Provision of government housing	No housing provided	Basic housing provided	Superior housing provided
Place of work	City	District town	

5.1.5 Generating the questionnaire

Once the initial six attributes and their corresponding levels are determined the alternative job descriptions can be generated. Although there were a total of 216 possible alternatives (3^3 x 2^3), a fractional factorial design was used to reduce this to a practical number. SPSS Conjoint was used to generate an orthogonal main effects design, which selected 16 job descriptions to include in the questionnaire. One of the job descriptions was chosen as a constant comparator, which provided 15 choice pairs for each respondent to consider. The 15 alternative job descriptions are presented in Table 5.2.

Table 5.2 Sixteen job descriptions generated using the orthogonal design facility in SPSS Conjoint

Choice set	Place of work	Net monthly Pay	Availability of material resources	Typical workload	Provision of governmen t housing	Opportunities to upgrade qualifications
Constant	City	K40,000	Inadequate	Heavy	Basic	After 5 years
A	District town	K50,000	Inadequate	Medium	None	After 5 years
B	District town	K30,000	Inadequate	Light	None	After 5 years
C	District town	K50,000	Adequate	Heavy	Superior	After 5 years
D	City	K30,000	Adequate	Heavy	None	After 3 years
E	District town	K40,000	Inadequate	Heavy	None	After 3 years
F	City	K30,000	Adequate	Light	None	After 5 years
G	District town	K30,000	Inadequate	Heavy	None	After 3 years
H	City	K50,000	Adequate	Heavy	None	After 3 years
I	District town	K40,000	Adequate	Light	Superior	After 3 years
J	District town	K30,000	Adequate	Medium	Basic	After 3 years
K	City	K40,000	Adequate	Medium	None	After 5 years
L	City	K30,000	Inadequate	Heavy	Superior	After 5 years
M	District town	K30,000	Adequate	Heavy	Basic	After 5 years
N	City	K50,000	Inadequate	Light	Basic	After 3 years
O	City	K30,000	Inadequate	Medium	Superior	After 3 years

The 15 choice pairs form the main section of the questionnaire. In terms of presentation, each pair was presented on a separate A4 page. Four versions of the pairs were produced which all had the same job description but differed in the order in which they were asked. This sequence variation was intended to minimise any bias relating to early cognitive difficulties or boredom when completing the questionnaire (Hensher et al., 2005). In addition, the order in which the attributes were listed in each job description was different in each version of the choice set in order to prevent the results being unduly influenced by the first attribute listed (Kjær et al., 2006). Finally, the version of the choice pairs used by each research assistant was rotated on a daily basis in order to mitigate interviewer bias.

For each choice pair a respondent was asked two questions. In the first question, the respondent was simply asked to state which of the two jobs shown he/she considered to be the better job. However, recognising that this question might fail to capture

personal circumstances or particular preferences, a second question asked respondents to take into account their circumstances and state which job they would choose. There were three possible responses to this second question: 'Job 1', 'Job 2' and 'Neither Job'. In those instances when the answers to the two questions differed, respondents were asked to explain why briefly. The answers were recorded by the research assistant.

An example of a choice pair is shown below in Figure 5.1.

Figure 5.1 An example of a choice pair: Version 1, Choice Set J

Choice Set: A

Job 1	
Place of work:	City
Net monthly pay:	K40,000
Availability of material resources (equipment, drugs and other supplies):	Usually inadequate
Typical workload:	Heavy: barely enough time to complete duties, works two hours extra each day
Provision of government housing:	Basic housing Provided
Opportunity to upgrade qualifications:	After 5 years

Job 2	
Place of work:	District town
Net monthly pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually adequate
Typical workload:	Medium: enough time to complete duties, works one hour extra each day
Provision of government housing:	Basic housing provided
Opportunity to upgrade qualifications:	After 3 years

Question 1:

In your opinion, of the two jobs described which one do you think is the better job?

☐ **Job 1** ☐ **Job 2**

Question 2:

Taking into account your circumstances, would you choose to take ….

☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

The final questionnaire also contained a set of socio-demographic and employment questions. This information can be combined with the responses to the choice pairs to determine the extent to which employment preferences reflect individual characteristics, such as marital status, grade, length of service or current working conditions. A copy of the questionnaire and one version of the choice sets are presented in Annexes 2 and 3.

5.1.6 Pre-testing of the questionnaire

The questionnaire was pre-tested on 21 respondents located in three districts, Zomba, Balaka and Chiradzulu over two days in April 2006.[15] In each location, all available registered nurses grade I, J or K were interviewed. Prior to starting the pre-testing, a training session was held with the research assistants to familiarise them with the choice questions and the format of the questionnaire. The questionnaires were individually administered by the research assistants. Having provided the respondent with a general overview and a copy of the Information Sheet, the research assistant asked him/her to sign a Consent Form. The research assistant would then explain that the respondent would be shown 15 choice pairs of hypothetical job descriptions and would be asked to answer two questions. Two example choice pairs were provided to familiarise the respondent with the discrete choice experiment technique prior to commencing the questionnaire.

During the pre-testing minor modifications were made to the attribute definitions and their levels, as outlined in section 5.1.4. A standard introduction to the discrete choice experiment was also developed and some refinements were made to the format of the questionnaire.

5.2 Sampling

The literature on discrete choice analysis offers limited guidance on what forms an appropriate sample size, and reveals considerable variation in the number of individuals interviewed (Hanson et al., 2005). Hensher et al. (2005) advised that 'there is no magic number, but one suspects that a total sample of 50 individuals each with 16 choice sets and fully generic parameter specification for design attributes and non contextual or covariate effects might just be acceptable' (Hensher et al., 2005). For this study, 50 respondents were considered the minimum sample size required.

A key limitation on the sample size was the absolute number of registered nurses working for the government of Malawi. It was necessary to exclude the registered nurses working for CHAM, as although their salaries are largely financed by the Malawi government, their working environment and conditions of service were sufficiently different. For example, although the base salary of a CHAM registered nurse is equivalent to their government counterpart, their take-home pay is usually higher is and supplemented by receipts from user fees. Similarly, the opportunities for upgrading qualifications were reported to be different in the two organisations.

[15] Zomba is the third largest city and is located in southern Malawi. In Zomba 11 RNs were interviewed from Zomba Central Hospital, Zomba Mental Hospital, Zomba District Health Office and Matawale Health Centre. Balaka and Chiradzulu are districts in southern Malawi, with reasonable access to Blantyre. 6 RNs were interviewed from Balaka District Hospital and 4 RNs were from Chiradzulu District Hospital.

The original target sample size was computed using data from the MoH about the number and distribution of registered nurses. It reported that there were 330 registered nurses in January 2005, distributed in approximately equal shares between central hospitals in 'urban' areas (the four cities in Malawi) and district hospitals located in 'rural' areas (the main town in the remaining districts). There were also some registered nurses working in the larger health centres in the four 'urban' districts.[16]

A stratified sampling approach was applied in which the target was to interview 150 registered nurses, 75 from urban areas and 75 from rural areas. Originally the survey was to be administered in all the urban areas, with Zomba included for pre-testing and the full survey. However, as the number of registered nurses found to be based in Zomba was lower than expected, it was necessary to exclude Zomba from the full survey. Random sampling, with probability proportionate to size of district, was used to select the 'rural' districts, with Chitipa excluded from the sampling for practical reasons due to its extreme remoteness. The potential for non-availability or refusal to participate was also taken into consideration by over-sampling. Some of the rural districts which were not sampled for the full survey were used for the qualitative research and pre-testing of the questionnaire.

Within each district the research assistants sought to interview all registered nurses at grades I, J or K. The few registered nurses working at higher grades, such as matrons or chief nursing officers, were excluded from the sample, as some of the attribute levels were not representative of their circumstances and were likely to distort results. For example, the attribute levels for pay were designed to represent base salaries and pay increases for registered nurses at grade I, J or K. Consequently the salary range would not reflect the salaries received by more senior nurses, and some of the hypothetical job descriptions would constitute a reduction in net pay, which was expected to influence the findings adversely.

5.3 Administering the Questionnaire

The administering of the questionnaire proceeded with relatively few problems. All health facilities were given prior notification of the fieldwork visit and authorisation was obtained from senior management, including the Chief Nursing Officer, before starting the interviews. The research assistants worked hard to ensure that as many nurses as possible had the opportunity to participate, whilst trying to minimise disruption and hold interviews at a convenient time.

The main difficulty encountered in administering the questionnaire was that the number of registered nurses present at the health facilities was usually lower than indicated in the data provided by the MoH on the number and distribution of public sector nurses. The discrepancies were thought to reflect the recent changes in the distribution of nurses as well as absence due to annual leave, illness and attendance at

[16] To some extent the urban/rural categorization is an oversimplification, though it is a categorisation which has been frequently applied in other studies. Lilongwe and Blantyre are, by far, the largest urban centres. Mzuzu and Zomba are also considered cities and are widely regarded as urban areas. However, there are some areas in all these districts which are comparatively rural. There is also some variation in district towns, with those located close to Lilongwe or Blantyre or along the main roads, such as Ntcheu, usually larger and with more amenities.

in-service training. Also there were some instances where nurses were on long-term study leave to upgrade their qualifications.

The data were independently double-entered into a Microsoft Access database by two clerks hired by the Centre for Social Research and trained by the author. Once entered, the data were transferred into SPSS, and checked for consistency using EPI Info. All data entry errors found during the consistency check were manually edited by the IT supervisor.[17]

5.4 Data Analysis

The survey results corresponding to each question were analysed using a random effects probit estimator in STATA version 9.2, where the dependent or observed variable is binary and indicates whether, for a given choice pair, the individual chose 'Job 1' (recorded as '1') or 'Job 2' (recorded as '0'). In those cases where the respondent chose 'Neither Job' or failed to answer, the dependent variable was recorded as missing ('.').

The probit model estimates the probability of choosing Job 1 given the differences in the attribute levels between Job 1 and Job 2. As discussed in Chapter 4, discrete choice experiments are based on random utility theory and it was assumed that the individual will choose the job that yields the highest utility. Thus, the probability of choosing Job 1 is equivalent to the probability that the utility associated with Job 1 is greater than the utility associated with Job 2. It is assumed that the utility associated with a job depends on the bundle of independent variables or job attributes. For a given choice pair, the difference in the utility between the two jobs will therefore depend on the differences in the attribute levels.

A general-to-specific approach was taken for estimating the model that best fitted the data corresponding to each question. In the baseline model it was assumed that there were non-linear effects for those independent variables for which there were three attribute levels: pay, workload and housing. In other words, the effect on utility of the difference between, say, K30,000 and K40,000 was allowed to differ from that of the difference between K40,000 and K50,000. This was consistent with an assumption of diminishing marginal returns to income, which would suggest that a K10,000 pay increase from a base salary of K30,000 should yield more utility than the equivalent pay increase from a base of K40,000. Similarly, the impact on utility of the difference between a 'light' and 'medium' workload was allowed to differ from the impact on utility of the difference between a 'medium' and a 'heavy' workload. Moreover, the impact on utility of the difference between the provision of 'no housing' and 'basic housing' was not assumed to be the same as the difference between the provision of 'basic' and 'superior housing'. The assumption of non-linear effects was later tested empirically. The baseline empirical model in each case was:

$$\text{Prob}[Y = 1 \mid x] = \text{Prob}[U_{\text{Job 1}} > U_{\text{Job 2}}]$$

[17] The IT supervisor was Mr Massy Chiocha, and the two data enterers were Mr McDonald Nkhlamba and Ms Joyce Malibe.

$$= (\beta_{01} - \beta_{02}) + \beta_1 dplace + \beta_2 dpay_{(40\text{-}50)} + \beta_3 dpay_{(40\text{-}30)} + \beta_4 dres + \beta_5 dwork_{(heavy\text{-}medium)} + \beta_6 dwork_{(heavy\text{-}light)} + \beta_7 dhouse_{(basic\text{-}superior)} + \beta_8 dhouse_{(basic\text{-}none)} + \beta_9 dupg + \varepsilon + \mu$$

where:

- Y was the dependent variable and equalled one if Job 1 was chosen (i.e. the utility of Job 1 exceeded Job 2), and zero if Job 2 was chosen (i.e. the utility of Job 2 exceeded Job 1);
- $(\beta_{01} - \beta_{02})$ was the alternative-specific constant;
- dplace was the dummy variable for the difference in the place attributes for Job 1 and Job 2;
- $dpay_{(40\text{-}50)}$ and $dpay_{(40\text{-}30)}$ were dummy variables for the difference in net monthly pay between Job 1 and Job 2;
- dres was the dummy variable for the difference in the availability of material resources between Job 1 and Job 2;
- $dwork_{(heavy\text{-}medium)}$ and $dwork_{(heavy\text{-}light)}$ were dummy variables for the difference in the typical workload between Job 1 and Job 2;
- $dhouse_{(basic\text{-}superior)}$ and $dhouse_{(basic\text{-}none)}$ were dummy variables for the difference in the provision of housing between Job 1 and Job 2;
- dupg was the dummy variable for the difference in the period of time before being eligible to upgrade qualifications between Job 1 and Job 2; and
- $corr(\varepsilon, \mu)=\rho$, which takes account of the correlation among individual choices.

The dummy variables were generated manually using the coding in Table 5.3. Further detail on the coding of the dummy variables is provided in Annex 4.

Table 5.3 Coding of independent variables

Attributes:	**Attribute Levels:**	**Variable values**
Net monthly pay	K30,000	30
	K40,000	40
	K50,000	50
Place	City	0
	District town	1
Availability of material resources	Usually inadequate	0
	Usually adequate	1
Typical workload	Light: more than enough time to complete duties and works no extra hours each day	0
	Medium: enough time to complete duties and works one extra hour each day	1
	Heavy: barely enough time to complete duties and works two extra hours each day	2
Provision of government housing	No housing provided	0
	Basic housing provided	1
	Superior housing provided	2
Opportunity to upgrade qualifications	After 3 years	3
	After 5 years	5

The internal consistency of an individual's responses was investigated by including one choice pair in which one job was superior or equal to the other in all

characteristics. This was based on the assumption that a higher level of monthly pay, better resource availability, a lighter workload, and a shorter time before being eligible to upgrade qualifications were all superior options and would yield higher utility. The provision of government housing, compared with no housing, was also assumed to generate higher utility, with a superior house yielding more utility than a basic house. Figure 5.2 shows the choice pair in which all the attribute levels in Job 2 were either equal to or assumed to be superior to those in Job 1. Individuals who failed to choose the superior job were thought to have misunderstood the question or were unable to provide consistent answers for other reasons, and all answers from those individuals were removed from the dataset.

Figure 5.2 Investigating the internal consistency of an individual's responses

Choice Set:

Job 1	
Place of work:	City
Net monthly pay:	K40,000
Availability of material resources (equipment, drugs and other supplies):	Usually inadequate
Typical workload:	Heavy: barely enough time to complete duties, works two hours extra each day
Provision of government housing:	Basic housing provided
Opportunity to upgrade qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K50,000
Availability of material resources (equipment, drugs and other supplies):	Usually inadequate
Typical Workload:	Light: more than enough time to complete duties, works no extra hours extra each day
Provision of government housing:	Basic housing provided
Opportunity to upgrade qualifications:	After 3 years

The theoretical validity of the evaluations was assessed by determining whether the estimated employment attribute parameters were of the expected sign. The signs of the parameters were examined with reference to attribute levels taken by the constant comparator. Higher pay, better resource availability, lighter workload and shorter time before having the opportunity to upgrade qualifications were all expected to increase

utility and should have a positive sign. As before, the provision of a government house was assumed to be better than none, with superior housing yielding more utility than basic housing. No assumption was made about how differences in place would affect utility.

The assumption of non-linear effects on utility for the three attributes that contain three levels (net monthly pay, workload and housing) was assessed using a Wald test. The null hypothesis was that the effect of the independent variable on utility was linear. This was tested against an alternative hypothesis that the effect was non-linear. For example, in the case of net monthly pay the test considered whether the effect on utility of a change in pay from K30,000 to K40,000 was the same as the change in pay from K40,000 to K50,000. A p-value of less than 0.05 was used as the cut-off level for rejection of the null hypothesis. Following these tests, revisions were made to the base model, to take account of those instances where it was not possible to reject the null hypothesis and the effect on utility was assumed to be linear.

Socio-demographic and employment characteristics were interacted with the difference variables to determine the degree to which an individual's characteristics influence the marginal valuations of job attributes. Specifically, the data were analysed to answer the following questions:

- Does whether the individual lives in an urban or rural district (individual characteristic) affect the utility associated with place (job attribute) or the provision of a government house (job attribute)?
- Does an individual's grade affect the utility associated with net monthly pay or with the time before being eligible for upgrading qualifications?
- Does the age of an individual affect the utility associated with place, pay or workload, or time before being eligible to upgrade qualifications?
- Does an individual's marital status affect the utility associated with place, or the provision of a government house?
- Does whether the individual is currently provided with a government house affect the utility associated with the provision of government housing?

To consider each of these questions interaction variables were generated and included in the revised model. For example, in examining if whether an individual lives in an urban or rural area affects the utility associated with the place attribute, a new dummy variable was generated (dplace*residence). This new variable (dplacereside) was included in the expanded model, with evaluations for the interaction exhibited at p-value of less than 0.05 using either a Wald test (individual variables) or likelihood ratio test (groups of variables) deemed to be statistically significant.

Chapter 6: Results

6.1 Findings from the Qualitative Research

From the transcripts of the interviews it was possible to identify the range of factors that influence how registered nurses value their employment. Manual content analysis was used to determine the frequency with which an issue was raised. Six of the attributes were then chosen to be included in the discrete choice experiment. The main criterion for inclusion was the frequency with which an issue was raised, though it was also important to avoid conceptual overlap. The range of issues raised by the registered nurses is summarised below and grouped by the frequency with which an issue was mentioned.

6.1.1 Issues that were always mentioned by the registered nurses:

Net Monthly Pay

All of the nurses interviewed raised the issue of poor remuneration at least once during the interview. Pay was often mentioned when respondents were asked to discuss what they did not enjoy about their job. Most explained that salaries in government employment were lower than in CHAM, and much lower than in non-governmental organisations and the private sector. Knowledge of the salaries provided by other organisations varied amongst respondents. Several commented that the level of pay was too low, given the cost of living, and some nurses said that they found it difficult to keep their expenditures to within their monthly pay. Pay as an indicator of recognition was a common theme, and several commented that the level of pay was not sufficient, given the amount of work, or not appropriate for the qualifications and professional status of a registered nurse. This was often also related to the frustrations concerning the grading structure and promotion, since pay levels depend on an individual's grade.

The respondents were asked to say why there is a shortage of registered nurses and almost all responded saying that the salaries were too low. Most nurses referred to the 'greener pastures' offered by jobs overseas such as in the UK, and although the term was used to capture several aspects of the working conditions pay was usually the main component. The knowledge of the pay and conditions in jobs overseas varied amongst respondents, though the expectations on pay and working conditions of some respondents appeared to be very high and without reference to differences in the cost of living. When asked what changes they would like to be made to their working environment and conditions of service, an increased salary was usually the reform ranked most highly by the majority of respondents.

The language used to refer to remuneration was most frequently pay or salary. They understood that the government had consolidated salaries and allowances and were aware that their pay included a salary top-up provided by the DFID. Those willing to provide details of their salary would usually respond by giving their net monthly pay. Data on the pay scales for each grade were also provided by the Ministry of Health.

Availability of material resources

All of the registered nurses interviewed commented on the shortage of resources. They distinguished between shortage of health workers (which is discussed under workload) and the availability of material resources, and used the terms resources or supplies to encompass a wide range of equipment, drugs and other supplies such as surgical gloves or cleaning products. Examples were provided to illustrate the scarcity of resources, often highlighting the adverse implications of the inadequate supply of these types of equipment and drugs, blood supplies and beds. In addition, a few nurses commented that the Ministry of Health did not provide them with enough uniforms.

Frustration related to the scarcity of material resources was a key theme when nurses spoke about whether they enjoyed their work. They explained that although they had the knowledge and skills to treat patients, they were often without the appropriate equipment or drugs. This could have an adverse impact on the quality of care and also on their motivation. The frustration of working without adequate supplies was often a reason given for the problems in retaining nurses, and accordingly many nurses highlighted the importance of improving the availability of resources when asked to give their suggestions for reform.

Workload

The heavy workload was an issue raised by all of the nurses interviewed and a wide range of examples were provided on this overall theme. Many spoke of the shortages of registered nurses and other cadres of health workers and the implications of this on the ratio of patients to nurses and the quality of care provided. Another aspect of the heavy workload was the pressure to work longer hours, with some nurses commenting that they were often unable to stop for lunch or had to take a shortened break. Some nurses said that the heavy workload contributed to the difficulties in retaining registered nurses and was a disincentive for those considering working in the public service. When asked for their suggestions on how to address the human resource shortages, a few nurses highlighted the need to train more nurses to ease the workload pressures, while many emphasised the importance of retaining existing workers.

6.1.2 Issues that were frequently mentioned by the registered nurses:

Opportunities to upgrade qualifications

Another common theme in the interviews with registered nurses was the importance they placed on having opportunities for further education, which were usually referred to as ‘upgrading’. The government supports nurses to obtain their initial training, and also to obtain higher qualifications. For example, many of the registered nurses with a diploma in nursing explained that they had previously worked as enrolled nurses and had had the opportunity to return to nursing college to ‘upgrade’. The majority of the nurses indicated that they would like to have the opportunity to upgrade to complete a degree or a master’s qualification. On the whole their impression of the government’s attitude on this issue was reasonably good, though a few said that they felt that the time before being considered for upgrading was too long. Many nurses indicated that one of the advantages of working for the government, compared with CHAM, non-governmental or private sector organisations, was the opportunity to receive government support to upgrade their qualifications. For example, a few of those

interviewed had recently completed a nursing degree and said that one of the main reasons for entering government employment was the possibility of undertaking a master's degree. A few nurses said that they felt a sense of loyalty to the government because of the support they had received during their training. Several nurses said that they would like the government to make more opportunities available for upgrading.

Place of work

A wide range of views were expressed on the place of work theme, with comments usually referring to either their preferences between urban and rural postings, or the differences between working in central and district hospitals.

In terms of location, some nurses said that they preferred to be located in a city, notably Lilongwe or Blantyre, because of the range of facilities and amenities available. However, they also acknowledged the higher cost of living, a greater reliance on minibuses for transportation and that there were fewer government houses available. Other nurses highlighted the advantages of living in a district town, such as the lower cost of living, and better housing provision, though they tended to specify those districts close to a city or on a main transport route, such as Chiradzulu or Ntcheu. A few nurses commented on the advantages of a cooler climate, or being close to their home village. It was also taken as given that a female registered nurse would be expected to relocate to where her husband worked.

There was also variation in the opinions expressed in comparing a central hospital with a district hospital or health centre. Overall, there appeared to be a slight preference for working in a district hospital, as it offered greater potential to be involved in hospital management. The variety of work for a registered nurse in a district hospital was likely to be greater, which was often perceived as an advantage. However, a few nurses said that they preferred central hospitals because of the chance to work in a specialised area. A further distinction made by a number of nurses was that the likelihood of attending in-service training courses was much greater for those in district hospitals, and some suggested that this was an explicit strategy of the Ministry of Health to make postings to district hospitals more attractive.

Although the nurses had views about their place of work, they explained that they had relatively limited choice over positions in different locations. A few commented that they had been asked their preferences in hospitals before starting work with the government, but this information did not appear to have influenced where they were posted. Some nurses explained that the Ministry of Health would consider requests to move to a different hospital, though the main reason for the request would usually be to follow their husband.

Provision of government housing

Some registered nurses are provided with government housing, for which the rent charged is below market rates. There is a limited stock of government housing, with more available outside the main urban centres, though housing shortages were also reported by those working in Nkhotakota. The provision of a government house was considered an important benefit, though a couple of nurses commented on the variability in the quality of housing and another spoke about the distance between her house and the hospital. In terms of what changes they would like the government to make several nurses suggested that the government should increase the supply of

government housing available for registered nurses, while others said that the government should improve the quality of the housing available.

Opportunities to attend in-service training

Many registered nurses interviewed said that they had attended some in-service training over the past year and that they valued the opportunity to refresh their skills. Although the importance of updating their knowledge was reported as their primary motivation, some nurses also mentioned the daily subsistence allowance they received whilst on training as a significant benefit. A few respondents commented that the opportunities to attend in-service training were not transparent. The access to in-service training was also perceived to be greater for those working in district hospitals.

Promotion prospects and grade structure

The opportunities for promotion and the grading structure were another theme emerging from the interviews. Several registered nurses spoke with frustration about how, while they had been promoted to grade K upon completing a two-year diploma course other enrolled nurses had been promoted to the same grade (and pay level) by passing an interview held by the Ministry of Health. The promotion by interview appeared to have caused considerable resentment amongst some registered nurses with more responsibility and higher qualifications but who were working at the same grade as enrolled nurses. For most nurses promotion was closely associated with the opportunities to upgrade their qualifications.

Transport

In the interviews several nurses raised issues relating to their transport between home and work. The main concern was the cost of travel, but accessibility was also mentioned. For example, one of nurses based in Lilongwe said that she had opted to work at Bottom Hospital principally because it would involve taking one minibus to work rather than two. Transport was also a factor for those nurses based in district towns who wanted to travel elsewhere, usually to Lilongwe or Blantyre. This is particularly a concern for those based in Ntchisi, which is currently only accessible by a dirt road.

6.1.3 Issues infrequently mentioned by the registered nurses:

Health risks (including HIV/AIDS)

In the interviews a few of the registered nurses explicitly mentioned the health risks associated with their work, such as their increased vulnerability to contracting HIV or tuberculosis. This issue was often raised alongside the shortage of resources, particularly of surgical gloves, and some nurses explained that there were circumstances where they felt compromised when treating patients, knowing that they were at risk of contracting the infection.

Weak administration

Some respondents spoke about inefficiencies in administration, often in relation to the Ministry of Health but also in hospital management. A few of the nurses interviewed had recently joined government employment after completing their nursing degree and mentioned that were substantial delays in being added to the central payroll

system. Others said that payment for working additional locum shifts had been delayed by a couple of months. Problems with administration were also highlighted in relation to the availability of resources.

Supervision

Several nurses commented that they were working with relatively little supervision. They explained that they often had to take on additional responsibilities because of staff shortages.

Managing junior members of staff

Almost all registered nurses were in charge of a ward and managed support staff, such as enrolled nurses, nursing auxiliaries, porters and cleaners. Some respondents mentioned that they had problems managing staff, such as difficulties in compiling rotas because of staff shortages.

Job security/leave entitlements

A few registered nurses reported that one advantage of working for the government was that it provided secure employment. Examples mentioned included the possibility of being paid while on long-term sick leave and the opportunity to take leave to care for a sick relative or to attend funerals.

Pension provision

Some nurses mentioned that they would be entitled to a pension after completing twenty years of service. Some, particularly those with longer service, felt that the pension provision was an advantage of working for the government. Others were indifferent and a few said that they felt twenty years of service was too long.

6.2 Results of the Discrete Choice Analysis

The questionnaire was administered to 107 respondents in 15 of Malawi's 27 districts by five research assistants during April and May 2006.[18] The final sample was slightly smaller than anticipated, though approximately double the minimum sample size recommended by Hensher et al (2005). Table 6.1 shows the distribution of the registered nurses interviewed by district and by urban/rural classification.

[18] The research assistants were: Mr James Mwera (supervisor), Mr MacDonald Chitekwe, Ms Nozgechi Phiri, Ms Elizabeth Kawale and Ms Kudakwashe Chimangeni (who replaced Ms Kawale for the second half of the fieldwork).

Table 6.1 Number and distribution of registered nurses' interviewed by district and urban/rural classification

District	Urban or rural area	Number of RNs interviewed	% Interviewed by district and urban/rural areas
Blantyre	Urban	20	18.7
Chikwawa	Rural	4	3.7
Dedza	Rural	3	2.8
Lilongwe	Urban	22	20.6
Machinga	Rural	6	5.6
Mangochi	Rural	4	3.7
Mchinji	Rural	3	2.8
Mulanje	Rural	5	4.7
Mwanza	Rural	3	2.8
Mzimba	Rural	7	6.5
Mzuzu	Urban	8	7.5
Nkhata Bay	Rural	4	3.7
Ntcheu	Rural	7	6.5
Salima	Rural	5	4.7
Thyolo	Rural	6	5.6
	Urban total	**50**	**46.7**
	Rural total	**57**	**53.3**
Grand total		**107**	**100.0**

In general, registered nurses welcomed the opportunity to express their views and were keen to participate in the research. The refusal rate was very low, with only three nurses (3%) declining to participate and one interview that could not be completed because the nurse was required for urgent duties. Six of the participants (5.6%) failed to choose the superior job, which suggested that they misunderstood the questionnaire and their responses to all choice pairs were removed from the dataset. This reduced the effective sample size to 101, of which 45 (45%) were urban and 56 (55%) were rural.

The majority (90%) of the respondents were female, and almost all respondents reported that they were Christian (97%). Most participants were married (55%), with 27% single, 6% engaged and 11% widowed or divorced. Almost two-thirds (63%) of respondents had children.

In terms of employment characteristics and nursing qualifications, there was a reasonably even distribution between those registered nurses at Grade I (49%), which usually indicates having qualified with a degree in nursing, and those at Grade J (13%) and K (38%), who are likely to hold a nursing diploma.[19] Slightly more than a third (36%) of registered nurses had previously worked as an enrolled nurse and had returned to nursing college to upgrade their certificate in nursing to a diploma.

[19] However, some caution should be used in making this inference as the grades may also reflect the experience of registered nurses not captured by their qualification. For example, there are very experienced registered nurses for whom their qualification and appointment to government service precede the introduction of the diploma and degree.

At the end of the questionnaire, respondents were asked to describe their current working environment. A large majority of registered nurses (90%) said that they would describe the supply of material resources as 'usually inadequate', and 82% said that they would describe their typical workload as 'heavy', with 16% stating 'medium' and only 2% reporting a 'light' workload. Around a quarter (26%) of respondents said that they were currently provided with a government house.

6.2.1 Baseline results: magnitude and statistical significance of attributes

The baseline empirical model was applied to the data for scenarios One (the best job) and Two (the job they would choose). The results for the baseline random effects probit models for registered nurses' responses on what constitutes the best job (Model 1) and on which job they would choose (Model 4) are presented in Tables 6.2 and 6.3 respectively.

The models appear to fit the data relatively well. The proportion of 1s and 0s correctly predicted is an indicator of goodness of fit. For scenario One (what constitutes the best job) 64% of 1s and 83% of 0s correctly predicted, while by chance alone it would be possible to predict 36% of 1s or 64% of 0s were simply by choosing all 1s or all 0s. For scenario Two (job they would choose) 65% of 1s and 81% of 0s were correctly predicted (compared with 32% and 68% respectively).

The coefficients for the variables can be interpreted as the effect of the difference between Job 1 and Job 2 on the likelihood of choosing Job 1 over Job 2. For instance, in the base model for scenario one (Model 1) an increase in material resources from 'usually inadequate' to 'usually adequate' is associated with a 50% decrease in the probability of choosing Job 1 rather than Job 2 (with the level of material resources held constant at 'usually inadequate' in Job 1). Similarly, the difference between the provision of no government housing and basic housing is associated with an 83% increase in the probability of choosing Job 1 over Job 2 (with 'basic government housing provided' held constant in Job 1).

For both scenarios (Models 1 and 4), all of the coefficients, except the difference between basic and superior housing, were found to be statistically significant, with p-values of less than 0.05. The estimated employment attribute parameters were all of the anticipated sign, where the sign of the coefficients reflects whether the level of the attribute was superior or inferior in Job 1 compared with Job 2. With reference to the attribute levels that were held constant in Job 1, it was possible to determine whether options for attribute levels in Job 2 were deemed to be superior or inferior. For example, the positive sign for the coefficient *dpay4030* shows that the level of the attribute was regarded as being superior in Job 1. The coefficient *dpay4030* represents the difference between net monthly pay of K30,000 and K40,000, with the level of pay in Job 1 held constant at K40,000 while for some choice pairs the pay level in Job 2 was K30,000. Consequently, it can be deduced that K40,000 (as given in Job 1), was considered superior to K30,000 (as exhibited in Job 2).

Using the same deduction, it can be shown that K50,000 was considered superior to K40,000; 'usually adequate' resources were superior to 'usually inadequate' resources; and 'light' and 'medium' workloads were considered superior to a 'heavy' workload. In

terms of housing, 'basic housing' was regarded as better than 'none', while 'superior housing' was preferred to 'basic housing'. The negative sign for the coefficient *dupg*, which represents the difference between 3 and 5 years in the period before being eligible to upgrade qualifications, showed that there was a preference for a shorter period before upgrading. No assumption was made about the superiority related to place, though the negative sign shows that a job in a 'city' was considered inferior to a job in a 'district town'.

6.1.4 Testing for non-linear effects of net monthly pay, workload and provision of housing

For the three attributes, pay, workload and housing that each had three attribute levels, it was necessary to test the assumption in the baseline models (Models 1 and 4) that there were non-linear effects. A Wald test was used to compare a null hypothesis that the effect on utility of the two independent variables relating to net monthly pay was linear with an alternative hypothesis that the effect on utility was non-linear. For scenario One the test generated a p-value of 0.0476 and for scenario Two the p-value was 0.0073, and therefore for both scenarios the null hypotheses were rejected in favour of the alternative hypotheses. It was therefore concluded that there were non-linear effects associated with the pay attribute, and that the difference between K30,000 and K40,000 does not necessarily have the same effect on utility as the difference between K40,000 and K50,000.

A test for non-linearity was also applied to the variables relating to the difference between 'light' and 'heavy' workload and between 'medium' and 'heavy' workload. In this instance, the test was to see if the effect on utility between 'light' and 'heavy' was twice that of between 'medium' and 'heavy'. The same null and alternative hypotheses were used and the Wald test generated p-values of 0.7484 and 0.3586 for scenarios One and Two respectively. For both scenarios the null hypotheses were accepted, which means that the effect on utility from the difference between 'light' and 'medium' workload was comparable to the difference between 'medium' and 'heavy' workload.

The Wald test was also used to consider whether the difference in the provision of 'basic government housing' compared with 'none' would have the same effect on utility as the difference between the provision of 'basic' and 'superior housing'. The null and alternative hypotheses were the same as in the previous case. P-values of 0.0707 and 0.0585 were obtained for scenarios One and Two respectively. It was therefore not possible to reject the null hypotheses that the effect was linear, though for both scenarios the test was of borderline significance since the p-values were close to the 5% significance level.

The results of the non-linearity tests suggested some changes to the specification of the baseline models. A strict application of the 5% significance level for the Wald tests suggests that the assumption of non-linear effects was only necessary for the pay attribute. However, given the relatively small sample size and the findings that the differences in the housing variables were of borderline significance, it can be argued that a more liberal significance criterion may be appropriate.

To examine whether this was the case, a likelihood ratio test was applied to determine whether an expanded model including non-linear effects for both pay and housing significantly improved the fit of the model when compared with a restricted model

with non-linear effects only for pay. The null hypothesis was that the expanded model when compared with the restricted model did not significantly improve the model specification. This was tested against an alternative hypothesis: that the expanded model did improve the fit of the model to the data. P-values of 0.0151 and 0.0095 were obtained, which suggested that the null hypotheses should be rejected in favour of the alternative hypotheses. Thus, for both scenarios the models with non-linear effects for pay and housing significantly improved model specification.

The baseline models were revised following the tests for non-linearity, such that the revised models contained non-linear effects for pay and housing attributes (though not for the workload attribute). The results for the revised models (Models 2 and 5) are presented in Tables 6.2 and 6.3 and given by:

$$\text{Prob}[Y = 1 \mid x] = \text{Prob}[U_{\text{Job 1}} > U_{\text{Job 2}}]$$

$$= (\beta_{01} - \beta_{02}) + \beta_1 \text{dplace} + \beta_2 \text{dpay}_{(40\text{-}50)} + \beta_3 \text{dpay}_{(40\text{-}30)} + \beta_4 \text{dres} + \beta_5 \text{dwork} + \beta_6 \text{dhouse}_{(\text{basic-superior})} + \beta_7 \text{dhouse}_{(\text{basic-none})} + \beta_8 \text{dupg} + \varepsilon + \mu$$

where:

- Y was the dependent variable and equalled one if Job 1 was chosen and zero if Job 2 was chosen;
- $(\beta_{01} - \beta_{02})$ was the alternative-specific constant;
- dplace, $\text{dpay}_{(4050)}$, $\text{dpay}_{(4030)}$, dres, dwork, $\text{dhouse}_{(\text{basic-superior})}$, $\text{dhouse}_{(\text{basic-none})}$ and dupg were the dummy variables for the differences in the attribute levels for place, pay, resources, workload, housing and period before upgrading between Job 1 and Job 2 and;
- $\text{corr}(\varepsilon, \mu)=\rho$, which takes account of the correlation among individual choices.

6.1.5 Comparing marginal utilities across socioeconomic groups: results for scenario one – the best job

The extent to which socio-economic and employment characteristics affect the marginal valuation of job attributes was explored for scenario One by including interaction terms in the revised model. In all but two of the cases examined, the interaction was found to be insignificant. The exceptions were the interactions between place and residence and between the provision of housing (job attribute) and whether the individual was currently provided with a government house.

The interaction between place and residence was considered in response to the question: does where an individual resides affect the utility associated with the place attribute in the job description? The socio-economic characteristic for residence is recorded as either 'urban district' (coded 0 for those individuals resident in Lilongwe, Blantyre and Mzuzu) or 'rural district' (coded 1 for those living in other districts).[20]

The evaluations show that for those living in urban areas the difference between places (from 'city' in Job 1 to 'town' in Job 2) was associated with a 31% decrease in the probability of choosing Job 1 rather than Job 2, while for those resident in rural areas the difference between places was associated with a 53% decrease in the probability of

[20] Zomba would also be considered an urban district but was not included in the administration of the full sample.

choosing Job 1 over Job 2. The decrease in the probability of choosing Job 1 over Job 2 for both urban and rural residents indicates that the attribute level in Job 1 (city) was considered to be comparatively inferior. Thus, both groups exhibited a preference for jobs located in a 'district town'. The effect on utility was found to be more pronounced for the group resident in rural districts, which implied that they had a stronger preference than those respondents living in urban districts for jobs located in district towns.

The question of whether an individual being currently provided with a government house affects the utility associated with the attribute for the provision of government housing was examined. The variable 'house' was used to record whether an individual was currently provided with a government house, and was coded as 1 for yes and 0 for no. This socioeconomic characteristic was interacted with the two dummy variables for housing (the difference between 'none' and 'basic housing' and that between 'basic' and 'superior housing'). The main effect and the interaction effect for the difference between 'none' and 'basic government housing' were found to be significant, though the difference between 'basic' and 'superior housing' and the corresponding interaction were not. The valuations show that for those who were not currently provided with a government house there was a 97% increase in the probability of choosing Job 1 (in which basic housing was provided) rather than Job 2 (in which no housing was provided). In comparison, for those individuals that are currently provided a government house there was a 54% increase in the probability of choosing Job 1 over Job 2. This implies that those who are currently provided with a government house place a relatively smaller value on the provision of government housing than those who are not provided with housing.

A likelihood ratio test was conducted to indicate whether the inclusion of all significant interaction terms (for place and residence and for the current provision of housing with the housing attribute) improved the fit of the model to the data, compared with the revised model. A p-value of 0.0113 was obtained, which implies that the null hypothesis that their inclusion would not improve model specification was rejected. Thus, it was concluded that adding the interaction terms to the Revised Model improves the fit of the model to the data. The final model (Model 3) as presented in Table 6.2 was given by:

$$\text{Prob}[Y = 1 \mid x] = \text{Prob}[U_{\text{Job 1}} > U_{\text{Job 2}}]$$

$$= (\beta_{01} - \beta_{02}) + \beta_1 \text{dplace} + \beta_2 \text{dpay}_{(40\text{-}50)} + \beta_3 \text{dpay}_{(40\text{-}30)} + \beta_4 \text{dres} + \beta_5 \text{dwork} + \beta_6 \text{dhouse}_{(\text{basic-superior})} + \beta_7 \text{dhouse}_{(\text{basic-none})} + \beta_8 \text{dupg} + \beta_9 \text{dplace*residence} + \beta_{10} \text{dhouse}_{(\text{basic-superior})} \text{*house} + \beta_{11} \text{dhouse}_{(\text{basic-none})} \text{*house} + \varepsilon + \mu$$

where:

- Y was the dependent variable and equalled one if Job 1 was chosen and zero if Job was chosen;
- $(\beta_{01} - \beta_{02})$ was the alternative-specific constant;
- dplace, $\text{dpay}_{(40\text{-}50)}$, $\text{dpay}_{(40\text{-}30)}$, dres, dwork, $\text{dhouse}_{(\text{basic-superior})}$, $\text{dhouse}_{(\text{basic-none})}$, dupg were the dummy variables for the main effect of difference in job attribute levels between Job 1 and Job 2 on utility;

- dplace*residence was the dummy variable for the interaction between the difference in place attribute and residence (with residence equal to 0 if urban and 1 if rural)
- $dhouse_{(basic\text{-}superior)}$*house and $dhouse_{(basic\text{-}none)}$*house were the interactions between the differences in the housing provision attribute and whether an individual was currently provided with a house (with house equal to 1 if the individual was currently provided with a house and 0 otherwise)
- $corr(\varepsilon, \mu)=\rho$, which takes account of the correlation among individual choices.

Table 6.2 Empirical model for scenario One: RNs' responses on what constitutes 'the best job'

Variable name	Variable definition	Base (Model 1)			Revised (Model 2)			Final (Model 3)		
		Coefficient	*Std Error*	*P value*	*Coefficient*	*Std Error*	*P value*	*Coefficient*	*Std Error*	*P value*
dplace	city-town	-0.45	0.11	<0.001	-0.43	0.11	<0.001	-0.31	0.13	0.014
dplaceres	(city-town)*residence	.	.	.	.	.	.	-0.22	0.13	0.087
dpay4050	40,000-50,000	-1.10	0.15	<0.001	-1.12	0.14	<0.001	-1.11	0.14	<0.001
dpay4030	40,000-30,000	0.67	0.11	<0.001	0.67	0.11	<0.001	0.68	0.11	<0.001
dres	inadequate-adequate	-0.50	0.13	<0.001	-0.48	0.11	<0.001	-0.48	0.12	<0.001
dworkhm	heavy-medium	-0.49	0.12	<0.001	.	.	.	.	.	.
dworkhl	heavy-light	-0.90	0.15	<0.001	.	.	.	.	.	.
dwork	heavy to medium or medium to light	.	.	.	-0.46	0.07	<0.001	-0.46	0.07	<0.001
dhousebs	basic-superior	-0.28	0.16	0.086	-0.25	0.15	0.085	-0.20	0.16	0.198
dhousebshouse	(basic-superior)*house	.	.	.	.	.	.	-0.21	0.22	0.337
dhousebn	basic-none	0.83	0.17	<0.001	0.86	0.12	<0.001	0.97	0.13	<0.001
dhousebnhouse	(basic-none)*house	.	.	.	.	.	.	-0.41	0.15	0.008
dupg	5yrs-3yrs	-0.96	0.10	<0.001	-0.97	0.10	<0.001	-0.97	0.10	<0.001
constant		0.40	0.25	0.116	0.36	0.22	0.102	0.36	0.22	0.101
N		1510			1510			1510		
Log likelihood		-724.35			-724.40			-718.86		
Prob(Chi2)		<0.001			<0.001			<0.001		
Rho		0.201	0.04		0.201	0.04		0.186	0.04	
Proportion of 1s correctly predicted (compared with 36%)		64.1%			64.1%			64.1%		
Proportion of 0s correctly predicted (compared with 64%)		82.5%			82.5%			82.5%		

6.1.6 Comparing marginal utilities across socio-economic groups: results for scenario two – the job they would choose

The extent to which socio-economic and employment characteristics affect the marginal evaluation of job attributes was also investigated using data on which job an individual would choose, having taken into account their circumstances. Of the interactions examined, there were only two cases in which the interactions were found to be significant: the impact of residence on the place attribute and the effect of age on the upgrading attribute.

The results for the interaction between place and residence are shown in Model 6 in Table 6.3. The valuations show that for those living in urban areas the difference in place (from 'city' in Job 1 to 'town' in Job 2) is associated with a 30% decrease in the probability of choosing Job 1 rather than Job 2, while for those resident in rural areas the difference in place was associated with an 81% decrease in the probability of choosing Job 1 over Job 2. These results show that both groups have a preference for jobs located in a 'district town'. The effect on utility was found to be more pronounced for the group resident in rural districts, which implies that they had a stronger preference than those respondents living in urban districts for jobs located in district towns.

The age of an individual was found to affect the utility associated with the time before being eligible to upgrade their qualifications. The negative coefficient for *dupg* indicates that a shorter time for upgrading was associated with a higher level of utility (since the upgrade attribute in Job 1 of '5 years' was regarded as inferior to that in Job 2 of '3 years'). The positive coefficient associated with the interaction with age implied that the utility associated with a shorter time before being eligible for upgrading was less pronounced with age. The magnitude of the coefficient indicated the change in the probability of choosing Job 1 rather than Job 2 for each year of age.

Again a likelihood ratio test was conducted to determine whether the inclusion of all significant interaction terms (for place and residence and for age and period before upgrading attribute) improved the fit of the model to the data. A p-value of 0.002 was obtained, which meant that the null hypothesis was rejected. Thus, it was concluded that adding the interaction terms to the Revised Model improved the fit of the model to the data. The final model (Model 6) was given by:

$$\text{Prob}\,[\,Y = 1 \mid x\,] = \text{Prob}\,[U_{\text{Job 1}} > U_{\text{Job 2}}\,]$$

$$= (\beta_{01} - \beta_{01}) + \beta_1 \text{dplace} + \beta_2 \text{dpay}_{(40\text{-}50)} + \beta_3 \text{dpay}_{(40\text{-}30)} + \beta_4 \text{dres} + \beta_5 \text{dwork} + \beta_6 \text{dhouse}_{(\text{basic-superior})} + \beta_7 \text{dhouse}_{(\text{basic-none})} + \beta_8 \text{dupg} + \beta_9 \text{dplace*residence} + \beta_{10} \text{dupg*age} + \varepsilon + \mu$$

where:

- Y was the dependent variable and equalled one if Job 1 was chosen and zero if Job 2 was chosen;
- $(\beta_{01} - \beta_{02})$ was the alternative-specific constant;
- dplace, $\text{dpay}_{(40\text{-}50)}$, $\text{dpay}_{(40\text{-}30)}$, dres, dwork, $\text{dhouse}_{(\text{basic-superior})}$, $\text{dhouse}_{(\text{basic-none})}$, dupg were the dummy variables for the main effect of difference in job attribute levels between Job 1 and Job 2 on utility;

- dplace*residence was the dummy variable for the interaction between the difference in place attribute and residence (with residence equal to 0 if urban and 1 if rural)
- dupg*age was the dummy variable for the interaction between the time before having the opportunity to upgrade and the age of an individual
- corr(ε, μ)=ρ, which takes account of the correlation among individual choices.

Table 6.3 Empirical model for scenario Two: RNs' responses on which job they would choose having taken into account their circumstances

Variable name	Variable definition	Base (Model 4)			Revised (Model 5)			Final (Model 6)		
		Coefficient	*Std Error*	*P value*	*Coefficient*	*Std Error*	*P value*	*Coefficient*	*Std Error*	*P value*
dplace	city-town	-0.60	0.14	<0.001	-0.56	0.13	<0.001	-0.30	0.16	0.060
dplaceres	(city-town) *residence	.	.	.	.	.	.	-0.51	0.17	0.003
dpay4050	40,000-50,000	-1.20	0.17	<0.001	-1.22	0.17	<0.001	-1.22	0.17	<0.001
dpay4030	40,000-30,000	0.49	0.13	<0.001	0.51	0.13	<0.001	0.52	0.13	<0.001
dres	inadequate-adequate	-0.36	0.14	0.012	-0.32	0.14	0.021	-0.33	0.14	0.019
dworkhm	heavy-medium	-0.49	0.15	0.001	.	.	.	.	.	.
dworkhl	heavy-light	-0.71	0.19	<0.001	.	.	.	.	.	.
dwork	heavy to medium or medium to light	.	.	.	-0.38	0.09	<0.001	-0.40	0.09	<0.001
dhousebs	basic-superior	-0.14	0.18	0.441	-0.08	0.17	0.628	-0.09	0.17	0.621
dhousebn	basic-none	0.76	0.18	<0.001	0.85	0.16	<0.001	0.86	0.16	<0.001
dupg	5yrs-3yrs	-1.03	0.13	<0.001	-1.05	0.13	<0.001	-1.90	0.32	<0.001
dupage	(5yrs-3yrs)*age	.	.	.	.	.	.	0.02	0.01	0.004
constant		0.42	0.30	0.173	0.29	0.27	0.291	0.33	0.27	0.227
N		1020			1020			1020		
Log likelihood		-457.22			-457.63			-449.11		
Prob(Chi2)		<0.001			<0.001			<0.001		
Rho		0.354	0.06		0.352	0.06		0.318	0.06	
Proportion of 1s correctly predicted (compared with 32%)		64.7%			64.7%			65.7%		
Proportion of 0s correctly predicted (compared with 68%)		80.7%			80.7%			79.6%		

6.3 Marginal Substitution of Employment Attributes

The finding that the level of net monthly pay had a statistically significant impact on the utility associated with the alternative job descriptions was important, as it suggests that the GoM's strategy of increasing remuneration is likely to have an impact on how registered nurses value their employment. For policy-making purposes it is, however, useful to have an indication of the relative importance of the remuneration compared with other employment attributes. The relative importance of the different independent variables can be estimated by calculating the ratio of their coefficients. For example, the coefficients relating to differences in the attribute levels for place, availability of resources, typical workload, provision of housing and the time before having the opportunity to upgrade can be divided by the coefficient representing a pay increase. Table 6.4 shows the magnitude of the coefficients for each independent variable as obtained in the revised models from the data sets on what constitutes the best job and which job the respondent stated they would choose. The table also shows the ratio of the coefficient for each of the independent variables to the coefficient for the difference between K30,000 and K40,000, and the order of importance (with 1 indicating the most and 8 the least important).

The results show that the attribute that had the most significant effect on the utility associated with a job, both in terms of what constitutes the best job and which job respondents would choose, was the difference in net monthly pay between K40,000 and K50,000. The next most important attribute was the difference in the time period before having the opportunity to upgrade qualifications, followed by the difference between none and the provision of basic government housing. Although the results for the two scenarios were very similar, there was some difference in the middle order. Place of work was not considered very important in what constitutes the best job (ranked 7 out of 8), though it was more important in terms of what job the respondent would choose, given their circumstances (ranked 4 out of 8). There was also some notable difference in the importance of resource availability, which was ranked higher in terms of what constitutes the best job compared with what job they would choose, indicating that individual benefits such as place or typical workload were considered relatively more important when it came to the job of choice. The difference between basic and superior government housing was not only statistically insignificant, but was also ranked lowest in both scenarios.

Table 6.4 Marginal substitution of employment attributes

	Scenario One: registered nurses' responses for what constitutes the best job			Scenario Two: registered nurses' responses for what job respondents would choose having taken into account their circumstances		
Independent Variables	*Magnitude of coefficient*	*Ratio relative to the diff. btwn K30,000 & K40,000*	*Order of relative importance*	*Magnitude of coefficient*	*Ratio relative to the diff. btwn K30,000 & K40,000*	*Order of relative importance*
Place: difference between city and district town	0.43***	0.65	7	0.56***	1.10	4
Net Monthly Pay: difference between K40,000 and K50,000	1.12***	1.66	1	1.22***	2.38	1
Net Monthly Pay: difference between K30,000 and K40,000	0.67***	1.00	4	0.51***	1.00	5
Availability of Material Resources: difference between inadequate and adequate resources	0.48***	0.72	5	0.32**	0.61	7
Typical Workload: difference between one unit change in the level of workload (from light to medium or from medium to heavy)	0.46***	0.68	6	0.38***	0.74	6
Provision of Government Housing: difference between basic and superior	0.25*	0.38	8	0.08	0.16	8
Provision of Government Housing: difference between none and basic	0.86***	1.28	3	0.85***	1.65	3
Opportunity to upgrade: difference between waiting time of 3 and 5 years	0.97***	1.45	2	1.05***	2.04	2

Note: * p<0.10; ** p<0.05; ***p<0.01

Chapter 7: Discussion

7.1 Discussion of the Results

The research provides a valuable insight into the employment preferences of registered nurses. The objective of the research was to determine the range of factors that public sector registered nurses take into account when evaluating employment options. The preliminary qualitative research provided a thorough description of the prevailing working conditions and the environment of registered nurses employed by the Malawi government. During the in-depth interviews nurses were asked what would improve their employment and what changes would improve the retention of registered nurses employed by the government. The overwhelming response was that salaries should be increased, though other factors such as improving resource availability and access to further education were also mentioned.

It was interesting, therefore, to conduct the discrete choice experiment to determine the extent to which a range of employment attributes were taken into account when evaluating alternative hypothetical job descriptions. Of the six employment attributes used in the discrete choice experiment, all the attributes were found to have a statistically significant effect on the utility associated with the employment alternatives. In other words, in stating preferences and making choices about different jobs, registered nurses were not only taking into account the level of net monthly pay, but also other employment attributes: the availability of material resources, the typical workload, the place of work, the provision of government housing and the time before being eligible to upgrade their qualifications. These results showed that registered nurses were to some extent willing to forgo income for other beneficial aspects of their conditions of employment and working environment. This implies that the Malawi government has a range of interventions available that would meaningfully improve the working conditions of registered nurses.

Although all the attributes were found to be significant, there was one difference in attribute levels that did not have a statistically significant impact on utility: the difference between the provision of basic and superior government housing. Thus, when registered nurses were stating preferences and making choices about different job descriptions they did value the provision of a basic government house, compared with no government housing, though the difference between basic and superior housing did not have a significant impact. There have been some initial discussions in the MoH on whether improving the quality of housing would make postings to remote and rural areas more attractive. This research suggests that improvements in the quality of housing would have a limited effect on how registered nurses value their employment, though further work would be required to ascertain what they understand by the distinction between 'basic' and 'superior' housing. Further research would also be required to gauge the impact of changes in housing provision on the motivation and retention of other cadres of health workers.[21]

[21] For example, relatively few registered nurses are required to work in remote settings, as outside the urban areas the majority are posted to district hospitals in small towns. However, district health centres tend to be staffed by enrolled nurses, and many more of these facilities are in extremely rural and remote locations and it is possible that the quality of housing provided may have a more significant impact on deployment and retention in these circumstances.

Although the research made no assumptions about the merits of a job located in a city compared with a district town, it is generally perceived that the best and the most popular jobs are those located in cities, particularly in Lilongwe and Blantyre. It was surprising, therefore, that the results of the discrete choice experiment found that respondents preferred jobs located in a district town, both in terms of what they considered to be the best job and when asked to take into account their circumstances and state which job they would choose. Compared with other employment attributes, the issue of location is complex and the questions in the qualitative research about the preferences of living and working in a city compared with a district town generated some of the most varied responses. Although the majority of respondents acknowledged that cities have a wider range of amenities, better access to utilities and a choice of schools, they explained that the costs associated with living in a city were generally higher. Other geographical preferences were highlighted by respondents, such as a cooler climate, good transport links to cities and proximity to their family home. There were also different opinions about working in central and district hospitals. Some nurses said that they preferred working in a district hospital because they were more likely be more involved in the overall administration of the facility, the nature of work was more varied, and there were more opportunities to attend in-service training. However, others said they preferred central hospitals and the opportunity to work in a more specialist job or department. Moreover, although the qualitative research found that registered nurses had preferences about their employment options, many nurses said that they had very little choice about where they worked as they were appointed to a health facility by the MoH and it was only usual to request a transfer if it was for a wife to follow her husband.

In terms of their employment preferences, the registered nurses interviewed represented a reasonably homogenous group. The impact of socio-economic and employment characteristics was examined by interacting an individual characteristic, such as marital status, with a job attribute, such as place, and using a likelihood ratio test to determine whether the inclusion of the interaction term improved the fit of the model to the data. Of the interactions examined, only one individual characteristic, place of residence, had a significant impact on what registered nurses considered to be a good job and on which job they would choose. Although it was not surprising to find that current residence affected preferences about place of work, the results were not as expected. It had been expected that preferences about place of work would reflect current residence, with urban residents preferring jobs located in cities and rural residents preferring jobs located in district towns, especially when asked to take account of their circumstances when making a choice.[22] It was therefore interesting to find that both urban and rural residents exhibited preferences for jobs located in district towns, though, as one would expect, the preference for jobs in district towns was more pronounced for those currently living in rural areas. When asked to state which job they would choose, the preference of urban residents for jobs located in district towns was particularly surprising as in the qualitative interviews many registered nurses indicated that they needed to remain in Lilongwe because of their husband's work and would therefore be unwilling or unable to move to a district town.

[22] 'Urban' residents are those living in Lilongwe, Blantyre, and Mzuzu and 'rural' residents those living in other districts.

One possible explanation for the different results is that there may be some circumstances that would make it feasible to move to a different town. For example, higher levels of net monthly pay might make it possible to move the household as the higher salary would offset only losses in the husband's income or would pay school boarding fees. However, there may be other explanations. Respondents may have failed to take their circumstances fully into account in responding to the question about whether they would choose Job 1, Job 2 or Neither Job, as they had relatively limited experience in making these types of choices. Methodologically it would also be interesting to examine whether the choice of constant comparator, which was located in a city, affected the results.

The decision to include two choice questions was rooted in an interest to ascertain not only their preferences about different employment attributes, but also to understand the extent to which individual circumstances limit those preferences. Overall there was considerable similarity in the results, with both scenarios obtaining the same results for the statistical significance of the variables and non-linear effects. It was also interesting to find that the interaction with socio-economic and employment characteristics had a limited impact in both cases, as it would have been reasonable to assume that, when asked to take into account their circumstances, individual characteristics would have had more of an impact on the utility associated with different jobs. Lack of power due to sample size constraints may explain the relatively few significant interactions.

Although the magnitude of the attribute parameters cannot be directly compared across the two samples, it was possible to make some inferences from the ranked order of importance. As noted above, the main difference between the two scenarios was that location was relatively more important when an individual had taken into account their circumstances. This finding was not unexpected, though it was surprising that place of work was not ranked more highly. As mentioned earlier, the qualitative research found that many of the registered nurses were unable or unwilling to move, often because of their husband's work. The middle order ranking of place of work indicates that location was not considered a prerequisite for which job they would choose nor to have a dominant effect on decision-making. Following the discrete choice questions, respondents were asked whether there was anything about their circumstances that prevented them from always choosing the best job, and the answers suggest that restrictions on place of work were no more important than other attributes, such as the provision of housing or the desire to upgrade. This was an interesting finding and an issue that would benefit from further research. Moreover, the simplification of location into two generic terms 'city' and 'district town' is likely to have masked some restrictions on mobility. In addition, the abstraction to generic terms, rather than specific names, may also have made it more difficult for individuals to consider the place attribute when taking into account their circumstances and stating which job they would choose.

The results of the discrete choice experiment confirmed that net monthly pay is an important job attribute, both in terms of what the respondents considered to be a good job and what job they would choose. The relative ranking of net monthly pay was high compared with other employment attributes in both scenarios. It was interesting to find that net monthly pay was found to have a non-linear effect on utility such that the impact of a K10,000 pay increase from a base of K30,000 was not the same as a K10,000 pay increase from a base of K40,000. Non-linearity was not

surprising; however, it was interesting to find that there were not, as theory suggests, diminishing returns to increases in income, at least over the salary range examined here, as the impact on utility of the difference between K30,000 and K40,000 was lower than that of the difference between K40,000 and K50,000. It was not clear from the data why this might be the case, though it is possible that all three salary levels applied lie below that at which diminishing marginal returns come into effect.

Ranked second in order of importance was the opportunity to upgrade qualifications. The emphasis placed on this employment attribute was also striking in the qualitative research. Several nurses commented that one of the advantages of working for the government compared with CHAM or the private sector was the possibility of receiving government support to study for an additional qualification, and almost half of those interviewed had received government support to upgrade from an enrolled nurse to a registered nurse with a diploma. The prospect of studying for a master's degree was also reported to be a key motivating factor for those newly graduated nurses working in the public service. The primary motivation given by respondents for wanting to upgrade their qualifications was their desire to maintain their professional knowledge, though a further qualification also leads to a higher grade and salary. A higher qualification may affect an individual's standing not only in the work environment but also within the community. Further research would be useful to understand better the motivating factors underlying the desire to obtain additional qualifications.

Other studies that have applied a discrete choice experiment to elicit the employment preferences of health workers have found that both monetary and non-monetary job attributes have a statistically significant impact on how individuals value their work (Chomitz et al., 1997; Scott 2001; Ubach et al., 2003; Wordsworth et al., 2004; Penn-Kekana et al., 2005). The work by Penn-Kekana et al. appears to be the only other discrete choice experiment to consider the employment preferences of African nurses. They also found that remuneration had a relatively large impact on job evaluation, though good management and a fully equipped health facility were also considered relatively important attributes. The urban-rural dimension was a key element in analysing the preferences of doctors in Indonesia, with the results showing a strong preference for urban locations (Chomitz et al., 1997). Access to specialist training was also found to be an important job attribute.

7.2 Limitations of the Research

The design of the EHRP involved consultations with various stakeholders, though given the time constraints, there was no systematic attempt to determine the range and relative importance of factors affecting the retention and motivation of staff in Malawi's health sector. Ideally, this research should have been conducted prior to the introduction of the salary top-up and would, therefore, have been better able to test the MoH's assumption that improving remuneration is the most effective strategy. However, as the implementation of the EHRP continues and the MoH considers alternative strategies to improve retention, this study should provide useful evidence for policy-makers.

For financial and practical reasons, it was necessary to limit the research to one cadre of health workers, though it would also be interesting to apply the same methodology to other cadres. Registered nurses were chosen, as this cadre has the greatest shortage, and retention has proved particularly difficult.

Another limitation of the study is that it provides evidence only on the likely impact of possible alternative strategies for retaining registered nurses and does not take into consideration the costs associated with implementing the alternative policy options. For example, although the research indicated that the opportunity to upgrade qualifications was one of the most highly valued employment attributes, further research would be required to consider the costs associated with improving access to further education. A thorough assessment of the costs ought to incorporate not only the direct costs of supporting nurses when they return to college but also the indirect costs associated with their extended absence from work. It would also be valuable to consider the costs over the long term and, if possible, take into account what impact the policy change would have on the retention of registered nurses in the Malawian public service. For some of the policy options, such as changes in resource availability, an assessment of the costs would require preliminary work to more fully understand what registered nurses perceive as constituting 'usually adequate' compared with 'usually inadequate' availability of material resources. This initial work would then provide a starting point from which to assess the costs of increasing the availability of resources, such as the procurement of additional equipment, drugs and other supplies or strengthening stock management and administration.

Finally, although the research found that registered nurses valued highly increases in remuneration, it does not provide sufficient information to determine the relationship between pay increases and improved retention. Accordingly, further work would be required to estimate the likely impact of the salary enhancement component of the EHRP on retention levels in the public health sector.

Chapter 8: Conclusions

The research proved to be successful in determining the range and relative importance of alternative attributes in the employment preferences of registered nurses working for the Malawi government. The qualitative research, which was undertaken during the preparation and design of the discrete choice experiment, provided a good insight into the range of factors that currently characterise the working environment and conditions of service of public sector registered nurses. The in-depth interviews also obtained a summary of the changes registered nurses felt would improve their employment and help retain nurses in the Malawian public service. All of those interviewed were dissatisfied with the current levels of remuneration, and improving pay was usually the first response regarding what respondents wanted to change. Other frustrations, related to difficulties in accessing resources and the amount of work were also dominant in the discussions about the current working conditions and the desired changes.

The discrete choice experiment proved to be an effective method for assessing the likely impact of various policy options for improving the motivation and retention of registered nurses and the results complemented the qualitative findings. The methodology simultaneously allowed assessment of the impact of several attributes on employment preferences and, by requiring respondents to off trade the advantages and disadvantages of different job descriptions, provided an indication of the relative importance of each attribute. In general, the registered nurses were keen to participate in the research and had few problems in understanding the technique, since there were very few cases when the superior option was not chosen.

It was interesting to find that, with the exception of the difference between the provision of basic and superior government housing, all the selected attributes were found to have a significant impact on employment preferences. This suggested that, as well as pay, the availability of resources, the typical workload, opportunities to upgrade qualifications, and the provision of basic housing (compared with none) were also important. The relative importance of the difference attributes to Malawian public sector registered nurses, as estimated by the ratios of coefficients, provides a useful estimate of the effectiveness of alternative policy options. Remuneration was found to be judged important, though opportunities for further education and the provision of basic housing were also ranked comparatively high.

This study considers only one aspect of the challenges of alleviating the shortage of health professionals. The research limitations are acknowledged and some areas for further research have been suggested. Given the relatively limited quantitative exploration to date of employment preferences of health workers in developing countries, this study provides an interesting contribution to the literature.

Bibliography

Aitken, J. M. and J. Kemp (2003), *HIV/AIDS, Equity and Health Sector Personnel in Southern Africa.* EQUINET Discussion Paper 12, Equinet, Harare.

Anand, S. and Barnighausen, T. (2004), 'Human Resources and Health Outcomes: Cross-country Econometric Study.' *Lancet* 364: pp.1603-1609.

Bryan, S. and Dolan, P. (2004),'Discrete Choice Experiments in Health Economics. For Better or for Worse?' *European Journal of Health Economics* 5 (3): pp.199-202.

Buchan, J. and Sochalski, J. (2004), 'The Migration of Nurses: Trends and Policies.' *Bulletin of the World Health Organization* 82 (8): pp.587-94.

Chomitz, K. M., Setiadi, G. et al. (1997). *What Do Doctors Want? Developing incentives for doctors too serve in Indonesia's rural and remote areas? World Bank Working Paper Series* No.1888, World Bank, Washington, DC.

Coast, J. and Horrocks, S. 'Developing Attributes and Levels for Discrete Choice Experiments Using Qualitative Methods' *Journal of Health Services Research and Policy* 12 (1): 25-30.

Commission on Macroeconomics and Health (2001), *Macroeconomics and Health: Investing in Health for Economic Development*, World Health Organization, Geneva.

Department for International Development (2004), *Improving Health in Malawi (2005/06 – 2010/11): A Sector Wide Approach including Essential Health Package and Emergency Human Resources Programme,* UK Department for International Development, London.

Dovlo, D. (2005), 'Wastage in the Health Workforce: some Perspectives from African Countries' *Human Resources for Health* 3 (6).

Green, A. (1999), *An Introduction to Health Planning in Developing Countries,* Oxford, Oxford University Press, Oxford.

Hanson, K., McPake, B. et al. (2005), 'Preferences for Hospital Quality in Zambia: Results from a Discrete Choice Experiment' *Health Economics* 14 (7): 687-701.

Hensher, D. A., Rose, J. M.et al. (2005), *Applied Choice Analysis: A Primer,* Cambridge University Press, Cambridge.

Hozumi, D. (2003), *Status of Health Facilities in Malawi*, study funded by JICA and submitted to the Malawi Ministry of Health and Population, JICA, Tokyo .

Huddart, J. and Picazo, O. F. (2003), *The Health Sector Human Resource Crisis in Africa: An Issues Paper*, United States Agency for International Development, Washington, DC.

Joint Learning Initiative (2004), *Human Resources for Health: Overcoming the Crisis,* Global Health Initiative, Harvard University, Cambridge, MA.

Kjær, T., Bech, M., et al. (2006), 'Ordering Effect and Price Sensitivity in Discrete Choice Experiments: Need We Worry?' *Health Economics* 15 (11): 1217-28.

Lancaster, K. (1966), 'A New Approach to Consumer Theory' *The Journal of Political Economy* 74(2): 132-57.

Martin-Staple, A. (2004a), 'Proposed 6-Year Human Resource Relief Programme for the Malawi Health Sector: Part I: Retention, Deployment and Recruitment', Paper Prepared for the Malawian Ministry of Health and funded by UK Department for International Development.

Martin-Staple, A. (2004b), 'Proposed 6-Year Human Resource Relief Programme for the Malawi Health Sector: Part II: Training and Tutor Incentive, Paper Prepared for the Malawian Ministry of Health and funded by UK Department for International Development.

Martinez, J. and Martineau, T. (2002), Human Resources in the Health Sector: an International Perspective, UK Department for International Development (DFID) Health Systems Resource Centre, London.

Merino-Castello, A. (2003), *Eliciting Consumer Preferences Using Stated Preference Discrete Choice Modes: Contingent Valuation versus Choice Experiment*, Universtat Pompeu Fabra Economics and Business Working Paper No 705, Universitat Pompeu Fabra, Barcelona.

Ministry of Health Malawi (2004a), *A Joint Programme of Work for a Health Sector Wide Approach (SWAp) 2004-2010*, Government of Malawi, Lilongwe.

Ministry of Health Malawi (2004b), *Human Resources in the Health Sector: Towards a Solution*, Government of Malawi, Lilongwe.

National Statistical Office Malawi (2005a), *Integrated Household Survey 2004-2005*, Government of Malawi, Zomba.

National Statistical Office Malawi (2005b), *Demographic and Health Survey 2004*, Government of Malawi, Zomba.

Nurses and Midwives Council of Malawi (2006), 'Data on Malawian registered nurses who sought validation of their qualifications, by calendar year'**:** By personal communication.

OECD (2001), *The DAC Guidelines: Poverty Reduction*, Organisation for Economic Co-operation and Development, Paris

Palmer, D. (2006), 'Tackling Malawi's Human Resource Crisis.' *Reproductive Health Matters* 14(27): 1-13.

Penn-Kekana, L., Blaauw, D. et al. (2005), *Nursing Staff Dynamics and Implications for Maternal Health Provision in Public Health Facilities in the Context of HIV/AIDS*, *Frontiers in Reproductive Health*, report funded by USAID, Centre for Health Policy (South Africa) & Frontiers in Reproductive Health (South Africa), Population Council. August.

Ryan, M., Bate, A.et al. (2001), 'Use of Discrete Choice Experiments to Elicit Preferences' Quality in Health 10(Supplement I): i55-i60.

Scott, A. (2001), 'Eliciting GPs' preferences for pecuniary and non-pecuniary job characteristics' *Journal of Health Economics* 20(3): 329-47.

Ubach, C., Scott, A.et al. (2003), 'What Do Hospital Consultants Value about their Jobs? A Discrete Choice Experiment' *BMJ* 326 (7404):1432.

United Nations Development Programme (2002), *The Impact of HIV/AIDS on Human Resources in the Malawian Public Service*, paper prepared by the Malawi Institute of Management for the UNDP, Lilongwe.

Valentine, T. (2003), *Towards the Development of a Medium-Term Pay Policy for the Malawi Civil Service*, report for the Government of Malawi, Office of the President and Cabinet, Lilongwe.

Wordsworth, S., Skatun, D.et al. (2004), 'Preferences for General Practice Jobs: a Survey of Principals and Sessional GPs' *British Journal of General Practice* 54(507): 740-6.

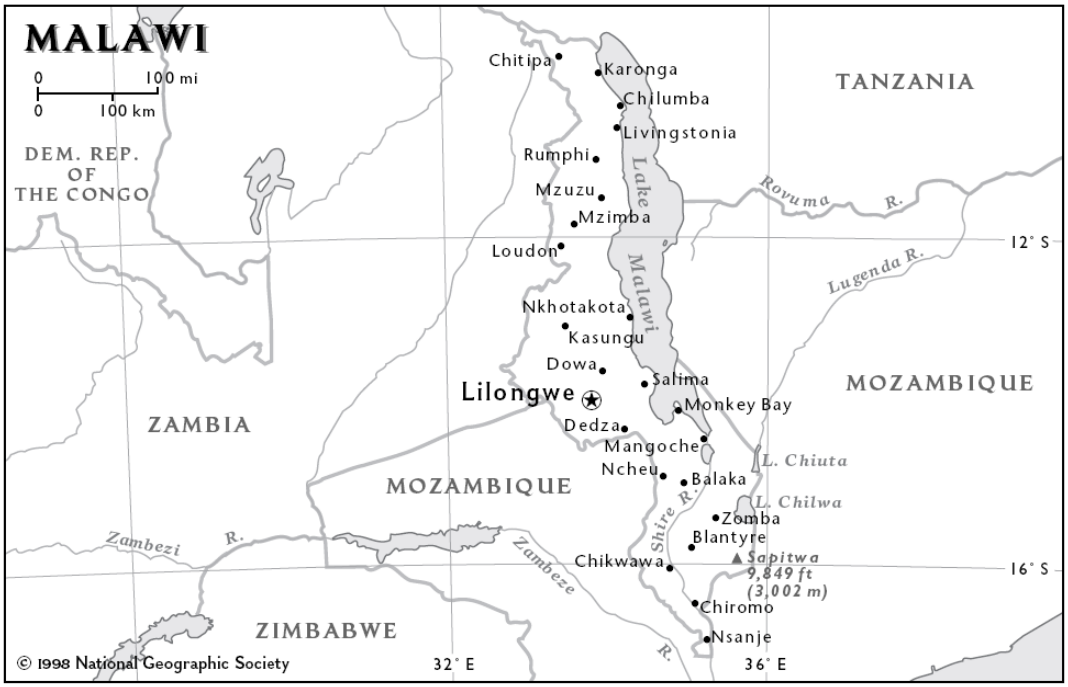
World Bank (2004a), *Human Resources and Financing for Health in Malawi: Issues and Options*, World Bank, Washington, DC.

World Bank (2004b), *Health Outcomes, Health Household Behaviour and Service Delivery System in Malawi: A Review*, World Bank, Washington, DC.

World Health Organization (2006a), *World Health Report 2006: Working together for health*, World Health Organization, Geneva.

World Health Organization, (2006b), 'Malawi National Health Accounts data' available from www.who.int/nha/country/malawi.xls, Retrieved September, 2006.

Annex 1: Map of Malawi



Annex 2: Copy of the Discrete Choice Questionnaire

WHAT FACTORS AFFECT THE MOTIVATION OF PUBLIC SECTOR REGISTERED NURSES IN MALAWI?

PART A: DETAILS OF THE INTERVIEW

ID: (R_V_ _ _)	
Date of Interview: (Insert in DD/MM/YYYY)	
Researcher: (Tick one)	☐ McDonald Chitekwe (R1) ☐ Elizabeth Kawale (R2) ☐ James Mwera (R3) ☐ Nozgechi Phiri (R4)
Version of Choice Set: (Tick one)	☐ Version 1 ☐ Version 2 ☐ Version 3 ☐ Version 4
Hospital / Health Centre: (Insert name)	
District: (Tick one)	☐ Balaka ☐ Blantyre ☐ Chikwawa ☐ Chiradzulu ☐ Chitipa ☐ Dedza ☐ Dowa ☐ Karonga ☐ Kasungu ☐ Lilongwe ☐ Machinga ☐ Mangochi ☐ Mchinji ☐ Mulanje ☐ Mwanza ☐ Mzimba ☐ Mzuzu ☐ Nkhata Bay ☐ Nkhotakota ☐ Nsanje ☐ Ntcheu ☐ Ntchisi ☐ Phalombe ☐ Rhumpi ☐ Salima ☐ Thyolo ☐ Zomba
Title of Respondent: (Tick one, if other specify)	☐ Mr. ☐ Mrs. ☐ Miss ☐ Other (specify):
First Name of Respondent: (Insert name, if refused mark with -)	
Last Name of Respondent: (Insert name, if refused mark with -)	
Grade: (Tick one)	☐ I (formerly PO) ☐ J (formerly STO) ☐ K (formerly TO)
Has the respondent signed the consent form? (Tick one)	☐ Yes ☐ No If no, do not proceed with questionnaire. Note it is accepted for the respondent to sign the consent form, but not to give name.

PART B: INTRODUCTION TO CHOICE QUESTIONS (Give the respondent the folder and allow him/her time to read the introduction. Then explain using the text below)

In this section of the questionnaire you are asked to compare different job descriptions. Please note that the job descriptions are hypothetical. You will be presented with 15 pairs of job descriptions. In each pair Job 1 will remain the same, but Job 2 will be slightly different each time.

Each job has advantages and disadvantages. You will need to trade-off the advantages and disadvantages in answering the following questions.

- *Question 1: In your opinion, of the two jobs described which one is the best or better job? You should answer either 'Job 1' or 'Job 2'.*
- *Question 2: Taking into account your circumstances, would you choose to take 'Job 1', 'Job 2', or 'Neither Job'?*

Do you understand the difference between the two questions? There are two questions because there may sometimes be a difference because the individual's particular circumstances or specific preferences means that he/she would not choose the job they consider to be the best job.

Before we start, I will show you an example. Look at the two jobs shown. Identify the differences between them. When you are ready please answer the two questions shown. *[Note: Give the respondent some time to look at the options and consider the questions.]*

Do you understand what is being asked of you? Do you have any questions? *[If you are uncertain whether the respondent has understood use Example 2]*

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job?(Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
A	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job?(Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
B	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	
C	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay: husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job? (Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
D	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	
E	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay: husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job?(Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
F	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	
G	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay: husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job?(Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
H	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	
I	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay: husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

64

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job? (Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
J	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	
K	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay: husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job? (Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
L	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	
M	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay: husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

Q1 In your opinion, which one of the two jobs described is the best or better job? (Tick one)
Q2 Taking into account your circumstances, would you choose Job 1, Job 2 or Neither Job? (Tick one)
Q3 Why is your answer to Question 2 different from that to Question 1? (If applicable, make notes first with full explanations. Use back of page if need extra space Then tick as many boxes as relevant.)

Set	Q1	Q2	Q3	Notes:
N	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay with husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	
O	☐ Job 1 ☐ Job 2 ☐ No answer	☐ Job 1 ☐ Job 2 ☐ Neither ☐ No answer	☐ N/A ☐ Prefers higher salary ☐ Prefers lighter workload ☐ Prefers to have resources ☐ Prefers earlier upgrade ☐ Does not want to upgrade ☐ Prefers to live in city ☐ Prefers to live in district town ☐ Prefers Central Hospital ☐ Prefers District Hospital ☐ Prefers to stay: husband ☐ Prefers to stay: children / dependents ☐ Prefers housing provided ☐ Does not need housing ☐ Both jobs have disadvantages ☐ Other (specify):	

PART B: CHOICE-BASED QUESTIONNAIRE (Continued)

Please explain what you considered important in answering the first question and choosing which job is the best or better job? (As far as possible write what the person says)

Please explain what you considered important in answering the second question and choosing between Job 1, Job 2 and Neither Job? (As far as possible write what the person says)

Is there anything about your circumstances that prevents you from choosing the best / better job? (As far as possible write what the person says)

PART C: SOCIOECONOMIC DETAILS

Gender: (Tick one)	☐ Male	☐ Female	
Which district do you come from? (Tick one)	☐ Balaka	☐ Lilongwe	☐ Nkhotakota
	☐ Blantyre	☐ Machinga	☐ Nsanje
	☐ Chikwawa	☐ Mangochi	☐ Ntcheu
	☐ Chiradzulu	☐ Mchinji	☐ Ntchisi
	☐ Chitipa	☐ Mulanje	☐ Phalombe
	☐ Dedza	☐ Mwanza	☐ Rhumpi
	☐ Dowa	☐ Mzimba	☐ Salima
	☐ Karonga	☐ Mzuzu	☐ Thyolo
	☐ Kasungu	☐ Nkhata Bay	☐ Zomba
How old are you? (Insert number of years)			
What is your religion? (Tick one)	☐ None	☐ Christian	
	☐ Islam	☐ Traditional	
	☐ Other religion (specify):		
What is your marital status? (Tick one)	☐ Single	☐ Separated	
	☐ Engaged	☐ Divorced	
	☐ Married	☐ Non Formal Relationship	
	☐ Widowed		
If in a relationship, does your partner work? (Tick one)	☐ Yes	☐ No	☐ N/A
If yes, in which district does your partner work?: (Tick one)	☐ Balaka	☐ Lilongwe	☐ Nkhotakota
	☐ Blantyre	☐ Machinga	☐ Nsanje
	☐ Chikwawa	☐ Mangochi	☐ Ntcheu
	☐ Chiradzulu	☐ Mchinji	☐ Ntchisi
	☐ Chitipa	☐ Mulanje	☐ Phalombe
	☐ Dedza	☐ Mwanza	☐ Rhumpi
	☐ Dowa	☐ Mzimba	☐ Salima
	☐ Karonga	☐ Mzuzu	☐ Thyolo
	☐ Kasungu	☐ Nkhata Bay	☐ Zomba
Do you have any children? (Tick one)	☐ Yes	☐ No	
If yes, how many children do you have? (Insert number of children)		☐ N/A	

How many of your children are still at school? (Insert number of children)		☐ N/A
Do you have any (other) dependants? (Tick one)	☐ Yes	☐ No
If yes, who is dependant on you, in and outside of your household? (Tick as many as appropriate in each column)	☐ N/A	
	In Household (direct care): ☐ None ☐ Parents ☐ Brothers / Sisters ☐ Nieces / Nephews ☐ Cousin(s) ☐ Adopted / Fostered Children ☐ Other (specify):	Outside of household: ☐ None ☐ Parents ☐ Brothers / Sisters ☐ Nieces / Nephews ☐ Cousin(s) ☐ Adopted / Fostered Children ☐ Other (specify):

PART D: EMPLOYMENT CHARACTERSITISCS

What is your position / job title? (Insert title)			
What is your department? (Insert name of department)			
What year did you become a nurse (at any grade)? (Insert year: YYYY)			
How many years have you worked as a nurse for the government? (Insert number of years. Enter zero if less than one year)			
Have you ever worked for CHAM or another type health facility? (Tick one in each column)	CHAM Health Facility: ☐ Yes ☐ No	Other Health Facility: ☐ Yes ☐ No	
Were you an Enrolled Nurse before becoming a Registered Nurse? (Tick one)	☐ Yes	☐ No	
If yes, for how many years did you work as an Enrolled Nurse? (Insert number of years. Enter zero if less than one year)		☐ N/A	
In what districts have you worked as a nurse (at any grade)? (Tick as many as appropriate Include current district)	☐ Balaka ☐ Blantyre ☐ Chikwawa ☐ Chiradzulu ☐ Chitipa ☐ Dedza ☐ Dowa ☐ Karonga ☐ Kasungu	☐ Lilongwe ☐ Machinga ☐ Mangochi ☐ Mchinji ☐ Mulanje ☐ Mwanza ☐ Mzimba ☐ Mzuzu ☐ Nkhata Bay	☐ Nkhotakota ☐ Nsanje ☐ Ntcheu ☐ Ntchisi ☐ Phalombe ☐ Rhumpi ☐ Salima ☐ Thyolo ☐ Zomba
Do you have a Diploma, Degree or Masters in Nursing? (Tick one in each column)	Diploma in Nursing: ☐ Yes ☐ No	Degree / BSc: ☐ Yes ☐ No	Masters: ☐ Yes ☐ No
When did you qualify with your Diploma / Degree / Masters? (If 'yes' insert year: YYYY, if 'no' mark -)			

Do you have any other nursing qualifications? (If yes, insert name of qualifications)	☐ Yes	☐ No
If you were to go for upgrading what qualification would you study for? (Tick one, if other specify qualification Insert subject)	☐ Do not want to upgrade ☐ Degree (BSc) ☐ Masters ☐ Other:	Subject:
Are you currently provided with a government house? (Tick one)	☐ Yes	☐ No
Would you describe your workload on a typical day as: 'light', 'medium', or 'heavy'? (Tick one)	☐ Light	☐ Medium ☐ Heavy
Would you describe the supply of material resources (equipment, drugs and other supplies) as ...? (Tick one)	☐ Usually Adequate Supply	☐ Usually Inadequate Supply

PART E: CONTACT DETAILS

Would you like to receive a copy of the research findings? (Tick one)	☐ Yes	☐ No

Name: (Insert name, or mark with a -)	
First line of address: (Insert address or mark with a -)	
Second line of address: (Insert address or mark with a -)	
Third line of address: (Insert address or mark with a -)	
City / Town: (Insert city / town or mark with a -)	
Email Address: (Insert email address or mark with a -)	

PART F: COMMENTS

Does the respondent have any comments?
(As far as possible write what the person says, or mark with a -)

This space is for the Research Assistant to add any comments about the interview.
(Insert if relevant, or mark with a -)

Annex 3: A set of Choice Pairs (Version 1)

What Factors Affect the Motivation of Public Sector Registered Nurses in Malawi?
Part B: Choice Questionnaire

In this section of the questionnaire we want to try and understand what factors affect the employment preferences of registered nurses. There are many factors, but we have chosen to focus on six of them. They are:

- Place of work
- Net monthly pay (including regular allowances)
- Availability of material resources (equipment, drugs and other supplies)
- Typical workload
- Provision of government housing
- Opportunity to upgrade qualifications

You are asked to compare different job descriptions and state your preference regarding pairs of jobs. The job descriptions are hypothetical, but are intended to represent a range of employment choices for registered nurses working in the public sector in Malawi.

You will be presented with 15 pairs of job descriptions. In each pair Job 1 will remain the same, but Job 2 will be slightly different each time. Each job has advantages and disadvantages. You will need to trade-off the advantages and disadvantages in answering the following questions.

- *Question 1: In your opinion, of the two jobs described which one is the best job? You should answer either 'Job 1' or 'Job 2'.*
- *Question 2: Taking into account your circumstances, would you choose to take 'Job 1', 'Job 2', or 'Neither Job'?*

If your answers to the two questions are different you will be asked to explain why.

You will be shown an example. Please ask if you have any questions?

74

Choice Set: Example 1

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day (without extra pay)
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K50,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Medium: Enough time to complete duties, works one hour extra each day (without extra pay)
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: Example 2

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day (without extra pay)
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Light: More than enough time to complete duties, works no extra hours each day
Provision of Government Housing:	Superior Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: A

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K50,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Medium: Enough time to complete duties, works one hour extra each day
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: B

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Light: More than enough time to complete duties, works no extra hours each day
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

78

Choice Set: C

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K50,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Superior Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: D

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

80

Choice Set: E

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take …. ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: F

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Light: More than enough time to complete duties, works no extra hours each day
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

82

Choice Set: G

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: H

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K50,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	No Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

84

Choice Set: I

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Light: More than enough time to complete duties, works no extra hours each day
Provision of Government Housing:	Superior Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: J

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Medium: Enough time to complete duties, works one hour extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: K

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Medium: Enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take …. ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: L

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Superior Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

88

Choice Set: M

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	District Town
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Adequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: N

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K50,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Light: More than enough time to complete duties, works no extra hours each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Choice Set: O

Job 1	
Place of work:	City
Net Monthly Pay:	K40,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Heavy: Barely enough time to complete duties, works two hours extra each day
Provision of Government Housing:	Basic Housing Provided
Opportunity to Upgrade Qualifications:	After 5 years

Job 2	
Place of work:	City
Net Monthly Pay:	K30,000
Availability of Material Resources (equipment, drugs and other supplies):	Usually Inadequate
Typical Workload:	Medium: Enough time to complete duties, works one hour extra each day
Provision of Government Housing:	Superior Housing Provided
Opportunity to Upgrade Qualifications:	After 3 years

Question 1:
In your opinion, of the two jobs described which one do you think is the best job? ☐ **Job 1** ☐ **Job 2**

Question 2:
Taking into account your circumstances, would you choose to take .... ☐ **Job 1** ☐ **Job 2** ☐ **Neither Job**

Annex 4: Coding of the dummy variables

The table below shows the dummy variables for the difference in the attribute levels between Job 1 (the constant comparator) and Job 2 and the corresponding range of possible values that they can take. Where the attribute level in Job 1 was the same as in Job 2, the difference was zero and in effect the dummy variables fall out of the model.

Calculation of Independent Dummy Variables

Attribute Levels in Job 1 (Constant Comparator)		**Range of Possible Attribute Levels in Job 2**		**Range of Possible options for difference variable**		**Dummy Variable**
	value		*value*		*value*	
place1		**place2**		**dplace**		
city	0	city	0	city-city	0	0
		district town	1	city-district town	-1	dplace
pay1		**pay2**		**dpay**		
		K30,000	30	40-30	10	$dpay_{(40-30)}$
K40,000	40	K40,000	40	40-40	0	0
		K50,000	50	40-50	-10	$dpay_{(40-50)}$
res1		**res2**		**dres**		
inadequate	0	inadequate	0	inad-inad	0	0
		adequate	1	inad-ad	-1	dres
work1		**work2**		**dwork**		
		light	0	heavy-light	2	$dwork_{(heavy-light)}$
		medium	1	heavy-medium	1	$dwork_{(heavy-medium)}$
heavy	2	heavy	2	heavy-heavy	0	0
house1		**house2**		**dhouse**		
		none	0	basic-none	1	$dhouse_{(basic-none)}$
basic	1	basic	1	basic-basic	0	0
		superior	2	basic-superior	-1	$dhouse_{(basic-superior)}$
upg1		**upg2**		**dupg**		
		3 years	3	5-3	2	dupg
5 years	5	5 years	5	5-5	0	0