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HNP DISCUSSION PAPER

HOW TO RECRUIT AND RETAIN HEALTH WORKERS IN RURAL AND REMOTE AREAS IN DEVELOPING COUNTRIES

A Guidance Note

Edson Araújo and Akiko Maeda

June 2013

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Health, Nutrition and Population (HNP) Discussion Paper

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Health, Nutrition and Population (HNP) Discussion Paper

How to Recruit and Retain Health Workers in Rural and Remote Areas in Developing Countries: *A Guidance Note*

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Abstract: Worldwide the geographical distribution of health workers is skewed towards urban and wealthier areas. This pattern is found in nearly every country in the world, regardless of the level of economic development and health system organization, but the problem is especially acute in developing countries. The geographical imbalances in the health workforce further exacerbate inequities in the health sector, as the services are not available where needs are higher and impact greater. A variety of interventions have been applied in different contexts and for different types of health workers to address this problem. There is an emerging consensus that policies for recruitment and retention in rural and remote areas need to address two critical issues: i) to be effective, interventions need to be implemented in bundles, combining different packages of interventions according to the variety of factors influencing the health worker's decision to work in rural or remote areas; ii) to match the interventions with health worker's preferences and expectations, since the health worker's employment decisions are a function of these preferences. In order to respond to these requirements, this paper proposes the application of Discrete Choice Experiments (DCEs) to allow for measurement of health workers' preferences and quantitatively predicts the job uptake given a set of job characteristics. This paper has a two-fold objective: i) to give the reader an overview of the magnitude of unequal health workforce distribution in the developing countries, provide a summary of the evidence to date on the factors that contribute to these imbalances, and present a systematic set of policy interventions that are being implemented around the world to address the problem of recruitment and retention of health workers in rural and remote regions of the developing countries; and ii) to introduce the reader to the potential application of the DCE to elicit health workers' preferences and determine the factors likely to increase their probability of taking up a rural or remote job.

Keywords: Human Resources for Health, Health Workers Preferences, Delivery of Health Services, Rural Health Services, Medically Underserved Areas

Disclaimer: The findings, interpretations, and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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FOREWORD

This Guidance Note is intended to inform Policy makers, World Bank Task Team Leaders (TTL) and government advisers in developing countries who are concerned with, and are looking for, effective policy interventions that will address rural recruitment and retention of health workers. It provides an overview of the most commonly used interventions, synthesizes the evidence on the effectiveness of such interventions, and presents the case for incorporating health workers' preferences in the design and implementation of effective interventions.

Worldwide the geographical distribution of health workers is skewed towards urban and wealthier areas. This pattern is found in nearly every country in the world, regardless of the level of economic development and health system organization, but the problem is especially acute in developing countries. Shortage of well-trained health professionals compromises access to health care and the quality of services. The geographical imbalances in the health workforce further exacerbate inequities in the health sector, as the services are not available where needs are higher and impact greater.

A variety of interventions have been applied in different contexts and for different types of health workers to address this problem. The interventions taken by countries to address this problem can broadly be divided into the following categories: a) education policies; b) monetary incentives; c) non-monetary incentives; d) skills substitution; and e) regulatory policies (such as compulsory services in rural areas).

While there is a growing number of studies conducted on the effectiveness of each of these interventions, there is a need for more rigorous evaluation of these interventions. In addition, there is an emerging consensus that policies for recruitment and retention in rural and remote areas will need to address two critical issues. First, given the variety of factors influencing the decision for health workers to work in rural or remote areas, a single intervention is unlikely to be sufficient or successful. Therefore, to be effective,

interventions need to be implemented in bundles, combining different packages of interventions according to the country's socio-economic context and characteristics of the health workers. Second, there is a need to match the interventions with health workers' preferences and expectations, since the health worker's employment decisions are a function of these preferences.

In order to respond to these requirements, this Guidance Note proposes the application of a Stated Preference Method (SPM) as an effective analytical instrument to inform the design of recruitment and retention policies. In particular, a Discrete Choice Experiment (DCE) is presented as an example of the SPM that allows for measurement of health workers' preferences for a combination of job attributes, and quantitatively predicts the job uptake given a set of job characteristics. Policy makers interested in understanding which combination of "incentives packages" (bundles) would most likely attract health workers to rural and remote areas may wish to consider the application of DCE in the Policy formulation.

In summary, the Guidance Note has a two-fold objective: first, it is intended to give the reader an overview of the magnitude of unequal health workforce distribution in the developing countries, provide a summary of the evidence to date on the factors that contribute to these imbalances, and present a systematic set of policy interventions that are being implemented around the world to address the problem of recruitment and retention of health workers in rural and remote regions of the developing countries.

Secondly, the paper is intended to introduce the reader to the potential application of the Discrete Choice Experiment – an analytical method that is being used increasingly in developing countries to elicit the stated preferences of health workers and determine the factors that will increase their likelihood of taking up appointments in a rural or remote regional setting. This paper is also meant to be a companion piece to the technical document: "How to Conduct a Discrete Choice Experiment for Health Workforce Recruitment and Retention in Remote and Rural Areas: A User Guide" (Ryan et al.,

2012). While the User Guide provides a detailed, step-by-step approach to implementing a DCE study, this paper offers a more general guidance for non-technical policy makers and World Bank Task Team Leaders to respond to the question of when and whether such a study should be conducted. It provides practical information on the cost and effort required to conduct the study, as well as important *caveats* related to the limitations of its application and interpretations.

This Guidance Note focuses on one aspect of HRH policies, namely, policies to promote recruitment and retention of health workers in rural and remote regions. This is just one subject within a much broader set of HRH labor market analyses that will be required to inform policy decisions. A series of Policy Briefs and Working Papers on analytical techniques related to HRH labor market policies will be forthcoming to address these demands.

PART I – INTRODUCTION

This Guidance Note is intended to inform policy makers and advisers in the developing countries who are concerned with, and are looking for, effective interventions that will address rural recruitment and retention of health workers. It presents an overview of the most commonly used interventions, synthesizes the evidence on the effectiveness of such interventions and discusses how to incorporate health workers' preferences in the design and implementation of effective interventions.

Worldwide the geographical distribution of health workers is skewed towards urban and wealthier areas. This pattern is found in nearly every country in the world, regardless of the level of economic development and health system organization, but the problem is especially acute in developing countries. Shortage of well-trained health professionals compromises access to health care and the quality of services. The geographical imbalances in the health workforce further exacerbate inequities in the health sector, as the services are not available where needs are higher and impact greater.

Over the past decade, developing countries have started to introduce a variety of interventions to address this distributional imbalance in health workers, and improve the recruitment and retention of health workers in rural and remote areas. Some of the more commonly reported interventions range from salary increases or bonuses, regulatory policies such as compulsory service, non-monetary incentives such as access to continuing medical education, and to preferential selection of students from rural areas into training programs. However, evidence to date on the effectiveness of these interventions is only moderate at best.

While there is substantial evidence on the factors that discourage health workers from choosing to work in rural and remote areas, most studies have focused on identifying individual factors that affect employment decisions and their relative rankings with respect to each other. But most of these studies do not measure how these factors jointly

affect health workers' employment decisions. An emerging consensus view is that (i) there is no single 'magic bullet' intervention that would adequately address the problem on its own; (ii) the relative importance of the factors is highly context specific; and (iii) any successful intervention would need to address simultaneously the multiple factors influencing a health worker's decision to relocate, stay or leave a post in rural or remote areas. There is a need for research that will enable joint measurements of health workers' preferences for job characteristics and how their employment decisions are affected when presented with a combination of interventions.

This paper will address two issues: first, it will review the magnitude and variety of challenges facing developing countries in the recruitment and retention of health workers in rural and remote areas, examine the range of policy interventions that have been implemented to address them as well as the evidence available to date of their relative effectiveness; and secondly, it will describe and discuss the application of Stated Preference Methods to inform the design of policies aimed at improving recruitment and retention of health workers in rural and remote areas.

This paper will present examples of how a more accurate and quantifiable understanding of the underlying health worker preferences would help policy makers in designing more effective policies that respond to these concerns. It will also discuss some of the limitations and challenges in using this approach in order to ensure appropriate application and interpretation of its findings.

The paper is structured as follows: the next section will present some evidence on the critical importance of human resources for health (HRH) in achieving health systems and development goals, and will describe the magnitude and range of distributional problems which are affecting HRH across the globe. The third section will discuss the main factors contributing to the health workers shortages in rural and remote areas, and presents an overview of the recent literature examining the effectiveness of the strategies used to address the issue. This section also emphasizes the importance of better designed

strategies, highlighting the need for analytical instruments to inform policy makers in this process.

The fourth section will describe an instrument for stated preference DCE implementation and interpretation of its results to inform policy making. A variety of issues related to DCE design, data collection, dataset organization and statistical analysis are discussed in a non-nontechnical manner as these, and others technical aspects, are extensively covered in the "How to Conduct a Discrete Choice Experiment for Health Workforce Recruitment and Retention in Remote and Rural Areas: A User Guide" (Ryan et al., 2012).

The fifth section presents a concise summary of DCE studies conducted on health workers recruitment and retention in low and middle income countries (LMIC) and briefly discusses some of the initial findings from this relatively recent set of studies. While a DCE provides insightful and detailed information on health workers preferences, its use in the HRH field, and in the health sector as a whole, is relatively new, and it is important to be aware of its limitations. The sixth section discusses these limitations in more detail, and presents some potential solutions. Despite some methodological limitations on the use of Stated Preference Methods to inform HRH policies, DCE remains an important tool for revealing health workers preferences in a systematic way. This information is essential for designing effective and sustainable policies and strategies to attract, recruit, and retain health workers in rural and remote areas. The last section of the paper concludes by describing a series of steps that would be necessary to generate and use the information to design and implement effective policies to address the health worker shortages in rural and remote areas.

Finally, before we proceed with the discussion on geographic imbalances in the health workforce, one more cautionary note is necessary. While a more balanced distribution of health workers would be desirable and in many cases necessary, policy makers should also consider whether it would be feasible or effective to maintain the same health worker to population ratio in a sparsely populated region as in an urban region. Health services

require a minimum volume of patient flow to ensure quality and keep health workers motivated. For some remote regions of the country it may be more appropriate to introduce alternate models of service delivery that call for very different skills mix and organization of staff, such as the greater use of outreach services and community health workers, in order to make more efficient use of the limited health workforce. These are important issues, but will not be addressed directly in this paper.

PART II – THE DISTRIBUTION OF THE HEALTH WORKFORCE:

AN OVERVIEW OF THE FACTORS INFLUENCING HEALTH WORKERS' EMPLOYMENT DECISIONS

Human resources for health (HRH) have been recognized as a pre-requisite for an effective and responsive health system. The evidence demonstrates the importance of HRH to improve health outcomes and to achieve the Millennium Development Goals (WHO, 2006; Dussault and Franceschini, 2006; Anand and Barnighausen, 2004; Chen et al., 2004; Travis et al. 2004). However, many countries around the world face difficulties in training, distributing and retaining health workers in sufficient numbers and with the appropriated skills and productivity levels. The World Health Organization (WHO, 2006) estimates the global workforce shortage is approximately 4.3 million workers, with some 57 countries facing critical shortages (see Annex 1). The situation is even more complicated when the population's health needs are considered: the countries that comprise the WHO African Region bear approximately 24 percent of the global burden of diseases and have only 3 percent of the total health workforce (36 countries in Sub-Saharan Africa have critical shortages of health workers). On the other hand, 37 percent of the global health workforce is in the WHO Region of the Americas which suffer from 10 percent of the global burden of disease (WHO, 2006).

The health worker shortage is further exacerbated by the severe imbalances in the distribution across and within countries. Throughout the world, there is a tendency for the health workforce to be concentrated in affluent urban areas rather than in rural and poorer areas. High income countries have approximately three or four times more doctors and nurses by unit of population (health worker density) compared to lower income countries (Hongoro and McPake, 2004). Globally, approximately one-half of the population lives in rural areas, but these areas are served by only 38 percent of the total nursing workforce and by less than 25 percent of the total physician workforce (WHO, 2006).

In Senegal, the Dakar region has more than 60 percent of all physicians in the country while its population represents only 23 percent of the total population (Zurn et al., 2010).

In Ghana, 69 percent of all doctors practice in the Greater Accra or in Kumasi, the two largest urban centers in the country (Snow et al., 2011). In Bangladesh, 35 percent of the doctors and 30 percent of the nurses practicing in the public sector are in metropolitan areas which contain only 15 percent of the country's population (Dussault and Franceschini, 2006). In Sudan, the doctor to population ratio in urban settings is 24 times higher than in rural locations, the same indicator for nurses is 20 times higher in urban locations (Lemiere et al., 2011).

Among the middle Income countries, South Africa where 46 percent of the population live in rural areas, but only 12 percent of the doctors and 19 percent of the nurses practice there (WHO, 2010). Approximately 43 percent of Brazilians live in the Southeast Region, and are served by 58 percent of the total number of doctors in the country. On the other hand, the North and Northeast regions, the poorest regions in the country – respectively represent 7.7 percent and 28 percent of the total population, but are served respectively by only 4 percent and 16 percent of the total number of doctors in the country (Povoas and Andrade, 2006).

It is worth noting that many high income countries also suffer from severe geographic imbalances in the availability of health workers. For example, while 20 percent of Americans and 24 percent of the Canadians live in rural and remote areas, they are respectively served by just 9 percent and 9.3 percent of the total number of physicians respectively (Committee on the Future of Rural Health Care, 2005; Dumont et al., 2008 – cited in WHO, 2010). Thus, the problem of rural recruitment and retention of health workers is a world-wide issue affecting countries at all levels of income.

Factors that affect the distribution of health workers differ by the categories of health workers. Highly trained health workers have a tendency to be concentrated in urban and wealthier areas – possibly reflecting the higher cost of education and hence a stronger need to achieve a higher income level - whereas in the rural and poorer areas the

percentage of workers with less (or no formal) training tend to be greater (Lemiere et al., 2011).

The spatial maldistribution of the health workforce presents a serious obstacle to the achievement of important national development goals such as universal health coverage. It raises equity concerns since it affects the access of health care for those with the highest relative needs, and allocative efficiency concerns as resources are not distributed towards areas where they would have the greatest impact. Additionally, excessive concentration of health care professionals in urban areas might also be contributing to overutilization or inappropriate uses of services, such over-prescription of drugs or laboratory tests, leading to wastage of scarce resources (Serneels et al., 2010; Chen, 2010).

Traditional approaches to address the HRH imbalances have focused primarily on increasing training capacity and on retraining of health professionals. The challenge for the policy makers is to design an appropriate set of incentives which are both politically feasible and financially affordable, and which create an environment that encourages health workers to stay in rural and remote areas and continue their practice. The next section presents the most common strategies to attract and retain health workers to rural and remote posts and discusses their effectiveness. Rather than a comprehensive review, it offers a brief summary of the evidence to date and the status of research, and an emerging consensus on an approach that highlights the need for better understanding of health workers' preferences as a necessary element for designing effective recruitment and retention policies.

PART III – IMBALANCES IN THE HEALTH WORKFORCE DISTRIBUTION:

EVIDENCE ON DETERMINANTS AND INTERVENTIONS

DETERMINANTS OF THE GEOGRAPHICAL IMBALANCES OF THE HEALTH WORKFORCE

There are multiple factors influencing a health worker's decision to relocate, stay or leave a post in rural or remote areas. They are complex and interconnected factors, linked to health professional's characteristics and preferences, related to health systems organization and wider social, political and economic environment (WHO, 2010). Although these factors are context specific, the evidence from different countries suggest a common set of issues that vary in their mixture and degree of intensity. Commonly reported factors include: unsuitable pre-service training for rural and remote areas practice, lack of opportunities for further training and career development, low salaries, poor working environments, limited availability of equipment and drugs, insufficient family support, inadequate management and unsupportive supervision (Grobler et al., 2009). These have been described as "*pull*" and "*push*" factors. The "pull" factors are those that attract health professionals for a given post/location (higher income or possibility of practicing in the private sector, improved working and living conditions, and etc.). The "push" factors are those that may coercively influence the health workers not to take up a post in a remote location and not to remain there (Lehmann et al., 2008).

Based on empirical evidence, a variety of factors have been shown to have varying degrees of influence on the employment decisions of health workers. These factors have been broadly grouped into the categories described below (Couper et al., 2007; Lehmann et al., 2008; Dussault and Franceschini, 2006; WHO, 2010).

Individual or personal factors: Personal characteristics of the health worker, such as his or her place of origin (rural or urban), gender, ethnicity, age, personal values and beliefs, have a significant impact on their employment decision. It should be noted that the way these factors influence health professionals' decisions may vary according to the

individual's age and stage of the career (Lehman et al., 2008). There is evidence demonstrating that rural upbringing increases the chances of rural practice (Lehmann et al., 2008; Dussault and Franceschini, 2006). The impact of gender on employment decisions is complex and requires a careful understanding of the underlying motivations as well as social context: for example, job mobility for women appears to be more likely to be influenced by family considerations, while for men mobility is guided more strongly by economic reasons. Altruism, religious beliefs and sociopolitical convictions are also other personal factors that may influence the decision to work in rural or remote areas.

Community, local environment, and local living conditions: Good living conditions are essential to influence worker decisions to move and stay in a particular area. They include factors such as the availability of good schools for the children, safety and security, employment opportunities for the spouse, good staff accommodation, and basic infrastructure such as supply of drinking water, roads and transport. Community support and appreciation toward the health workers have also been identified as important *pull* factors.

Work-related factors - working conditions and organizational environment: It has been pointed out that the shortage of health workers in rural and remote areas is more significantly affected by the problem of retention rather than of recruitment (Dussault and Franceschini, 2006). In other words, while a significant number of health workers could be initially recruited to these posts, they do not generally stay for long, and high turnover rates affect the overall availability. Rural and remote health facilities are often poorly equipped and inadequately supplied with drugs, the physical working conditions are severe, and staff are poorly supported or supervised and often feel isolated and neglected. Doctors in remote areas in Ghana, for example, have identified the sense of "professional isolation" to describe their working conditions, and highlighted the lack of mentoring and inability to contact peers to discuss cases and share experiences as a major problem (Snow et al., 2011).

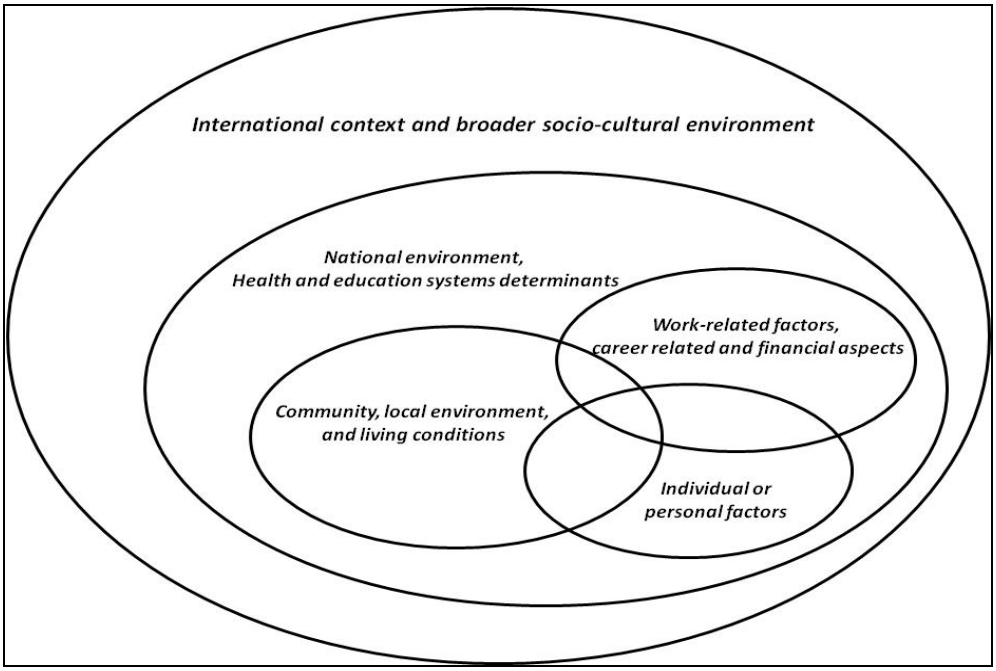
Career related and financial incentives: Rural and remote posts are associated with lack of opportunities for professional development and continuing education as well as low remuneration. Therefore, salaries and other financial benefits such as scholarships play an important role in the decision to relocate to rural and remote posts. However, financial benefits should be expanded in order to incorporate the "ability to generate income" rather than the salary differential only. The possibility of generating income in a second employment (private practice, for example) may be more influential than the income generated in the primary employment. The evidence suggests that access to continuing education (professional courses and workshops) is limited to those not working in the urban settings. Moreover, as those working in rural and remote areas are often overloaded, they have limited amount of time to dedicate to these activities if they are available. The absence of senior posts in rural areas, lack of recognition from managers and slower career progression are other factors associated with the feeling of "professional imprisonment" identified by those working in rural and remote posts in Ghana (Snow et al., 2011). Transparency in the system for deploying staff is also an important factor; health professionals may be willing to practice in rural areas as long as the period for the assignment is defined and complied.

Education system: The way health care professionals are trained, the skills they acquire and the situations they are exposed to during training are important determinants of their future practice choices, including location. The predominant medical education model (hospital-based, curative and of highly specialized care) does not provide exposure and skills for recently graduated professionals to practice in rural and remote areas. It has been proved that medical schools located outside urban centers result in higher turnover of health professionals in rural and remote areas (Dussault and Franceschini, 2006). The stock of health care professionals, its demographic characteristics, division by cadres and level of specialization determine the total number of health workers available (and willing) to practice in rural and remote posts. Macro-health system factors also play a determinant role. The way health care is financed and provided, the regulation and the

management of the health system, all affect the dynamics of the health care labor market including the health workers' choices for employment and location.

National and international context and migration: The broader socio-economic environment beyond the health care systems can affect the employment decisions of the health workers, especially among those that have job mobility. Social unrest and conflict have been identified as the main reasons for migration (Dussault and Franceschini, 2006). Emigration results in lower availability of health care professionals in the country of origin and therefore may exacerbate the shortages in rural and remote areas in these countries (ironically, in some cases those who migrate are going to serve in rural and remote areas in the recipient country). The *pull* factors associated with migration include higher salaries, better working and living conditions, more opportunities for continuing education and career development. The *push* factors may include limited job opportunities (both financial and professional) in the home country, as well as political and social instability.

Figure 1: Factors Influencing Attraction and Retention of Health Workers



Source: Adapted from Lehmann et al., 2008; p.4.

From an economic perspective, the movement of health workers is a function of wages differentials. As wages increase (reflecting an increase in demand), more individuals are likely to enter the health care labor market, and a more balanced distribution of health professionals might be achieved in the long run (Dussault and Franceschini, 2006; Lehman et al., 2008). But creating the demand for more qualified health workers will require economic capacity to purchase these services. In the developing countries, where households are poor and insurance schemes are limited, and public sector capacity to employ trained health workers is also limited, there is often a significant gap between the need for qualified health workers and the labor market capacity to generate sufficient demand for these workers.

Health service labor markets also face many factors that may contribute to "market failures", such as asymmetric information, entry regulations, and other factors. Moreover, employment decisions are subject to many factors other than financial ones, such as job satisfaction, community recognition, and other factors that influence individual preferences. The movement of labor in the health care market is driven by a complex decision-making process, which requires a better understanding of the behavioral characteristics of the health care professionals. To be successful, any intervention would need to be based on more detailed and accurate understanding of this decision-making process, including information on how they can vary over time and place.

The next section focuses on the policies that have been applied to attract and retain health workers to rural and remote posts, and, where available, offers evidence on the effectiveness of these policies.

INTERVENTIONS TO ADDRESS GEOGRAPHICAL IMBALANCES

Policy makers have a range of policy options and interventions to address the problem of health worker shortages in rural and remote areas. These interventions aim to make rural and remote posts more attractive by introducing a set of incentives (creating *pull* factors)

or/and by addressing the *push* factors usually associated with rural and remote employment (see previous section). There is substantial literature from different parts of the world proposing and describing these interventions and which can be applied for different categories of health workers (Buykx et al., 2010; Snow et al., 2011; Peña et al., 2010; Frehywot et al., 2010; Grobler et al., 2009; Willis-Shattuck et al., 2008; Lehmann et al., 2008; Dussault and Franceschini, 2006; Wilson et al., 2009; Couper et al., 2007; Zurn et al., 2010). The various interventions that have been adopted by countries can be divided into five categories: a) education policies; b) monetary incentives; c) non-monetary incentives; d) skill substitution; and e) HRH regulatory policies. Table 1 below reproduces the recommendations proposed by a panel of experts commissioned by the World Health Organization (WHO, 2010). These recommendations "focus solely on strategies to increase the availability of motivated and skilled health workers in remote and rural areas through improved attraction, recruitment, and retention of health workers in these areas" (WHO, 2010; p. 9).

Table 1: Categories of Interventions used to Improve Attraction, Recruitment and Retention of Health Workers in Rural Areas (WHO, 2010)

Category of Intervention	Examples
A. Education	A1 - Students from rural backgrounds
	A2 - Health professional schools outside major cities
	A3 - Clinical rotations in rural areas during studies
	A4 - Curricula that reflect rural issues
	A5 - Continuous professional development for rural health workers
B. Regulation	B1 - Enhanced scope of practice
	B2 - Different types of health workers
	B3 - Compulsory services
	B4 - Subsidized education for return of service
C. Financial Incentives	C1 - Appropriate financial incentives
D. Professional and Personal Support	D1 - Better living conditions
	D2 - Safe and supportive working environment
	D3 - Outreach support
	D4 - Career development programs
	D5 - Professional networks
	D6 - Public recognition measures

Source: WHO, 2010; p.17.

There is a consensus that given the nature and variety of factors influencing the decision to "go rural"; a single intervention is unlikely to be successful. As a result, interventions are to be implemented in *bundles*, combined in different packages according to the country's socio-economic context and characteristics of the health workers. The available reviews highlight the limited number of rigorous evaluations carried out on the implementation of these strategies, making it difficult to evaluate their medium and long term impact (Grobler et al., 2009). Based on the WHO recommended categories, we will now briefly describe each of these strategies and discuss their effectiveness.

- **Education**

Education is the central element of any strategy aiming to improve the provision of health care services. In the case of recruitment and retention policies, training individuals who are more likely to move to rural areas (A1), or including aspects of rural health practice in their training that will encourage them to take up work in rural areas (A4), are possible ways of increasing the stock of rural based health workers. Data from Mexico and Japan has shown that increasing overall enrolment in medical school has no impact on rural employment (WHO, 2010). Newly graduated professionals can migrate, opt to practice in the urban private sector or even work in other sectors. This highlights the need for targeted recruitment policies. Recruiting health workers from rural areas seems to be effective. Experience from countries as diverse as Australia, Indonesia, and Thailand, has shown that health workers with a rural background are more likely to practice in rural areas after completing their studies.

Exposing students to rural area practice during their training has also been proved effective. It can be done either by including compulsory rotations in rural settings during their studies (A3), or by including in the courses curricula rural health topics to develop their competences to work in these areas (A4). Another strategy is to relocate medical schools to rural areas (A2). Evidence from China, Democratic Republic of Congo, Japan and USA demonstrates the effectiveness of this strategy (WHO, 2010; Dolea et al., 2010).

Strategies that facilitate access to continuing education can contribute to improve retention. The use of new educational tools such as distance learning and creating virtual networks of professionals may encourage continuing education and facilitate professional development for those located in rural and remote areas. Initiatives in these areas have been implemented in Australia, Taiwan and Thailand (Dussault and Franceschini, 2006).

Overall, these strategies aim to integrate education, training, and service. These strategies when combined encourage students to choose rural health practice as their career choice. A central point is the need to reform the health education curricula in order to increase the emphasis on primary health care and rural health needs.

- **Regulatory policies**

Governments can regulate and establish rules that essentially force health workers to move to rural areas. This approach can be implemented by creating coercive measures (bonding and compulsory services) or by combining these with some additional incentives. A widely used strategy is the introduction of compulsory service (B3), which requires the newly graduated health workers to practice in rural or remote areas for a given period of time. A recent review demonstrated that more than 70 countries have introduced this intervention (Frehywot et al., 2010). Despite its popularity, compulsory service has been associated with unfairness and low motivation (consequently low productivity) and it tends to penalize particularly women. Evaluation of this intervention demonstrates its unpopularity among students and professionals and difficulties in the management of the scheme. It has been criticised as a short-sighted solution because its long term impact is unknown.

Another regulatory policy for drawing health workers to rural areas is to combine compulsory services with a set of incentives such as scholarships and other educational subsidies (B4). Examples vary from giving scholarships to provide preferential access to professional training to health workers in rural and remote areas. Indonesia, Thailand,

South Africa and Zambia are examples of countries that introduced educational incentives to match with compulsory service and bonding schemes. Overall, the success of compulsory services (with and without additional incentives) depends on general health systems structure and governance. As pointed above, the evidence of its effectiveness is yet to be confirmed.

"Task-shifting" has also been proposed as a way to retain and motivate the health workforce in rural and remote areas (B1). It consists in training lower level health workers to be able to perform higher skilled tasks as a possibility of increasing health service delivery in rural areas. In the United Kingdom and in Australia, nurses are allowed to prescribe medicines (WHO, 2010). In low and middle income countries (LMIC) this strategy is commonly associated with the use of auxiliary cadres (B2). Combined these two strategies offer a relatively cheap short-term alternative. It takes much less time and resources to train these health professionals and additionally these qualifications are much less marketable which reduces the probability of migration (Hongoro and McPake, 2004). Community health workers, nurse aids, traditional birth attendants, and medical assistants are an integral part of health systems in many national health systems (Malawi, Tanzania, Ghana, Argentina, Brazil, Ethiopia, Mozambique and others). Despite its popularity and relative success, task-shifting and the use of auxiliary cadres face resistance from health professionals associations (McPake and Mensah, 2008).

Other possible strategies, not explicitly included in the WHO review, are the regulation of private practice, introduction of more flexible contracts, and the international recruitment of health workers. Evidence from Senegal demonstrates the positive impact of innovative contracts arrangements in addressing the geographical imbalances of health workers (Zurn et al., 2010). On the international recruitment of health workers, Cuba provides an example of training and exporting of health professionals for other Latin American and African countries (Reed, 2010).

- **Financial Incentives**

Financial incentives are the most commonly used strategy to attract and retain health workers in rural and remote areas. These can be direct monetary incentives such as allowances and bonuses, or indirect ones in the form of housing benefits, free transportation, paid vacations, health insurance, loans, and etc. To be effective, these benefits have to be larger than the opportunity costs associated with working in rural areas (including the possible additional income generated from working in the urban private sector). The evidence on the effect of this strategy is not conclusive. Although it is clear that monetary incentives influence health workers' behaviour and choices, it is argued that intrinsic motivation also plays a role in influencing their behaviour. The risk is that the first set of incentives (extrinsic motivation) may "crowd out" the second (intrinsic motivation).

A contingent valuation study conducted among medical and nursing students in Ethiopia and Rwanda found that intrinsic motivation was strongly related to the health worker's willingness to take up a rural job (Serneels et al., 2010). Those students who identified the "ability to help the poor" as the most important job characteristic were those with lower reservation wages – the wage at which they would take up a rural job. Another interesting finding from this study is that 40 percent of the nursing students would be willing to "go rural" at the current wage, while for doctors only 7 percent would accept the initial wage. Students with a rural background and religious affiliation also have lower reservation wages and are more likely to take up rural posts (Serneels et al., 2010). These results highlight the importance of intrinsic motivation factors in the health worker's employment decisions and how these motivation factors vary from individual to individual. Similar evidence was observed in a qualitative study conducted in Ghana. When asked about their priority in terms of incentives doctors working in urban and rural areas answered differently. Financial incentives, clear terms of contract, and career development were emphasized by those working in urban areas. Those working in rural

areas emphasized career development; clear terms of contract and rewards or recognition (Snow et al., 2011). In the examples above it is clear that the underlying motivational values play an important role in influencing a health worker's decisions to work in rural and remote areas. However, it is important to point out that some of these results are context specific and may vary over time. Those factors are facilitators when introducing incentives. As an example, financial incentives (C1) combined with targeted recruitment (B1) may result in a higher rate of attraction and retention at a lower cost.

- **Professional and personal support**

Non-financial incentives addressing working and living conditions are important determinants for the length of stay of health workers in rural and remote areas. As pointed out before, the shortages of health workers in these areas are more a matter of retention than attraction. While financial incentives may be decisive in attracting health workers to rural and remote areas, they seem to be a as they do not guarantee the retention of these professionals. Once health professionals start to practice in rural and remote areas, professional and personal support may influence their decision to remain there; in other words, they are "staying factors" (Couper et al., 2007). Improving living conditions for health professionals and their family (D1) is one of main factors in this equation. Access to sanitation, telecommunications, schools for children, and employment opportunities for spouse, are important factors. These are not easy to implement, as they are linked to the wider socio, economic and political context, and require coordinated actions to be addressed. Thailand, Zambia, Mozambique, Kenya and Chile provide examples of initiatives in this area. A common strategy is to offer government housing to staff (Frehywot et al., 2010; Lehmann et al., 2008; Peña et al., 2010). In Zambia, the Health Worker Retention Scheme includes lower car loan rates and scholarships to send children to better schools in other areas, as part of the retention strategy (Lehmann et al., 2008).

Organizational aspects are important factors to improve motivation and performance of health workers, and consequently health systems performance. Where employment in

rural and remote areas is associated with poor management and lack of support, then initiatives that improve these aspects may reflect positively in attracting and retaining health workers in these areas. Improved working conditions (D2) includes the provision of adequate equipment and supplies, availability of drugs, supportive supervision and functioning management system. Evidence from Philippines and Papua New Guinea demonstrates the positive impact of improved supervision on performance and quality of care in remote areas (Lehmann et al., 2008). Other frequent *push* factors related to rural and remote areas post is the feeling of "professional isolation" (Snow et al., 2011; WHO, 2010). This can be tackled by facilitating the exchange and cooperation among health professionals (D3 and D4). Incentives to networks, regular workshops, conferences, and long distance support through telecommunications are potential strategies. Professional associations and journals focused on rural health issues contribute to improve professional motivation and diminish the sense of isolation among those working in rural and remote areas.

Another important aspect usually associated with rural and remote posts is the sense of "professional imprisonment". Health professionals in a rural or remote area posts often feel forgotten by those who take decisions on career development and other compensations (Snow et al., 2011). Moreover, despite the heavy workload, they point out the lack of recognition and appreciation from their managers, local and national authorities and the general community. Developing clear career paths for rural and remote areas posts (D4) and adopting strategies to increase public recognition (D6) are strongly recommended strategies. The first includes defining clear terms of contract, stating clear career development guidelines and incentives structure. Establishing senior posts for rural and remote areas, with clear terms of promotion, has the potential to improve satisfaction and retention. Health professionals must feel these terms are followed and are the main guidance for promotions and rotations. Measures to improve social and professional recognition can be implemented at a relatively low cost. The implementation of awards at the local and national levels is one example of such initiatives. The aim is to demonstrate political support and community appreciation of the health professionals' work in these

areas. These factors may improve intrinsic motivation and attract young students to practice in rural and remote areas in the future (as well as provide the feeling of role models for those professionals practising in these areas).

INTERVENTIONS TO ADDRESS GEOGRAPHICAL IMBALANCES: EVALUATION OF THEIR EFFECTIVENESS

Despite the interest in formulating and implementing these interventions, evaluation of their impact has provided limited evidence on their effectiveness. Evaluations controlling for bias and confounding factors involved are yet to be done (Grobler et al., 2009). A first challenge is to select the appropriate set of indicators to measure the impact of the interventions. The common ways to measure the success of these interventions are: attractiveness (number of applicants to rural posts, intentions to "go rural" after graduation, etc.), actual recruitment (effective contracting and posting) or retention (length of stay, number of health workers staying after a given period of time). But how can we incorporate other aspects such as job satisfaction, quality of care provided, patients satisfaction and, ultimately, how to evaluate the effects on improved health outcomes? These are difficulties dimensions to measure since they are influenced by many contextual factors not always possible to control in evaluations[1]. Table 2 summarizes evidence on the different interventions with the available evidence to support them. Annex 2 presents an extended version of this table, which includes the summary of recommendation for each intervention as proposed by the panel of experts commissioned by WHO (WHO, 2010).

Despite the fact that many of these strategies have yet to be robustly evaluated, there is an emerging consensus on two key requirements when introducing policies for recruitment and retention in rural and remote areas. These are: (i) any effective policy will involve combining a set of interventions and; and (ii) the need to match the interventions with health workers' preferences and expectations.

[1] Huicho and colleagues (2010) propose a conceptual framework to monitor and evaluate retention strategies.

Table 2: Strategies for Implementation and Evidence Available to Support Implementation

Status of evidence on policy effectiveness	Relatively strong evidence	Moderate evidence	Weak evidence
Interventions	• Student selection policies by: rural origin, career intent, gender • Post vocational fellowships • Developing more medical/nursing schools in rural areas or establishing satellite rural campus	• Rural exposure during training • Scholarships with rural service agreements • Rural outreach and support • Financial compensation (combined with other incentives)	• Selection on the basis of ethnicity • Coercive policies - community service for newly graduated, prerequisite for specialization • Provision of continuous professional development • Time-off (having back-up during holidays and weekends) • Foreign recruitment

Source: Wilson et al., 2009; Grobler et al., 2009.

The geographical imbalances of health professionals are a result of a series of complex and interconnected *pull* and *push* factors, with their roots in the wider socio, political, and economic context. A single intervention is unlikely to be sufficient in attracting and retaining health professionals in rural and remote areas. Financial incentives, for example, may initially attract workers to rural areas, but are usually not sufficient to retain health professionals in these areas over a longer period. The same could be said about compulsory services. Both strategies appear to be effective in recruiting and/or attracting health professionals, but are not as effective in retaining them in rural and remote posts.

Thus, a successful strategy will need to include a bundle of interventions, including a set of financial, educational, and organizational incentives. Other interventions, such as improving living conditions or ensuring greater social and community support, may require interventions beyond the health sector, and will need to be embedded within the broader multi-sector development actions. The *Rural Practitioner Programme* in Chile provides a good example of how interventions have been coherently combined as a multiple set of incentives in order to be successful. Other countries such as Thailand, Indonesia, and Zambia have introduced similar multi-sector approach (Peña et al., 2010; Lehmann et al., 2008).

Furthermore, any successful intervention will need to address health workers' needs and expectations, and these can vary considerably by gender, age, professional specialization, and other socio-cultural factors. Therefore, it will be essential to understand the behavioral characteristics of health workers within the context of the particular health labor market in which they operate in order to design more effective recruitment and retention policies. In other words, health workers' employment decisions are both highly context specific and vary across the different types of health workers. Evidence from Georgia, Ethiopia, and Rwanda, shows how health workers from different national contexts value financial incentives differently (Serneels et al., 2010; Willis-Shattuck et al., 2008).

In summary, the challenge is not only to identify which single intervention is more likely to promote recruitment and retention of health workers in rural areas, but to identify the best combination of interventions which can be realistically implemented, as well as develop distinct and fine-tuned interventions that recognize the differences in preferences among different types of health workers, and not treat them as one homogenous block. Some examples of research questions that will need to be answered are listed below:

- How much additional salary will be necessary to attract doctors, nurses, midwives, and other professionals, at different stages of their career?

- How important are non-monetary incentives in retaining different types of health workers? How do these factors vary among men and women, workers with different educational background, socio-economic background, etc.?

- What is the trade-off between salary and other types of incentives, such as improved working conditions? Do the provision of housing and other non-monetary incentives compensate for salary increases?

Answers to these questions should give valuable insights into specific interventions that will impact on availability of health professionals in rural and remote areas as well as on the affordability and sustainability of the interventions. Effective policies addressing the rural/urban imbalance in health worker density should make rural employment more attractive. To do so, strategies need to include factors that health workers value when making employment decisions. Without an accurate knowledge of the job attributes most valued by health workers, the attempts of policy makers to attract, recruit, and retain health workers in rural areas will at the best be short term solutions. Stated Preference Methods, Discrete Choice Experiment (DCE) in particular, have been used as an instrument to elicit health workers' preferences for job attributes, and could be a useful tool for discovering some of the critical aspects of health worker employment decisions. The next sections will provide a brief overview of the method, and its potential application in informing HRH recruitment and retention policies.

PART IV – APPLICATION OF STATED PREFERENCE METHODS IN DETERMINING HEALTH WORKERS' PREFERENCES

DCE is a quantitative technique based on the assumption that any good or service can be described in terms of its characteristics (or attributes), and that individuals choose goods and services observing their characteristics (Ryan et al., 2001). The aim is to have a quantitative evaluation of the importance of each attribute on an individuals' choices. DCE has been extensively applied in health care research (De Bekker-Grob et al. 2012; Guttmann et al., 2009; Ryan and Gerard, 2003), in a wide range of contexts and addressing different policy and research issues. Its applications vary from economic evaluation of health care technologies, to the assessment of demand for health care services and to the identification of health workers preferences for job attributes. DCE is conducted by presenting respondents with a set of hypothetical job alternatives and asking them to make a sequence of choices. Each job alternative is described in terms of the selected attributes and attributes values or levels. In most HRH applications the alternatives are presented in pairs (called "choice sets"), and respondents are asked to choose one of the alternatives or, in some cases, none of them - *opt out* or *status quo* alternative. What follows is a brief explanation of how DCE's are carried out and how the resulting data can be processed and interpreted. For a detailed and comprehensive technical guidance on the application of DCE, the reader is referred to "How to conduct a Discrete Choice Experiment for Health Workforce Recruitment and Retention in Remote and Rural Areas: A User Guide" (Ryan et al., 2012).

The first step to implement a DCE study is a clear and precise understanding of the choice context that individuals face in a real world situation. This allows identifying a set of relevant attributes and attribute levels that affects an individual's choices, in HRH applications we are usually interested in observing the factors that influence a health worker's decision to take up a given job alternative, therefore possible attributes include: salary levels, provision of equipment and drugs, workload, location, etc. The next step is to assign levels for the selected attributes, as an example the levels for the salary attribute

could be: *basic salary*, *twice the basic* and *three times the basic salary*. It is a gold standard to use qualitative research methods (focus groups discussion or/and in-depth interviews) to identify and define the attributes and attribute levels (Mangham et al, 2009). The larger the numbers of attributes and attribute levels, the larger will be the number of choice sets to be presented to respondents. From one side, more attribute and attribute levels enable to make predictions about relatively large policy changes (different combinations of attribute and attribute levels – job alternatives). From the other side, it may increase the cognitive burden for respondents, as they will need to evaluate more complex choice sets. Two main concerns should be taken into account when selecting attributes and attribute levels: 1) they should be relevant for policy purposes; and 2) they have to be meaningful and important to respondents (Bennett and Blamey, 2001). Table 3 below presents the attributes and attribute levels for a DCE study conducted in Vietnam.

Table 3: Job Attributes and Levels for the Discrete Choice Experiment – Vietnam

Attribute	Levels
Location	Remote rural area Urban center area
Equipment	Inadequate Adequate
Official Income (includes base salary, allowances and payments from autonomous funds)	Level 1 (VND 4 million) Level 2 (VND 8 million) Level 3 (VND 12 million) Level 4 (VND 16 million) Level 5 (VND 20 million)
Skills Development	No skills development program Short-term courses, expert exchange, and supportive supervision
Long-term Education	None Possibility to enter advanced medical school after 5 years on the job
Housing	None Government-provided housing

Source: Vujicic et al., 2011; and Vujicic et al., 2010c.

Once the attributes and attribute levels are defined, they will need to be combined into a set of carefully selected scenarios (choice sets). Each of these scenarios is a combination of the attributes and attribute levels identified earlier. The process of selecting these

scenarios and putting them together to form choice sets is called *experimental design*. This is one of the main challenges when designing and implementing DCE studies, since the selected design must satisfy a series of desirable statistical properties[2], as well as policy relevant options, in order to guarantee statistical efficiency of the DCE estimative (see Ryan et al., 2012 – Chapter 1; and Mangham et al., 2009). Once the choice sets are created, they are presented to the respondents. Figure 2 is an example of choice set obtained from the attributes and attribute levels presented in Table 3.

Figure 2: Example of a Discrete Choice Experiment Question (choice set) – Vietnam

Job 1	
Location	Remote rural
Equipment	inadequate
Long term education after 5 years on the job	No
Skills development (courses, workshop, meetings)	No
Housing	No
Payment /month	20 m.

Job 2	
Location	Remote rural
Equipment	Adequate
Long term education after 5 years on the job	Yes
Skills development (courses, workshop, meetings)	No
Housing	Yes
Payment /month	8 m.

If your circumstances permitted it, which of the two jobs described would you choose? ☐ Job 1 ☐ Job 2

Source: Vujicic et al., 2011; and Vujicic et al., 2010c (survey report).

The selected choice sets along with a set of questions related to a health worker's employment, personal and family characteristics forms the DCE questionnaire. Respondents are asked to evaluate a series of choice sets and chose one alternative in each - or none. An important assumption of DCE application is that individuals apply compensatory decision making when stating their choices over the choice sets. This means that they are expected to trade across attributes, i.e. they are willing to accept more of one attribute as compensation for less of another attribute. Therefore, an important aspect of the DCE analysis is to observe whether or not individuals present strong

[2] These properties are: level balance, orthogonality, minimal overlap, and utility balance (see chapter one in Ryan et al., 2012).

preferences for a specific attribute (if they exhibit non-compensatory decision making). This situation is known in the DCE literature as *dominant preferences* and refers to the situation in which respondents consistently chose the alternative with the highest (or lowest) value of a particular attribute (Mangham and Hanson, 2008; Scott, 2002).

The numbers of choice sets to be presented varies according to the number of selected attributes and attribute levels and the design strategy used. A general rule is to avoid too many choice sets in order to guarantee accurate responses. As each respondent makes multiple choices, the data generated have *panel data* features and require specific regression techniques to be analyzed. The most common modeling techniques include random-effect logit or Probit model, conditional logit models and mixed logit models (Lagarde and Blaauw, 2009). The estimated coefficients in the regression model indicate health workers' preferences for job attributes. Additionally, the negative ratio of any two attribute coefficients provide the marginal rate of substitution (MRS), which indicates how much individuals are willing to trade among attributes. In other words, it indicates the rate of compensation between any two attributes. If the denominator is the coefficient of the salary (cost or price) attribute, the obtained MRS is the *willingness to pay* (WTP) for having more of that given attribute.

PRACTICAL CONSIDERATIONS WHEN CONDUCTING DCE STUDIES

As emphasized above, the implementation of DCE studies requires a series of steps. From the selection of attributes and levels to the econometric analysis of the data collected. This subsection describes the practical requirements and arrangements necessary to conduct a DCE in a LMIC context. A first and obvious question is: how much does a DCE study cost? It is difficult to have accurate information on costs, as each study covers different populations (students, in-service workers, those living in urban or rural areas, etc.), uses different sample sizes and may apply different data collection procedures (face-to-face interviews, on-line questionnaires or self-administered to be returned by post). Ryan and colleagues (2012) present a rough estimative ranging from $20,000 to $150,000. These numbers were based on DCE conducted in 5 LMIC (Ghana, Malawi,

Tanzania, Thailand, and Uganda) and included costs of international consultants, local research teams, in-country travel and other items such as laptops (Ryan et al., 2012). A DCE carried out in India in 2010 and funded by the World Bank had a total budget $85,150.

A second concern might be: how much time does it take to implement a DCE? Again it is difficult to generalize as the time requirement depends on the country conditions and study design (sample, data collection strategy, etc.). Ryan and colleagues (2012) estimate that on average it takes 8 to 12 months. They estimated the time for each DCE step is summarized in Table 4, below.

Table 4: **How Long Does it Take to Conduct a DCE?**

Phase	Time (in months)
Planning	1 - 2
Qualitative work	1 - 3
Design of questionnaire (including piloting and testing)	2 - 3
Survey administration	1 - 2
Data entry and analysis	1 – 3
Report writing	1 - 2

Source: Ryan et al., 2012, page 54.

Other issues may be related to the skills and competences the implementation team needs and the logistical challenges. The expertise needed includes: qualitative work skills for the identification of attribute and attribute levels (in-depth interviews and focus group discussions); expertise with experimental design techniques for the design of the choice sets; operational research knowledge to run the field work (including training of field interviewers; field work supervision and data entry); intermediate to advance expertise in statistical analysis to define the sample and sampling strategy and, the most critical, to analyze the data. Ryan and colleagues (2012) include other competences such as broad human resources for health policy, health economics, social sciences, and program management. The main logistical challenges are transportation, difficulties to access institutions, absence of health workers in the days the surveys were conducted in health

centers in rural and remote areas. For an in-depth discussion of the challenges in applying DCE in the LMIC context see Ryan et al., 2012 and Mangham et al., 2009.

PART VI – USING DCE TO INFORM RECRUITMENT AND RETENTION POLICIES

The success of any recruitment and retention policy lies on whether or not they address health workers' needs and expectations. Moreover, there is a consensus that *bundles* of interventions, addressing distinct but interconnected issues, are necessary and the combination varies accordingly to context, cadres and health workers characteristics (gender, age, marital status, etc.). Policy-makers hence face the challenge of not only ascertaining health workers' preferences but also quantifying them in a way that allows comparisons across different bundles of policies, and across different categories of workers with individual attributes. The DCE helps to predict how a particular group of health workers is likely to react to different bundles of policies. For example, based on health workers characteristics it may be possible to identify the type of health workers that are most likely to move to rural and remote areas given the set of incentives provided. It may also be possible to observe the effects of financial incentives on different cadres, gender and marital status.

This section highlights how DCE could help in addressing such challenges. Some of the advantages of using a DCE to inform the design of HRH recruitment and retention policies are described below:

- DCE provides a quantitative estimate of how health workers value different job attributes and based on this can simulate rural employment take-up resulting from different policies. Moreover, it allows an estimate of the monetary value (i.e. the wage equivalent or willingness to pay) for any given attribute included in the design;

- It allows several job attributes to be compared against each other simultaneously. It is possible to estimate the marginal rate of substitution between attributes. In other words, it is possible to observe how much of a given attribute respondents are willing to sacrifice in order to get more of another attribute. This information

is useful if policy makers are weighing up non-monetary and monetary attributes against each other;

- The survey is fairly straightforward to health workers as the choices closely resemble real-world decisions (based on the situation analysis and qualitative work conducted to define choice context and attributes and attribute levels);

- It can also be used to simulate results of different policies regardless of whether these policies have been applied in the past or not. DCE facilitates estimates of the likely effects of a new intervention (for example, the introduction of a continuing education program);

- DCE helps in cases where there is limited variation in key job attributes in practice, making it difficult to estimate the effects of different interventions the government is considering. For example, unless housing allowances are implemented and allowed to vary in size, quality, etc., there is no way of estimating their impact from observed data. The DCE technique allows job attributes to lie outside the existing range;

- Where there are insufficient data to estimate health worker preferences based on actual choices (e.g. evaluation of policy reform already implemented), a DCE is likely to be an effective way to gauge preferences;

- With calculation of the cost of the respective packages of policies DCEs allow policy makers to draw a correlation between money invested and increase in rural employment. Therefore, the cost-effectiveness of policies can be estimated;

The DCE can be used to identify which group of health workers to target. By dividing the interviewed health workers into sub-samples based on health worker's characteristics, the approach can be used to determine which group of health workers value urban location

most and are less likely to work in a rural post, and conversely, which group would more likely prefer to work in rural areas[3]. It has been assumed that individuals with rural upbringing are more likely to return to these areas after medical studies. The DCE can test this hypothesis and thus enable policy makers to target these individuals in the pre-service training recruitment process, thus improving the likelihood of rural retention among the cohort of graduates.

DCE has been employed in different contexts and scenarios within health care research in the developed countries over the last two decades, including recruitment and retention issues. Its application to HRH recruitment and retention issues in the developing countries is a relatively recent development, and there has been an increasing application of the method over the last few years. Due to the recent history of DCE application in the developing country context, its validity and effectiveness in predicting the actual behavior of health workers will require longer term research. It will also call for further research in the area of impact evaluation on the actual consequences of the HRH policy changes on rural recruitment and retention.

To date, DCE on rural and remote areas recruitment and retention have been carried out in developing countries as diverse as Malawi, Indonesia, Peru, Laos, Vietnam, and Mozambique. These studies have focused on different categories of health workers, including in-service physicians (Hanson and Jack, 2008), nurses (Penn-Kekana et al., 2005; Mangham and Hanson, 2008; Blaauw et al., 2010; Vujicic et al., 2010a), and clinical officers (Kolstad, 2010). Other studies have focused on interviewing medical students (Chomitz et al., 1998; Kruk et al., 2010). Some studies examined more than one category of health workers in one study, thus enabling differences in preferences to emerge among these groups (Vujicic et al, 2010c; Rockers et al, 2012). Annex 3 provides an overview of the applications of DCE to inform recruitment and retention policies. It is

[3] The use of sub-group analysis has implications for the sample of respondents used. In the DCE literature a minimum sample of 50 respondents is suggested for each particular subgroup of interest (Ryan et al, 2008; Scott 2001; Vujicic et al., 2010a).

important to emphasize that the hypothetical choices elicited by DCE are highly context specific, and cannot be used to extrapolate results to other countries.

The World Bank has supported a series of DCE studies to inform recruitment and retention policies in developing countries. These include DCE's in Ethiopia, Vietnam, Liberia, and India. With some examples from these studies we highlight how DCE can support the development of country strategies to attract and retain health workers in rural and remote areas. Annex 4 contains a more detailed description of the Liberia and Vietnam DCEs.

In Ethiopia, as in many other low income countries, rural and remote areas suffer from severe shortages of health workers. Data from the Ministry of Health indicate that in 2004 about 20 percent of the approximately 1,000 doctors in the public sector were based in Addis Ababa, serving about 5 percent of the total population. The World Bank supported the application of a DCE to identify the factors that influence doctors and nurses employment decisions (Hanson and Jack, 2008). Alternative jobs options were described according to the six attributes presented in Table 5 below. These attributes were selected based focus group discussions with government officials and health workers to identify their relevance to health worker decisions in the Ethiopian context. Subsequently, these attributes were combined into 16 choice sets and presented to a sample of 850 health workers in Ethiopia.

Table 5: Job Attributes and Levels – Ethiopia

Doctors	
Attribute	Possible levels
Location	Addis Ababa vs Regional Capital
Net Monthly Pay ($Base = 2,500$)	$1 \times Base; 1.5 \times Base; 2 \times Base$
Housing	None, Basic, Superior
Equipment and Drugs	Inadequate vs Improved
Time Commitment	2 years vs 1 year
Private Sector	Yes vs No
Nurses	
Attribute	Possible levels
Location	City vs Rural
Net Monthly Pay ($Base = 1,250$)	$Base; 1.5 \times Base; 2 \times Base$
Housing	None, Basic, Superior
Equipment and Drugs	Inadequate vs Improved
Time Commitment	2 years vs 1 year
Supervision	High vs Low

Source: Hanson and Jack, 2008.

Based on the survey data, the authors estimated the impact of different incentive policies. First, they calculated the impact of an improvement in a non-wage attribute on the likelihood of a health worker to take up rural employment while holding constant the wage attribute. Table 7 presents the percentages of health workers willing to take up a job in a rural area when offered different incentives, i.e., improvements in job characteristics (attributes). For example, under the *status quo* (base line), some 7.4 percent of doctor and 4.6 percent of nurses indicated willingness to locate to a rural area. When doctors were offered *superior housing*, 27 percent indicated willingness to accept a rural job, showing the largest effect. For nurses, the largest effect was associated with *improved equipment*, with some 32 percent indicating they would accept a rural job under this condition.

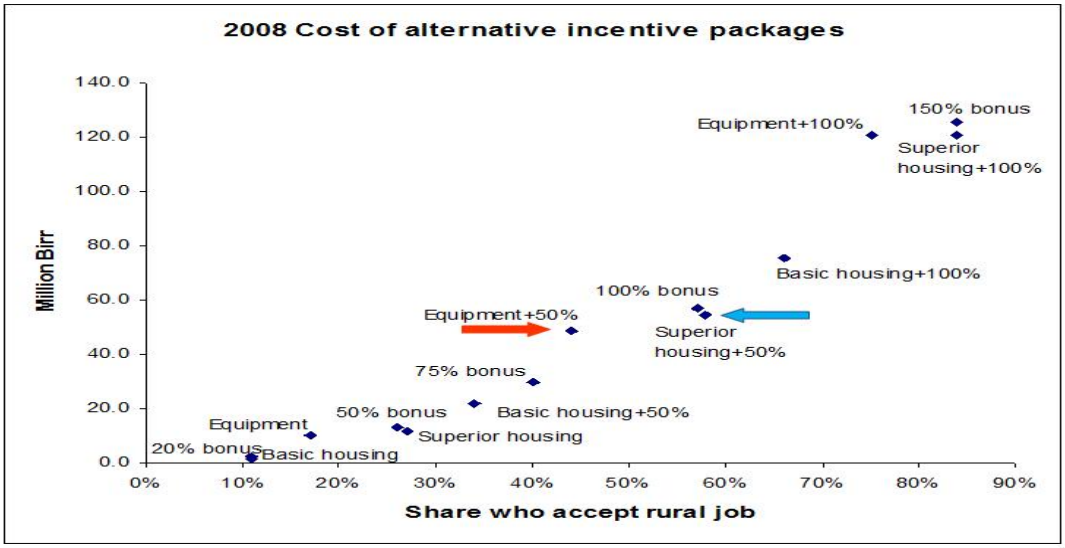
Table 6: Probability of Accepting a Job in a Rural Area Under Different Incentive Schemes

	Doctors			Nurses		
	p	95% CI	Increase	*p*	95% CI	Increase
Baseline	0.074	(0.029,0.122)	–	0.046	(0.034,0.058)	–
Basic housing	0.109	(0.046,0.173)	47%	0.097	(0.080,0.115)	112%
Superior housing	0.269	(0.137,0.400)	262%	0.192	(0.152,0.233)	319%
Equipment	0.167	(0.105,0.229)	125%	0.198	(0.165,0.231)	332%
Pay-back time	0.114	(0.047,0.180)	53%	0.056	(0.041,0.072)	22%
Equip & housing	0.226	(0.144,0.308)	204%	0.323	(0.284,0.362)	605%
Supervision	-	-	-	0.075	(0.055,0.095)	64%

Source: Hanson and Jack, 2008.

The DCE conducted in Liberia included the cost estimation of different incentives packages (Vujicic et al., 2010a). This is an important additional feature of the DCE analysis which could add considerable value to the study findings, as it enables the calculation of the relative cost-effectiveness of different incentive schemes. This study focused on nurses and certified midwives (CM), who form the majority of the health workforce in Liberia; together they make up 35 percent of the clinical health workforce (Health Worker Census, 2009). To demonstrate this, Figure 3 plots the share of health workers willing to accept rural employment against the cost of each intervention for a given set of interventions. Figure 3 shows that providing a 50 percent wage bonus and improving equipment in rural facilities would cost the government about the same as providing superior housing, but with different outcomes in terms of the probability of health workers accepting a rural job. When considering the interventions in *bundles* we can see that combining a 50 percent wage bonus with improved equipment (red arrow) would have less impact than combining a basic 50 percent wage bonus with superior housing (blue arrow). Once these options are laid out, policy makers could then discuss what is feasible politically and financially in the short, medium, and long term, and the likely impact of these alternative policies on retention.

Figure 3: **Cost-effectiveness of Alternative Policy Options – Liberia**



Source: Vujicic et al., 2010a.

The DCE carried out in Vietnam focused on in-service physicians and final year medical students. It aimed to test the hypothesis that newly graduated physicians and mid-career doctors have different employment preferences. In Vietnam about 53 percent of physicians are concentrated in urban areas where only 28 percent of the population lives (Vujicic et al., 2011). Table 3 (section 4) presents the 6 job attributes and their respective levels used in this study. Figure 2 (also section 4) provides an example of a choice set constructed with those attributes and levels. The sample size included 292 physicians (about 0.6 percent of all physicians in the country) and 105 medical students selected from medical universities in each of the regions, 35 from each.

Results demonstrate that in-service physicians and medical students, positively value being located in an urban area, having adequate equipment, higher income, being offered skills development (short-term training) and long-term education (specialist training), as well as free housing. However, when analyzed by groups, there are significant differences between physicians and medical students. The latter group value nonfinancial incentives much more and financial incentives much less than physicians (Vujicic et al., 2010c). The authors estimated the predicted impact of different policies on the uptake of

rural posts by physicians (Vujicic et al., 2011). Table 7 below presents the results of this estimative.

Table 7: Impact of Alternative Interventions to Attract Physicians to Rural Areas

Interventions	Predicted Uptake
Baseline	7%
Improve Equipment	15%
Provide Long-term Education	15%
Provide Short-term Training	14%
Provide Housing	12%
Financial Bonuses	
VND 500,000	8%
VND 1 million	13%
VND 2 million	15%
VND 3 million	17%
Combinations	
Provide Training and VND 1 million	16%
Provide Housing and VND 1 million	13%
Provide Education and VND 1 million	17%
Provide Training and VND 2 million	19%
Provide Housing and VND 2 million	15%

Source: Vujicic et al., 2011, page 975.

The results suggest that improving equipment in rural area facilities and providing long-term education for physicians who work in rural areas would increase the share of physicians willing to work in rural areas by 8 percent from 7 percent (baseline) to 15 percent (Vujicic et al., 2011). Combining training and salary increases (VND 2million) would have the highest impact: 19 percent. Annex 4.1 provides a detailed summary of the design and findings of this study.

PART VII – LIMITATIONS ON THE APPLICATION OF DCE IN HRH POLICY FORMULATION

It has been shown that DCE represents a powerful tool to inform policy making for HRH. At the same time, it allows the observation of health workers' preferences for employment characteristics, and provides instruments to measure the optimal combination of these characteristics that would increase the choices to "go rural" as well as the costs of such a combination. In the context of designing policies to reduce to shortages of health workers in rural and remote areas, DCE is an essential instrument. However, there are important technical challenges to consider:

- DCE relies on hypothetical and not actual choices. Experiences from other fields show DCEs to be a reliable predictor of actual behavior, but there is as yet limited evidence on its reliability when predicting labor force decisions. There is a need for validation of the DCE's results using longitudinal surveys and/or the combination of revealed preference data (Mark, and Wait, 2004). The objective is to observe if health workers actually made the same employment decisions they stated in the choice survey. As a result, a DCE should preferably be used to inform the design of pilot incentives schemes that can then be implemented and evaluated first, before being scaled up;

- The number of job attributes and levels within each attribute need to be limited. The summary of the studies presented in Annex 2 shows that six or seven job attributes are used to avoid high cognitive burden to respondents. Therefore, DCEs implies some degree of simplification as it is reasonable to assume there are many other job characteristics that are likely to influence a health worker's employment decisions;

- The implementation of the DCE survey assumes respondents are trading off attributes, i.e., they are applying compensatory decision rules. If this does not happen, for many reasons, the results obtained may not be valid, either because

the respondents do not understand the choice exercise, or because they demonstrate dominant preferences (making choices based on a single attribute) which do not take into consideration the alternative options (trade-offs);

The design of DCE questionnaires as well as the analysis of the choice data are not simple and require understanding of different types of research techniques, including: qualitative research design for obtaining a comprehensive set of potential preferences; experimental design techniques; and relatively sophisticated econometric analysis.

Having highlighted the potential and limitations of applying a DCE to inform recruitment and retention policies, it is important to place the technique in the context of a set of analytical tools and approaches available to able to inform the design of recruitment and retention policies. Qualitative work, for example, may provide good evidence on the relative importance of different pull and push factors, and the results would be immediately understandable by policy makers (for examples of qualitative study in this area see Rao et al., 2010)[4]. Another possibility is to conduct a survey of health professionals, to identify their demographic characteristics, their sources of income, their expectation and aspirations. Although these are examples of alternative approaches, these approaches are not mutually exclusive. Indeed the information from qualitative work is a cornerstone for any DCE application. When undertaking the DCE data collection some socio-demographic questions are commonly included. The decision when to use one approach or another, or both, will depend on time and costs constraints as well as the level of information required.

[4] For a general guidance on the application of qualitative methods in HRH research see Lievens et al., 2009.

PART VIII – CONCLUSIONS

This Guidance Note aims to inform policy makers and advisers in developing countries on the alternative interventions available to address HRH shortages in rural and remote areas. Different interventions have been applied in different contexts and for different types of health workers. Despite the lack of rigorous evaluations, there seems to be a general agreement on: i) interventions need to be implemented in *bundles*, addressing different but interconnected issues; ii) the need to consider health workers' preferences in the design of interventions, as a health worker's employment decisions are a function of these preferences and the success of any recruitment and retention strategy depends on making rural and remote posts more attractive to health workers.

In this context, stated preference methods represent a powerful instrument to inform the design of recruitment and retention policies. DCE is a stated preference method that allows to measure health workers' preferences for job attributes and predicts the job uptake given a set of job characteristics. Policy makers interested in what would be the combination of "incentives packages" (bundles) that would attract health workers to rural and remote areas should strongly consider the application of DCE in the policy formulation.

The process to design and implement effective recruitment and retention policies are:

1. A comprehensive situation analysis, including a systematic HRH labor market analysis. Such an analysis would provide accurate information on key elements of the health workforce in the country (e.g., current number and distribution of health workers by skills, gender, geographical region, distribution across public and private sectors, the existence of dual practice, and existence of unemployment, as retention policies appear to work more effectively and are cheaper when there is some underemployment in urban areas) and identify the main factors leading to a mismatch between demand and supply of health workers in rural and remote areas (i.e., the *push* and *pull* factors);

2. Qualitative work to identify employment decision context. This step will be essential for reaching an understanding of the context in which health workers make employment decisions, as well as specific characteristics of health workers preferences and expectations. A carefully designed qualitative research will help to identify the critical job attributes most valued by the health workers and their relative importance and intensity of preferences. This should lead to the identification of a realistic set of job attributes to be selected for the DCE experimental design;

3. Choice survey and data analysis. Once the priority set of preferences (choice sets) are constructed using experimental design techniques, the choice survey could be carried out. This survey could focus on the specific category of health workers in demand (shortages) or at points in their career where they are likely to be facing important decisions (e.g., upon graduation) or critical constraints. The sample should include health workers with different backgrounds and characteristics (gender, marital status, place of origin, etc.) in order to allow subgroup analysis. The results of the econometric analysis allows quantification of the preferences and the marginal rates of substitution among job attributes;

4. Validation of the results. DCE results are hypothetical, health workers state how they would behave if they face a similar choice situation (employment decisions). There is a need to validate these responses, as health workers may act differently in real world situations. Once DCE data are analyzed and checked against the qualitative work results (step 2), policy makers will need to assess the results within the broader policy context before taking a decision to implement a specific package of interventions. This may take the form of piloting the intervention within a controlled environment to validate its findings before scaling up the interventions.

5. Scale up interventions. After piloting the package of interventions selected on the basis of DCE analyses and other considerations, policy effectiveness will need to be monitored and evaluated for further validation during the scaling up of the interventions. The impact of the interventions will also need to be assessed within the broader context of the HRH labor market analysis that was conducted in Step 1.

This Guidance Note has focused on one aspect of HRH policies, namely, policies to promote recruitment and retention of health workers in rural and remote regions, and with a specific purpose of offering practical guidance on the application of a Discrete Choice Experiment in informing policies on this topic. This is just one step within a much broader set of HRH labor market analyses that will be required to inform policy decisions. A series of Guidance Notes and User Guides on analytical tools will be forthcoming to address these demands.

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ANNEX 1: WHO DEFINITION OF ACUTE HRH SHORTAGE AND LIST OF 57 COUNTRIES FACING CRITICAL SHORTAGES OF HRH

In its 2006 World Health Report, WHO attempted to define a global measure of HRH shortages by empirically determining the average number of health workers (doctors, nurses and midwives) required to ensure that 80 percent of deliveries are attended by skilled professionals. Using a regression analysis based on this definition, WHO suggested that some 2.3 health professionals per 1,000 population will be required to achieve 80 percent coverage of all births by skilled health professionals. From this figure, WHO identified 57 countries whose health professional density falls below this critical figure of 2.3 health workers per 1,000 population. The list of the 57 countries is provided below.

These national averages do not adequately capture the sub national imbalances in the distribution of health workers. In recognition of this problem, WHO subsequently published the report on rural recruitment and retention of workers in 2010 to highlight the criticality of not only addressing the overall shortage of qualified health workers, but focusing policy attention on the difficult challenge of recruiting and retaining rural health workers.

List of 57 Countries Identified as Facing Acute Health Worker Shortage – By WHO Region

Africa		Americas
1. Angola	29. Rwanda	1. El Salvador
2. Benin	30. Senegal	2. Haiti
3. Burkina Faso	31. Sierra Leone	3. Honduras
4. Burundi	32. United Republic of Tanzania	4. Nicaragua
5. Cameroon	33. Togo	5. Peru
6. Central African Republic	34. Uganda	
7. Chad	35. Zambia	**Eastern Mediterranean**
8. Comoros	36. Zimbabwe	1. Afghanistan
9. Congo		2. Djibouti
10. Côte d'Ivoire		3. Iraq
11. Democratic Republic of Congo		4. Morocco
12. Equatorial Guinea		5. Pakistan
13. Eritrea		6. Somalia
14. Ethiopia		7. Yemen
15. Gambia		
16. Ghana		**Western Pacific**
17. Guinea		1. Cambodia
18. Guinea-Bissau		2. Lao People's Democratic Republic
19. Kenya		3. Papua New Guinea
20. Lesotho		
21. Liberia		**South-East Asia**
22. Madagascar		1. Bangladesh
23. Malawi		2. Bhutan
24. Mali		3. India
25. Mauritania		4. Indonesia
26. Mozambique		5. Nepal
27. Niger		6. Myanmar
28. Nigeria		

Source: WHO, 2006.

ANNEX 2: STRATEGIES FOR RECRUITMENT AND RETENTION - STRENGTH OF EVIDENCE

Category of Intervention	Strategy	Hypothesis	Strength of the current evidence
Education	Student selection	Rural up-bring and other personal characteristics (gender, career intent, personal beliefs, etc.) may affect the likelihood of choosing rural/remote area.	Moderate
	Health professional schools outside major cities	Students from medical schools located in rural areas are more likely to practice in these areas.	Low
	Clinical rotations in rural areas during studies	Exposure in rural areas while tanning may influence students' decisions of where to practice after graduation.	Very low
	Curricula that reflect rural issues	Exposing students to understand rural health care needs may encourage them to consider rural practice.	Low
	Continuous professional development for rural health workers	The availability of continuing education opportunities may influence health workers' employment choices (post-graduate generalist fellowship, e.g.)	Low
Regulation	Enhanced scope of practice	Allowing certain categories of health workers to carry out tasks beyond their training may increase access of service in rural and remote areas and increase job satisfaction.	Very low
	Different types of health workers	Creating different cadres of health workers (registered nurses, medical officer, etc.) increases the availability of human resources in rural and remote areas. Additionally, these professionals are less likely to migrate to other countries.	Low
	Compulsory services	Requiring newly graduated health workers to practice in rural and remote areas to ensure availability of services.	Low

Category of Intervention	Strategy	Hypothesis	Strength of the current evidence
	Subsidized education for return of service	Providing scholarships and allowances with an enforceable rural service agreement may encourage practice in rural areas.	Low
Financial Incentives	Appropriate financial incentives	The provision of financial incentives may encourage practice in rural and remote areas. These can be grants for housing, increases in salary, free transportation, paid vacation, etc.	Low
Professional and Personal Support	Better living conditions	Provision of appropriated personal and family support may encourage practice in a rural area. These include general infrastructure (electricity, water supply, sanitation, telecommunications), schools for children, spouse employment, etc.	Low
	Safe and supportive working environment	Professional support plays an important role in influencing health a worker’s decision to "go rural". Appropriated equipment and supply of drugs, supportive supervision and management also influence health workers' perceptions of rural and remote area posts.	Low
	Outreach support	Exchanges between health workers in rural and remote areas with their counterparts in urban settings. Regular meetings and visits by specialists in rural clinics or health centers are examples. These interventions may reduce the feeling of professional isolation reported by health workers in rural and remote posts.	Low

Category of Intervention	Strategy	Hypothesis	Strength of the current evidence
	Career development program	Create career prospects for rural and remote areas practice. Creating senior posts associated with practicing in these areas may encourage health workers to take up these positions and stay for the long run.	Low
	Professional networks	Knowledge exchange among health workers may reduce the feeling of professional isolation. Activities such as conferences, local academic activities, rural health workers' associations and journals, and other types of professional networks may improve morale and raise the status of rural health professionals.	Low
	Public recognition measures	Recognition from peers, managers and community as a whole may motivate new graduates to work in rural and remote areas. These interventions demonstrate political support for rural health workers.	Low

Source: WHO, 2010; Grobler et al., 2009.

ANNEX 3: SUMMARY OF DCE STUDIES ON HRH RECRUITMENT AND RETENTION IN DEVELOPING COUNTRIES

Study	Country	Cadre(s)	Respondents	Sample Size	Attributes
Kolstad (2011)	Tanzania	Clinical Officer	Final year students	320	Salary and allowances Education opportunities/possibility of upgrading qualifications Availability of Equipment and Drugs Location Workload Housing Infrastructure
Chomitz et al (1998)	Indonesia	Physician	Final year students	585	Province Remoteness Total monthly income Length of contract Probability of subsequent appointment to the civil service Probability of subsequent specialist training
Hanson and Jack (2008; 2010)	Ethiopia	Physicians	In-service workers	219	Location Net monthly pay Housing Equipment and Drugs Time Commitment Private Sector (for Physicians)/ Supervision (for Nurses)
		Nurses	In-service workers	642	
Mangham and Hanson (2008)	Malawi	Nurses	In-service workers	107	Place of work Net monthly pay Availability of material resources (equipment, drugs and other supplies) Typical workload Provision of government housing Opportunity to upgrade qualifications
Kruk et al (2010)	Ghana	Physicians	Final year students	302	Salary Children's education Infrastructure, equipment, supplies Management style Years of work before study leave Housing Transportation

Study	Country	Cadre(s)	Respondents	Sample Size	Attributes
Blaauw et al (2010)	Kenya, South Africa and Thailand	Nurses	Final year students	345 (KEN), 377 (SAF), and 342 (THA)	Facility type * Salary Training Housing Promotion Additional Benefit Workplace culture * Some attribute levels differ across countries.
Penn-Kekana et al. (2005)	South Africa	Nurses	In-service workers	147	Salary Social Amenities Equipment Staffing Facility Mix
Vujicic et al. (2010a)	Liberia	Nurses	In-service workers	197	Location Equipment Total Pay Transportation Housing Workload
Vujicic et al. (2010c)	Vietnam	Physicians	Final year students and In-service workers	292 in-service and 105 students	Location Equipment Official Income Skills development (short-term training) Long term Education (specialist training) Housing
Rao et al. (2012)	India	Physicians	In-service workers and medical students	222 in-service, 163 students	Type of health Center Area Health center Infrastructure Staff Salary (including allowances, Rupees/ month) Change in location to city/town Professional development Job location
		Nurses	In-service workers and nurses students	235 in-service, 145 Students	
Rockers et al. (2012)	Uganda	Physicians, Nurses, Pharmacists, Laboratory	Students and In-service workers	158 In-service, 485 Students	Salary Housing Facility infrastructure and equipment Length of contract Manager support Tuition support Staffing level Opportunity for dual practice

Study	Country	Cadre(s)	Respondents	Sample Size	Attributes
Rockers et al. (2013)	Laos	Medical Doctors	Students and workers in rural provinces	329 Students, 105 In-service	Quality of Facility Career Promotion Housing Salary Continued Education Transport
		Medical Assistants	Students and workers in rural provinces	280 Students, 90 In-service	Quality of Facility Career Promotion Housing Salary Continued Education Children's Education
		Nurses*/Midwives * includes mid and low level training nurses	Students and workers in rural provinces	361 Students, 289 In-service	Career Promotion Housing Salary Continued Education Transport Award
McAuliffe et al. (forthcoming)	Malawi, Mozambique and Tanzania	Mid-level providers	In service (maternity staff)	631 Malawi, 587 Mozambique, 854 Tanzania	Location Net Monthly Pay Housing Equipment and Drugs Continuing Professional Development Human Resources Management
Miranda et al. (2012)	Peru	Doctors	In service	102	Health facility type Monthly take home salary Time in post before getting a permanent job Points when applying for a residency in Community and Family Medicine Free housing provided Work schedule Free days for continuous medical Education
Huicho et al. (2012)	Peru	Nurses and Midwives	In service	205	Health facility type Monthly take home salary Time in post before getting a permanent job Points when applying for a residency in Community and Family Medicine Scholarship for training in Family and Community Health Specialization Free housing provided Work schedule Recognition of rural service

ANNEX 4: AN OVERVIEW OF SOME RECENT WORLD BANK SUPPORTED DCE APPLICATIONS

4.1 – Vietnam Case Study

Background: The shortage of health workers in rural and remote areas of Vietnam has been identified as one of the main challenges to deliver accessible, high-quality, and affordable health services to the population. About 53 percent of physicians are concentrated in urban areas where only 28 percent of the population lives (Vujicic et al., 2011). The Government of Vietnam has implemented a series of interventions to attract doctors to take up rural posts, these include: rotations, task shifting, and faster professional development routes for doctors with rural practice experiences (Ministry of Health, 2009). These policies have not achieved their objectives as they rely mostly on administrative measures and hardly touch on any incentive mechanisms such as the underlying factors that motivate physicians to choose the location of practice. The World Bank supported a study to explore the factors that motivate physicians' employment decisions in Vietnam. The study was conducted from November 2009 to February 2010 and was carried out in collaboration with Oxford Policy Management and the Hanoi School of Public Health. The main purpose of the study was to support the development of effective policies in Vietnam for reducing shortages of physicians in rural areas and at lower-level health facilities.

DCE implementation: The study was carried out in three regions: Northern Uplands, Mekong Delta, and Hanoi. These regions differ in terms of availability of physicians; the first two are predominantly rural areas and face serious shortages and the last one is the capital with an abundance of physicians and tertiary-level facilities (Vujicic et al., 2011). In order to select the attribute and attribute levels, in-depth interviews and focus group discussions were conducted. Additionally, key decision makers in the government were interviewed to ensure that the job attributes selected were amenable to policy changes (Vujicic et al., 2010). Six job attributes were selected: location, condition of equipment in facility, official income, skills development, long-term education, and availability of free housing – these and the respective levels are reported in table 3, page 19). The study tested the hypothesis that newly graduated physicians and mid-career doctors have different employment preferences. Prior to field data collection, the questionnaire was tested in a pilot to evaluate respondents reactions, understanding of the task, wording of questions, and appropriateness of the questions. The final data collection was carried out in person at the health facilities and universities. Physicians were sampled using a multi-stage sampling strategy. In the first stage district, province and national-level facilities were randomly selected. In the second stage, physicians were randomly selected within facilities. The final sample size was 292 physicians (representing about 0.6 percent of all

physicians in Vietnam). Medical students were selected from medical universities in each of the regions, 35 in each – 105 in total.

Results: Data were analyzed using the mixed-logit model. The coefficients of all attributes were significant and positive. Respondents, in-service physicians and medical students, positively value being located in an urban area, having adequate equipment, higher official income, being offered skills development (short-term training), long-term education (specialist training), and free housing. The monetary value that respondents place on different job attributes (willingness-to-pay – WTP) is presented in the table below. The results show significant differences between physicians and medical students: medical students value nonfinancial incentives much more and financial incentives much less than physicians (this is consistent with the findings from the preliminary qualitative work). Medical students are willing to pay VND 31.1 million on average for long-term education (most valued attribute), which is much higher than the VND 5.17 million for doctors. Medical students are willing to pay, on average, VND 15.6 million for adequate equipment compared to VND 4.96 million for doctors. For the other attributes, willingness to pay is not statistically different among doctors and medical students (Vujicic et al., 2010).

Estimated Willingness to Pay for Different Job Attributes

	Doctors			Medical Students		
How much are you willing to pay for …	***WTP ****	***95% Confidence Interval***		***WTP ****	***95% Confidence Interval***	
A Job in Urban Area	7.04	5.34	8.77	28.3	8.3	48.41
Adequate Equipment	4.96	4	5.92	15.6	7.32	23.9
Long-term Education	5.17	4.24	6.11	31.1	15.02	47.22
Skills Development	4.73	3.85	5.63	6.4	-2.44	13.06
Housing	3.16	2.22	4.11	6.2	-5.99	13.07

Source: Vujicic et al., 2010, page 9. ** In VND millions*

The authors estimated the predicted the take up date of rural jobs given a change in one attribute keeping all other attributes constant at the baseline scenario (current urban and rural scenarios in Vietnam). An improvement in the condition of equipment in rural areas increases the predicted take-up rate of rural jobs, compared to the current situation, by 32 percent for both medical students and doctors. The provision of skills development opportunities in rural areas increases the take up by 32 percent for doctors and by 27 percent for medical students, again compared to the baseline scenario. Provision of free housing results in an increase of 29 percent and 27 percent for doctors and students, respectively. As in the WTP estimative, the impact of long-term education varies dramatically between the two groups. For doctors, it is predicted to increase the take-up rate of a rural job by 34 percent and by 42 percent for medical students (Vujicic et al.,

2010). Vujicic and colleagues (2011) divided the sample based on key individuals' characteristics (age, gender, and whether the person grew up in a rural area or not) in order to explore differences among groups of physicians. Taking into account physicians with a rural background, the results show that this group is more willing to be located in a rural area than those with an urban background. Moreover, those who lived in a rural area prior to medical school have a much lower valuation for an urban workplace. Physicians who resided in a village before their medical studies are willing to pay VND 4.69 million to work in an urban area - the WTP estimate for those who resided in towns or cities is VND 8.23 million (Vujicic et al., 2011).

Conclusions: The results provide two interesting insights into the design of retention policies in rural areas in Vietnam. First, the current government salary policy is diluted by the various additional sources of income available to doctors in urban areas (such as dual practice, etc), making rural jobs less attractive. The DCE results provide an estimate of the total pay differential that is required to attract more doctors to rural areas. Second, the magnitude of differences between medical students and doctors provide strong motivation to move away from a uniform approach to specific incentive packages tailored to suit the needs of doctors at different stages of their careers.

4.2 – Liberia Case Study

Background: There is an overall shortage of nurses and certified midwives (CMs) in Liberia. The civil war brought about the total destruction of many health facilities and caused many people, including health workers, to flee the country (Vujicic et al., 2010). The government of Liberia has made significant efforts to reform the health sector and improve access to quality health care. The Basic Package of Health Services (BPHS) is a major strategy. It stipulates the preventive and curative services available at every level of care and includes specific requirements for infrastructure, equipment, drug availability, and human resources necessary to provide the basic package. However, the limited health workforce in the country is a major constraint. According to the 2009 health worker census, there is an average of 1.3 nurses and CMs combined per clinic while the minimum staffing level stipulated by the BPHS is one nurse and one certified midwife. Furthermore, there is major geographic variation in nurse and certified midwife staffing levels, with the largest shortages in rural areas. Evidence demonstrates a general pattern of higher staffing levels in urbanized areas and low staffing levels in more rural, less developed counties (Vujicic et al., 2010). This study focused on nurses and CMs who, together, comprise the majority of health workers in Liberia: 35 percent of the clinical health workforce (Health Worker Census, 2009).

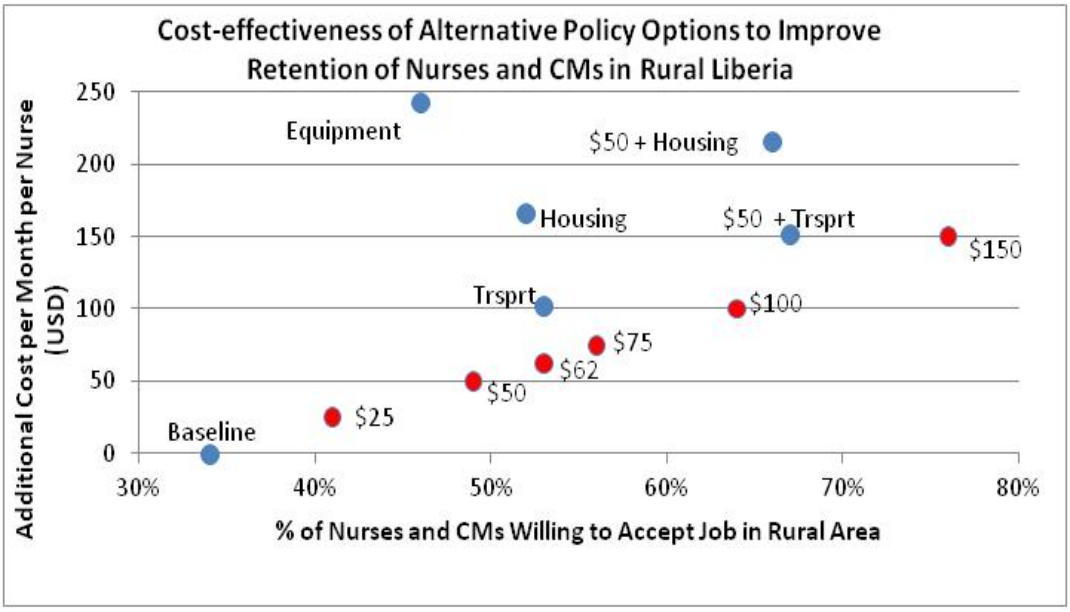
DCE implementation: A DCE was conducted to test how nurses and CMs in Liberia would respond to alternative policies being considered by the ministry of health and social welfare (Vujicic et al., 2010). The first stage of the study consisted in carrying out in-depth interviews with 15 nurses and CM both in rural and urban areas. The objective was to identify the most important job attributes that affect nurse and certified midwife decisions on where to locate. The selection of attributes were guided by three principles (Vujicic et al., 2010): i) the frequency with which respondents mentioned an attribute; ii) making sure attributes were independent of each other (For example it would be inappropriate to include both '*lack of gloves*' and '*on-the-job-risk*' since they partially express the same concern); and iii) the attributes had to be amenable to policy interventions and within the present government capacity to implement. The resulting DCE questionnaire was tested in a sample of nurses, CMs and policy makers. It resulted in changes in the wording of some attributes and revisions to the level of the pay attributes for two reasons: first, the response patterns and feedback from respondents indicated that the pay attribute levels were being set too high, and second, to adapt to a salary that would be affordable for the government. The attribute and attribute levels selected are presented in the table below.

Attribute	Levels
Location	Urban, Rural
Equipment	Adequate, Inadequate
Total Pay	US$ 150, US$ 300, US$ 450, US$ 600
Transportation	Yes, No
Workload	Heavy, Normal
Housing	Yes, No

Source: Vujicic et al., 2010, page 7.

In the survey, the authors allowed individuals to choose their current job over the two jobs presented in the choice set. Initially individuals were asked to choose between two hypothetical jobs in the choice set. Then, they were asked whether they would accept the preferred choice over their current job (Vujicic et al., 2010). Random sampling was used to generate a sample of 220 individuals; this number was decided in order to have a minimum sample of 50 respondents per subgroup of interest (by gender, under or over 35 and those working in Monrovia or not). The final sample size was 197 nurses and CMs (10.9 percent of the Liberia nurse and certified midwife workforce). Face-to-face interviews were conducted over a period of 4 weeks. Data was analyzed using a mixed-logit model.

Results: All estimated coefficients were positive and produced the expected signals. All respondents positively value being located in an urban area, having adequate equipment, having higher pay, having access to transportation and housing, and having a normal workload. In terms of willingness to pay (WTP), nurses and CMs were willing to pay US$ 63 a month for a motorbike and US$ 29 for not having a heavy workload. Housing is valued the second highest at US$ 58 followed by working in an urban location. The authors divided the sample into subgroups to test whether or not the preferences vary across groups (classified by health workers characteristics). Indeed there were significant differences among groups: Nurses and CMs aged 35 or above value an urban location very highly with a (WTP of US$ 141 to be in an urban area) compared to those under 35 (WTP US$ 27 to be in an urban area). Women place a higher value on an urban location compared to men, US$ 79 and US$ 12 respectively. Health workers with some exposure to rural areas, by birth or working experience, value being located in an urban area the least. Women, older nurses, and certified midwives, and those with exposure to rural areas value transportation the most. It may reflect the current state of the transportation infrastructure in rural Liberia (Vujicic et al., 2010). The authors estimated the effect of different policies on the willingness to accept a rural post. With the costs of these policies the authors were able to estimate the cost-effectiveness of each intervention.



Source: Vujicic et al., 2010, page 20.

Under the current baseline scenario in Liberia, the simulations indicate that 34 percent of nurses and CMs would be willing to work in a rural area. By changing different job attribute levels in rural areas, we can get a sense of the relative impact this has on willingness to work in rural areas. For example, if equipment conditions in rural areas change from inadequate to adequate, it is expected that the proportion of nurses and CMs willing to work in a rural area would increase to 46 percent. Taking the cost data into account, the most cost-effective strategy to attract nurses and CMs to rural areas is to increase salaries in rural areas.

A US$ 62 pay increase for a health worker in a rural area is estimated to have the same impact as providing housing or providing transportation. However, the financial bonus costs $62 per person per month compared to an average of US$ 166 for housing and US$ 102 for transportation (Vujicic et al., 2010a). The authors then conclude: If the Ministry of Health and Social Welfare (MOHSW) had an additional US$ 100 to spend per nurse per month on a retention package, the analysis suggests that this money is best spent by providing a US$ 100 financial bonus rather than providing transportation. Improving equipment as an attraction strategy is not cost-effective; however the impact on availability and quality of services delivered has to be considered.

Conclusions: Based on the DCE analysis, the authors propose that the MOHSW consider the following actions for improving recruitment and retention of nurses and CMs in the rural areas of Liberia (Vujicic et al., 2010; 2010b): i) recruiting students from rural areas and exposing them to rural working conditions during their training; ii) increasing pay levels in rural areas as this strategy is likely to be cost-effective; iii) providing

transportation to nurses and certified midwives in rural areas where financial bonuses are not feasible; and iv) the MOHSW should reconsider its plan to construct new on-site housing units for staff as this is not a cost-effective policy.

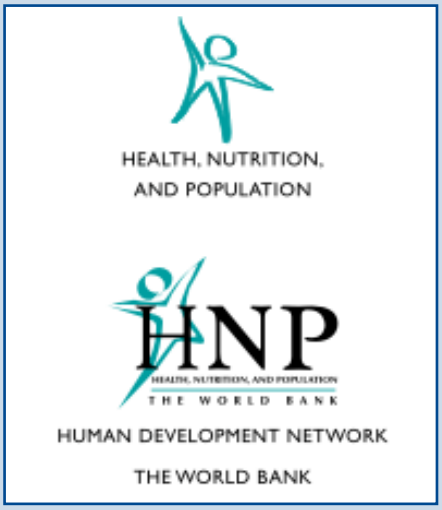
4.3 – India Case Study

Background: India faces significant challenges in attracting qualified health workers to rural and underserved areas. The geographic mal-distribution of health workers in India severely constrains the health system's ability to deliver adequate and quality services to many regions of the country (Rao et al., 2012). The ratio of doctors per 10,000 population is approximately 13.3 in urban areas compared to 3.9 in rural areas; for nurses and midwives this ratio is 15.9 in urban areas and 4.1 in rural areas (Rao et al., 2011). It is estimated that almost 60 percent of health workers in the country live in urban areas (80 percent of the qualified private providers – WHO, 2007) yet 74 percent of the Indian population lives in rural areas (Rao et al., 2009). There have been some efforts to address this issue by State Health Departments. Many of them have implemented efforts to promote rural recruitment and retention. However in most cases these efforts are based on a single incentive (e.g., salary); they are not based on systematic assessment of health workers' needs, and there is little evidence on their effectiveness. The World Bank supported a DCE in India that was conducted by the Public Health Foundation of India (PHFI). The objectives of this study were: i) to examine the relative effect of monetary and non-monetary job attributes on health worker's employment decisions; ii) to design incentive 'packages' based on different combinations of monetary and non-monetary job attributes; and iii) estimate the cost-effectiveness of these incentive packages (Rao et al., 2012).

DCE implementation: The study was conducted in the states of Andhra Pradesh and Uttarakhand. These states were chosen because of the diversity they represented in terms of geography, terrain, size, and capacity to produce doctors and nurses (Rao et al., 2012). Initially, a qualitative study was carried out to inform the design of the DCE questionnaire. A total of 80 in-depth interviews were conducted in the two states with a variety of health workers (medical students, nursing students, in-service doctors and nurses). The study showed that while financial and personal development incentives are considered important, these were not sufficient to attract doctors to rural settings. In general health workers demonstrated frustration with the lack of infrastructure, support-staff and drugs. Additionally, issues such as lack of water, electricity and transport increased dissatisfaction (Rao et al., 2010). Eight attributes were selected based on the frequency with which they were cited in the interviews and from consultation with policy makers on how *actionable* the selected attributes were. The table below describes the attributes and attribute levels used in this study.

Attributes and attribute levels were combined into 16 choice sets according to experimental design techniques. In addition to the DCE choice sets, the questionnaire also collected information on health workers' general background and demographic

characteristics, socio-economic status, work place characteristics, and health worker satisfaction (only for in-service doctors). Prior to data collection, two pilots were carried out. An important finding from the pilots was to give respondents a sheet of attributes to familiarize themselves with the job attributes before handing out the actual questionnaire (Rao et al., 2012). Final questionnaires were translated into local languages. The sample included medical students, nursing students, in-service medical doctors, and nurses. It was divided as follows: Andhra Pradesh included 163 medical students, 145 nursing students, 154 in-service primary care doctors and 187 in-service nurses. In Uttarakhand, the survey was done on 68 in-service primary care doctors and 51 nurses (Rao et al., 2012). A team of seven field workers was involved in the data collection. Data were cleaned and entered into a database. Mixed logit regression was used to analyze responses. All analysis was stratified by students, in-service respondents, medical doctors, and nurses as well as by state.



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