



Toward Development of a Rural Retention Strategy in Lao People's Democratic Republic: Understanding Health Worker Preferences

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INTRODUCTION

As in many developing and developed countries, Lao People's Democratic Republic (PDR) faces challenges in attracting and retaining sufficient numbers and types of human resources for health (HRH) to provide quality services in rural and remote areas. Following on the governmental decree on financial incentives for rural civil servants, the Ministry of Health (MOH) drafted the Health Personnel Development Strategy (HPDS) through 2020 in consultation with key stakeholders to provide a framework and strategic directions to guide the development of an effective workforce that can meet the challenges facing the Lao PDR health system. The aim of the HPDS is to ensure that the health system has health professionals in the required quantity and quality at leadership, managerial, and technical levels, deployed where and when needed, and motivated to perform their functions (Lao PDR MOH 2010).

One of the key pillars of the HPDS is to ensure appropriate incentives for health workers based on the national policy and legal frameworks. The MOH Department of Organization and Personnel (DOP) aims to further articulate the HPDS through development of a national HRH retention strategy, which will describe the implementation of incentives and other interventions to motivate health professionals to work in rural and remote settings. The recent release by the World Health Organization (WHO) of global policy recommendations on rural retention provides timely guidance. These recommendations describe various strategies countries can pursue to increase access to health workers in rural and remote areas through a range of retention interventions covering four main categories: education, regulation, financial incentives, and personal and professional support mechanisms (WHO 2010). As suggested by the global recommendations, due to the complex nature of the social, professional, and economic factors that influence motivation, a bundle or combination of well-selected interventions is needed to make rural postings more attractive to a country's health workers.

Given the large menu of incentive options proposed in the WHO recommendations, as well as those potential interventions described in Lao PDR policy documents, a formal planning process supported by local information on the potential impact of particular interventions is required to determine which incentives or interventions would be most effective in Lao PDR. One important step in the selection process is to estimate which incentives or interventions health workers themselves most prefer. To this end, the MOH, in close partnership with the WHO and *CapacityPlus*, USAID's global health workforce project, conducted a discrete choice experiment (DCE), using *CapacityPlus*'s rural retention survey toolkit, in May 2011. The DCE surveyed health professional students and health workers practicing in rural provinces to investigate their motivational preferences for potential strategies to increase attraction and retention in the country's rural and remote settings. This report presents the results of this survey, which constitute an important input to the policy-making process toward development of a national strategy to increase health worker attraction and retention in rural and remote areas of Lao PDR.

METHODS

Discrete Choice Experiment

The DCE is a rigorous research methodology that can be used to assess the potential effectiveness of different retention interventions. The DCE helps determine the relative importance health workers place on different characteristics or attributes related to employment options and to predict health workers' decision-making using hypothetical choice data. Eliciting health worker preferences for various incentive packages can help determine how health workers may respond to the implementation of future financial and nonfinancial incentives in regards to accepting to practice at health facilities in rural areas. Through the polling process the DCE identifies the trade-offs that health professionals are willing to make between specific job characteristics as well as the probability of accepting a job post. Figure 1 illustrates an example of the job preference pair questions that respondents are posed in a DCE survey. Through statistical analysis of their choice of one job posting over another (Job Posting A vs. Job Posting B) based on the attributes or benefits (e.g., facility quality, career promotion, housing) presented in each hypothetical job scenario, the DCE determines which incentives would motivate health workers. The results of the DCE allow human resources planners and managers to calculate the percentage of health workers who will take a job given certain conditions in order to determine the most appropriate combinations of incentives or other retention interventions.

Figure 1: Example Job Scenario Pair Question from DCE Survey Applied to Nurses/Midwives

Which of these two job postings do you prefer? Select one by marking the circle under the job posting you prefer.

	<u>Job A</u>	<u>Job B</u>
Quality of the facility	Insufficient staff type and number and equipment NOT always available for facility type/level	Sufficient staff type and number and equipment always available for facility type
Career promotion	Directly promoted to permanent staff upon posting in rural facility	Promoted to permanent staff after one year
Housing	Housing allowance provided	No housing provided
Salary	50% additional salary	40% additional salary
Continued education	Qualify for further study and financial support after three years in rural facility	Qualify for further study and financial support after one year in rural facility
Transport	No transport provided	Transport provided for official activity
	<input type="radio"/>	<input type="radio"/>

CapacityPlus has operationalized the DCE methodology through the development of a rural retention survey toolkit designed to quickly allow human resources managers and other stakeholders to determine health workers' motivational preferences. The toolkit consists of a step-by-step guide with instructions and sample formats for conducting a health worker retention survey using the DCE methodology. Through a combination of guided instruction by the CapacityPlus technical assistance team using the toolkit and hands-on experience and skills-

building through application of each step in the DCE process, DOP staff built their capacity in conducting DCEs.

Developing the Survey Instruments

The first step in the DCE process is to select the health worker cadres to be targeted by the survey. The DOP identified four groups: doctors, medical assistants (MA), midlevel nurses/midwives, and low-level nurses/midwives. Both nurses and midwives were included within the midlevel and low-level cadres. In order to determine the appropriate list of job attributes and levels to be included in the DCE survey instrument for each cadre, the team undertook a review of retention literature, held stakeholder discussions, and collected qualitative data. A focus group discussion was held with each cadre with approximately 8-18 members per group to identify the job characteristics or motivational preferences they deemed most important. DOP staff with previous experience in the qualitative methodology facilitated the focus group discussions. Table 1 illustrates the job attributes and levels for each cadre, which were used as inputs to design the survey tool. The survey questionnaires for midlevel and low-level nurses/midwives included the same job attributes and levels.

The team used Sawtooth Software SSI Web Version 7.0.2¹ to develop the job scenario pairs section of the DCE survey instrument. As described earlier, this section posed a series of 12 questions asking respondents to select which of two hypothetical job postings with varying characteristics or benefits they preferred in order to understand which of the factors they consider most important when deciding where they may work. Additionally, the instrument included a series of questions to obtain information on demographics, education, and professional background.

¹ As described in the *CapacityPlus* rural retention survey toolkit, this software package requires a license, which can be purchased from Sawtooth at a reduced rate of USD\$2,500 for humanitarian/nonprofit use.

Table 1: Job Attributes and Levels by Cadre

Attribute	Level	MD	MA	Nurses/Midwives*
Quality of the facility	1. Insufficient staff type and number, equipment NOT always available/working, according to facility type	X	X	
	2. Sufficient staff type and number; equipment always available/working, according to facility type			
Career promotion	1. Promoted to permanent staff after 2 years	X	X	X
	2. Promoted to permanent staff after 1 year			
	3. Directly promoted to permanent staff upon posting			
Housing	1. No housing provision	X	X	X
	2. Housing allowance provided			
	3. Provide dormitory/housing			
Salary	1. No additional salary	X	X	X
	2. 30% additional salary			
	3. 40% additional salary			
	4. 50% additional salary			
Continued education	1. Qualify for further study and scholarship after 3 years	X	X	X
	2. Qualify for further study and scholarship after 2 years			
	3. Qualify for further study and scholarship after 1 year			
Transport	1. No transport provided	X		X
	2. Transport provided for official activity/routine work			
	3. Transport provided for official and personal use			
Children's education	1. No provision for children's education		X	
	2. Support for primary/secondary school fees or special admission into university education			
Award	1. No award			X
	2. Award for high performing nurse (e.g., money, prize)			

*The same attributes and levels were used for midlevel and low-level nurses/midwives.

Sampling

The DCE survey was administered to a sample of two target subgroups from each of the selected cadres:

- Health workers practicing in rural provinces (to address retention): doctors, MAs, midlevel and low-level nurses/midwives
- Students in their final or near to final year of their program (to address attraction): medical, MA, and nursing.

Both health workers and students were included in the sample to address issues of attraction and retention of the health workforce. Strategies focusing on attraction relate to incentives or interventions that motivate graduating health professional students to take up a rural job posting. In this case, the DCE surveyed students of the selected cadres who will soon qualify to become health workers looking for employment. On the other hand, retention strategies incentivize health

providers already working in rural facilities to continue practicing in rural areas, and for this the DCE surveyed currently practicing health workers.

The survey sample drew from three provinces: Luang Prabang, Savannakhet, and Champasak. These particular provinces were selected in order to have one province each from the northern, central, and southern areas of the country; because each has a provincial college providing MA and nursing programs and a provincial hospital serving as a clinical internship site for sixth-year medical students from the University of Health Sciences; and due to geographical distance and feasibility given time, logistical, and financial limitations of the study. To ensure that the provinces were representative of rural environments, many of the districts and facilities included in the sample were located at a considerable distance from the provincial capitals.

The total sample size for the DCE study reached 1,454 respondents, comprised of 484 health workers and 970 students. The breakdown by health worker cadre, student type, and province is presented in Table 2. The final sample size surpassed the original target set at the start of the survey. This resulted from the fact that additional members from some of the health worker cadres and student groups were fairly easy to gather for survey administration in the time allotted at selected facilities in the provinces. On an individual level only the targets set for the samples of MAs and medical students were not achieved.

Table 2: Comparison of Target and Actual Sample Size, by Health Worker Cadre, Student Type, and Province

Province	HW: MD			HW: MA			HW: Midlevel Nurses/Midwives			HW: Low-Level Nurses/Midwives		
	Target	Actual	Rate	Target	Actual	Rate	Target	Actual	Rate	Target	Actual	Rate
Luang Prabang	19	26	137%	32	34	106%	26	39	150%	35	71	203%
Savannakhet	46	45	98%	39	26	67%	39	26	67%	35	43	123%
Champasak	30	34	113%	38	30	79%	37	41	111%	35	69	197%
Vientiane												
TOTAL	95	105	111%	109	90	83%	102	106	104%	105	183	174%

Province	Students: MD			Students: MA			Students: Nurses/Midwives		
	Target	Actual	Rate	Target	Actual	Rate	Target	Actual	Rate
Luang Prabang	20	20	100%	60	111	185%	100	119	119%
Savannakhet	20	25	125%	60	79	132%	100	136	136%
Champasak	20	20	100%	60	90	150%	100	106	106%
Vientiane	360	264	73%						
TOTAL	420	329	78%	180	280	156%	300	361	120%

Group	Target	Actual	Rate
Health workers	411	484	118%
Students	900	970	108%
TOTAL	1311	1454	111%

Table 3 shows the breakdown by year of study of the student sample within each respective health professional program. Medical students included both sixth-year students completing their clinical practice internship at a provincial or Vientiane hospital and fifth-year students attending classes at the University of Health Sciences in Vientiane. Since the MA program had only recently been revived in the country, no students had yet entered into their third and final year. Likewise, some colleges had just reinstated the MA program so only had first-year students. As such, the DCE survey sample included both first- and second-year MA students. The target student population for nurses/midwives was students in their third and final year. As the original target of third-year nursing students was not obtained at some of the provincial colleges, some additional nursing students from earlier years were also included.

Table 3: Student Sample by Year of Study

Year of Study	MD		MA		Nurses/Midwives	
	n	(%)	n	(%)	n	(%)
6 th	127	38.6%	---	---	---	---
5 th	197	59.9%	---	---	---	---
3 rd	---	---	---	---	256	70.9%
2 nd	---	---	176	62.9%	78	21.6%
1 st	---	---	104	37.1%	25	6.9%
Other	5*	1.5%	---	---	2**	0.6%
Total	329	100%	280	100%	361	100%

*Family Medicine I program

**Respondents did not specify their year of study

Data Collection

The data collection team consisted of 15 members from the DOP and the WHO that subdivided into three smaller teams, one per province. Within each province the teams divided into two subteams for data collection activities. Prior to initiating data collection in the field, the team participated in a one-day workshop to be trained in the application of the DCE survey and data collection protocols. All DCE surveys were administered to groups of respondents within a facility meeting room, classroom, or lecture hall using paper-based questionnaires. However, each individual completed the survey independently. The average survey completion time was approximately 20-30 minutes. Data collection occurred over a period of five days during May 2011.

Data Analysis

The data collection teams were responsible for entering the data from their respective provinces in a database template created in Microsoft Excel. The data from all three provinces were merged into individual datasets per cadre and health worker or student categorization, and the data were cleaned twice. The demographic and background data were analyzed using the tab (frequency), means, and standard deviation commands of the statistical analysis package STATA 11.1. Data from nurses and midwives were analyzed together because information that could be used to delineate between these two groups was not collected. The data generated in the DCE job

scenario pair section were analyzed using the mixed logit regression function of the STATA 11.1 program.

FINDINGS

Respondent Demographics and Other Background Information

Descriptive statistics consisting of demographic, professional experience, and other background information on the health worker and student respondents are provided in Tables 4 and 5, respectively. As Table 4 illustrates, the gender of the health workers surveyed was relatively equal among doctors, with 47% males and 53% females, while the majority of the MAs and midlevel and low-level nurses/midwives were female (77%, 85%, and 79%, respectively). The vast majority of health workers were 35 years of age and older in all cadres with the exception of midlevel nurses/midwives, of which more than half (57%) were aged 34 years or less at the time of the study. Given the age distribution of the study population it is not surprising that the majority of the respondents indicated they were married and had children. In terms of religion, most of the health workers were Buddhist (doctors: 91%, MAs: 70%, midlevel nurses/midwives: 83%, low-level nurses/midwives: 60%). Most of the respondents across all cadres were of Lao ethnicity.

Table 4: Descriptive Statistics for Health Worker Respondents, by Cadre

Variable	MD (N=105)		MA (N=90)		Midlevel Nurses/Midwives (N=106)		Low-Level Nurses/Midwives (N=183)	
	n	(%)	n	(%)	n	(%)	n	(%)
Demographics								
Gender					<i>(Missing)</i>		<i>(1)</i>	<i>(0.6%)</i>
Male	49	46.7%	21	23.3%	16	15.1%	37	20.2%
Female	56	53.3%	69	76.7%	90	84.9%	145	79.2%
Age	<i>(Missing)</i>				<i>(2)</i>	<i>(1.9%)</i>	<i>(6)</i>	<i>(3.3%)</i>
18 – 24	1	1.0%	0	0.0%	24	22.6%	0	0.0%
25 – 34	19	18.1%	0	0.0%	36	34.0%	34	18.6%
35 – 44	34	32.4%	48	53.4%	34	32.1%	80	43.7%
45 – 54	46	43.8%	40	44.4%	8	7.5%	46	25.1%
55+	5	4.7%	2	2.2%	2	1.9%	17	9.3%
Marital status								
Single	19	18.1%	9	10.0%	27	25.5%	17	9.3%
Married	86	81.9%	81	90.0%	79	74.5%	166	90.7%
Number of children	<i>(Missing)</i>				<i>(3)</i>	<i>(2.8%)</i>	<i>(2)</i>	<i>(1.1%)</i>
0	20	19.0%	12	13.3%	43	40.6%	18	9.8%
1-2	49	46.7%	38	42.2%	48	45.3%	91	49.7%
3+	36	34.3%	40	44.5%	12	11.3%	72	39.4%
Religion								
Buddhist	95	90.5%	63	70.0%	88	83.0%	110	60.1%
Christian	8	7.6%	26	28.9%	16	15.0%	63	34.4%
Animist	2	1.9%	1	1.1%	1	1.0%	9	4.9%
Other	0	0.0%	0	0.0%	1	1.0%	1	0.5%
Ethnicity								
Lao	92	87.6%	73	81.1%	93	87.7%	135	73.8%
Hmong	4	3.8%	10	11.1%	4	3.8%	25	13.7%
Kmou	2	1.9%	1	1.1%	3	2.8%	10	5.4%
Other	7	6.7%	6	6.7%	6	5.7%	13	7.1%
Lived in rural area ≥1 year since childhood	81	77.1%	71	78.9%	67	63.2%	125	68.3%
Work experience								
Facility type								
Provincial hospital	68	64.8%	12	13.3%	43	40.6%	38	20.8%
District hospital	22	21.0%	47	52.2%	32	30.2%	93	50.8%
Health center	1	0.9%	5	5.6%	22	20.7%	17	9.3%
DHO	14	13.3%	26	28.9%	9	8.5%	34	18.6%
Other	0	0.0%	0	0.0%	0	0.0%	1	0.5%
Years of work experience, mean (SD)	13.5	7.8	20.9	5.5	9.4	9.1	20.2	8.8
Years of work at current facility, mean (SD)	12.3	7.9	20.1	6.1	8.8	8.8	19.5	8.8

More than three-quarters of the doctors (77%) and MAs (79%) surveyed had lived in a rural area for at least one year since childhood while a slightly lower percentage of nurses/midwives (midlevel 63%, low-level 68%) had experienced living in a rural area.

The respondents surveyed worked at all levels of the health system with the greatest percentages of doctors (65%) and midlevel nurses/midwives (41%) located at the provincial hospital while the highest percentage of MAs (52%) and low-level nurses/midwives (51%) worked at the district hospital. The MA and low-level nurses/midwives respondents had the highest average years of work experience (20.9 years and 20.2 years, respectively) compared to doctors (13.5 years) and midlevel nurses/midwives (9.4 years). The vast majority of the respondents had worked at their current health facility for almost the same amount of time they had practiced as a health worker (mean years: MA 20.1, low-level nurses/midwives 19.5, MD 12.3, and midlevel nurses/midwives 8.8).

As shown in Table 5, more than half of the student survey population was female (MD 58%, MA 56%) with the nurses/midwives student group being predominantly female (70%). The majority of the MD and nurses/midwives students (76% and 86%, respectively) were aged 18-24 while the MA students had a wider age range with only about half (52%) between the ages of 18 and 24 and about one-third (36%) aged 35 and over. This may be due to the fact that approximately 39% of the MA students surveyed were in the upgrading program, while the majority of the students in the other health professions were enrolled in the direct entry program. The marital statistics for the student population follow closely with those for age with a high proportion of medical (87%) and nurses/midwives (93%) students who were single as compared with only a little over half (58%) of the MA students. Likewise, almost none of the medical and nurses/midwives students had children while 40% of MA students had one or more children. The majority of students surveyed were Buddhists (MD 83%, MA 79%, nurses/midwives 83%) followed by Animists (MD 13%, MA 15%, nurses/midwives 14%). In terms of ethnicity the majority of those surveyed across all cadres were of Lao ethnic origin (MD 82%, MA 78%, nurses/midwives 84%). On average approximately two-thirds of the students surveyed had lived in a rural area for at least one year since childhood (MD 59%, MA 68%, nurses/midwives 72%).

The vast majority of student respondents paid their own tuition. Only a small percentage were sponsored by the government, with medical students having the highest percentage of support (16%) as compared to MA (6%) and nurses/midwives students (4%). The medical and nurses/midwives students surveyed had limited work experience as a health provider prior to beginning their study program (mean: MD 1.3 years, nurses/midwives 0.7 years). MA students had by far the most work experience with an average of 7.8 years, with 30% of them having worked in a rural area. Less than 10% of the medical and nurses/midwives students with previous experience as a health provider had worked in a rural area. However, a majority of medical (80%) and nurses/midwives (65%) students had conducted an internship or clinical practice in a rural health facility as part of their current study program. Only a quarter (25%) of MA students had participated in rural practice during the program, which may be related to their year of study or enrollment in an upgrading program.

Table 5: Descriptive Statistics for Student Respondents, by Student Type

Variable	MD (N=329)		MA (N=280)		Nurses/Midwives (N=361)	
	n	(%)	n	(%)	n	(%)
Demographics						
Gender	<i>(Missing)</i>		<i>(1)</i>	<i>(0.3%)</i>	<i>(1)</i>	<i>(0.3%)</i>
Male	138	41.9%	122	43.6%	106	29.3%
Female	190	57.8%	158	56.4%	254	70.4%
Age	<i>(Missing)</i>		<i>(1)</i>	<i>(0.4%)</i>	<i>(4)</i>	<i>(1.1%)</i>
18 – 24	250	76.0%	147	52.3%	310	85.9%
25 – 34	50	15.2%	31	11.1%	39	10.8%
35 – 44	27	8.2%	66	23.6%	7	1.9%
45 – 54	2	0.6%	34	12.2%	1	0.3%
55+	0	0.0%	1	0.4%	0	0.0%
Marital status	<i>(Missing)</i>		<i>(4)</i>	<i>(1.4%)</i>		
Single	285	86.6%	160	57.2%	336	93.1%
Married	44	13.4%	116	41.4%	25	6.9%
Number of children	<i>(Missing)</i>		<i>(1)</i>	<i>(0.3%)</i>	<i>(2)</i>	<i>(0.7%)</i>
0	297	90.3%	167	59.6%	347	96.1%
1-2	27	8.2%	61	21.8%	11	3.1%
3+	4	1.2%	50	17.9%	3	0.8%
Religion						
Buddhist	274	83.3%	220	78.6%	301	83.4%
Animist	44	13.4%	43	15.3%	50	13.8%
Christian	8	2.4%	15	5.4%	10	2.8%
Other	3	0.9%	2	0.7%	0	0.0%
Ethnicity						
Lao	271	82.4%	218	77.8%	302	83.7%
Hmong	37	11.2%	24	8.6%	18	5.0%
Kmou	8	2.4%	26	9.3%	25	6.9%
Other	13	4.0%	12	4.3%	16	4.4%
Lived in rural area ≥1 year since childhood	194	59.0%	189	67.5%	259	71.7%
Study program and work experience						
Program	<i>(Missing)</i>		<i>(1)</i>	<i>(0.3%)</i>	<i>(2)</i>	<i>(0.7%)</i>
Direct Entry	296	90.0%	169	60.4%	309	85.6%
Upgrading	32	9.7%	109	38.9%	47	13.0%
Form of tuition payment	<i>(Missing)</i>		<i>(2)</i>	<i>(0.7%)</i>		
Sponsored by government of Laos	53	16.1%	17	6.1%	13	3.6%
Sponsored by NGO	6	1.8%	11	3.9%	11	3.1%
Self-pay or family assistance	269	81.8%	247	88.2%	337	93.3%
Other	1	0.3%	3	1.1%	0	0.0%
Work as HW before, years: <i>mean (SD)</i>	1.3	4.0	7.8	10.2	0.7	3.0
Work as rural HW prior to program	32	9.7%	84	30.0%	24	6.7%
Rural internship during program	263	79.9%	70	25.0%	233	64.5%

Willingness to Work in Rural Areas

Prior to initiating the job pair scenario section of the DCE survey, student respondents were asked if they would consider working in a rural area if the government of Lao PDR provided

incentives or other motivational factors. The question was slightly revised for health workers to ask if they would consider continuing to work in a rural area if the government were to provide a package of incentives. As Table 6 illustrates, the majority of respondents expressed willingness to work in a rural area should incentives be made available. More than 90% of students in all groups said they would consider rural work while the percentage of health workers (all then currently practicing in rural provinces) who would continue in their rural posting if given incentives was somewhat less (varying from 78% for MDs and MAs to 83% and 69% for midlevel and low-level nurses/midwives, respectively).

Table 6: Willingness to Work in Rural Area with Incentives, by Respondent Type

Respondent	Willingness to Work in Rural Area if Provided Incentive Package	
	n	(%)
Doctor (N=105)	82	78.1
Medical Student (N=329)	301	91.5
MA (N=90)	70	77.8
MA Student (N=280)	257	91.8
Midlevel Nurses/Midwives (N=105)	87	82.9
Low-level Nurses/Midwives (N=183)	126	68.9
Nurses/Midwives Student (N=361)	343	95.0

In the demographics and background portion of the survey the respondents identified the most important factor in their decision to work in a rural area (in the case of students) or to continue working in a rural area (in the case of health workers). Multiple responses to this question were not permitted. Table 7 presents the motivational factors and the percentage of each respondent group who provided that response. All respondent groups ranked support for further study among the highest of the six factors or incentives presented in the survey, and in most cases as the top factor selected. The other prominent motivational factors included accelerated career promotion, quality of the facility in terms of sufficient type and number of staff and available equipment, and increased salary. Interestingly, across each cadre both health workers and students selected the exact same top three motivational factors (although they varied with regard to which received the highest percentage of responses), with the one exception of increased salary versus accelerated career promotion for MA respondents.

Table 7: Most Important Factor in Decision to Work in Rural Area, by Respondent Type

Note: Question was from demographics and background section of survey; only one response was allowed

Priority Factor (Respondents could only select one)	MD				MA				Nurses/Midwives					
	HW (N=105)		Student (N=329)		HW (N=90)		Student (N=280)		Midlevel (N=105)		Low-Level (N=183)		Student (N=361)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Accelerated career promotion	28	26.7	56	17.0	12	13.3	47	16.8	16	15.1	27	14.7	128	35.4
Facility has sufficient staff, equipment available	20	19.1	57	17.3	26	28.9	31	11.1	---	---	---	---	---	---
Housing provision	2	1.9	8	2.4	3	3.3	9	3.2	2	1.9	7	3.8	13	3.6
Increased salary	18	17.1	20	6.1	19	21.1	23	8.2	16	15.1	42	23.0	29	8.0
Qualify for further study and scholarship	25	23.8	167	50.8	16	17.8	130	46.4	65	61.3	75	41.0	167	46.3
Children's education support*	---	---	---	---	13	14.5	27	9.7	---	---	---	---	---	---
Performance award**	---	---	---	---	---	---	---	---	1	0.9	3	1.6	6	1.7
Transport: official/personal use	5	4.8	7	2.1	---	---	---	---	4	3.8	26	14.2	10	2.8
Other	7	6.6	14	4.3	1	1.1	11	3.9	0	0.0	2	1.1	5	1.4
Missing responses	0	0.0	0	0.0	0	0.0	2	0.7	2	1.9	1	0.6	3	0.8

*Defined as support for children's primary/secondary school fees or children receive special admission into university

**Receive an award (i.e., money, prize) for high performance

Preferences for Rural Attraction and Retention Strategies

Weighted Preference Ranking

The raw output from statistical regression models of the DCE job scenario data are presented in the appendix Tables 12-14 by cadre showing the results for health workers and students combined. These outputs were used to determine the weighted preference ranking of each job attribute for the grouping of health workers and students within a cadre (Table 8). The weighted preference ranking not only provides a priority ranking order of respondents' preferences for the job attributes or factors surveyed, but more importantly shows how much more respondents favor the most preferred attribute to all the others—i.e., the "weight" or value they place on an attribute when compared to the other factors.

The weighted ranking is determined by comparing the mean coefficients resulting from the mixed logit regression analysis of the job scenario pairs section and ordering them from the most preferred attribute (highest mean coefficient) to the least preferred (lowest mean coefficient). Table 8 illustrates the weighted ranking of job attributes in order of highest to least mean coefficient value.

Table 8: Weighted Ranking of Incentives from Highest to Least Mean Coefficient, by Respondent Type

Note: The data below represent the results from the job scenario pairs section of the DCE survey

Medical Doctors		Medical Assistants		Nurses/Midwives	
Job Attribute	Coefficient	Job Attribute	Coefficient	Job Attribute	Coefficient
Increase salary by 50%	1.10608	Increase salary by 50%	1.017595	Increase salary by 50%	0.93039
Qualify for further study and scholarship after 1 year	0.9279915	Increase salary by 40%	0.814076	Increase salary by 40%	0.744312
Increase salary by 40%	0.884864	Support for children's education	0.8040558	Promote to permanent staff upon posting	0.6839065
Provide transport for official and personal use	0.7776597	Increase salary by 30%	0.610557	Provide transport for official and personal use	0.5862543
Promote to permanent staff directly upon posting	0.6911337	Qualify for further study & scholarship after 1 year	0.5896809	Increase salary by 30%	0.558234
Provide transport for work	0.6857288	Qualify for further study & scholarship after 2 years	0.4469021	Provide housing	0.5281613
Increase salary by 30%	0.663648	Provide housing	0.3998500	Provide transport for work	0.5040759
Provide an allowance for housing	0.6613072	Ensure sufficient staff type/number; equipment	0.3998500	Promote to permanent staff after 1 year	0.4452464
Provide housing	0.6590841	Provide an allowance for housing	0.3273572	Qualify for further study & scholarship after 1 year	0.4239137
Qualify for further study & scholarship after 2 years	0.5214688	Promote to permanent staff after 1 year	0.1864198	Provide an allowance for housing	0.4212149
Ensure sufficient staff type/number; equipment	0.4621432	Promote to permanent staff upon posting	0.1190612	Give award for high performance	0.4149719
Promote to permanent staff after 1 year	0.4530914			Qualify for further study & scholarship after 2 years	0.3079756

The weighted rankings in Table 8 illustrate the differences across cadres in terms of preferences for incentives that motivate health workers to work in rural and remote settings. Medical doctors and medical assistants rated opportunities and support for further study very high while doctors and nurses/midwives placed high value on being promoted to permanent staff upon posting. Both doctors and nurses/midwives had high preference for the provision of transport, whether only for work or for both official and personal use (note: the survey for MAs did not include transport as this attribute did not rank high during the focus group discussions). Medical assistants valued support for their children's education as a priority incentive. All cadres ranked housing as an important incentive.

Naturally, salary is also an important motivation factor for health workers. The degree to which salary influenced the health workers' preferences depended on the percentage of the salary increase. All cadres placed the highest preference on a 50% salary increase. A 40% increase ranked second among MAs and nurses/midwives and third for doctors. A 30% salary increase, while still highly valued for doctors and nurses/midwives, ranked below other incentives, such as career promotion and transport.

Predicted Preference Impact Measure

The raw output from the mixed logit analysis models was also used to estimate the predicted preference impact for each cadre for the different potential packages of retention incentives or interventions presented in Tables 9-11. Student and health worker data were pooled within each cadre for the analyses presented in these tables. The preference impact measure estimates what percentage of the cadre population would prefer a job posting that offers the presented package of incentives to other available jobs that do not have those benefits. In other words, the preference impact measure looks at how the probability of selecting a given post changes as the attributes and levels of those attributes change (Ryan et al. 2011). The preference impact measure assists stakeholders in determining which incentives and in what specific combination will be the most attractive to health workers and will more likely motivate them to work in rural and remote areas.

Each retention intervention package in Tables 9-11 is presented with preference impact values for the four levels of potential salary increase—0%, 30%, 40%, and 50%—included in the DCE survey instrument and are listed in order of highest preference to lowest preference (using the preference impact percentage for the 0% salary to order each package). Additionally, preference impact measures for each retention strategy package are provided for the overall cadre sample as well as separated by male and female. The discussion below of results describes those for the overall sample (males and females combined). A separate discussion of results from the gender perspective is also included. The tables propose a number of potential combinations of incentives and illustrate that by changing the salary or swapping one incentive for another. The percent of the cadre motivated by that specific combination will increase or decrease to varying degrees. In addition to the particular combinations of incentives included in the tables, there are many others that may be proposed if they are of interest to the stakeholders.

In each of the tables the most preferred package of incentives for each cadre is listed first with the subsequent combinations of incentives appearing in decreasing order of desirability, as expressed by the respondents' selection of preferred posting in the job pair scenario section of the DCE survey. For doctors the most preferred package of interventions includes career promotion to permanent staff directly upon posting, transport for both personal and official use, scholarship for further study after one year in post, and housing. Even with no salary increase this combination of incentives is preferred by 93.5% of doctors. For MAs and nurses/midwives to reach a preference impact near 90% (at the base 0% salary increase level), all possible incentives in the DCE survey needed to be included. For doctors, a combination of fewer incentives (Packages 1 and 2) was required to exceed a 90% preference impact percentage.

It is important to note that at some levels of preference impact, increasing the salary only improves the preference by a small margin. As seen in Tables 9-11, the higher the preference impact percentage at the 0% salary level, the less difference increasing the salary level has on the preference impact. For example, while Package 2 for medical doctors is preferred by 93.0% at the 0% salary increase level, the preference only rises slightly to 96.1% with a 30% salary increase. There is little value added in terms of a three-point rise in preference while the cost of providing a 30% salary increase to the cadre would be very high. However, as the preference impact percentage for a proposed package goes down, increasing the salary level has a much greater impact on the desirability of the retention strategy. For example, sample packages with a preference impact measure of less than 80% at the 0% salary increase level rise approximately ten points when the salary is raised by 30%. In these cases raising the salary makes a less desirable retention strategy much more appealing to a broader percentage of the cadre population. However, the value added as compared to cost is still an important consideration in the lesser preferred packages. While a salary increase from 0% to 30% does have a result, the difference in favorability of the packages when the salary increases from 30% to 40% or from 40% to 50% is very slight for all combinations of incentives presented.

The differences in the components of each respective package allow stakeholders to see how great an impact one component over another can have or how altering one level within a specific incentive can result in a large or small change in preference. For example, the difference in preference impact measures between the combination in Packages 8 and 10 for MAs (Table 10) illustrates that providing support for further study after one year in a post (80.1%) with no additional salary is slightly more desirable than if the opportunity for continuing education is offered after two years in a job (77.7%). While this variation may be small, the implications for the Ministry of Health in having to provide study support to a health worker sooner while also covering the health worker's services while on study leave can be great.

In each table there are one or two incentives that particularly skew how favorable a package is considered by members of that cadre. In the case of MAs the most effective intervention is to provide for children's primary or secondary school fees or give their children special admission into university. If this were the only incentive offered, almost 70% of MAs would be interested in taking the job posting (Table 10). If the salary is increased by 30%, then the percentage of MAs willing to take the job rises to 80% while 40% and 50% salary raises garner a few more interested members. In the case of nurses/midwives two incentives hold more weight—promotion to permanent staff and transport. Providing a combination of these incentives at their varying levels (promotion after one year or directly upon posting or transport only for work or for both official and personal use) attracts approximately three-quarters of the nurses/midwives cadre. Depending on the promotion time frame or allowable uses of the vehicle, the percentage goes up or down a few points from the 75% mark. Transport was also a key factor for doctors in addition to scholarships for continuing education. A package of the two incentives of continuing education after only one year in a job posting combined with transport for official and personal use, with no additional salary, would attract a high majority (83%) of doctors. Allowing the vehicle only for work purposes would only diminish the percentage interested in the job posting to 82%.

Motivational Preferences from a Gender Perspective

As mentioned above, Tables 9-11 also illustrate the differences in preference between males and females for the various retention strategy packages. In general the largest difference in motivational preference (at the 0% salary level) is seen in the nurses/midwives cadre (Table 11) where the variation in uptake probability for each package is considerable. The packages with more substantial differences between male and female preferences are noted in bold. In some cases female nurses/midwives prefer the combined incentives 10 to 11 percentage points higher (i.e., Packages 4, 7 and 11) while the lowest variation is approximately 5 percentage points (Package 14). However, as the salary incentive is increased within a given retention package, the difference between male and female preferences goes down.

The least variation between males and females for the different combinations of motivational packages to work in rural areas was found in the MA cadre (Table 10). The average difference in percentage points between men and women was 2.2 with a range of 0.1 (Package 11) to 3.9 (Package 12). Unlike the nurses/midwives cadre, increasing the salary level does not necessarily lower the disparity between the two genders—in about a third of the packages raising the salary slightly widens the gap between male and female MAs.

The difference in motivational preferences for male and female doctors (Table 9) is the most similar to the MAs with an average variation in preference for a given retention package of 3.3 percentage points with a range of 0.1 (Package 11) to a maximum of 9 percentage points (Package 14). As the salary level within a retention package increases, the difference between male and female preferences decreases.

Table 9: Predicted Preference Impact of Retention Strategy Packages for Medical Doctors
*Results are based on surveys with medical doctors (N=105) and medical students (N=329), comprised of 187 males and 246 females**

Potential Retention Strategy	Salary Increase	Medical Doctor			
		0%	30%	40%	50%
Package 1					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use		93.5%	96.5%	97.1%	97.7%
Provide scholarship for further study after 1 year					
Provide housing					
	Male	91.8%	95.5%	96.3%	97.0%
	Female	94.7%	97.2%	97.7%	98.2%
Package 2					
Promote to permanent staff directly upon posting					
Provide transport for official use		93.0%	96.1%	96.8%	97.4%
Provide scholarship for further study after 1 year					
Provide housing					
	Male	91.5%	95.3%	96.2%	96.9%
	Female	94.3%	97.0%	97.6%	98.0%
Package 3					
Provide transport for official use					
Provide scholarship for further study after 1 year		89.3%	94.1%	95.2%	96.1%
Provide housing					
	Male	86.9%	92.6%	93.9%	95.0%
	Female	91.4%	95.5%	96.4%	97.1%
Package 4					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use		87.2%	92.8%	94.1%	95.2%
Provide allowance for housing					
	Male	86.0%	92.0%	93.5%	94.7%
	Female	87.9%	93.3%	94.6%	95.6%
Package 5					
Provide transport for official and personal use					
Provide scholarship for further study after 1 year		86.6%	92.3%	93.6%	94.8%
Improve facility quality (staff number/type & equipment/supplies)					
	Male	84.1%	90.4%	92.0%	93.3%
	Female	88.5%	93.6%	94.8%	95.8%
Package 6					
Promote to permanent staff directly upon posting					
Provide transport for official use		85.8%	91.9%	93.3%	94.5%
Provide housing					
	Male	83.9%	90.8%	92.4%	93.8%
	Female	87.7%	93.2%	94.5%	95.6%
Package 7					
Provide scholarship for further study after 1 year		83.4%	90.5%	92.2%	93.7%
Provide transport for official and personal use					
	Male	82.1%	89.6%	91.5%	93.0%
	Female	84.5%	91.4%	93.0%	94.3%

Potential Retention Strategy	Medical Doctor				
	Salary Increase	0%	30%	40%	50%
Package 8					
Provide transport for official use		82.1%	89.7%	91.5%	93.1%
Provide scholarship for further study after 1 year					
	Male	81.4%	89.2%	91.1%	92.7%
	Female	83.2%	90.6%	92.4%	93.9%
Package 9					
Promote to permanent staff directly upon posting					
Provide transport for official use		81.7%	88.8%	90.7%	92.2%
Improve facility quality (staff number/type & equipment/supplies)					
	Male	80.3%	87.8%	89.8%	91.5%
	Female	83.1%	90.2%	91.9%	93.4%
Package 10					
Provide transport for official and personal use					
Provide scholarship for further study after 2 years		78.4%	87.6%	89.8%	91.6%
	Male	76.6%	86.3%	88.7%	90.7%
	Female	79.9%	88.8%	90.9%	92.6%
Package 11					
Promote to permanent staff directly upon posting					
Provide transport for official use		77.1%	86.2%	88.5%	90.5%
	Male	77.5%	86.7%	89.0%	90.9%
	Female	77.4%	86.7%	89.0%	91.0%
Package 12					
Provide transport for official use					
Provide scholarship for further study after 2 years		76.8%	86.5%	88.9%	90.9%
	Male	75.8%	85.8%	88.3%	90.4%
	Female	78.1%	87.8%	90.1%	92.0%
Package 13					
Provide scholarship for further study after 2 years					
Provide allowance for housing		76.5%	86.3%	88.7%	90.8%
	Male	73.5%	84.1%	86.8%	89.1%
	Female	78.7%	88.2%	90.4%	92.2%
Package 14					
Provide scholarship for further study after 2 years					
Provide housing		76.0%	85.9%	88.4%	90.4%
	Male	71.1%	82.4%	85.3%	87.8%
	Female	80.1%	89.0%	91.1%	92.8%
Package 15					
Provide scholarship for further study after 1 year					
	Male	70.6%	82.0%	84.9%	87.5%
	Female	69.6%	81.0%	84.1%	86.7%
	Female	72.2%	83.4%	86.3%	88.7%

*One doctor did not answer the survey question on gender.

Table 10: Predicted Preference Impact of Retention Strategy Packages for Medical Assistants
Results are based on surveys with MAs (N=90) and MA students (N=280), comprised of 143 males and 227 females

Potential Retention Strategy	Salary Increase	Medical Assistants (MA)			
		0%	30%	40%	50%
Package 1					
Provide support for children's education					
Provide scholarship for further study after 1 year					
Provide housing		91.1%	95.0%	95.8%	96.6%
Improve facility quality (staff number/type & equipment/supplies)					
Promote to permanent staff after one year					
	Male	85.1%	90.3%	91.6%	92.8%
	Female	87.6%	92.4%	93.6%	94.7%
Package 2					
Provide support for children's education					
Provide scholarship for further study after 1 year					
Provide housing		89.4%	94.0%	95.0%	95.9%
Improve facility quality (staff number/type & equipment/supplies)					
	Male	83.6%	89.3%	90.8%	92.1%
	Female	85.8%	91.2%	92.6%	93.8%
Package 3					
Provide support for children's education					
Provide scholarship for further study after 1 year					
Provide housing		87.1%	92.6%	93.9%	94.9%
Promote to permanent staff directly upon posting					
	Male	81.3%	87.6%	89.2%	90.7%
	Female	82.1%	88.5%	90.2%	91.6%
Package 4					
Provide support for children's education					
Provide scholarship for further study after 1 year					
Provide housing		85.7%	91.7%	93.1%	94.3%
	Male	81.0%	87.5%	89.2%	90.8%
	Female	82.1%	88.8%	90.5%	92.0%
Package 5					
Provide support for children's education					
Provide housing					
Improve facility quality (staff number/type & equipment/supplies)		84.1%	90.7%	92.3%	93.6%
Promote to permanent staff directly upon posting					
	Male	77.5%	84.7%	86.7%	88.5%
	Female	78.7%	85.9%	87.9%	89.6%
Package 6					
Provide support for children's education					
Provide scholarship for further study after 2 years					
Provide housing		83.9%	90.6%	92.2%	93.5%
	Male	80.0%	87.0%	88.8%	90.4%
	Female	80.4%	87.6%	89.5%	91.1%

Potential Retention Strategy	Medical Assistants (MA)				
	Salary Increase	0%	30%	40%	50%
Package 7					
Provide support for children's education					
Provide allowance for housing					
Improve facility quality (staff number/type & equipment/supplies)		83.1%	90.1%	91.7%	93.2%
Promote to permanent staff directly upon posting					
	Male	74.6%	82.3%	84.5%	86.5%
	Female	78.6%	85.8%	87.7%	89.5%
Package 8					
Provide support for children's education					
Provide scholarship for further study after 1 year		80.1%	88.1%	90.1%	91.8%
	Male	74.2%	82.5%	84.8%	86.9%
	Female	77.3%	85.4%	87.5%	89.4%
Package 9					
Provide support for children's education					
Improve facility quality (staff number/type & equipment/supplies)		78.0%	86.7%	88.9%	90.8%
Promote to permanent staff directly upon posting					
	Male	70.3%	79.1%	81.6%	83.9%
	Female	73.9%	82.2%	84.5%	86.6%
Package 10					
Provide support for children's education					
Provide scholarship for further study after 2 years		77.7%	86.5%	88.7%	90.6%
	Male	72.8%	81.7%	84.2%	86.3%
	Female	75.3%	83.9%	86.2%	88.3%
Package 11					
Provide support for children's education					
Provide housing		76.9%	86.0%	88.3%	90.2%
	Male	73.3%	82.0%	84.4%	86.5%
	Female	73.4%	82.5%	84.9%	87.1%
Package 12					
Provide support for children's education					
Improve facility quality (staff number/type & equipment/supplies)		75.9%	85.3%	87.7%	89.7%
	Male	69.3%	78.7%	81.3%	83.8%
	Female	73.2%	82.2%	84.6%	86.8%
Package 13					
Provide support for children's education					
Provide allowance for housing		75.6%	85.1%	87.5%	89.6%
	Male	69.8%	79.1%	81.7%	84.1%
	Female	73.2%	82.3%	84.7%	86.9%
Package 14					
Provide scholarship for further study after 1 year					
Provide housing		75.2%	84.8%	87.2%	89.3%
Promote to permanent staff directly upon posting					
	Male	72.9%	81.6%	84.0%	86.1%
	Female	71.7%	81.5%	84.1%	86.5%
Package 15					
Provide support for children's education					
Promote to permanent staff directly upon posting		71.6%	82.3%	85.0%	87.4%
	Male	65.9%	75.8%	78.7%	81.3%
	Female	68.5%	78.1%	80.8%	83.3%

Potential Retention Strategy	Medical Assistants (MA)				
	Salary Increase	0%	30%	40%	50%
Package 16					
Provide support for children's education		69.1%	80.4%	83.5%	86.1%
	Male	64.6%	75.2%	78.3%	81.0%
	Female	67.3%	77.8%	80.7%	83.3%
Package 17					
Provide housing					
Promote to permanent staff directly upon posting		62.7%	75.6%	79.1%	82.3%
	Male	62.9%	73.9%	77.1%	80.0%
	Female	60.2%	72.2%	75.8%	79.0%
Package 18					
Provide allowance for housing					
Promote to permanent staff directly upon posting		61.0%	74.2%	77.9%	81.2%
	Male	58.9%	70.3%	73.7%	76.8%
	Female	60.2%	72.1%	75.6%	78.8%

Table 11: Predicted Preference Impact of Retention Strategy Packages for Nurses/Midwives
*Results are based on surveys with midlevel nurses/midwives (N=106), low-level nurses/midwives (N=183), and nurse/midwife students (N=361), comprised of 159 males and 489 females**

Potential Retention Strategy	Salary Increase	Nurses/Midwives			
		0%	30%	40%	50%
Package 1					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use					
Provide housing		93.3%	96.1%	96.7%	97.3%
Provide scholarship for further study after 1 year					
Give award for high performance					
	Male	83.0%	87.8%	89.1%	90.3%
	Female	90.4%	94.0%	94.9%	95.7%
Package 2					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use					
Provide housing		90.2%	94.2%	95.1%	95.9%
Provide scholarship for further study after 1 year					
	Male	79.4%	85.1%	86.7%	88.2%
	Female	88.0%	92.5%	93.6%	94.6%
Package 3					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use					
Provide housing		90.1%	94.1%	95.1%	95.9%
Give award for high performance					
	Male	79.9%	85.5%	87.1%	88.5%
	Female	86.9%	91.7%	92.9%	93.9%
Package 4					
Promote to permanent staff directly upon posting					
Provide transport for official use					
Provide housing		89.5%	93.7%	94.7%	95.6%
Provide scholarship for further study after 1 year					
	Male	76.9%	83.1%	84.9%	86.5%
	Female	87.6%	92.3%	93.5%	94.5%
Package 5					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use					
Provide scholarship for further study after 1 year		89.2%	93.5%	94.5%	95.4%
Give award for high performance					
	Male	77.7%	83.6%	85.3%	86.8%
	Female	85.8%	90.9%	92.2%	93.4%
Package 6					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use		85.8%	91.3%	92.7%	93.9%
Provide housing					
	Male	75.5%	82.3%	84.2%	86.0%
	Female	83.6%	89.5%	91.1%	92.4%

Potential Retention Strategy	Nurses/Midwives				
	Salary Increase	0%	30%	40%	50%
Package 7					
Promote to permanent staff directly upon posting					
Provide transport for official use		84.8%	90.7%	92.1%	93.4%
Provide housing					
	Male	72.6%	79.9%	82.0%	84.0%
	Female	83.2%	89.3%	90.8%	92.2%
Package 8					
Promote to permanent staff directly upon posting					
Provide transport for official and personal use		84.4%	90.5%	92.0%	93.2%
Provide allowance for housing					
	Male	75.7%	82.4%	84.3%	86.0%
	Female	81.9%	88.3%	90.0%	91.5%
Package 9					
Promote to permanent staff directly upon posting					
Provide transport for official use		83.2%	89.7%	91.3%	92.6%
Give award for high performance					
	Male	70.8%	78.1%	80.2%	82.2%
	Female	80.5%	87.2%	89.0%	90.5%
Package 10					
Provide transport for official use					
Provide scholarship for further study after 1 year		81.1%	88.2%	90.0%	91.6%
Provide housing					
	Male	73.1%	80.3%	82.4%	84.3%
	Female	81.0%	88.2%	90.0%	91.6%
Package 11					
Promote to permanent staff directly upon posting					
Provide transport for official use		76.6%	85.1%	87.4%	89.3%
	Male	64.6%	73.3%	75.9%	78.3%
	Female	75.8%	83.9%	86.2%	88.1%
Package 12					
Promote to permanent staff after 1 year in post					
Provide transport for official and personal use		73.7%	83.1%	85.5%	87.7%
	Male	67.6%	76.5%	79.1%	81.4%
	Female	74.7%	83.9%	86.3%	88.4%
Package 13					
Promote to permanent staff after 1 year in post					
Provide housing		72.6%	82.2%	84.8%	87.0%
	Male	65.4%	74.6%	77.2%	79.7%
	Female	73.7%	83.2%	85.7%	87.9%
Package 14					
Promote to permanent staff after 1 year in post					
Provide allowance for housing		70.4%	80.6%	83.4%	85.8%
	Male	65.7%	74.7%	77.3%	79.8%
	Female	71.0%	81.3%	84.0%	86.4%

*Two nurses/midwives did not answer the survey question on gender

CONCLUSIONS AND RECOMMENDATIONS

The findings from the DCE survey suggest that there may be a number of effective strategies to attract and retain health workers in rural and remote areas of Lao PDR. Both students and health workers expressed willingness to take jobs in rural areas if the postings were made more attractive. The motivational preferences expressed by the survey respondent population indicate specific interventions that if implemented appropriately would likely increase the number of health workers willing to work in rural settings.

While the DCE data cannot be merged across cadres to calculate preference impact measures for all health worker cadres combined, the individual cadre results provide insight as to what incentives or interventions may be preferred by all. While salary was important to all cadres, it is notable that when a combination of other highly valued interventions was offered, such as career promotion and study opportunities, salary became less of an issue. This finding is consistent with recent literature, which contends that increasing salary alone is not enough to motivate health workers to work in rural and remote areas—a bundle of appropriate incentives is needed. Opportunities for further study and housing were important motivational factors across all three cadres. Transport ranked very high with doctors and nurses while support for children’s education was extremely valuable to MAs. Although career promotion was highly preferred by doctors and nurses, it received little weight by MAs when compared to other proposed incentives. As such, career promotion incentives in a retention strategy may not entice MAs to take a rural posting. Of course, given that a strategy must include an effective combination and not a single intervention, the other incentives mentioned above would satisfy their preferences to a large degree.

On average the likelihood for a retention package to be attractive to both male and female doctors and MAs was higher than for the nurses/midwives cadre. Because substantially more female nurses/midwives preferred the potential packages of incentives than their male counterparts, the MOH may need to contend with the fact that on average fewer male nurses/midwives will be attracted by a rural retention strategy.

The decision regarding which incentives or interventions to include in a national retention strategy needs to be determined by stakeholders based on political and economic feasibility. A key factor in the decision-making process should focus on the capacity to deliver on the selected incentives or interventions. For example, to provide opportunities for further study after one to three years in the posting, not only is funding required for the scholarships, but there must be adequate capacity in the educational institutions as well as a plan to substitute for the health worker while on study leave to avoid interruption in health services at the health facility. Likewise, to promote a health worker to a permanent staff position upon posting or within one or two years, there must not only be enough funding in the health sector budget to pay the associated salary and benefits but there must be adequate positions or quotas in the wage bill. These examples illustrate the level of policy implications that must be taken into account when determining the components and other considerations to be included in the national retention strategy.

Similarly, if the incentives in the final retention package selected for implementation vary from the incentives to which the survey participants responded (and the way they were understood by respondents), participants' motivational preferences and willingness to take a rural job posting may also vary and therefore not match the original DCE results. For example, if the respondents understood the continuing education incentive as qualifying for and receiving training after one, two, or three years in a rural post, but in the end the incentive becomes *eligibility* for paid training because of financial and logistical feasibility, then it should be recognized that the health workers' preferences for the package may be lower than what the DCE results estimated. Regardless of the incentives or interventions that will comprise the retention strategy, a critical component will be the functioning of the human resources management (HRM) systems. To ensure appropriate and consistent implementation of a national retention strategy, a comprehensive approach for HRM systems strengthening is required. This includes having strong HRH planning skills and effective HR information systems to keep track of how many health workers are practicing in rural and remote areas and the schedule for when they are due to receive their particular incentives. Smooth and consistent implementation of retention interventions that ensure that the right health workers are getting the right incentives requires efficient management and monitoring of all HRH processes. When health workers continue to receive rural service benefits even after moving to an urban facility it distorts the incentive system and causes a reduction in its motivational potential. Delays in receiving agreed upon benefits will only serve to foster lack of confidence in the health system and further demotivate health workers, making it less likely that future efforts to attract and retain health workers in rural areas will be successful. As such, it is important that prior to initiating implementation of a retention strategy an assessment of the HRM systems is undertaken to identify specific areas for improvement and to obtain technical assistance should it be needed to strengthen HRM systems at national and/or provincial levels.

While these data clarify student and health worker motivational preferences for attraction and retention interventions in rural and remote areas of Lao PDR, they do not provide information on how much it will cost the MOH to pursue these strategies. Without knowing the financial implications of any of the potential packages of retention incentives or interventions it will be difficult to speak of the economic feasibility of the national retention strategy. For this information, a formal costing exercise will be required. As requested by the MOH, *CapacityPlus* will assist the MOH to conduct a costing exercise of the DCE results through capacity-building of MOH staff to use iHRIS Retain, the retention intervention costing tool jointly developed by *CapacityPlus* and the WHO.

Once the costs of the different retention intervention combinations are determined, stakeholders should return to the DCE results and engage in a more comprehensive assessment of the costs and potential benefits of retention incentive packages to determine the most cost-effective attraction and retention policies for health workers in Lao PDR. Furthermore, an understanding of the local health labor market conditions, such as the available supply of graduating students and the rates of turnover among health workers, can build on the information provided by the DCE to better inform HRH policy decisions around recruitment and retention of health workers in rural and remote areas of the country.

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APPENDIX

The following tables present output from mixed logit regression models of the DCE data for each health worker cadre and student type. For these analyses, each cadre was surveyed independently. Each table presents two important estimates. First, the “mean” value indicates the average utility respondents derived from specific DCE attributes. The magnitude of the “mean” values can be compared within a specific cadre’s table to better understand the relative values respondents within that cadre placed on different job posting attributes. For example, in Table 12 the “mean” value for “qualify for further study and scholarship after two years” was 0.30, while the “mean” value for “promotion to permanent staff directly upon posting” was 0.72. We can interpret these values by saying the medical doctors valued promotion upon posting more than twice as much as further study after two years ($0.72/0.30 = 2.4$). However, “mean” values cannot be compared across cadre tables. We cannot compare the “mean” value for “quality of the facility: staff and equipment available” among the medical cadre in Table 12 to the “mean” value for “quality of the facility: staff and equipment available” among the MA cadre in Table 13. This comparison has no meaning.

Table 12: Results from a Mixed Logit Model of DCE Data Collected from Medical Doctors and Medical Students

Attributes	Full Sample		Male		Female	
	Mean	(Standard Error)	Mean	(Standard Error)	Mean	(Standard Error)
Percent increase in salary (continuous)	0.02	(0.00)***	0.02	(0.00)***	0.02	(0.00)***
Quality of facility: staff and equipment available	0.46	(0.05)***	0.40	(0.09)***	0.51	(0.07)***
Promotion to permanent staff (ref: promoted after 2 years)						
Promoted after 1 year	0.45	(0.05)***	0.37	(0.08)***	0.52	(0.07)***
Promoted directly upon posting	0.66	(0.06)***	0.62	(0.09)***	0.70	(0.09)***
Housing (ref: none provided)						
Allowance provided	0.66	(0.05)***	0.60	(0.09)***	0.73	(0.07)***
Housing provided	0.66	(0.06)***	0.47	(0.08)***	0.82	(0.08)***
Qualify for further study and scholarship (ref: after 3 years)						
After 2 years	0.52	(0.05)***	0.46	(0.08)***	0.59	(0.07)***
After 1 year	0.93	(0.06)***	0.89	(0.10)***	1.03	(0.09)***
Transport (ref: none provided)						
Provided for official use	0.69	(0.05)***	0.70	(0.08)***	0.68	(0.07)***
Provided for official and personal use	0.78	(0.05)***	0.75	(0.09)***	0.82	(0.08)***
Model diagnostics						
Number of respondents		434		187		246
Number of observations		10,386		4,460		5,902
Log likelihood		-2858.2		-1,243.7		-1,587.4
Likelihood ratio χ^2		171.5		113.4		77.5

*p < 0.10, **p < 0.05, ***p < 0.01

Table 13: Results from a Mixed Logit Model of DCE Data Collected from MAs and MA Students

Attributes	Full Sample		Male		Female	
	Mean	(SE)	Mean	(SE)	Mean	(SE)
Percent increase in salary (continuous)	0.02	(0.00)***	0.02	(0.00)***	0.02	(0.00)***
Quality of facility: staff and equipment available	0.34	(0.05)***	0.27	(0.07)***	0.35	(0.06)***
Promotion to permanent staff (ref: promoted after 2 years)						
Promoted after 1 year	0.19	(0.06)***	0.15	(0.09)*	0.19	(0.07)***
Promoted directly upon posting	0.12	(0.07)*	0.10	(0.10)	0.13	(0.08)
Housing (ref: none provided)						
Allowance provided	0.33	(0.06)***	0.30	(0.10)***	0.34	(0.07)***
Housing provided	0.40	(0.06)***	0.48	(0.10)***	0.33	(0.07)***
Qualify for further study and scholarship (ref: after 3 years)						
After 2 years	0.45	(0.06)***	0.42	(0.09)***	0.45	(0.07)***
After 1 year	0.59	(0.06)***	0.55	(0.10)***	0.58	(0.07)***
Support for children's education	0.80	(0.06)***	0.67	(0.09)***	0.84	(0.08)***
Model diagnostics						
Number of respondents		370		143		227
Number of observations		8,820		3,392		5,428
Log likelihood		-2,586.6		-1,020.2		-1,572.8
Likelihood ratio χ^2		175.83		51.2		105.4

*p < 0.10, **p < 0.05, ***p < 0.01

Table 14: Results from a Mixed Logit Model of DCE Data Collected from Midlevel Nurses/Midwives, Low-Level Nurses/Midwives and Nurse/Midwife Students

Attributes	Full Sample		Male		Female	
	Mean	(SE)	Mean	(SE)	Mean	(SE)
Percent increase in salary (continuous)	0.02	(0.00)***	0.01	(0.00)***	0.02	(0.00)***
Award for high performing nurse	0.41	(0.04)***	0.38	(0.07)***	0.41	(0.04)***
Promotion to permanent staff (ref: promoted after 2 years)						
Promoted after 1 year	0.45	(0.04)***	0.23	(0.08)***	0.51	(0.05)***
Promoted directly upon posting	0.68	(0.06)***	0.31	(0.09)***	0.79	(0.06)***
Housing (ref: none provided)						
Allowance provided	0.42	(0.04)***	0.44	(0.08)***	0.40	(0.05)***
Housing provided	0.53	(0.04)***	0.42	(0.08)***	0.55	(0.05)***
Qualify for further study and scholarship (ref: after 3 years)						
After 2 years	0.31	(0.04)**	0.26	(0.08)***	0.32	(0.05)***
After 1 year	0.42	(0.05)***	0.34	(0.09)***	0.43	(0.05)***
Transport (ref: none provided)						
Provided for official use	0.50	(0.04)***	0.35	(0.08)***	0.54	(0.05)***
Provided for official and personal use	0.59	(0.04)***	0.51	(0.08)***	0.60	(0.05)***
Model diagnostics						
Number of respondents		650		159		487
Number of observations		15,536		3,806		11,686
Log likelihood		-4707.6		-1,192.6		-3,493.2
Likelihood ratio χ^2		255.03		58.4		180.4

*p < 0.10, **p < 0.05, ***p < 0.01



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