Strengthening the Supply Chain Management Workforce in Namibia:
Results of a Rapid Retention Survey for Pharmacists and Pharmacist Assistants

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ACRONYMS

ART	Antiretroviral therapy
CMS	Central medical store
DCE	Discrete choice experiment
FGD	Focus group discussion
HR	Human resources
HRH	Human resources for health
IRB	Institutional Review Board
MOHSS	Ministry of Health and Social Services
MRC	Multidisciplinary Research Centre
PEPFAR	President's Emergency Plan for AIDS Relief
PtD	People that Deliver
RMD	Regional medical depot
SCM	Supply chain management
SCMS	Supply Chain Management System
UNAM	University of Namibia
WHO	World Health Organization
WISN	Workload Indicators of Staffing Need

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EXECUTIVE SUMMARY

Globally, health systems are under pressure to deliver quality services with limited resources. Well-functioning health supply chains are necessary to ensure that medicines and commodities for HIV/AIDS, family planning, and other priority health programs reach the people who need them to save and prolong their lives. In Namibia, a shortage and maldistribution of health workers combined with other workforce challenges is hindering the country's ability to procure and distribute health commodities in the public sector, preventing HIV-affected communities from accessing the preventive and live-saving supplies that will help engender an AIDS-free generation. The challenges include a heavy reliance on expatriate pharmaceutical professionals, particularly for product selection and quality control functions; out-of-date job descriptions, competency frameworks, and standard operating procedures; lack of information about the types and numbers of supply chain workers needed; poor ability to attract and retain workers in supply chain functions; and limited education and training opportunities to build and maintain the capacity of the supply chain workforce.

People that Deliver is a global initiative that aims to build global and national capacity to plan, finance, develop, support, and retain the national workforces needed for the effective, efficient, and sustainable management of health supply chains. The Ministry of Health and Social Services in Namibia requested People that Deliver to support the country in applying a set of targeted interventions to strengthen the supply chain management workforce. One of the interventions was a rapid retention survey to understand incentives and retention schemes needed to attract and retain pharmacists and pharmacist assistants to underserved public sector facilities across Namibia.

Capacity*Plus* applied its Rapid Retention Survey Toolkit (Jaskiewicz et al. 2014) to determine the benefits and incentives most likely to attract and retain pharmacists and pharmacist assistants to rural, public sector services in Namibia. The approach is based on the discrete choice experiment methodology, which is a powerful research technique that identifies the trade-offs workers are willing to make between specific job characteristics, and determines their preferences for various incentive packages, including the probability of accepting a post in a rural, public sector facility. It is a quantitative method that explores the relative importance that specific cadres of health workers place on different employment characteristics and options.

Data were collected from 52 pharmacists and 50 pharmacist assistants in seven regions: Erongo, Hardap, Karas, Khomas, Kunene, Oshana and Oshikoto. The findings for pharmacists indicated that in addition to salary, pharmacists perceived four other factors to be the most attractive incentives: proximity to good schools for children; well-maintained government housing; a wide scope of practice; and eligibility for promotion after one year. Pharmacist assistants considered three options in addition to salary to be most attractive: well-maintained government housing; fixed overtime (specified as a set amount irrespective of overtime hours worked); and continued education opportunities after three years.

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The recommendations derived from the rapid retention survey results include stakeholder review of the preferred job packages for pharmacists and pharmacist assistants, respectively. In next steps, national stakeholders should consider costing the potential preferred job packages using iHRIS Retain, a web-based costing application developed by Capacity*Plus* and the World Health Organization, to estimate the costs of planning and implementing health worker retention strategies in order to determine which will be the most feasible for the Ministry of Health and Social Services. Other recommendations include considering additional strategies such as: increased production of pharmacy cadres to broaden the availability of potential hires; aggressive marketing and career day opportunities specifically targeted to pharmacy cadres; specific packages to attract and retain workers to supply chain management positions; and formal competency-based programs for continued education with bonding.

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BACKGROUND

Globally, health systems are under pressure to improve service delivery to growing populations with limited resources. Medicines are essential in providing services for HIV/AIDS, family planning, and treatment of long-term chronic illness, and well-functioning supply chain management systems are required to ensure that the medicines actually reach the people who need them. A well-functioning supply chain depends on successful financial, technical, infrastructure, and human resources inputs. The World Health Organization's (WHO's) World Health Report of 2006 highlighted an urgent need for a competent, recognized, and empowered health supply chain workforce to ensure on-time service delivery of health commodities (WHO 2006). One of the goals of the US President's Emergency Plan for AIDS Relief (PEPFAR) is to support well-functioning health supply chains composed of pharmacists and pharmacist assistants, logisticians, and warehouse and transport personnel, among other categories of personnel.

Annual spending on procurement of health products designated for low-income countries reached $10 billion in 2011 (Lu et al. 2011). However, the WHO has indicated that only two-thirds of these health products reach patients, leaving a substantial number of people without access to essential health products (WHO 2004). WHO highlighted one of the challenges contributing to these inefficiencies as lack of suitable health personnel, including an adequate supply chain management workforce (2004).

In an effort to address these inefficiencies, a global consensus meeting, hosted by WHO, launched the People that Deliver (PtD) Initiative in 2011 (PtD 2014). PtD raises awareness of the human resources (HR) challenges of supply chain management (SCM) and works with countries to strengthen their human resources for SCM capacity. PtD utilizes a holistic and systematic approach for developing workforce excellence in supply chain management using five building blocks, which include engaging stakeholders, optimizing policies and plans, developing workforces, increasing performance, and professionalizing SCM cadres. To ensure the applicability and success of PtD efforts, the initiative works with several focus countries that are already actively engaged in various health workforce efforts to implement a set of activities to strengthen the SCM workforce within overarching human resources for health (HRH) efforts (Hasselberg et al. 2014).

Namibia is one of the PtD focus countries and operates an integrated health supply chain for the public sector. Its central medical store (CMS) oversees the procurement, storage, and distribution of pharmaceutical products (600 medicines in 2006) and clinical medical supplies (800 items in 2006) for use in public facilities. The CMS is one of three subdivisions of the Pharmaceutical Services Division, which is under the Directorate of Tertiary Health Care and Clinical Support Services within the Ministry of Health and Social Services (MOHSS). The range of product categories handled by the CMS and the RMDs includes essential medicines (such as antiretroviral therapy: ARTs, medicines for malaria and tuberculosis, contraceptives, and other

reproductive health supplies); vaccines; HIV test kits; clinical supplies (such as gloves, needles, and syringes); surgical equipment; and radiology supplies.

The MOHSS currently manages a supply chain that serves approximately 350 public health facilities, including 29 hospitals, four intermediate hospitals and one national tertiary hospital and 313 primary health care facilities (43 health centers and about 270 clinics) (Ongeri 2015). In addition to the CMS, there are two regional depots that also act as intermediate stock holding points: the Oshakati Multi-Regional Medical Depot located 700km to the northwest of Windhoek, and Rundu Medical Regional Depot, located 700km to the northeast. The national tertiary, intermediate, and district hospitals serve as additional intermediate stock holding points by ordering, managing and redistributing products to the majority of the clinics and health centers in Namibia, not served by the CMS or RMDs. Figure 1 provides an overview of the Namibian public health sector supply chain system. Although the system also includes private sector actors as well as other partners, the PtD focus was solely on the public sector.

Figure 1: Overview of Namibia's Public Health Sector Supply Chain System
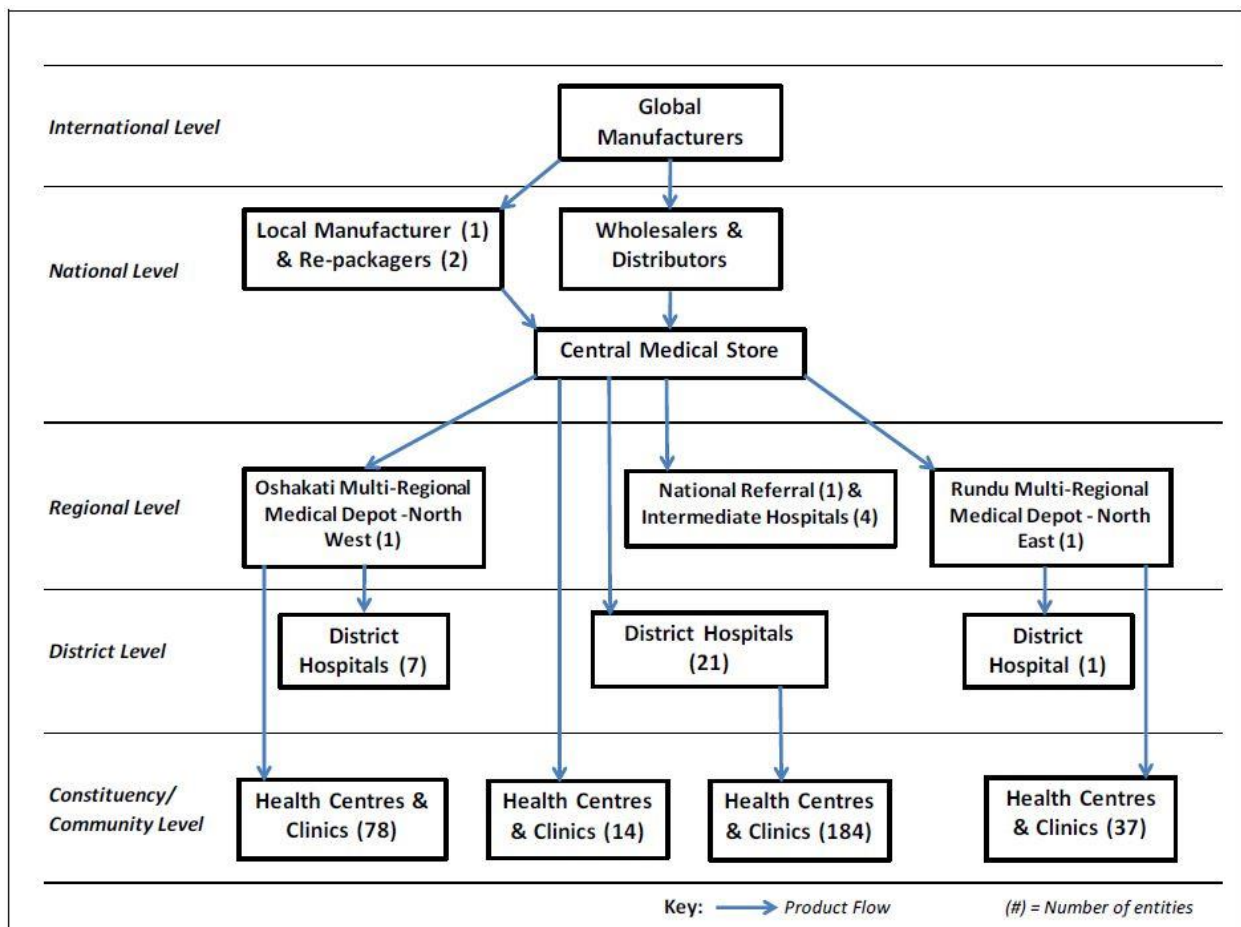
Source: Ongeri 2015.

In 2003, Namibia's MOHSS introduced ART in its public health facilities. Since that time, the annual procurement value of medicines and health commodities for HIV/AIDS and other priority health programs has increased by more than 350% since 2003 (MOHSS 2014). During the same period, however, there has been a limited response in terms of changes in policies, plans, education, training, recruitment, deployment, management, and retention for staff with SCM responsibilities at the central, regional, and district levels. As a result, Namibia has experienced a number of SCM workforce challenges, including staff shortages, poor motivation, high turnover, and loss of public sector staff to the private sector, particularly among midlevel supply chain staff. For example, a 2003 assessment of SCM cadres found that only 39% of pharmacist posts and 68% of pharmacist assistant posts were filled (Aboagye-Nyame et al. 2004). Two years later, a 2005 assessment identified a need to fill 18 vacant pharmacist posts, 15 pharmacist assistant posts, and to create an additional 11 pharmacist posts in the public sector to meet the goal of scaling up access to ART (Management Sciences for Health [MSH] 2006). The assessment also found that, due to the limited number of pharmacy-related graduates from national education and training programs, approximately 90% of occupied pharmacist positions were filled by foreign nationals on two- to three-year contracts (MSH 2006). Finally, the 2005 assessment found high levels of turnover and loss of public sector staff (both pharmacists and pharmacist assistants) to the private sector, which were associated with poor salaries, lack of career ladders, excessive workload, and limited training opportunities (MSH 2006). More recent assessments of the Namibian health workforce in general, and the SCM cadres in particular, have reaffirmed severe health workforce shortages, imbalanced geographical distribution of health workers, and poor skills mix and distribution of tasks (McQuide et al. 2013; Titus and Ongeri 2015).

Without an adequate supply chain workforce, HIV-affected communities cannot access preventive and life-saving drugs and supplies to help engender an AIDS-free generation. For this reason, the government of Namibia requested that PtD assist in assessing and strengthening the national public sector supply chain workforce. IntraHealth International (via Capacity*Plus*) and Supply Chain Management System (SCMS) were identified as the two preferred PtD partners to collaborate with the Namibian government to address supply chain workforce challenges. These challenges include limited awareness of the number of staff required in the CMS and RMDs, poor alignment of scopes of practice and job descriptions with required job responsibilities, limited education and training opportunities within the country for workers with SCM responsibilities, and limited information on how to attract and retain relevant staff in SCM positions.

To assist in understanding these challenges, it is necessary to have an overview of job responsibilities at the CMS and RMDs as well as to identify distribution challenges not only at the central and regional levels (including hospitals) but also to "last mile" health centers and clinics. The MOHSS proposed an initial focus on the CMS and RMDs. Using an integrated health workforce planning approach, an SCMS-led effort involved working with stakeholders and SCM project partners to conduct a competency mapping of SCM cadres at the CMS. The competency mapping was useful in developing activity standards. The activity standards were necessary to use the WHO's Workload Indicators of Staffing Need (WISN) method, which estimated the types and numbers of staff needed at the central and district levels, based on predicted workload. In

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turn, the WISN findings were useful in identifying the focus cadres for the development of evidence-based job incentive packages and a comprehensive costed health worker retention strategy. The objective was to influence MOHSS strategic plans and strengthen the Namibian supply chain workforce and eventually health service delivery.

Increasing the number of workers with SCM expertise will not resolve staffing problems if steps are not taken to attract and retain those workers in public sector SCM positions, especially in rural areas. For this reason, Capacity*Plus* and SCMS advised the MOHSS to conduct a rapid retention survey to identify viable, evidence-based, and costed salary and benefit packages to attract and retain pharmacists and pharmacist assistants in public sector positions with supply chain responsibilities. This report shares the health worker preferences resulting from the rapid retention survey to better pinpoint the bundle of incentives and interventions that could more effectively attract and retain health workers in rural and remote areas. We also make recommendations on job packages for the two pharmacy cadres.

OVERVIEW OF THE RAPID RETENTION SURVEY METHOD

The Rapid Retention Survey is a quantitative method used to determine the relative importance health workers place on different characteristics of potential job packages and then to predict the likelihood that workers would accept a job in an underserved area. Capacity*Plus* developed this rapid approach, which is based on the discrete choice experiment (DCE) methodology. The approach enables human resource managers and policy-makers to quickly determine what motivates health workers to live and work in particular settings or facilities (Viney et al. 2002, Jaskiewicz et al. 2014). Figure 2 outlines the Rapid Retention Survey process.

Figure 2: Rapid Retention Survey Process Overview

* Using iHRIS Retain

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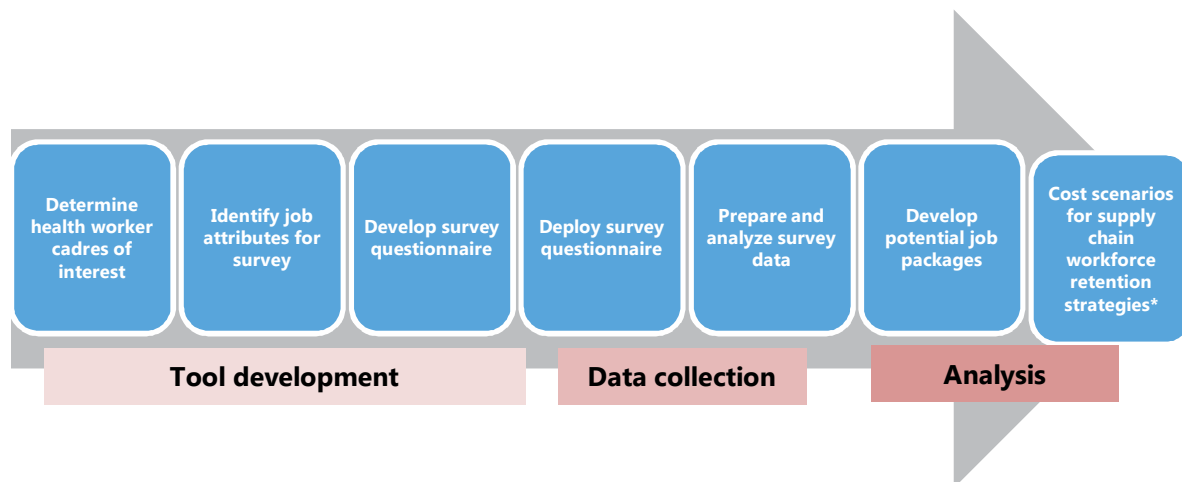
Tool Development
Determine health worker cadres of interest

CapacityPlus and national stakeholders determined that two supply chain cadres were of interest for the Rapid Retention Survey in Namibia: pharmacists and pharmacist assistants. Although the data clerk (also known as administrative officer) cadre also contributes to the national supply chain, it is a generic, non-technical cadre within the public service, whereas this research focused on the clinical service delivery aspects of supply chain management. Due to the study's focus on sensitive topics such as salary, CapacityPlus obtained Institutional Review Board (IRB) approvals from the MOHSS, the University of Namibia (UNAM) Multidisciplinary Research Centre (MRC), and IntraHealth International before commencing with data collection.

Identify job attributes for survey

CapacityPlus reviewed the existing literature on HRH for supply chain management cadres in Namibia. A 2006 study conducted by MSH identified salary, housing, and working conditions among the job attributes that needed improvement for both pharmacist and pharmacist assistant cadres, and the lack of a career ladder and excessive workload as two additional job challenges for pharmacist assistants (MSH 2006). The team also referred to the job attributes and strategies outlined in the WHO's policy recommendations on improving retention of health workers in remote and rural areas (WHO 2010).To develop focus group discussion (FGD) guides, the team referred to preliminary results from an MOHSS (2015) study on incentives and retention for remote, rural, and hardship areas, which surveyed 1,705 health workers across multiple cadres. The MOHSS study listed the top non-financial incentives as adequate infrastructure, continuing education, workplace safety, refresher training opportunities, and career development (MOHSS 2015).

Subsequently, the team conducted FGDs[1] with representatives from both cadres to gather data on what these health workers valued most in a job incentives package, in order to determine the job attributes for inclusion in the Rapid Retention Survey for each cadre. Four FGDs were conducted in all, two with pharmacists (one urban, one rural) and two with pharmacist assistants (one urban, one rural). Efforts also were made to represent the cadres' diversity in terms of gender, age, and nationality. The FGDs identified six priority job attributes (i.e., benefits, incentives, or characteristics) that pharmacists and pharmacist assistants deemed most important to attract and retain them at underserved posts. After consulting with in-country stakeholders to determine which strategies would be feasible to consider implementing, CapacityPlus defined various levels for each job attribute to be included in the Rapid Retention Survey questionnaire (Tables 1 and 2). For example, the "housing" attribute levels were defined as either: no housing; a housing allowance; or the provision of a well-maintained house by the government.

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[1] The FGD guide can be accessed at:
http://www.capacityplus.org/files/Appendix1_Sample_Focus_Group_Discussion_Guide_0.docx

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Table 1: Job Attributes and Levels for Pharmacists

Attributes	Levels
Monthly salary (basic salary excluding benefits)	1. No additional basic salary
	2. 10% additional basic salary
	3. 20% additional basic salary
	4. 30% additional basic salary
Housing	1. No housing allowance
	2. Housing allowance (extra to basic salary)
	3. Well-maintained government housing provided
Living conditions	1. Availability and access to basic amenities (running water, electricity)
	2. Always good availability and access to amenities (running water, electricity, supermarkets, Internet)
Children's education	1. No good schools close by
	2. Good schools close by
Career advancement/promotion possibilities	1. Eligible for promotion after 2 years
	2. Eligible for promotion after 1 year
Scope of practice (range of responsibility with available resources)	1. Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, etc.)
	2. Wide scope of practice and ability to apply skills

Table 2: Job Attributes and Levels for Pharmacist Assistants

Attributes	Levels
Monthly salary (basic salary excluding benefits)	1. No additional basic salary
	2. 10% additional basic salary
	3. 20% additional basic salary
	4. 30% additional basic salary
Opportunities for continued education	1. No opportunity for continued education
	2. Opportunities for further study and scholarship within field after 5 years
	3. Opportunities for further study and scholarship within field after 3 years
Housing	1. No housing allowance
	2. Housing allowance (extra to basic salary)
	3. Well-maintained government housing provided
Fixed overtime	1. No overtime payable
	2. Fixed overtime payable (set amount irrespective of overtime hours worked)
Living conditions	1. Availability and access to basic amenities (running water, electricity)
	2. Always good availability and access to amenities (running water, electricity, supermarkets, Internet)
Scope of practice (range of responsibility with available resources)	1. Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, etc.)
	2. Wide scope of practice and ability to apply skills

Develop survey questionnaire

The job attributes and levels were used to construct the Rapid Retention Survey questionnaire using Sawtooth SSI Web software (Version 8.3.6) (Huber 2005; Johnson 2002; Sawtooth Technologies 2015). The questionnaire asked for informed consent and began with a variety of background items, including basic demographic questions (age, gender, nationality, relationship status, number of children); questions about work experience (type of facility in which currently working, years of professional practice, regions worked); and a question about whether the respondent had lived in a rural area for more than one year. The job attributes and levels then were entered into the software to develop job preference pair questions, whereby respondents would be presented with 12 scenarios with randomized combinations of job attribute levels. Within each scenario, the respondent was asked to choose which job they would prefer: the rural job posting with a random combination of particular job attributes, or the urban job posting with another random combination of particular job attributes. In this case, the rural job posting was described as a district hospital, and the urban posting as the national tertiary hospital in Windhoek. Figures 3 and 4 depict examples of job preference scenario questions for pharmacists and pharmacist assistants. (The complete Rapid Retention Survey questionnaires for each cadre can be found in Appendices 1 and 2.) After pretesting the survey questionnaire, it was finalized and uploaded to Sawtooth's hosting site for Internet-based deployment and data collection.

Figure 3: Sample Job Preference Survey Question for Pharmacists

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

	District Hospital	National Tertiary Hospital
Housing	No housing allowance	Well-maintained government housing provided
Living Conditions	Availability and access to basic amenities (running water, electricity)	Always good availability and access to amenities (running water, electricity, supermarkets, internet)
Monthly Salary (basic salary excl. benefits)	10% additional basic salary	20% additional basic salary
Children's Education	No good schools close-by	Good schools close-by
Career Advancement/Promotion Possibilities	Eligible for promotion after 2 years	Eligible for promotion after 1 year
Scope of Practice with Available Resources	Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, infrastructure, etc.)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure, etc.)
	○	○

◁ ▷

Figure 4: Sample Job Preference Survey Question for Pharmacist Assistants

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

	District Hospital	National Tertiary Hospital
Housing	No housing allowance	Housing allowance (extra to basic salary)
Living Conditions	Availability and access to basic amenities (running water, electricity)	Always good availability and access to amenities (running water, electricity, supermarkets, internet)
Monthly Salary (basic salary excl. benefits)	No additional basic salary	20% additional basic salary
Opportunities for continued education	Opportunities for further study and scholarship within field after 5 years	Opportunities for further study and scholarship within field after 3 years
Overtime	No overtime payable	Fixed overtime payable (set amount irrespective of overtime hours worked)
Scope of Practice With Available Resources	Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, infrastructure, etc.)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure, etc.)
	○	○

Data Collection

Deploy survey questionnaire

Capacity*Plus* trained five research assistants from UNAM through a one-day training workshop to learn the Rapid Retention Survey method and data collection protocols. Each team member received a laptop and Internet dongle to enable data collection at the SCM cadres' place of work or preferred location, with a minimum of 50 respondents per cadre to ensure adequate statistical power. Capacity*Plus* received the valuable endorsement of the survey from the Namibia Pharmaceutical Society, the professional body for pharmacy cadres, which then helped to disseminate information and sensitize respondents from health workers to participate in the survey. In all, data were collected from 52 pharmacists and 50 pharmacist assistants. The research team was challenged to identify health workers available to complete the survey, however; overall, there are very few SCM workers within Namibia.

The UNAM research assistants facilitated data collection over a two-week period in seven regions: Erongo, Hardap, Karas, Kavango, Khomas, Oshana and Oshikoto. Identifying respondents from a range of levels at private, public and faith-based facilities, the research assistants introduced the survey and oriented the respondents to the web-based survey interface, guiding them through to the informed consent page and then allowing the respondents to complete the remainder of the survey at their own pace (20 minutes on average). Figure 5 shows a participant answering the online questionnaire. The survey data were automatically uploaded to the Sawtooth survey hosting site and progress monitored in real time.

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Photo courtesy of Rachel Deussom/IntraHealth International. Ebba, a pharmacist at the Corner Pharmacy in the Katutura of Windhoek, Namibia, completes a Rapid Retention Survey questionnaire online. February 27, 2015. Photo was taken and included with the respondent's permission.

Analysis

Prepare and analyze survey data

After all questionnaires had been completed, data were extracted from the Sawtooth hosting site, cleaned, and loaded into STATA IC (Version 13.1) for analysis. A basic descriptive statistical analysis was undertaken to assess respondents' demographic and professional characteristics, followed by analysis using a logistical regression model (mixlogit) to measure the impact of improving one of the six job attributes on a respondent's inclination to choose a rural job posting in a district hospital over a job posting in an urban area.

Develop potential job packages

The regression outputs identified coefficients for each job attribute level, used to measure the impact of the six job attributes and their levels on a respondent's willingness to choose a job posting in a rural as opposed to an urban area. Analyses are presented in terms of predicted preference impact measures (Jaskiewicz et al. 2014). The preference impact measure estimates what percentage of the cadre population is expected to prefer a job posting that offers the presented package of incentives over 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 (Jaskiewicz et al. 2014; Ryan et al. 2012). The preference impact measure assists stakeholders in determining which incentives

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and in what specific combination will be the most attractive to a cadre and will more likely motivate them to work in a specific facility or geographic area. In this way, it is possible to identify how much salary a respondent would be willing to forgo to obtain other benefits or incentives.

In the last phase of the study, the preference impact measure was used to recommend different benefit packages based on the proportion of respondents that are likely to pick a proposed package for a posting at a rural facility as opposed to the standard job package at an urban facility.

Limitations

The results are based on the minimum sample size required to achieve adequate statistical power for the regression model. However, the general shortage of pharmacists and pharmacist assistants across Namibia is such that some who were approached to complete the survey were unable to participate due to their heavy workload. Moreover, while the survey's Internet-based administration greatly simplified data collection and management, a few respondents were hesitant to complete an Internet-based survey, indicating that they perceived paper-based surveys to be a more reliable way to capture responses. Internet connectivity was also a challenge in some rural areas; the research assistants experienced difficulties in some facilities with Internet availability, bandwidth, and connectivity (for example, where the facility pharmacy was located in the basement).

FINDINGS

Respondent Demographics and Work Experience

From a demographic perspective, about half of the survey respondents were female (50% of pharmacists and 55% of pharmacist assistants, respectively). The mean age of pharmacist respondents was 38 years old (range=22–65 years), whereas the mean age of pharmacist assistants was 31 years (range=21–56 years). While less than half (46%) of pharmacists surveyed were of Namibian nationality, 94% of pharmacist assistants were Namibian. About two-thirds (69%) of pharmacists were married, compared to about one-third (31%) of pharmacist assistants. However, two-thirds of both cadres had at least one child. Half of the pharmacist respondents indicated that they had lived in a rural area for at least one year, whereas about three in four (74%) pharmacist assistants had lived in a rural area for more than one year.

In terms of their professional experience, two-thirds of surveyed pharmacists worked at private facilities, compared to two-thirds of pharmacist assistants who worked at public facilities. Only one pharmacist assistant reported working at a faith-based facility. The mean number of years of practice was 13 for pharmacists (range=1–43 years) and six for pharmacist assistants (range=1–22 years); one in four of the pharmacists had over 20 years of experience, whereas 57% of pharmacist assistants had fewer than five years' experience. The Namibian regions in which pharmacists had the most experience ever working were Khomas (50%), Erongo (27%), Otjozndjupa (23%), and Oshana (19%). The Namibian regions in which pharmacist assistants had

the most experience working were Khomas (39%), Erongo (31%), Kavango (16%), and Oshikoto (12%).

Table 3 summarizes the demographic information for pharmacists and pharmacist assistants, and Appendix 3 provides additional demographic data.

Table 3: Descriptive Statistics for Pharmacy Cadre Respondents

		Pharmacists (N=48)*		Pharmacist Assistants (N=49)*	
		n	%	n	%
Demographics					
Female		24	(50.0)	27	(55.1)
Age					
	18-24	3	(6.3)	9	(18.4)
	25-34	20	(41.7)	30	(61.2)
	35-44	12	(25.0)	7	(14.3)
	45-54	6	(12.5)	3	(6.1)
	55+	7	(14.6)	0	(0)
Have children		32	(66.7)	33	(67.3)
Lived rural > 1 year		24	(50.0)	36	(73.5)
Work experience					
Type of facility (place of work)					
	Private	32	(66.7)	15	(30.6)
	Public	16	(33.3)	33	(67.3)
	Faith-based	0	(0.0)	1	(2.0)
Number of years practicing					
	1-5 years	17	(35.4)	28	(57.1)
	6-10 years	8	(16.7)	14	(28.6)
	11-15 years	8	(16.7)	4	(8.2)
	16-20 years	3	(6.3)	2	(4.1)
	21-25 years	6	(12.5)	1	(2.0)
	26-30 years	3	(6.3)	0	(0)
	31+ years	3	(6.3)	0	(0)

* In a few instances, pharmacists and pharmacist assistants initiated the online survey but did not complete it. Data collectors noted that the reason for not completing the survey was due to the health worker needing to attend to their workload.

Preferences for Potential Rural Job Packages

The RRS found there were the clear differences in non-salary preferences for pharmacists contrasted to the pharmacist assistants, reflecting their separate sets of levels of education, current salary, and professional prospects. We analyzed potential retention job packages in relation to a standard job package—defined as what is currently offered in the public sector for

each cadre[2]. Analysis results are expressed as predicted preference impact rates, which indicate the percentage of health workers expected to prefer the retention job package compared to the standard job package.

The outputs of the mixed logit model were reviewed to determine the most preferred rural job incentive packages for pharmacists and pharmacist assistants, respectively, as part of the effort to identify an SCM rural retention strategy. (Appendix 4 presents raw data outputs from the mixed logit statistical models.) The mixed logit coefficient values were ranked according to which job attribute levels survey respondents considered the most important, ordering them from the most preferred attribute (highest mean coefficient) to the least preferred (lowest mean coefficient).

Pharmacists

Table 4 ranks the model coefficients for each job attribute and level of incentive or condition for pharmacists. The location variable was not significant in the mixed logit model, indicating that if the other job attribute levels are offered, it is predicted that pharmacists would be amenable to both urban (e.g., CMS, national hospital) and rural (e.g., RMD, district hospital) posts.

In ranking the coefficient values of the job attributes for pharmacists, salary increases—whether 10%, 20%, or 30%—were the most valued job incentive. In addition to salary, pharmacists most valued the following job attributes and levels for a public sector posting, in order of preference:

1. Being close to good children's schools

2. Well-maintained government housing

3. Having a wide scope of practice and opportunity to apply skills

4. Housing allowance.

Table 4: Ranked Job Attributes and Levels for Pharmacists

Job Attribute	Job Incentives/Conditions (ranked from most to least preferred)	Coefficient
Monthly salary *(basic salary excluding benefits)*	1. 30% additional basic salary	9.53*
	2. 20% additional basic salary	8.80*
	3. 10% additional basic salary	8.06*
Children's education	4. Good schools close by ǂ	1.83*
Housing	5. Well-maintained government housing provided	1.34*

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[2] For pharmacists, the standard job package is: the basic salary, excluding benefits; housing allowance; having good children's schools close by; and an urban location. For pharmacist assistants, the standard job package is: the basic salary, excluding benefits; housing allowance; opportunities for further study and scholarship within the field after three years; and an urban location.

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Scope of practice *(range of responsibility with available resources)*	6. Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure, etc.)*	1.09*
Housing	7. Housing allowance (extra to basic salary) ‡	1.04*
Location	8. National tertiary hospital (Windhoek)‡	0.32
Career advancement/ promotion possibilities	9. Eligible for promotion after 1 year	0.18
Living conditions	10. Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	-0.04

* Significant at the $p \leq 0.1$ level. Job attributes and levels that were not significant at the $p \leq 0.1$ values were not included in potential job packages.

‡ Included as part of the current job package or standard job posting.

Pharmacist Assistants

Similar to pharmacists, salary increases—whether 10%, 20%, or 30%—were the most valued job incentive or condition for pharmacist assistants. In addition, they most valued opportunities for continued education, fixed overtime, housing, and an urban location. Table 5 ranks the model coefficients for each job attribute and incentive or condition for pharmacist assistants.

Table 5: Ranked Job Attributes and Levels for Pharmacist Assistants

Job Attribute	Job Incentives/Conditions *(ranked from most to least preferred)*	Coefficient
Monthly salary *(basic salary excluding benefits)*	1. 30% additional basic salary	5.74*
	2. 20% additional basic salary	5.30*
	3. 10% additional basic salary	4.85*
Opportunities for continued education	4. Opportunities for further study and scholarship within field after 3 years ‡	2.77*
	5. Opportunities for further study and scholarship within field after 5 years	2.09*
Overtime	6. Fixed overtime payable (set amount irrespective of overtime hours worked)	1.20*
Housing	7. Well-maintained government housing provided	0.78*
	8. Housing allowance (extra to basic salary) ‡	0.70*
Location	9. National tertiary hospital (Windhoek)‡	0.33*
Living conditions	10. Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	0.11
Scope of practice *(range of responsibility with available resources)*	11. Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure, etc.)	0.09

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‡ Included as part of the current job package or standard job posting.

Predicted Preference Impact Rates

We analyzed potential rural retention job packages in relation to a standard job package—defined as what is currently offered in the public sector for each cadre. Analysis results are expressed as predicted preference impact rates, which indicate the percentage of health workers expected to prefer the rural retention job package compared to the standard job package. The predicted preference impact rates for these potential job packages were compiled using a calculation worksheet provided in the Rapid Retention Survey Toolkit, Appendix 7 (http://www.capacityplus.org/files/Appendix7_Preference_Calculation_Worksheet.xlsx).

The RRS found there were clear differences in non-salary preferences for pharmacists contrasted to the pharmacist assistants, reflecting their separate sets of levels of education, current salary, and professional prospects. We analyzed potential retention job packages in relation to a standard job package—defined as what is currently offered in the public sector for each cadre[3]. Analysis results are expressed as predicted preference impact rates, which indicate the percentage of health workers expected to prefer the retention job package compared to the standard job package. The results of the various combinations of incentive packages and their respective preference impact rates for pharmacists are shown in Tables 6, 7, and 8. The attributes of potential job packages are grouped in the left-hand column, with a range of predicted preference impact rates for the percentage salary increase option for each package.[4]

Pharmacists

In addition to salary, pharmacists most valued the following job attributes and levels for a public sector posting, in order of preference: (1) being close to good children's schools; (2) well-maintained government housing; (3) having a wide scope of practice and opportunity to apply skills; and (4) a housing allowance. Job location, eligibility for promotion, and living conditions were not significant factors. The combination of a 30% salary increase, good children's schools close by, well-maintained government housing, and having a wide scope of practice was the most-preferred job package (Package 1, Option D), with a predicted 96% pharmacists choosing this job over the currently offered post. The job package options in bold were identified in preliminary analysis for costing.

Table 6: Pharmacists' Most Preferred Job Packages: Predicted Preference Impact Rates (%) by Salary Amount (% Increase)

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[3] For pharmacists, the standard job package is: the basic salary, excluding benefits; housing allowance; having good children's schools close by; and an urban location. For pharmacist assistants, the standard job package is: the basic salary, excluding benefits; housing allowance; opportunities for further study and scholarship within the field after three years; and an urban location.

[4] For example, Job Package 1 has a preference impact rate of 74% if there is no salary increase (Option A), whereas with a 10% salary increase (Option B) it has a preference impact rate of 86%.

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	Job Package	Monthly Salary (basic salary excluding benefits)			
		Option A: 0% salary increase	Option B: 10% salary increase	Option C: 20% salary increase	Option D: 30% salary increase
1	Good children's schools close by Well-maintained government housing Wide scope of practice	74%	86%	93%	96%
2	Good children's schools close by Housing allowance provided Wide scope of practice	68%	82%	90%	95%
3	Good children's schools close by Well-maintained government housing	49%	67%	81%	90%
4	Good children's schools close by Housing allowance provided	42%	60%	76%	87%

Pharmacist Assistants

Similar to pharmacists, salary increases—whether no increase, 10%, 20%, or 30% increase—were the most valued job incentive or condition for pharmacist assistants. In addition, they most valued the following job attributes and levels for a public sector posting, in order of preference: (1) opportunities for continued education, (2) fixed overtime, (3) well-maintained government housing, (4) housing allowance and (5) an urban job location. The results of the predicted preference impact rates for pharmacist assistants are shown in Table 7. Given the shortage of pharmacist assistants in the public sector in urban as well as rural areas and their preference for urban posts, preference impact rates were considered for both locations. For example, it is predicted that 93% and 90% of pharmacist assistants would prefer the first combination of job incentives and conditions for an urban or rural setting, respectively (Package 1, Option D) over the standard job posting. The job package options in bold were identified in preliminary analysis for costing.

Table 7: Pharmacist Assistants' Most Preferred <u>Rural</u> Job Packages: Predicted Preference Impact Rates (%) by Salary Amount (% Increase)

	Rural Job Package (e.g., RMD, district hospital)	Monthly Salary (basic salary excluding benefits)			
		Option A: 0% salary increase	Option B: 10% salary increase	Option C: 20% salary increase	Option D: 30% salary increase
1	Housing allowance Fixed overtime Continued education - 3 years	70%	79%	85%	90%
2	Housing allowance Fixed overtime Continued education - 5 years	55%	65%	74%	82%

Rural Job Package (e.g., RMD, district hospital)		Monthly Salary (basic salary excluding benefits)			
		Option A: 0% salary increase	Option B: 10% salary increase	Option C: 20% salary increase	Option D: 30% salary increase
3	Well-maintained government housing Continued education - 3 years	44%	55%	65%	74%
4	Housing allowance Continued education - 3 years	42%	53%	63%	73%

Given the shortage of pharmacist assistants in the public sector in urban as well as rural areas, further analyses can be undertaken to determine the "most preferred" job package for the CMS and national tertiary hospital. This is done by removing the rural location coefficient from the calculation. Table 8 shows the predicted preference impact rates for this scenario:

Table 8: Pharmacist Assistants' Most Preferred Urban Job Packages: Predicted Preference Impact Rates (%) by Salary Amount (% Increase)

Urban Job Package (e.g., CMS, national tertiary hospital)		Monthly Salary (basic salary excluding benefits)			
		Option A: 0% salary increase	Option B: 10% salary increase	Option C: 20% salary increase	Option D: 30% salary increase
1	Housing allowance Fixed overtime Continued education - 3 years	77%	84%	89%	93%
2	Housing allowance Fixed overtime Continued education - 5 years	63%	72%	80%	86%
3	Well-maintained government housing Continued education - 3 years	52%	63%	72%	80%
4	Housing allowance Continued education - 3 years	50%[5]	61%	71%	79%

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[5] N.B. The predicted preference impact rate for this urban post, Job Package 4, Option A is the standard job posting.

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RECOMMENDATIONS

The findings of the Rapid Retention Survey and iHRIS Retain costing exercise generated evidence that can be used to develop policy and strategy options for attracting and retaining pharmacists and pharmacist assistants at rural facilities such as RMDs and district hospitals. Recommendations for moving forward are briefly outlined below.

Design viable attraction and retention packages.
Recent WISN studies conducted in Namibia determined the numbers of pharmacists and pharmacist assistants needed at the CMS, RMDs, and district hospitals. Pooling the WISN and Rapid Retention Survey results and using iHRIS Retain software[6], the MOHSS can cost potential attraction and retention packages to develop scenarios of job packages for pharmacists and pharmacist assistants to reduce the vacancy rates at the central, regional, and district levels. There are plans for Capacity*Plus* to collaborate with the MOHSS to complete the costing of various packages across all , identifying scenarios and different levels of costs that will allow the government to identify the most feasible, affordable, and sustainable attraction and retention packages for the country context.

Implement viable, evidence-based, and costed attraction and retention packages.
Using the results of the Rapid Retention Survey and the iHRIS Retain costing exercise, the government of Namibia should introduce viable, evidence-based, and costed salary and benefit packages to attract and retain pharmacists and pharmacist assistants in public sector positions with supply chain management responsibilities.

Increase the production and availability of pharmacy cadres so that more potential hires will be available in-country.
While it is important to attract and retain more pharmacy cadres to underserved facilities, it is also important to consider strategies to produce more pharmacy graduates. Initiatives to sponsor or promote additional pharmacy cadres through accredited national training programs would increase the number of graduates entering the labor market.

Develop and implement strategies to promote careers in pharmacy and supply chain management.
Salary and benefit packages can help attract and retain workers in supply-chain-related posts, if people are aware of them. The government should develop strategies to encourage young people to pursue careers in pharmacy and supply chain management to increase the number of health workers available to meet current needs and successfully recruit recent pharmacy graduates into vacant positions. Strategies could include, for example, providing information about supply-chain-related education pathways and careers to secondary school students; and aggressively marketing vacant posts through channels available to pharmacy students, such as conferences, online discussion groups, job boards, and career days. Marketing efforts could reference the attractive salary and benefit packages developed as a result of the Rapid Retention Survey and iHRIS Retain costing exercise.

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[6] http://retain.ihris.org/retain

Introduce formal, competency-based education and training programs for cadres with supply chain responsibilities.

Consideration should be given to strengthening the capacity of local institutions to provide education and training, assess qualifications, and build career tracks to locally produce and retain pharmacists and pharmacist assistants needed to fill public sector supply-chain-related employment gaps (McQuide et al. 2013). To increase the number of graduates posted to rural and remote areas, the government should consider the development of long-term education strategies to increase access to health workers in remote and rural areas through improved retention (WHO 2010). In addition, the MOHSS should determine what types of continuing education opportunities would present the greatest added value to the supply chain management system in support of Namibia's vision to achieve an AIDS-free generation. Training opportunities should be local and as practical as possible, including engagement with the country's Regional Health Training Centers and investigation of flexible and/or remote learning (i.e., eLearning) opportunities.

Conclusion

The ability of policy-makers to increase salary levels or provide benefits such as housing allowances or continued education varies according to context. Any potential rural job package must be assessed in terms of its viability for implementation, feasibility, affordability, and sustainability. Results of the WISN activity generated estimates of the number of pharmacists and pharmacist assistants needed to meet the country's health needs given the current workload. With the SCM staffing needs estimated by WISN and the iHRIS Retain costing results, the MOHSS can assess the viability and scale-up potential of the different job packages intended to enhance rural retention.

REFERENCES

Aboagye-Nyame, F., L. Akhlaghi, and V. Dias. 2004. Assessment of the public sector pharmaceutical supply system of Namibia. Rational Pharmaceutical Management Plus Project (RPM Plus). http://pdf.usaid.gov/pdf_docs/Pnadb998.pdf (accessed July 14, 2015).

Hasselberg, E., A. Van Buuren, B. Ongeri, and B. McHenry. 2014. Public health supply chain competency mapping in Namibia: Results and recommendations from the People that Deliver Initiative collaboration between the Ministry of Health and Social Services, SCMS, and Capacity*Plus*. Submitted to the US Agency for International Development by the Supply Chain Management System (SCMS).

Huber, J. 2005. Conjoint analysis : How we got here and where we are (an update). *Sawtooth Software Research Paper Series.* http://www.sawtoothsoftware.com/support/technical-papers/general-conjoint-analysis/conjoint-analysis-how-we-got-here-and-where-we-are-an-update-2004 (accessed 5 July, 2015).

Jaskiewicz, W., R. Deussom, L. Wurts, and G. Mgomella. 2014. Rapid Retention Survey toolkit: Designing evidence-based incentives for health workers. Washington, DC: Capacity*Plus/*IntraHealth International. http://www.capacityplus.org/rapid-retention-survey-toolkit (accessed July 14, 2015).

Johnson, R.M. 2001. History of ACA. *Sawtooth Software Research Paper Series.* https://www.sawtoothsoftware.com/download/techpap/histaca.pdf (accessed 5 July, 2015).

Lu, Ye, Patricia Hernandez, Dele Abegunde, and Tessa Edejer. 2011. The world medicines situation 2011: Medicine expenditures. Geneva, Switzerland: World Health Organization. http://apps.who.int/medicinedocs/documents/s18767en/s18767en.pdf (accessed 3 May 2015).

Management Sciences for Health (MSH). 2006. Human capacity development assessment for public sector pharmaceutical services in Namibia: Strategies to scale up HIV/AIDS programs and ART therapy. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program and the Management and Leadership Program. Arlington, VA: Management Sciences for Health.

McQuide, P.A., R.-L. Kolehmainen-Aitken, and N. Forster. 2013. "Applying the Workload Indicators of Staffing Need (WISN) method in Namibia: Challenges and implications for human resources for health policy." *Human Resources for Health* 11: 64.

Ministry of Health and Social Services (MOHSS). 2015. Namibia incentives and retention study for remote, rural and hardship areas. Windhoek,Namibia.

Strengthening the Supply Chain Management Workforce in Namibia:
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Ministry of Health and Social Services (MOHSS). 2014. "Namibia Supply Chain HR Situation" Powerpoint Presentation delivered by Jennie Lates, Deputy Directoir, Pharmaceutical Services, MOHSS. Windhoek, Namibia. http://peoplethatdeliver.org/sites/peoplethatdeliver.org/files/dominique/files/Namibia%20%E2%80%93%20Supply%20Chain%20HR%20Situation.pdf (accessed July 14, 2015).

Office of the Prime Minister (OPM), Republic of Namibia. 2014a. Personnel administration measures (PAM). Job category: Pharmacist. Windhoek, Namibia.

Office of the Prime Minister (OPM), Republic of Namibia. 2014b. Personnel administration measures (PAM). Job category: Pharmacist assistant. Windhoek, Namibia.

Ongeri. B., 2015. "Alternative strategies for distribution of pharmaceuticals to public sector health facilities in Namibia". Submitted to the Polytechnic of Namibia in fulfillment of the requirements for the Masters in Logistics and Supply Chain Management. Professor Christopher John Savage. April 2015.

People that Deliver. 2014. Health supply chains [Webpage]. http://www.peoplethatdeliver.org/content/health-supply-chain-assessments-developing-countries (accessed 13 March 2014).

Ryan, Mandy, Julie R. Kolstad, Peter C. Rockers, and Carmen Dolea. 2012. How to conduct a discrete choice experiment for health workforce recruitment and retention in remote and rural areas: A user guide with case studies. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/2012/12/17101972/conduct-discrete-choice-experiment-health-workforce-recruitment-retention-remote-rural-areas-user-guide-case-studies (accessed 5 July, 2015).

Sawtooth Technologies. 2015. www.sawtooth.com

Titus, Maritza, and Benjamin Ongeri. 2015. Strengthening the supply chain management workforce in Namibia: Applying the WISN method to estimate staffing needs. Washington, DC: Capacity*Plus*/IntraHealth International.

Viney, R., E. Lancsar, and J. Louviere. 2002. "Discrete choice experiments to measure consumer preferences for health and healthcare." *Expert Review of Pharmacoeconomics & Outcomes Research* 2, no. 4: 319–326. doi:10.1586/14737167.2.4.319

World Health Organization. 2010. Increasing access to health workers in remote and rural areas through improved retention: Global policy recommendations. Geneva, Switzerland: WHO.

World Health Organization. 2006. The world health report 2006: Working together for health. Geneva, Switzerland: WHO. http://www.who.int/whr/2006/whr06_en.pdf (accessed 13 June, 2014).

Strengthening the Supply Chain Management Workforce in Namibia:
Results of a Rapid Retention Survey and Costed Strategies for Pharmacists and Pharmacist Assistants

World Health Organization. 2004. The world medicines situation. Geneva, Switzerland: WHO. http://apps.who.int/medicinedocs/pdf/s6160e/s6160e.pdf (accessed 3 May 2015).

APPENDIX 1: SAMPLE RAPID RETENTION SURVEY FOR PHARMACISTS

See separate file.

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APPENDIX 2: SAMPLE RAPID RETENTION SURVEY FOR PHARMACIST ASSISTANTS

See separate file.

APPENDIX 3: RESPONDENT DEMOGRAPHIC AND WORK EXPERIENCE

		Pharmacists (N=48)		Pharmacist Assistants (N=49)	
		n	%	n	%
Demographics					
Female		24	(50.0)	27	(55.1)
Age					
	18-24	3	(6.3)	9	(18.4)
	25-34	20	(41.7)	30	(61.2)
	35-44	12	(25.0)	7	(14.3)
	45-55	6	(12.5)	3	(6.1)
	55+	7	(14.6)	0	(0)
Nationality					
	Namibian	22	(45.8)	46	(93.9)
	Congolese	2	(4.2)	0	(0)
	Ethiopian	5	(10.4)	0	(0)
	Pakistani	2	(4.2)	0	(0)
	South African	2	(4.2)	1	(2.0)
	Zambian	2	(4.2)	0	(0)
	Zimbabwean	10	(20.8)	2	(4.1)
	Other*	3	(6.3)	0	(0)
Relationship status					
	Single	12	(25.0)	32	(65.3)
	Married	33	(68.8)	15	(30.6)
	Divorced/Separated	1	(2.1)	1	(2.0)
	Widowed	2	(4.2)	1	(2.0)
Have children		32	(66.7)	33	(67.3)
Lived rural > 1 year		24	(50.0)	36	(73.5)
Work experience					
Type of facility (Place of work)					
	Private	32	(66.7)	15	(30.6)
	Public	16	(33.3)	33	(67.3)
	Faith-based	0	(0.0)	1	(2.0)
Number of years practicing					
	1 - 5 years	17	(35.4)	28	(57.1)
	6 - 10 years	8	(16.7)	14	(28.6)
	11 - 15 years	8	(16.7)	4	(8.2)
	16 - 20 years	3	(6.3)	2	(4.1)
	20-25 years	6	(12.5)	1	(2.0)
	26-30 years	3	(6.3)	0	(0)
	30+ years	3	(6.3)	0	(0)
Regions worked in**					
	Caprivi	4	(8.3)	1	(2.0)

	Region				
	Erongo	13	(27.1)	15	(30.6)
	Hardap	4	(8.3)	3	(6.1)
	Karas	3	(6.3)	5	(10.2)
	Kavango East	4	(8.3)	8	(16.3)
	Kavango West	0	(0.0)	6	(12.2)
	Khomas	24	(50.0)	19	(38.8)
	Kunene	0	(0.0)	1	(2.0)
	Ohangwena	1	(2.1)	0	(0.0)
	Omaheke	1	(2.1)	0	(0.0)
	Omusati	5	(10.4)	2	(4.1)
	Oshana	9	(18.8)	5	(10.2)
	Oshikoto	3	(6.3)	6	(12.2)
	Otjozondjupa	11	(22.9)	5	(10.2)

* Cuban (1), Nigerian (1), Tanzanian (1)

**Percentages will add up to more than 100%, as multiple regions could have been selected.

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APPENDIX 4: RAW OUTPUT FROM MIXLOGIT MODEL

Pharmacists

```
. mixlogit choice salary, id(respond_id) group (pair) rand(location living child_ed
career scope housing_alwnc housing_house) nrep(500)


Iteration 0:   log likelihood = -292.50119  (not concave)
Iteration 1:   log likelihood = -265.64995  (not concave)
Iteration 2:   log likelihood = -263.59351
Iteration 3:   log likelihood = -253.92597
Iteration 4:   log likelihood = -253.19051
Iteration 5:   log likelihood = -253.18328
Iteration 6:   log likelihood = -253.18327
```

```
Mixed logit model                              Number of obs   =    1106
                                               LR chi2(7)      =   81.42
Log likelihood = -253.18327                    Prob > chi2     = 0.0000
```

choice	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Mean						
salary	.0003518	.0000592	5.94	0.000	.0002357	.0004678
location	.3244308	.2786216	1.16	0.244	-.2216575	**.870519**
living	-.0412851	.1641846	-0.25	0.801	-.363081	.2805108
child_ed	1.82618	.3858082	4.73	0.000	1.07001	2.58235
career	.1783855	.1887735	0.94	0.345	-.1916037	.5483748
scope	1.090039	.2738918	3.98	0.000	.553221	1.626857
housing_al~c	1.044617	.2678501	3.90	0.000	.5196407	1.569594
housing_ho~e	1.336216	.3174029	4.21	0.000	.7141179	1.958314
SD						
location	1.336642	.3737665	3.58	0.000	.6040734	2.069211
living	.0876812	.77554	0.11	0.910	-1.432349	1.607712
child_ed	2.034263	.412661	4.93	0.000	1.225462	2.843064
career	-.5844063	.3135657	-1.86	0.062	-1.198984	.0301712
scope	1.141983	.2940335	3.88	0.000	.5656884	1.718278
housing_al~c	-.0351913	1.157177	-0.03	0.976	-2.303216	2.232834
housing_ho~e	1.110812	.3349262	3.32	0.001	.4543689	1.767256

The sign of the estimated standard deviations is irrelevant: interpret them as
being positive

Pharmacist Assistants

```
. mixlogit choice salary, id(respond_id) group(pair) rand( location living overtime
scope housing_alwnc housing_house cont_ed_3yr cont_ed_5yr) nrep(500)

Iteration 0:   log likelihood = -267.02116  (not concave)
Iteration 1:   log likelihood = -257.15176
Iteration 2:   log likelihood = -253.46226  (not concave)
Iteration 3:   log likelihood = -253.40026
Iteration 4:   log likelihood = -253.22541
Iteration 5:   log likelihood = -253.22101
Iteration 6:   log likelihood = -253.22101

Mixed logit model                               Number of obs   =   1152
                                                LR chi2(8)      =  28.79
Log likelihood = -253.22101                     Prob > chi2     = 0.0003


-------------------------------------------------------------------------------
      choice |    Coef.    Std. Err.     z     P>|z|    [95% Conf. Interval]
-------------+-----------------------------------------------------------------
Mean         |
      salary |  .0004413   .0000939    4.70   0.000    .0002573    .0006252
    location |  .3328417   .2020996    1.65   0.100   -.0632663    .7289496
      living |  .1138057   .1442899    0.79   0.430   -.1689972    .3966086
    overtime |  1.199312   .2167309    5.53   0.000    .7745275    1.624097
       scope |  .0928383   .1372279    0.68   0.499   -.1761235    .3618001
 housing_al~c |   .699202   .2022063    3.46   0.001     .302885    1.095519
 housing_ho~e |  .7772526   .2272568    3.42   0.001    .3318374    1.222668
  cont_ed_3yr |   2.76818   .3859105    7.17   0.000    2.011809     3.52455
  cont_ed_5yr |  2.088773    .293783    7.11   0.000    1.512969    2.664577
-------------+-----------------------------------------------------------------
SD           |
    location |  .9042313    .244167    3.70   0.000    .4256728     1.38279
      living |  .3258911   .3527022    0.92   0.355   -.3653926    1.017175
    overtime |  .8609145   .2457889    3.50   0.000    .3791771    1.342652
       scope |  .1687223   .5263275    0.32   0.749   -.8628607    1.200305
 housing_al~c | -.0266573   .3468379   -0.08   0.939   -.7064471    .6531325
 housing_ho~e |  .5355531   .3977587    1.35   0.178   -.2440397    1.315146
  cont_ed_3yr |  .9725855   .3142078    3.10   0.002    .3567495    1.588422
  cont_ed_5yr |   .066776    .376535    0.18   0.859   -.6712191     .804771
-------------------------------------------------------------------------------
The sign of the estimated standard deviations is irrelevant: interpret them as
being positive
```

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CapacityPlus is the USAID-funded global project uniquely focused on the health workforce needed to achieve the Millennium Development Goals. Placing health workers at the center of every effort, CapacityPlus helps countries achieve significant progress in addressing the health worker crisis while also having global impact through alliances with multilateral organizations.

The Capacity*Plus* Partnership